COG Operating, LLC - Square Bill Federal Com 23H

1. Geologic Formations

TVD of target	12,670' EOL	Pilot hole depth	12,950'
MD at TD:	19,881'	Deepest expected fresh water:	207'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1142	Water	
Top of Salt	1518	Salt	
Base of Salt	5043	Salt	
Lamar	5362	Salt Water	
Bell Canyon	5396	Salt Water	
Cherry Canyon	6382	Oil/Gas	
Brushy Canyon	7948	Oil/Gas	
Bone Spring Lime	9240	Oil/Gas	
U. Avalon Shale	9569	Oil/Gas	
L. Avalon Shale	9569	Oil/Gas	
1st Bone Spring Sand	10385	Oil/Gas	
2nd Bone Spring Sand	10925	Oil/Gas	
3rd Bone Spring Sand	12055	Oil/Gas	
Wolfcamp	12485	Target Oil/Gas	

2. Casing Program

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body
17.5"	0	1170	13.375"	68	J55	STC	3.64	0.78	8.48
12.25"	0	12080	9.625"	47	L80	BTC	1.26	1.22	1.91
8.5"	0	19,881	5.5"	23	P110	BTC	2.10	2.24	2.50
			BLM Minimum Safety Factor				1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Surface burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface and
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Operating, LLC - Square Bill Federal Com 23H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? 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 intermediate 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?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
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.	510	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl2
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter.	1490	10.3	3.6	21.48	16	Tuned Light Blend
	250	16.4	1.08	4.32	8	Tail: Class H
5.5 Prod	130	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	2040	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results
Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1st Intermediate	0'	50%
Production	11,580'	30% OH in Lateral (KOP to EOL) – 40% OH in Vertical

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type
12000	12,950	10	385	17.2	0.98	4	Class H

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?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	3M	Annular	x	3000 psi
			Blind Ram		3M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	5M	Annular	x	50% testing pressure
			Blind Ram	x	5M
			Pipe Ram	x	
			Double Ram		
			Other*		

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.

X	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.
Y	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.

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	9-5/8" Int shoe	Brine Diesel Emulsion	8.4 - 9	28-34	N/C
9-5/8" Int shoe	PHTD	Brine	10	28-34	N/C
9-5/8" Int shoe	Lateral TD	OBM	9.6 - 10.5	35-45	<20

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.	
Y	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.
Y	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
Y	Coring? If yes, explain. Rotary Sidewall cores, depth determined by log runs.

Additional logs planned		Interval
Y	Resistivity	Pilot Hole TD to ICP
Y	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
Y	PEX	Pilot Hole TD to ICP

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	7075 psi at 12670' TVD
Abnormal Temperature	NO 180 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

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.	
N	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

N	Is it a walking operation?
N	Is casing pre-set?

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	**Hobbs**	*Hose Assembly Type*	**Rotary/Vibrator**
MWH Sales Representative	**Ryan Rynolds**	*Certification*	**API 7K/FSL Level 2**
Date Assembled	**11/19/2015**	*Hose Grade*	**D**
Location Assembled	**OKC**	*Hose Working Pressure*	**5000**
Sales Order #	**271739**	*Hose Lot # and Date Code*	**11834 11/14**
Customer Purchase Order #	**302337**	*Hose I.D. (Inches)*	**3.5"**
Assembly Serial # (Pick Ticket #)	**326000**	*Hose O.D. (Inches)*	**4.89"**
Hose Assembly Length	**25'**	*Armor (yes/no)*	No

Fittings			
End A		**End B**	
Stem (Part and Revision #)	**R3.5X64WB**	*Stem (Part and Revision #)*	**R3.5X64WB**
Stem (Heat #)	**A144783**	*Stem (Heat #)*	**A144783**
Ferrule (Part and Revision #)	**RF3.5**	*Ferrule (Part and Revision #)*	**RF3.5**
Ferrule (Heat #)	**J1628**	*Ferrule (Heat #)*	**J1628**
Connection . Flange Hammer Union Part	**4-1/16 5000**	*Connection (Part #)*	**4-1/16 5000**
Connection (Heat #)	**14032501**	*Connection (Heat #)*	**1404H321**
Nut (Part #)	**N/A**	*Nut (Part #)*	**N/A**
Nut (Heat #)	**N/A**	*Nut (Heat #)*	**N/A**
Dies Used	**5.49"**	*Dies Used*	**5.49"**

Hydrostatic Test Requirements		
Test Pressure (psi)	**10,000**	***Hose assembly was tested with ambient water temperature.***
Test Pressure Hold Time (minutes)	**11 1/2**	

Date Tested	*Tested By*	*Approved By*
11/19/2015		

Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **Hobbs**	*Customer P.O.#* **302337**
Sales Order # **271739**	*Date Assembled:* **11/19/2015**

Specifications

Hose Assembly Type:	**Rotary/Vibrator**		
Assembly Serial #	**326000**	*Hose Lot # and Date Code*	**11834 11/14**
Hose Working Pressure (psi)	**5000**	*Test Pressure (psi)*	**10000**

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

Comments:

Approved By	*Date*
Kim Thomas	11/19/2015

Midwest Hose & Specialty, Inc.

Internal Hydrostatic Test Graph

November 19, 2015

Customer: Hobbs

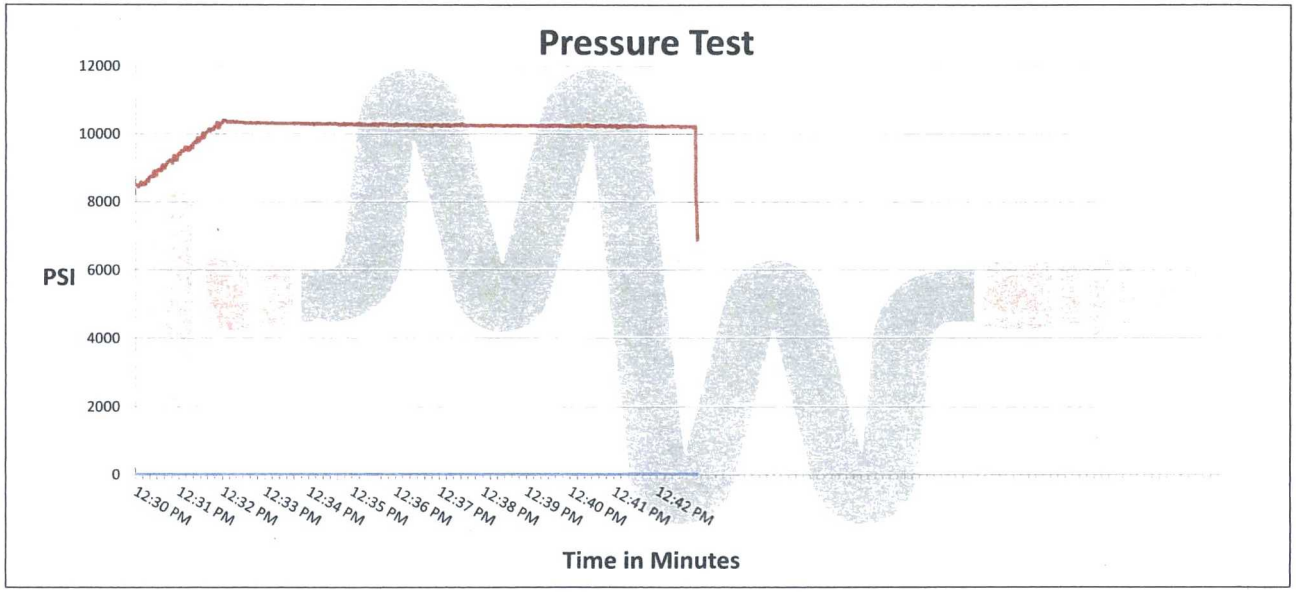
Pick Ticket #: 326000

Hose Specifications

Hose Type	Length
D	25'
I.D.	**O.D.**
3.5"	4.89"
Working Pressure	**Burst Pressure**
5000 PSI	Standard Safety Multiplier Applies

Verification

Type of Fitting	Coupling Method
4 1/16 5K	Swage
Die Size	**Final O.D.**
5.49"	5.50"
Hose Serial #	**Hose Assembly Serial #**
11834	326000



Test Pressure	Time Held at Test Pressure	Actual Burst Pressure	Peak Pressure
10000 PSI	11 2/4 Minutes		10473 PSI

Comments: Hose assembly pressure tested with water at ambient temperature.

Tested By: *James Hawkins*

Approved By: *Kim Thomas*

x _____

x _____

Midwest Hose & Specialty, Inc.

Hose Assembly & Test Report

General Information		Hose Specifications	
Customer	Hobbs	Hose Assembly Type	Choke & Kill
Date Assembled	6-26-14	Certification	API 7K
Location Assembled	OKC	Hose Grade	D
Sales Order #	216797	Hose Working Pressure	5,000
Customer Purchase Order #	237512	Hose Lot #	8309
Hose Assembly Serial #	260212	Hose Date Code	04/12
Pick Ticket Line Item	0010	Hose I.D. (Inches)	3.5 inches
Hose Assembly Length (Feet and Inches)	50 feet	Hose O.D. (Inches)	5.45
Contact Information Phone #		Armor (yes/no)	yes

Fittings			
End A		End B	
Stem (Part and Revision #)	R3.5X64WB	Stem (Part and Revision #)	R3.5X64WB
Stem (Heat #)	1311405022.5	Stem (Heat #)	13114050225
Stem (Rockwell Hardness HRB #)	—	Stem (Rockwell Hardness HRB #)	—
Ferrule (Part and Revision #)	RF3.5	Ferrule (Part and Revision #)	RF3.5
Ferrule (Heat #)	126151	Ferrule (Heat #)	372114
Ferrule (Rockwell Hardness HRB #)	—	Ferrule (Rockwell Hardness HRB #)	—
Connection (Part #)	4 1/16 5K	Connection (Part #)	4 1/16 5K
Connection (Heat #)	U3360	Connection (Heat #)	U3360
Connection (Brinell Hardness HB #)	—	Connection (Brinell Hardness HB #)	—
Stress Relief #	17614	Stress Relief #	17614
Welding #	MKR	Welding #	MKR
X-ray #	—	X-ray #	—

Assembly Information			
End A		End B	
Skive O.D. (Inches)	5.04	Skive O.D. (Inches)	4.92
Swager Dies (1st pass)	5.62	Swager Dies (1st pass)	5.53
Swager Dies (2nd pass)	—	Swager Dies (2nd pass)	—
Final Swage O.D. (Inches)	5.64	Final Swage O.D. (Inches)	5.48
Compression % (See Crimp Calculator)	24%	Compression % (See Crimp Calculator)	22%
Swaged By	Charles Ash		

Hydrostatic Test Requirements			
Test Pressure (psi)	10,000	Hold Time (minutes)	13 1/4
Tested By	Charles Ash	Date Tested	6-26-14

This is to certify that the above Hose Assembly has been satisfactorily tested in accordance with MHSI procedure 8.2.4.2

Final Verification					
[illegible]	(Yes)	No	Hammer Unions	Yes	(No)
[illegible]	(Yes)	No	Safety Clamps	Yes	(No)
[illegible] Third Party Witness	(No)		Customer or Third Party Witnessed By:		

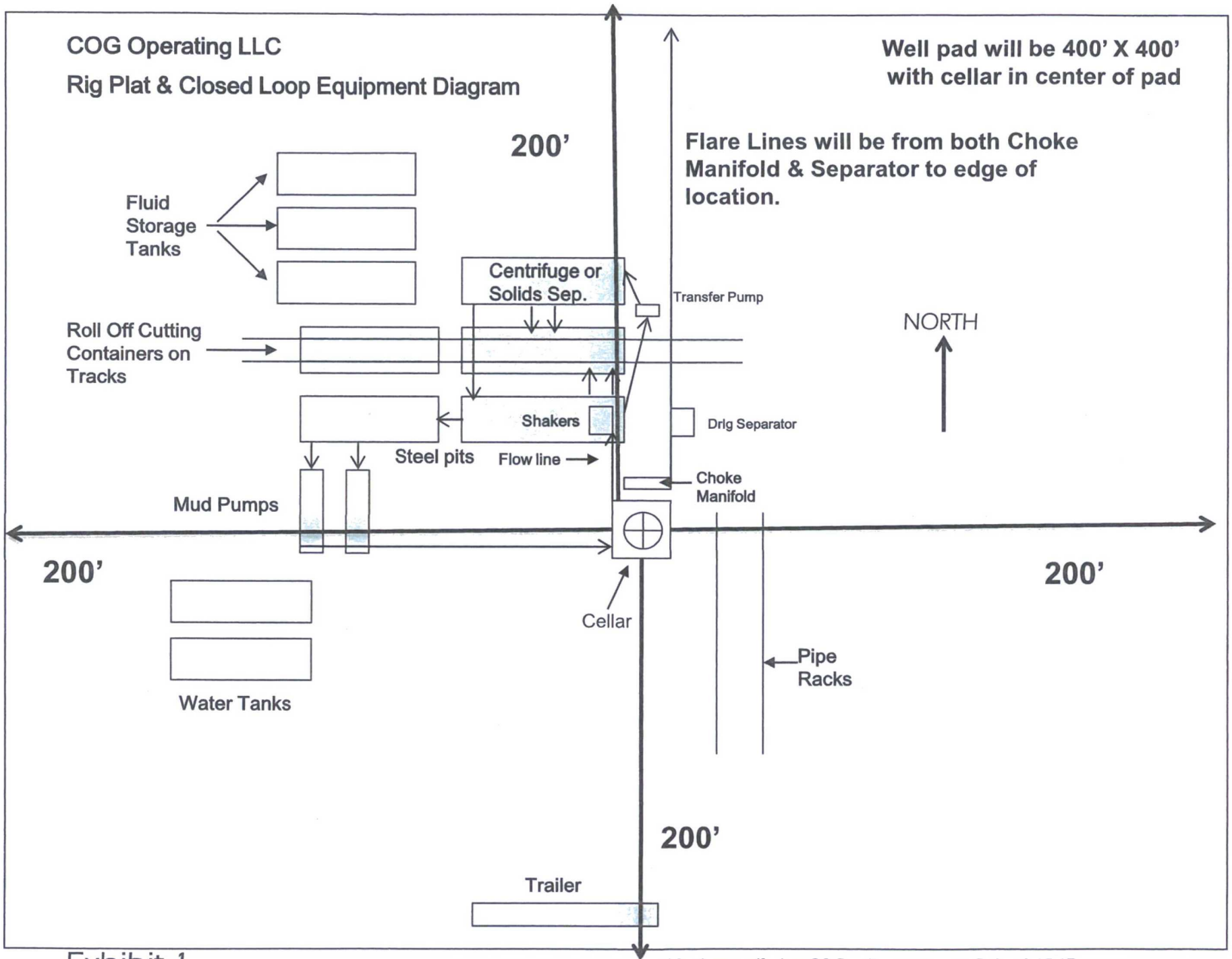


Exhibit 1

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

OPERATOR CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 27th day of MARCH, 2017.

Signed: Mayte Reyes

Printed Name: Mayte Reyes
Position: Regulatory Analyst
Address: 2208 W. Main Street, Artesia, NM 88210
Telephone: (575) 748-6945
E-mail: mreyes1@concho.com
Field Representative (if not above signatory): Rand French
Telephone: (575) 748-6940. E-mail: rfrench@concho.com

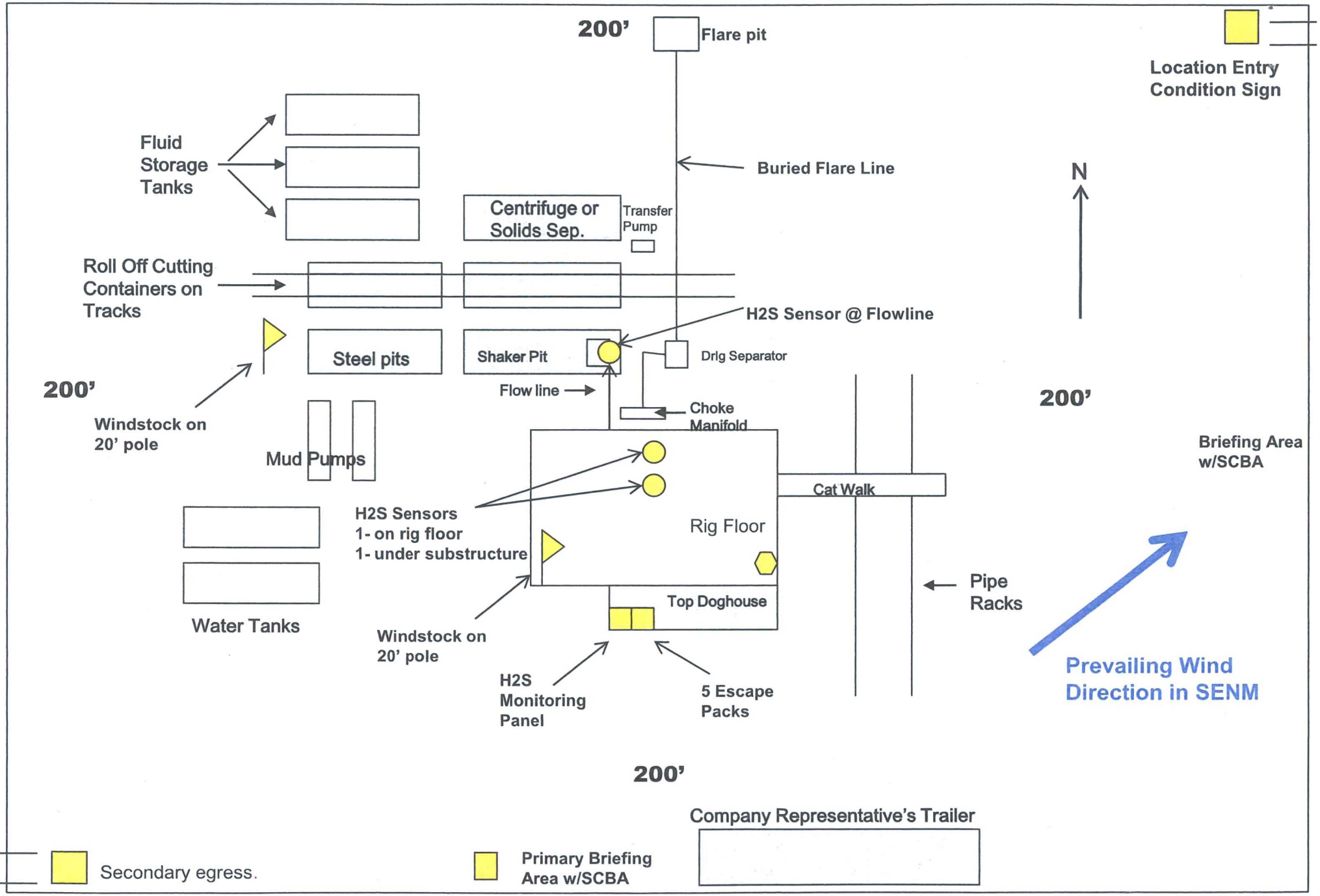
Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body
	From	To							
17.5"	0	1170	13.375"	68	J55	STC	3.64	0.78	8.48
12.25"	0	12080	9.625"	47	L80	BTC	1.26	1.22	1.91
8.5"	0	19,881	5.5"	23	P110	BTC	2.10	2.24	2.50
			BLM Minimum Safety Factor				1.125	1	1.6 Dry 1.8 Wet

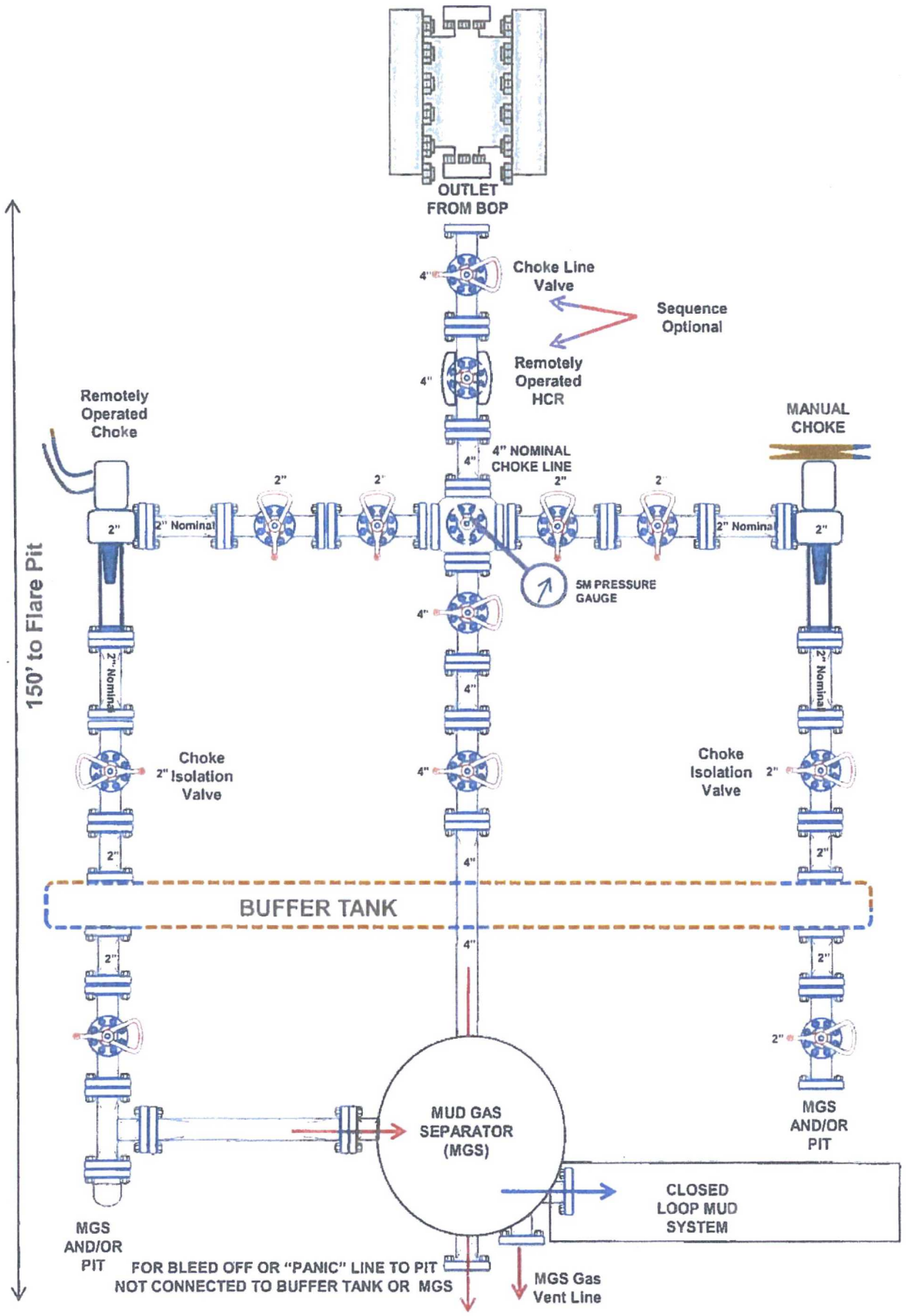
Intermediate casing will be kept at least 1/3 full while running casing.to mitigate collapse. Surface burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface and
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

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

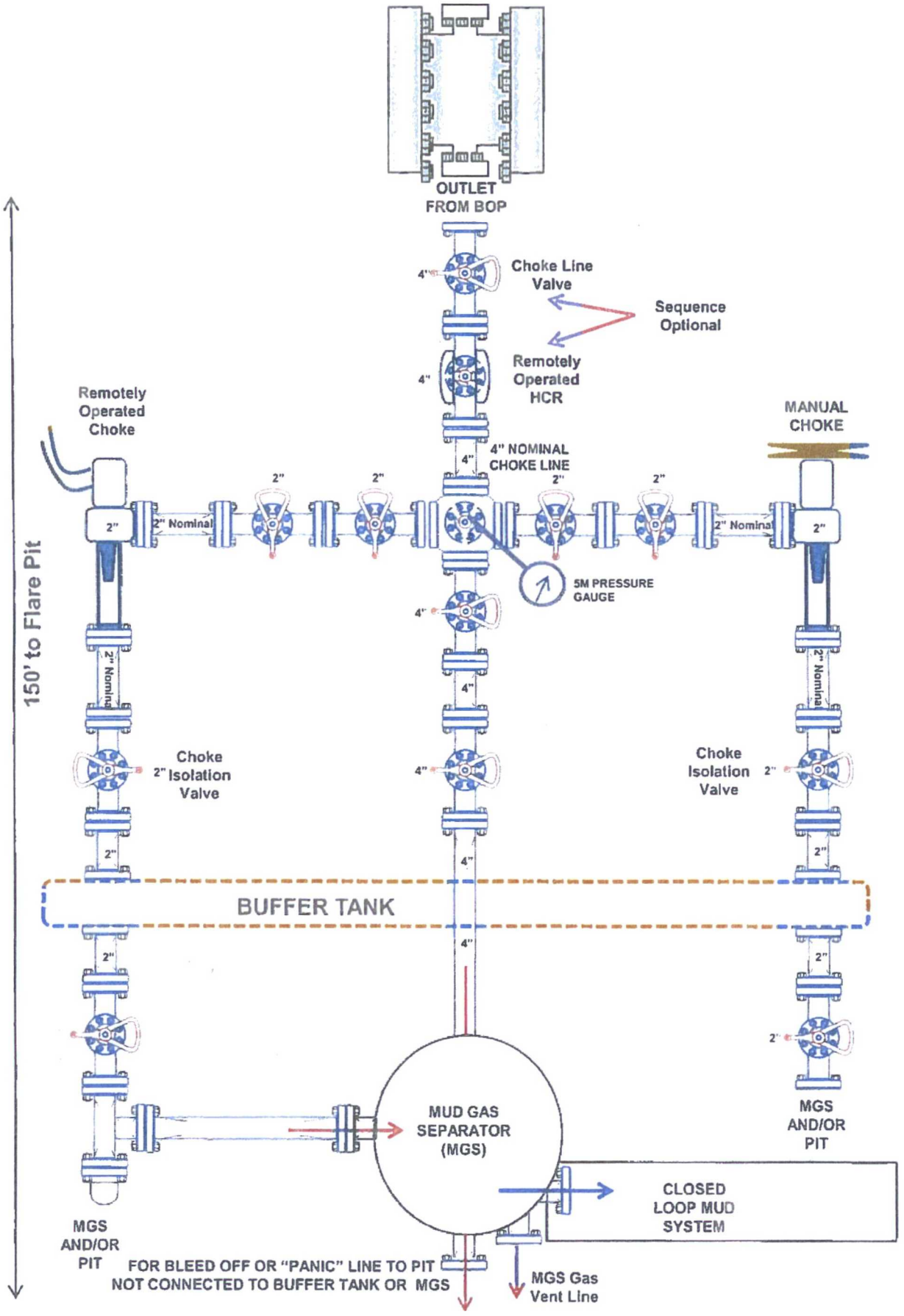
Well pad will be 400' x 400' with cellar in center of pad



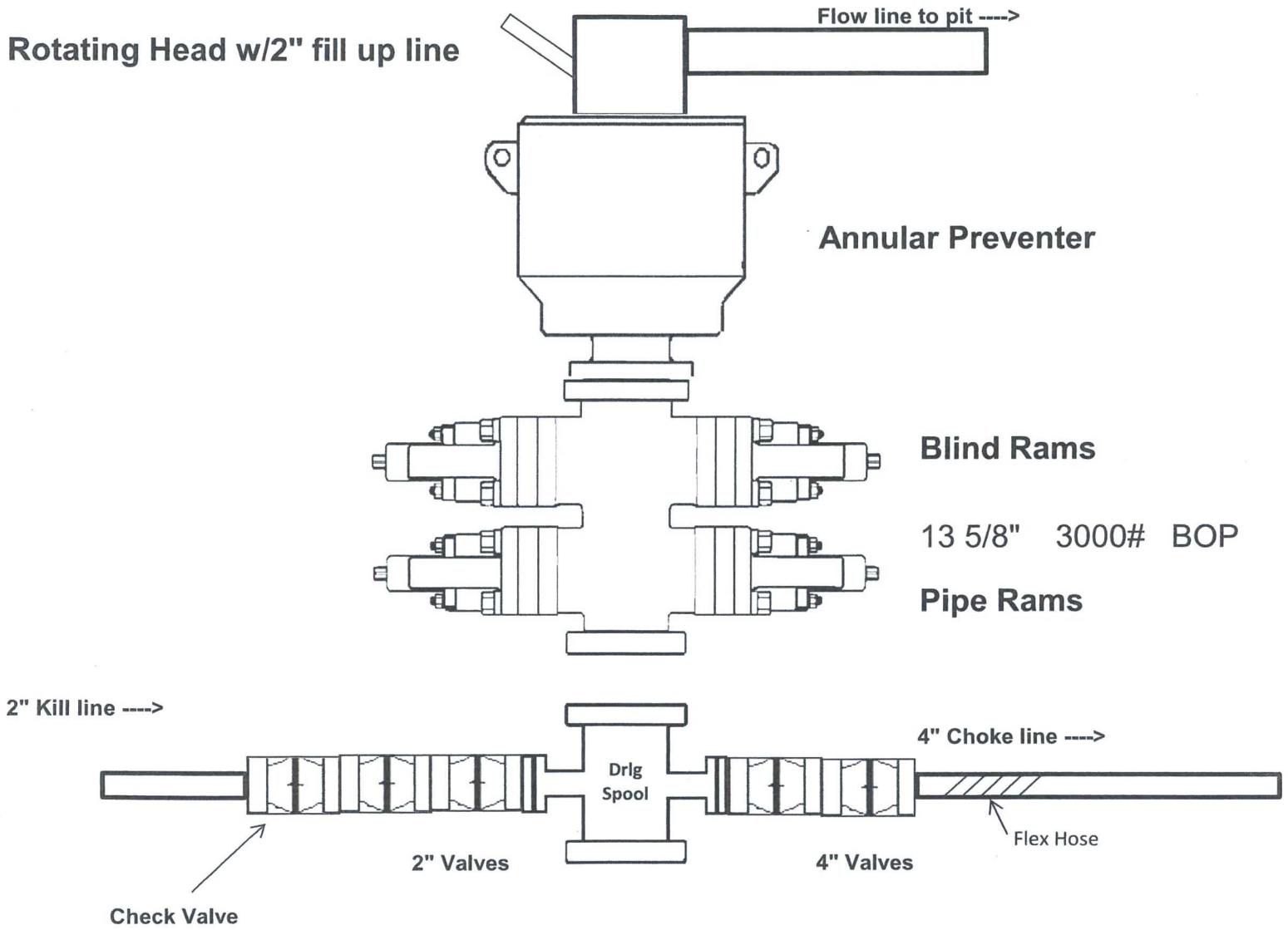
3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



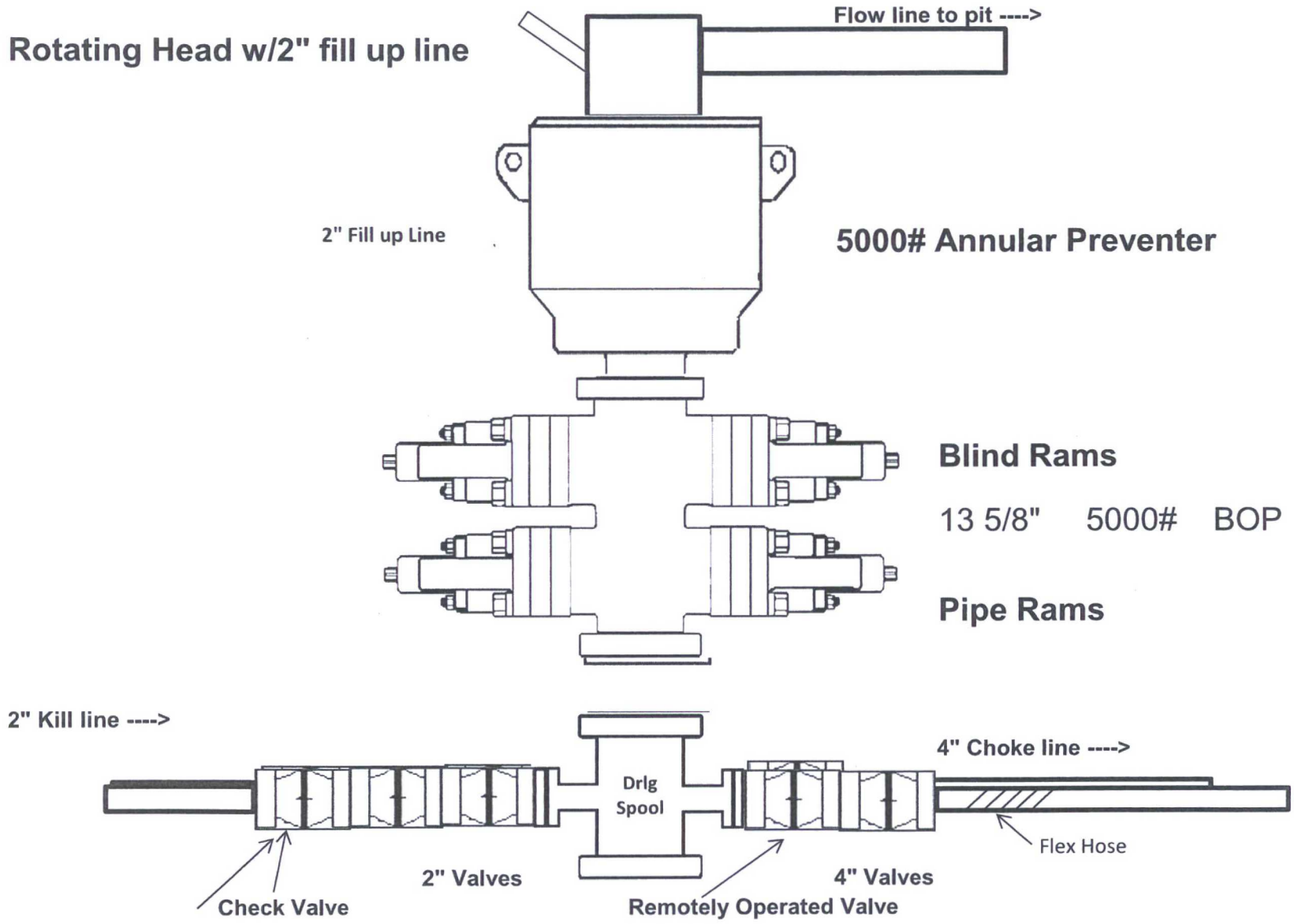
5M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



3,000 psi BOP Schematic

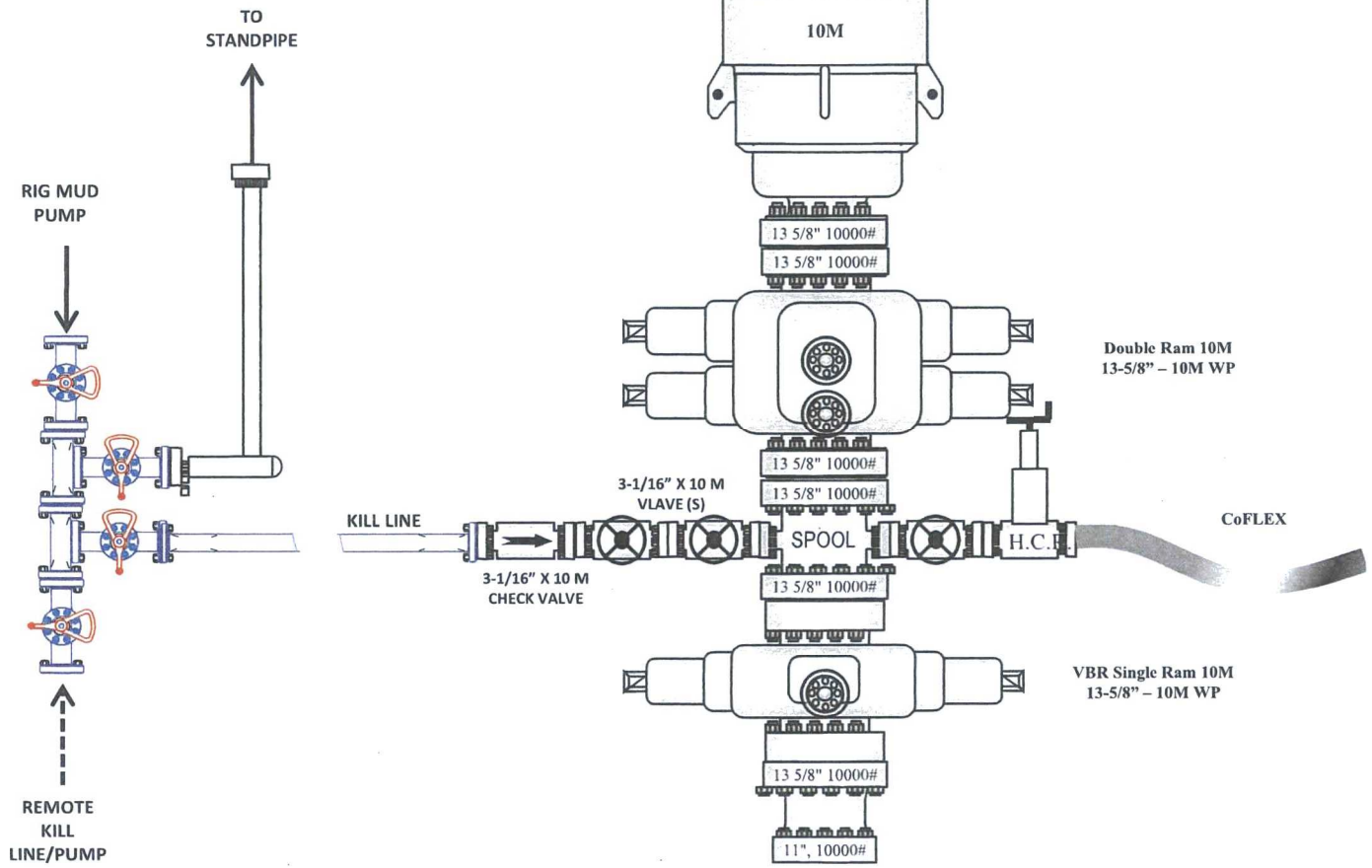


5,000 psi BOP Schematic



10M BOP Stack

10M REMOTE KILL SCHEMATIC



10M BOP Stack
(10M Annular)

10M CHOKE MANIFOLD CONFIGURATION