Form 3160-3
(March 2012)

OCD – HOBBS
11/30/2016
RECEIVED

OCD Hobbs

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMLC0029519A

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. [315664]: Mas Federal #4H

2. Name of Operator: COG Operating LLC. [229137]

9. API Well No.: 30-025-43482

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

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

10. Field and Pool, or Exploratory: BERRY;BONE SPRING, NORTH [5535]
~~East Bone Spring~~

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface: 190' FNL & 2440' FWL Unit Letter C (NENW) Sec. 34.T20S.R34E SHL

At proposed prod. Zone: 200' FSL & 1980' FWL Unit Letter N (SESW) Sec 34.T20S.R34E BHL

11. Sec., T.R.M. or Blk and Survey or Area: Sec. 34 - T20S - R34E

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

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): 190'

16. No. of acres in lease: 520

17. Spacing Unit dedicated to this well: 160

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.: SHL: 530' BHL: 1398'

19. Proposed Depth: TVD: 11,334' MD: 16,036'

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3719.5' GL

22. Approximate date work will start*: 11/1/2016

23. Estimated duration: 30 days

24. Attachments

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

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

25. Signature: Mayte Reyes | Name *(Printed/Typed)*: Mayte Reyes | Date: 9-15-16

Title: Regulatory Analyst

Approved by *(Signature)*: /S/ Ty Bryson | Name *(Printed/Typed)*: | Date: NOV 30 2016

Title: Acting FIELD MANAGER | Office: CARLSBAD FIELD OFFICE

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

APPROVAL FOR TWO YEARS

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

(Continued on page 2)

*(Instructions on page 2)

Carlsbad Basin

KZ 11/30/2016

SEE ATTACHED FOR CONDITIONS OF APPROVAL

Approval Subject to General Requirements & Special Stipulations Attached

COG Operating, LLC - Mas Federal #4H

1. Geologic Formations

TVD of target	11,334' EOL	Pilot hole depth	NA
MD at TD:	16,036'	Deepest expected fresh water:	1,349'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1652	Water	
Top of Salt	1735	Salt	
Base of Salt	3356	Salt	
Yates	3522	Salt Water	
Capitan Reef	3753	Salt Water	
Base of Reef/ CYCN	5751	Oil/Gas	
Brushy Canyon	6927	Oil/Gas	
Bone Spring Lime	8587	Oil/Gas	
U. Avalon Shale	8689	Oil/Gas	
L. Avalon Shale	9056	Oil/Gas	
1st Bone Spring Sand	9714	Oil/Gas	
2nd Bone Spring Sand	10292	Oil/Gas	
3rd Bone Spring Sand	11120	Target Oil/Gas	
Wolfcamp	11284	Not Penetrated	

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	1730	13.375"	54.5	J55	STC	1.43	4.49	5.45
12.25"	0	4000	9.625"	40	J55	LTC	1.42	1.98	3.25
12.25"	4000	~~6955~~ 5280'	9.625"	40	L80	LTC	1.14	2.13	2.00
8.75"	0	16,036	5.5"	17	P110	LTC	1.35	2.41	2.31
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

SEE COA

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

	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?	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?	Y
If yes, are the first three strings cemented to surface?	Y
Is 2nd string set 100' to 600' below the base of salt?	N
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.	2310	12.7	2.0	9.6	16	Lead: 35:65:6 C Blend
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
Inter., Stage 1	~~60~~ 380	12.7	1.98	10.6	16	Lead: 35:65:6 C Blend
	200	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
DV/ECP @ 3640						
Inter., Stage 2	640	12.7	2.0	10.6	16	Lead: Class C + 4% Gel + 1% CaCl2
	200	14.8	1.35	6.34	8	Tail: Class C + 2% CaCl
5.5 Prod	1050	11	3.2	19.66	72	Lead: Halliburton NEOCEM + 1 lb/sk kol-seal
	1400	13.2	1.5	7.5	8	Tail: Halliburton NEOCEM TM

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	0'	35% OH in Lateral (KOP to EOL) – 40% OH in Vertical

4. Pressure Control Equipment — SSG COA

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"	2M	Annular	x	2000 psi
			Blind Ram		2M
			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.

SSG COA 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 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.

5. Mud Program → SEE COA

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	Saturated Brine	8.3 - 8.7	28-34	N/C
9-5/8" Int shoe	Lateral TD	Cut Brine	8.6 - 9.4	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 → SEE COA

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.
N	Coring? If yes, explain.

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

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	5545 psi at 11334' TVD
Abnormal Temperature	NO 170 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.

SEE COA

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

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.	
N	H2S is present → H_2S might be present
Y	H2S Plan attached

8. Other Facets of Operation

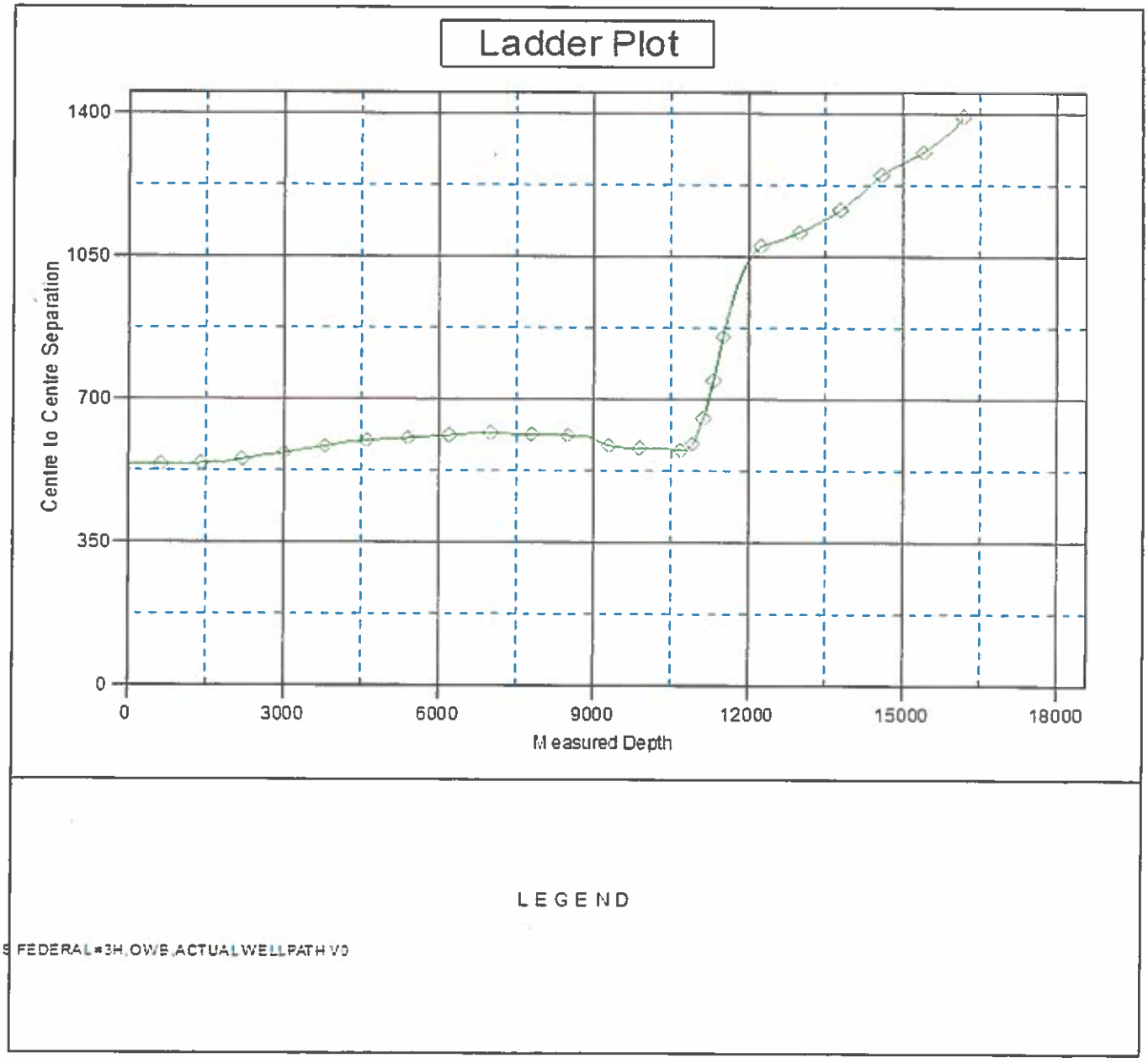
N	Is it a walking operation?
N	Is casing pre-set?

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well MAS FEDERAL #4H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3719.5+20 @ 3729.5usft (PATRIOT 2)
Reference Site:	DEEP BSS	**MD Reference:**	RKB=3719.5+20 @ 3729.5usft (PATRIOT 2)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	MAS FEDERAL #4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB=3719.5+20 @ 3729.5usft (PATR
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: MAS FEDERAL #4H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.42°

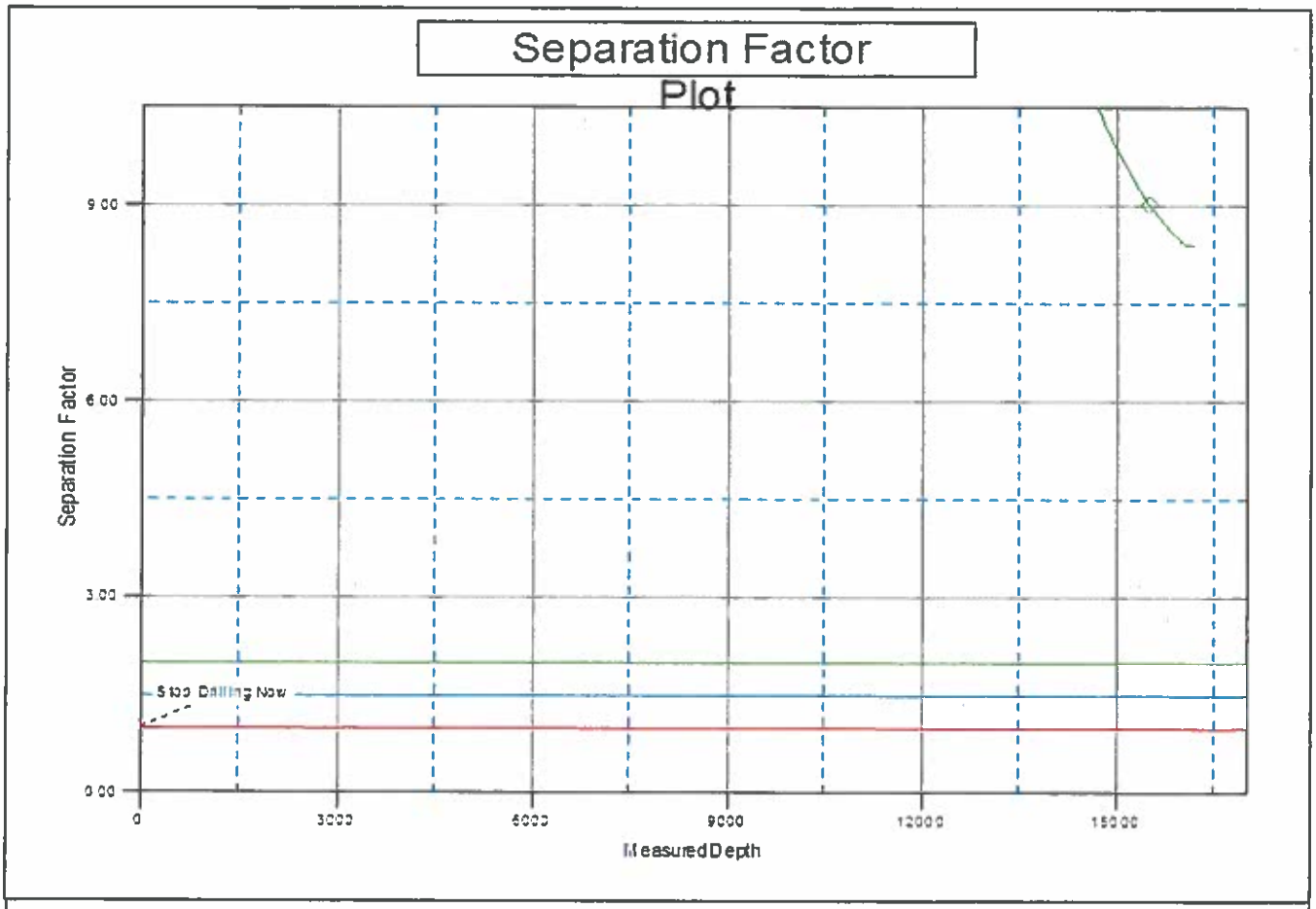


COG Operating LLC
Anticollision Report

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well MAS FEDERAL #4H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3719.5+20 @ 3729.5usft (PATRIOT 2)
Reference Site:	DEEP BSS	**MD Reference:**	RKB=3719.5+20 @ 3729.5usft (PATRIOT 2)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	MAS FEDERAL #4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB=3719.5+20 @ 3729.5usft (PATR
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: MAS FEDERAL #4H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.42°



LEGEND

AS FEDERAL #3H, OWB, ACTUAL WELLPATH V0

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

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00654			LE		4	4	12	20S	34E	640103	3605947*	60		
CP 00655			LE		3	1	14	20S	34E	637294	3605108*	210		
CP 00656			LE	4	4	4	04	20S	34E	635342	3607391*	225		
CP 00657			LE		3	3	17	20S	34E	632465	3604239*	165		
CP 00665			LE		1	4	24	20S	34E	639740	3603128*	698	270	428
CP 00750			LE		3	4	07	20S	34E	631639	3605834*	320		
CP 00799			LE	4	3	4	34	20S	34E	636666	3599364*	100		
CP 00800			LE	2	2	2	22	20S	34E	637007	3603994*	220		
CP 01204 POD1			LE	3	1	1	25	20S	34E	638755	3602250	370		
CP 01288 POD1			LE	4	4	2	34	20S	34E	637134	3600204	1255	757	498
CP 01289 POD1			LE	4	4	2	34	20S	34E	637037	3600261	1222	651	571
CP 01330 POD1			LE	3	2	1	34	20S	34E	636197	3600483	1349	683	666
CP 01334 POD1			LE	3	2	4	35	20S	34E	638402	3599879	1253	732	521
CP 01335 POD1			LE	4	1	4	35	20S	34E	638205	3599736	1307	735	572
CP 01352 POD1			LE	3	1	4	34	20S	34E	636559	3599716	1254	785	469

Average Depth to Water: **659 feet**

Minimum Depth: **270 feet**

Maximum Depth: **785 feet**

Record Count: 15

PLSS Search:

Township: 20S **Range:** 34E

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

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

(A CLW###### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 00799		LE	4	3	4	34	20S	34E	636666	3599364*	100		
CP 01288 POD1		LE	4	4	2	34	20S	34E	637134	3600204	1255	757	498
CP 01289 POD1		LE	4	4	2	34	20S	34E	637037	3600261	1252	1026	226
CP 01330 POD1		LE	3	2	1	34	20S	34E	636197	3600483	1349	683	666
CP 01352 POD1		LE	3	1	4	34	20S	34E	636559	3599716	1270	785	485
CP 01389 POD1		LE	1	1	1	34	20S	34E	635726	3600733	1250	1005	245

Average Depth to Water: **851 feet**

Minimum Depth: **683 feet**

Maximum Depth: **1026 feet**

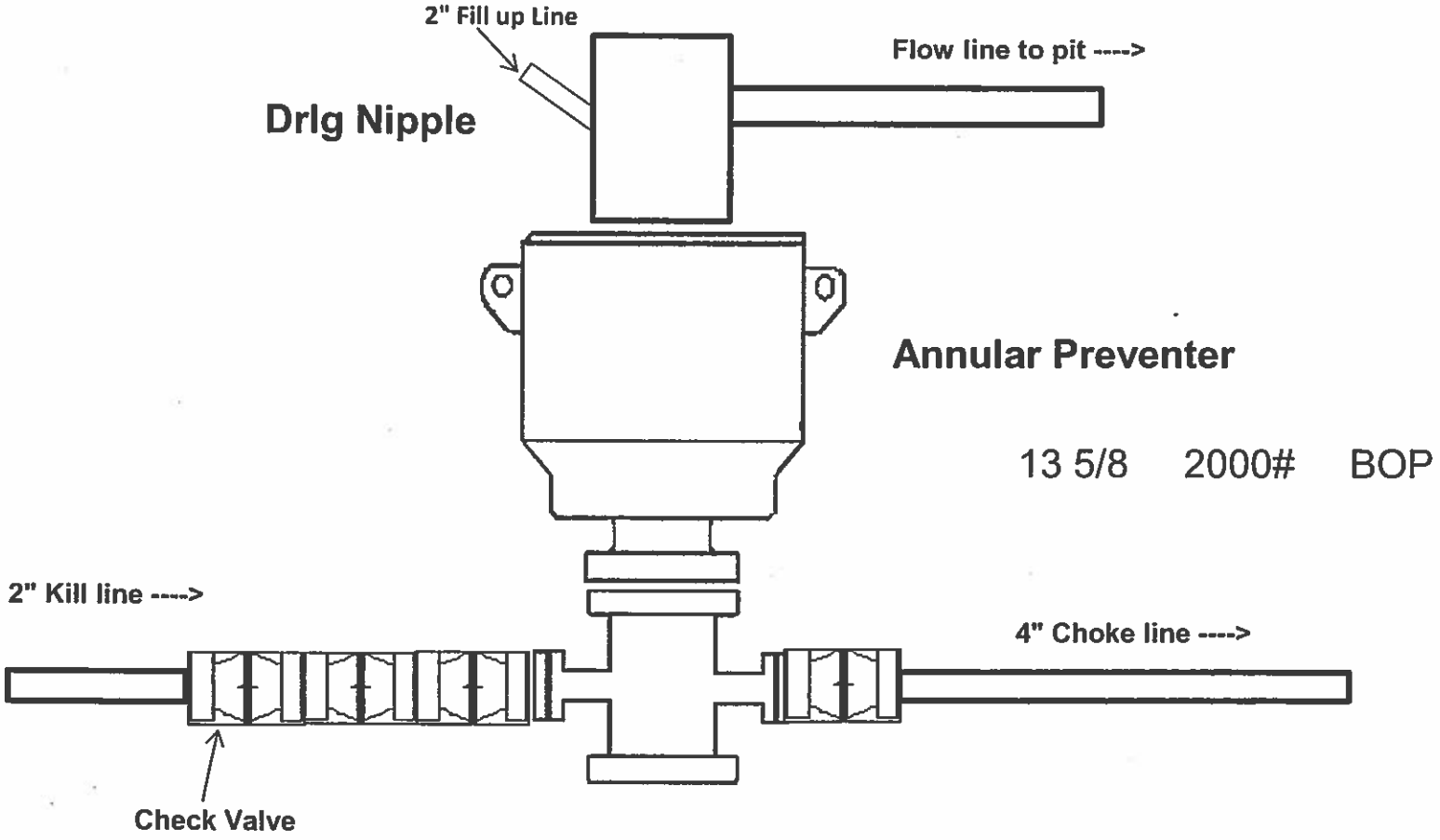
Record Count: 6

PLSS Search:

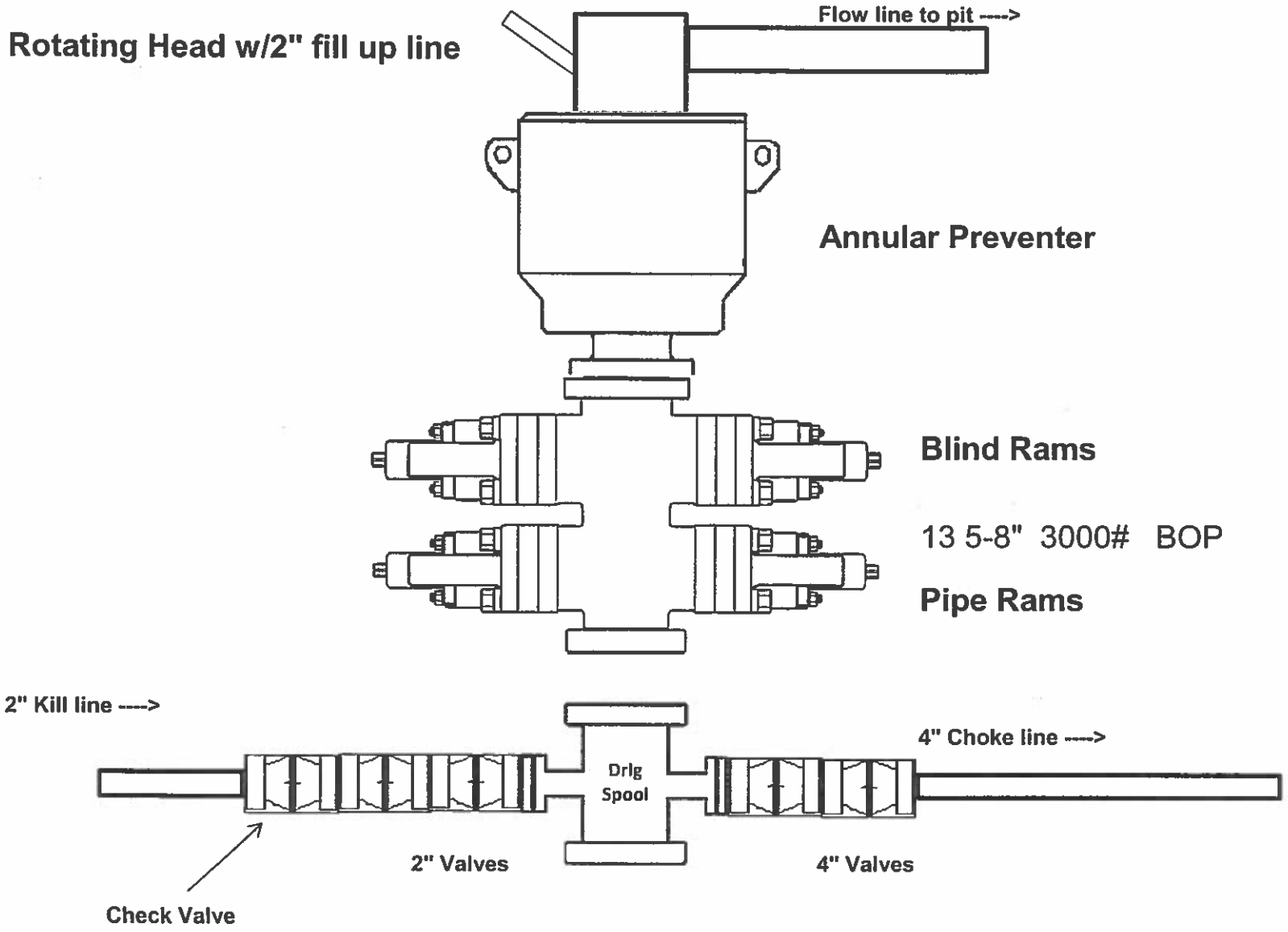
Section(s): 34 **Township:** 20S **Range:** 34E

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

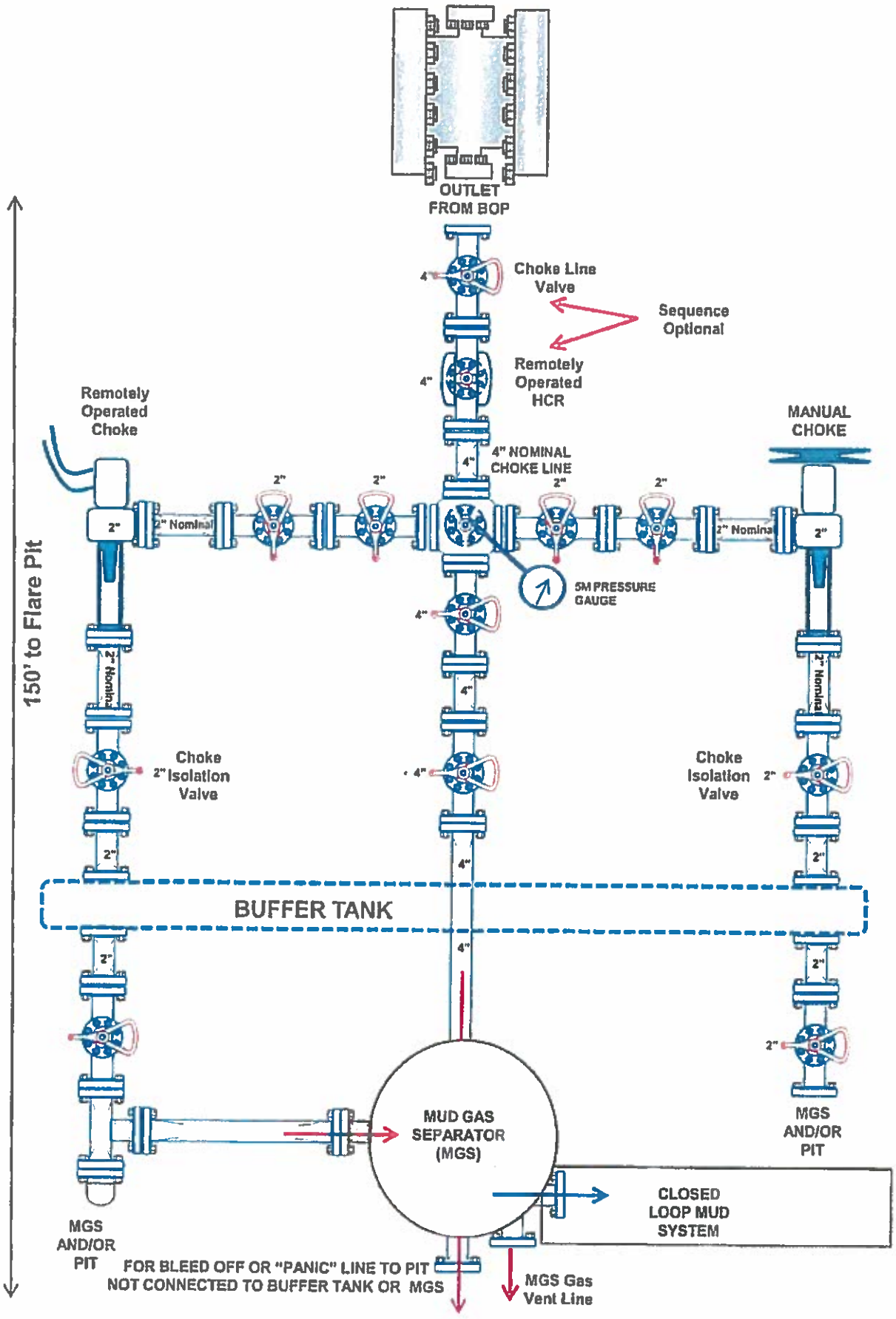
2,000 psi BOP Schematic



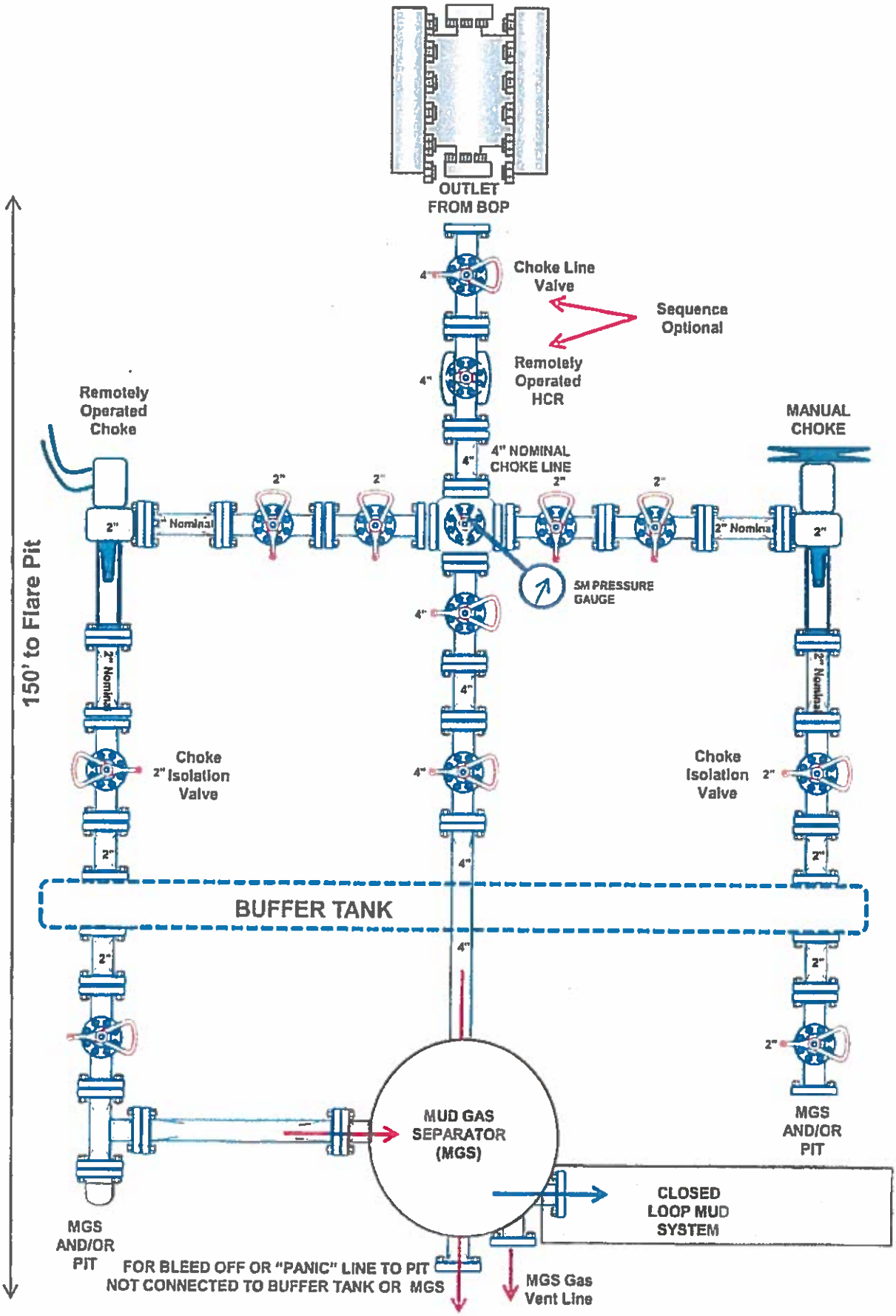
3,000 psi BOP Schematic



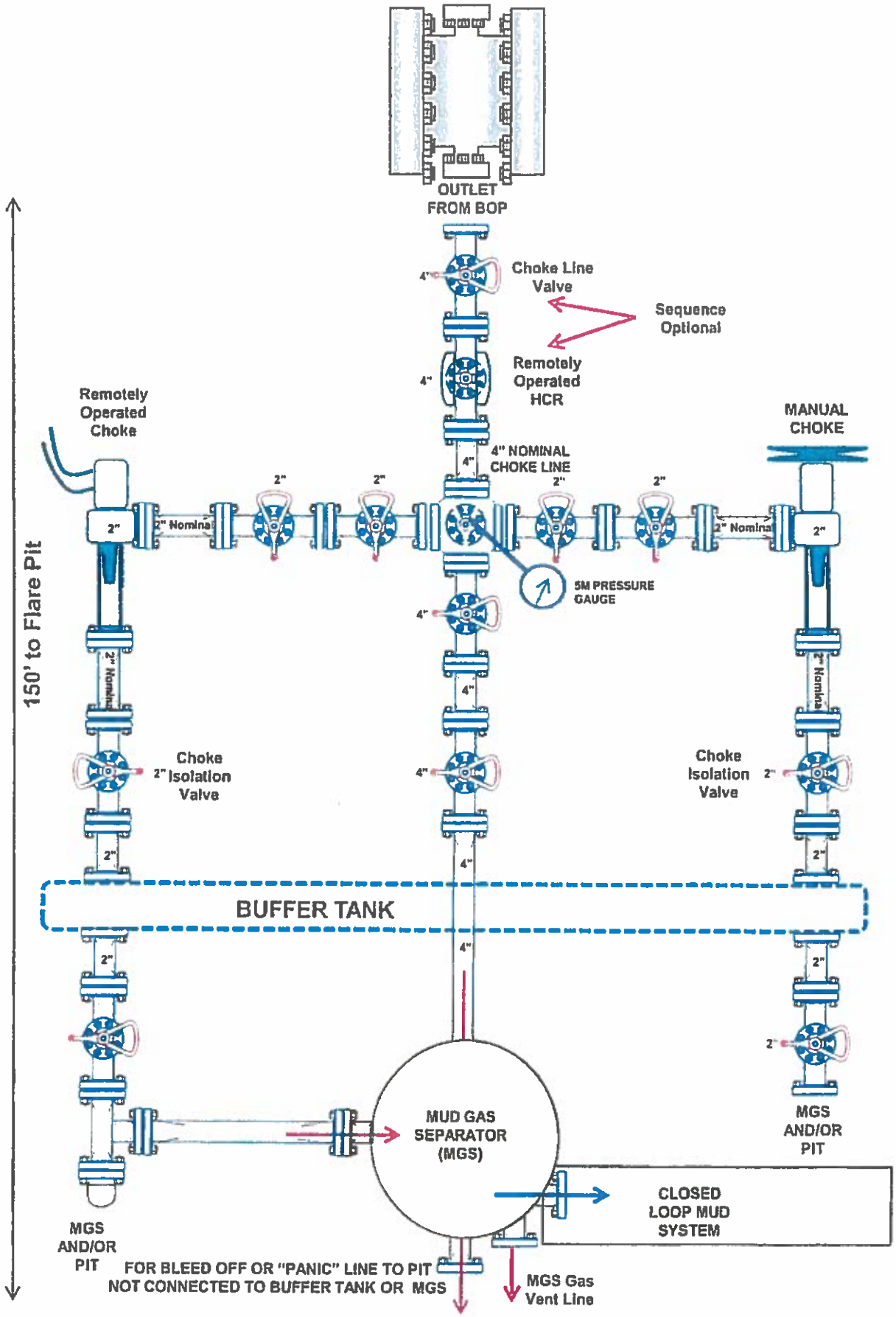
2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



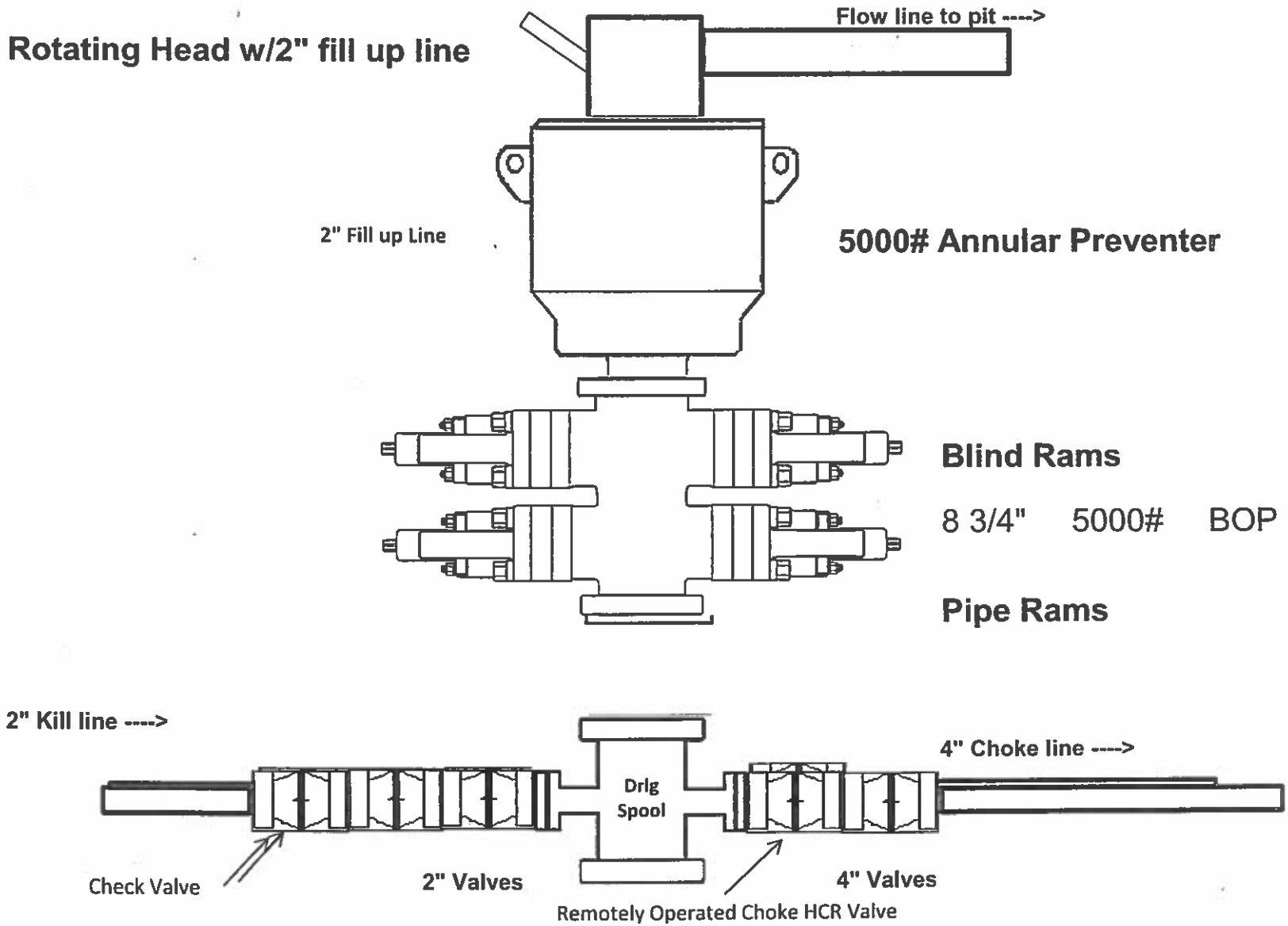
3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



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



5,000 psi BOP Schematic



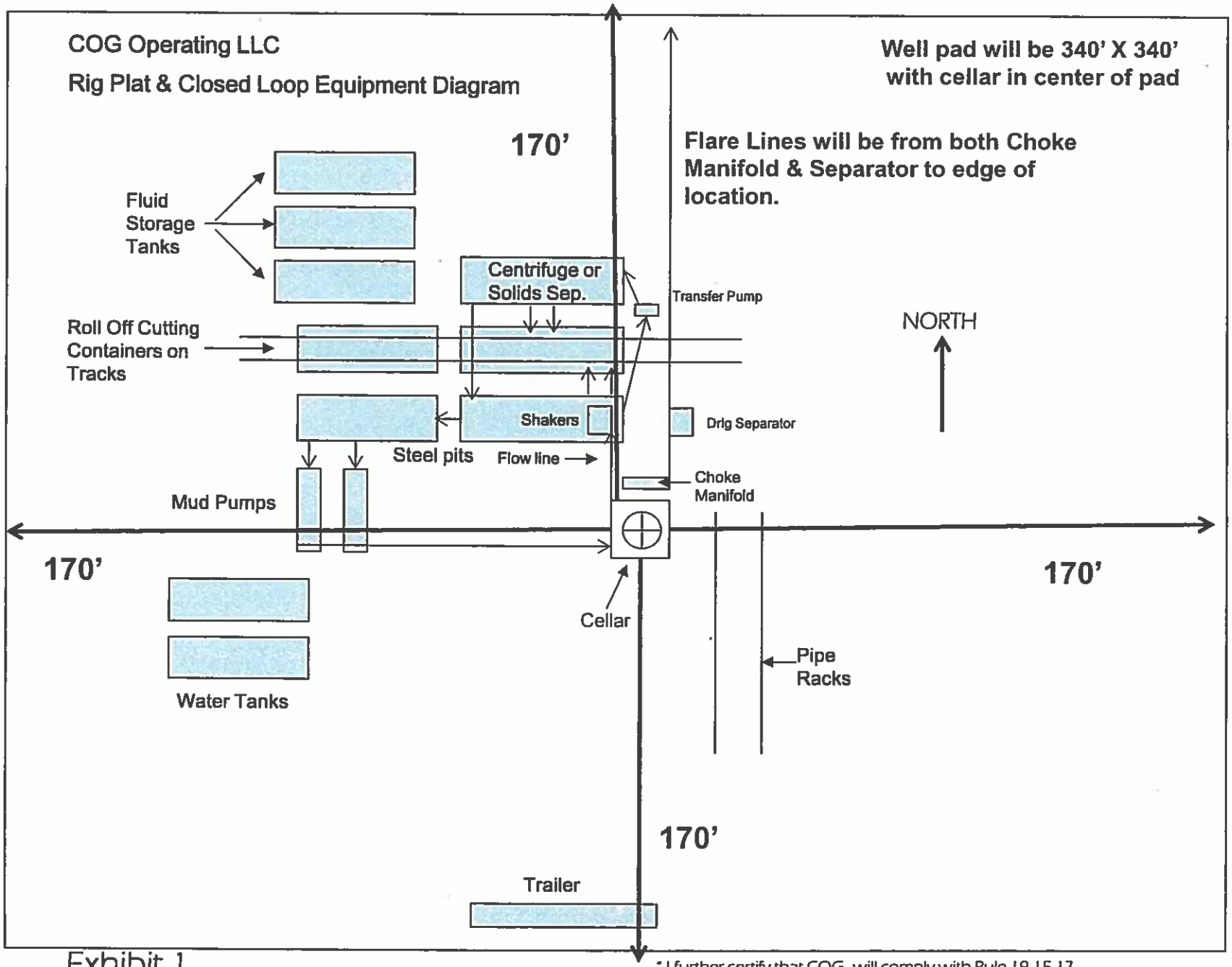


Exhibit 1

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

CONCHO

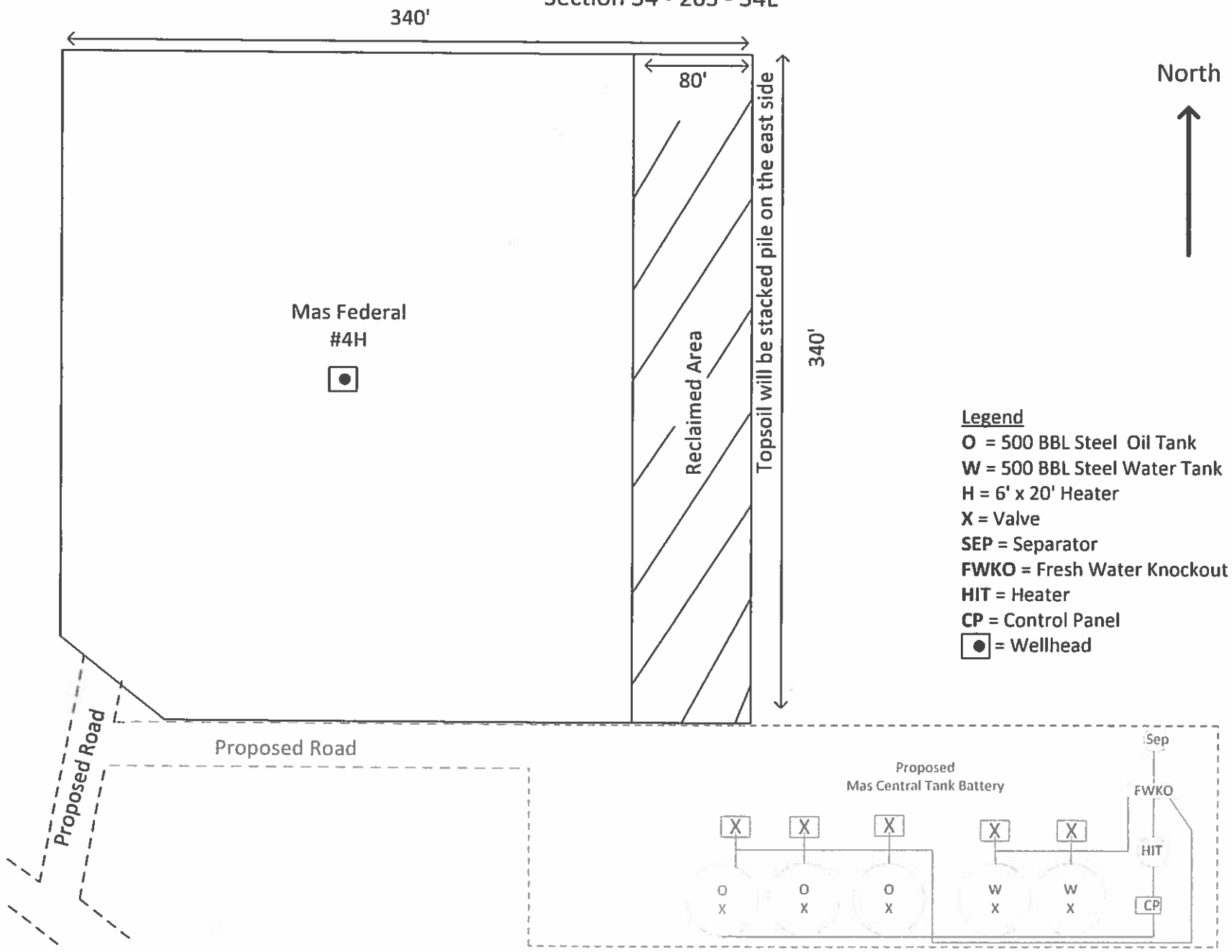
COG Operating LLC
2208 West Main Street
Artesia, NM 88210

Well Site Layout

Production Facility Layout

Mas Federal #4H
Section 34 - 20S - 34E

Exhibit 3



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

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