

OCD Hobbs
HOBBS OCD

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AUG 25 2014

AUG 25 2014

ATS-14-744

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

1a. Type of Work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM111965
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator COG Operating LLC.		7. If Unit or CA Agreement, Name and No.
3a. Address 2208 West Main Street Artesia, NM 88210		8. Lease Name and Well No. <313618> Mastiff Federal #3H
3b. Phone No. (include area code) 575-748-6940		9. API Well No. 30-025-42064
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface 190' FNL & 1980' FWL Lot #3 (NENW) SHL Sec. 4 - T24S - R32E At proposed prod. Zone 330' FSL & 1980' FWL Unit Letter N (SESW) BHL Sec. 4 - T24S - R32E		10. Field and Pool, or Exploratory Mesa Verde; Bone Spring
14. Distance in miles and direction from nearest town or post office* Aproximately 22 miles from Malaga		11. Sec., T.R.M. or Blk and Survey or Area Sec. 4 - T24S - R32E
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 638.48	17. Spacing Unit dedicated to this well 159.56
18. Distance from location* to nearest well, drilling, completed, SHL: 1320' (Proposed Mastiff #2H) applied for, on this lease, ft. BHL: 2661'	19. Proposed Depth TVD: 10,605' MD: 15,149' ✓ PH: 12,175'	20. BLM/BIA Bond No. on file NMB000740 & NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3664.3 GL	22. Approximate date work will start* 6/1/2014	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. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan | 5. Operator certification |
| 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). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature <i>Mayte Reyes</i>	Name (Printed/Typed) Mayte Reyes	Date 4-30-14
Title Regulatory Analyst		
Approved by (Signature) Steve Caffey	Name (Printed/Typed)	Date AUG 14 2014 ✓
Title 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 thereon.

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 Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations Attached

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

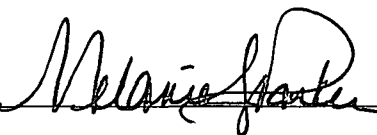
AUG 26 2014

Surface Use Plan
COG Operating LLC
Mastiff Federal #3H
SHL: 190' FNL & 1980' FWL Lot #3
Section 4, T24S, R32E
BHL: 330' FSL & 1980' FWL UL N
Section 4, T24S, R32E
Lea County, New Mexico

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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 30th day of April, 2014.

Signed: 

Printed Name: Melanie J. Parker

Position: Regulatory Coordinator

Address: 2208 W. Main Street, Artesia, NM 88210

Telephone: (575) 748-6940

Field Representative (if not above signatory): Rand French

E-mail: mparker@concho.com

COG Operating LLC
DRILLING AND OPERATIONS PROGRAM

Mastiff Federal 3H
SHL: 190' FNL & 1980' FWL
BHL: 330' FSL & 1980' FWL
Section 4, T24S, R32E
Lea County, New Mexico

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In conjunction with Form 3160-3, Application for Permit to Drill subject well, COG Operating LLC submits the following eleven items of pertinent information in accordance with BLM requirements.

1. Geological surface formation: Permian
2. The estimated tops of geologic markers & estimated depths at which anticipated water, oil or gas formations are expected to be encountered are as follows:

Fresh Water	380	
Rustler	1085'	
Salado	1576'	
Fletcher	4515'	
Delaware (Lamar)	4827'	Oil
Bell Canyon	4868'	Oil
Cherry Canyon	5737'	Oil
Brushy Canyon	7047'	Oil
Bone Spring	8646'	Oil
Upper Avalon Shale	8935'	Oil
Lower Avalon Shale	9202'	Oil
1 st Bone Spring Sand	9803'	Oil
2 nd Bone Spring Sand	10417'	Oil
3 rd Bone Spring Sand	11711'	Oil
Wolfcamp	12,022'	Oil/Gas
Pilot Hole TD	12,175'	
Lateral TD MD	15,149'	
Lateral TD TVD	10,605'	

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 ^{1240'}~~1100'~~ and circulating cement back to surface.

The salt sections will be isolated by setting 9-5/8" casing at 4850' and circulating cement back to surface.

Other intervals will be isolated by setting 5 1/2" casing to total depth and circulating cement back to surface.

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

See COA

Hole Size	Depths	Section	OD Casing	New/Used	Wt	Collar	Grade	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0' - 1100' ^{1240'}	Surface	13 3/8"	New	54.5#	STC	J-55	1.125	1.125	1.6
12 1/4"	0' - 4850'	Intrmd	9 5/8"	New	40#	LTC	J-55	1.125	1.125	1.6
8 3/4"	0' - 15,149'	Prod, Vert, Curve & Lateral	5 1/2"	New	17#	LTC	P-110	1.125	1.125	1.6
8 3/4"	0' - 12,175'	Pilot Hole								

- 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.
- Will run one centralizer every other joint in lateral section of well.

4. Proposed Cement Program

a. 13-3/8" Surface

Lead: 600 sx Class C + 4% Gel + 1% CaCl₂
(13.5 ppg / 9.2 gal/sk / 1.75 ft³/sk)
Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 6.35 gal/sk / 1.34 ft³/sk)
**Calculated w/75% excess on OH volumes

b. 9 5/8" Intermediate:

Lead: 900 sx 35:65:6 C w/ 8# salt, 5# kolseal, 0.5% Halad-322, 0.3% HR-601 & 1/4# D-Air 5000
(12.7 ppg / 9.2 gal/sk / 1.89 ft³/sk)
Tail: 250 sx Class C + 2% CaCl₂
(14.8 ppg / 6.35 gal/sk / 1.34 ft³/sk)
**Calculated w/35% excess on OH volumes

c. 5 1/2" Production

See COA

Lead: 1100 sx 50:50:10 H w/ 8# salt, 5# kolseal, 0.5% Halad-322, 0.3% HR-601 & 1/4# D-Air 5000
(11.9 ppg / 14.07 gal/sk / 2.51 ft³/sk)
Tail: 1350 sx 50:50:2 H w/ 1% salt, 0.4% GasStop, 0.3% CFR-3 & 0.1% HR601, & CFR-3
(14.4 ppg / 5.66 gal/sk 1.25 ft³/sk)
**Calculated w/35% excess on OH volumes

- The above cement volumes could be revised pending caliper measurements.
- All casing strings are designed to circulate cement to surface.
- Pilot hole will be plugged back with the following:
 1. 475 sx Class H @ 17.2 ppg / 0.98 ft³/sx (12,175' - 11,075')
 2. 475 sx Class H @ 17.2 ppg / 0.98 ft³/sx (11,075' - 9975')

5. Minimum Specifications for Pressure Control:

See
COA

Nipple up on 13 3/8" with minimum 2M annular preventer. Annular will be tested to 50% of WP and remainder of system tested to 2000 psi by independent tester.

Nipple up on 9 5/8" with minimum 5M annular and double ram preventers. Annular will be tested to 50% of WP and remainder of system tested to 5000 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 5000 psi WP rating.

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string depth or 1500 psig, whichever is greater, but not to exceed 70 percent of casing's minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action will be taken.

See
COA

While drilling the intermediate section, if a reading of H₂S is greater than 100 ppm, well will be shut-in and a remote operated choke will be installed.

6. Estimated BHP & BHT:

PHTD = 5318 psi

PHTD = 174° F

Lateral TD = 4632 psi

Lateral TD = 160° F

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' - 1100'	Fresh Water	8.4 - 9.0	29	N.C.
1100' - 4850'	Brine	10.0 - 10.3	29	N.C.
4850' - 15,149' (Lateral)	Cut Brine	8.7 - 9.2	29	N.C.
4850' - 12,175' (PH)	Cut Brine	8.7 - 9.2	29	N.C.

- The necessary mud products for weight addition and fluid loss control will be on location at all times.
- A visual and electronic mud monitoring system will be rigged up prior to spud to detect changes in the volume of mud system. The electronic system consists of a pit volume totalizer, stroke counter and flow sensor at flow line.
- If weight and/or viscosity are introduced to the mud system a daily mud check will be performed by mud contractor, along with tourly check by rig personnel.
- After setting intermediate casing, a third party gas unit detection system will be installed at the flow line.

8. Auxiliary Well Control and Monitoring Equipment:

- a. A Kelly cock will be in the drill string at all times.
- b. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times.
- c. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the 5 1/2" casing is cemented. Breathing equipment will be on location upon drilling the 13 3/8" shoe until total depth is reached.

See
COA

9. Testing, Logging and Coring Program:

- 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 cores are planned.
 - iv. Additional testing will be initiated subsequent to setting the 5 1/2" 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.

See
COA

11. Anticipated starting date and Duration of Operations:

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



COG Operating LLC

Lea County, NM (NAD27 NME)

Mastiff Federal

#3H

OH

Plan: Design #1

Standard Planning Report

29 April, 2014



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3682.3usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3682.3usft (Original Well Elev)
Site:	Mastiff Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project:	Lea County, NM (NAD27 NME)		
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:	Mastiff Federal		
Site Position:		Northing:	456,424.40 usft
From:	Map	Easting:	701,585.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 15' 11.321 N
		Longitude:	103° 40' 52.520 W
		Grid Convergence:	0.35 °

Well:	#3H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level:
			3,664.3 usft

Wellbore:	OH		
Magnetics:	Model Name	Sample Date	Declination
			(°)
	IGRF2010	4/29/2014	7.29
			Dip Angle
			(°)
			60.12
			Field Strength
			(nT)
			48,333

Design:	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD):	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			179.87

Plan Sections:										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,127.5	0.00	0.00	10,127.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,877.6	90.00	179.87	10,605.0	-477.5	1.1	12.00	12.00	0.00	179.87	
15,149.4	90.00	179.87	10,605.0	-4,749.3	10.8	0.00	0.00	0.00	0.00	PBHL(MF#3H)



Wellplanning Planning Report

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Company:	COG Operating LLC	TVD Reference:	WELL @ 3682.3usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3682.3usft (Original Well Elev)
Site:	Mastiff Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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)	
0.0	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	



Wellplanning Planning Report

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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	
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,127.5	0.00	0.00	10,127.5	0.0	0.0	0.0	0.00	0.00	0.00	
10,150.0	2.70	179.87	10,150.0	-0.5	0.0	0.5	12.00	12.00	0.00	
10,175.0	5.70	179.87	10,174.9	-2.4	0.0	2.4	12.00	12.00	0.00	
10,200.0	8.70	179.87	10,199.7	-5.5	0.0	5.5	12.00	12.00	0.00	
10,225.0	11.70	179.87	10,224.3	-9.9	0.0	9.9	12.00	12.00	0.00	
10,250.0	14.70	179.87	10,248.7	-15.6	0.0	15.6	12.00	12.00	0.00	



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3682.3usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3682.3usft (Original Well Elev)
Site:	Mastiff Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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)	
10,275.0	17.70	179.87	10,272.7	-22.6	0.1	22.6	12.00	12.00	0.00	
10,300.0	20.70	179.87	10,296.3	-30.8	0.1	30.8	12.00	12.00	0.00	
10,325.0	23.70	179.87	10,319.4	-40.3	0.1	40.3	12.00	12.00	0.00	
10,350.0	26.70	179.87	10,342.0	-50.9	0.1	50.9	12.00	12.00	0.00	
10,375.0	29.70	179.87	10,364.1	-62.7	0.1	62.7	12.00	12.00	0.00	
10,400.0	32.70	179.87	10,385.4	-75.7	0.2	75.7	12.00	12.00	0.00	
10,425.0	35.70	179.87	10,406.1	-89.7	0.2	89.7	12.00	12.00	0.00	
10,450.0	38.70	179.87	10,426.0	-104.8	0.2	104.8	12.00	12.00	0.00	
10,475.0	41.70	179.87	10,445.1	-121.0	0.3	121.0	12.00	12.00	0.00	
10,500.0	44.70	179.87	10,463.4	-138.1	0.3	138.1	12.00	12.00	0.00	
10,525.0	47.70	179.87	10,480.7	-156.1	0.4	156.1	12.00	12.00	0.00	
10,550.0	50.70	179.87	10,497.0	-175.0	0.4	175.0	12.00	12.00	0.00	
10,575.0	53.70	179.87	10,512.3	-194.8	0.4	194.8	12.00	12.00	0.00	
10,600.0	56.70	179.87	10,526.6	-215.3	0.5	215.3	12.00	12.00	0.00	
10,625.0	59.70	179.87	10,539.8	-236.6	0.5	236.6	12.00	12.00	0.00	
10,650.0	62.70	179.87	10,551.8	-258.5	0.6	258.5	12.00	12.00	0.00	
10,675.0	65.70	179.87	10,562.7	-281.0	0.6	281.0	12.00	12.00	0.00	
10,700.0	68.69	179.87	10,572.4	-304.0	0.7	304.0	12.00	12.00	0.00	
10,725.0	71.69	179.87	10,580.8	-327.5	0.7	327.5	12.00	12.00	0.00	
10,750.0	74.69	179.87	10,588.1	-351.5	0.8	351.5	12.00	12.00	0.00	
10,775.0	77.69	179.87	10,594.0	-375.7	0.9	375.7	12.00	12.00	0.00	
10,800.0	80.69	179.87	10,598.7	-400.3	0.9	400.3	12.00	12.00	0.00	
10,825.0	83.69	179.87	10,602.1	-425.0	1.0	425.1	12.00	12.00	0.00	
10,850.0	86.69	179.87	10,604.2	-450.0	1.0	450.0	12.00	12.00	0.00	
10,875.0	89.69	179.87	10,605.0	-474.9	1.1	474.9	12.00	12.00	0.00	
10,877.6	90.00	179.87	10,605.0	-477.5	1.1	477.5	12.00	12.00	0.00	
10,900.0	90.00	179.87	10,605.0	-499.9	1.1	499.9	0.00	0.00	0.00	
11,000.0	90.00	179.87	10,605.0	-599.9	1.4	599.9	0.00	0.00	0.00	
11,100.0	90.00	179.87	10,605.0	-699.9	1.6	699.9	0.00	0.00	0.00	
11,200.0	90.00	179.87	10,605.0	-799.9	1.8	799.9	0.00	0.00	0.00	
11,300.0	90.00	179.87	10,605.0	-899.9	2.0	899.9	0.00	0.00	0.00	
11,400.0	90.00	179.87	10,605.0	-999.9	2.3	999.9	0.00	0.00	0.00	
11,500.0	90.00	179.87	10,605.0	-1,099.9	2.5	1,099.9	0.00	0.00	0.00	
11,600.0	90.00	179.87	10,605.0	-1,199.9	2.7	1,199.9	0.00	0.00	0.00	
11,700.0	90.00	179.87	10,605.0	-1,299.9	2.9	1,299.9	0.00	0.00	0.00	
11,800.0	90.00	179.87	10,605.0	-1,399.9	3.2	1,399.9	0.00	0.00	0.00	
11,900.0	90.00	179.87	10,605.0	-1,499.9	3.4	1,499.9	0.00	0.00	0.00	
12,000.0	90.00	179.87	10,605.0	-1,599.9	3.6	1,599.9	0.00	0.00	0.00	
12,100.0	90.00	179.87	10,605.0	-1,699.9	3.9	1,699.9	0.00	0.00	0.00	
12,200.0	90.00	179.87	10,605.0	-1,799.9	4.1	1,799.9	0.00	0.00	0.00	
12,300.0	90.00	179.87	10,605.0	-1,899.9	4.3	1,899.9	0.00	0.00	0.00	
12,400.0	90.00	179.87	10,605.0	-1,999.9	4.5	1,999.9	0.00	0.00	0.00	
12,500.0	90.00	179.87	10,605.0	-2,099.9	4.8	2,099.9	0.00	0.00	0.00	
12,600.0	90.00	179.87	10,605.0	-2,199.9	5.0	2,199.9	0.00	0.00	0.00	
12,700.0	90.00	179.87	10,605.0	-2,299.9	5.2	2,299.9	0.00	0.00	0.00	
12,800.0	90.00	179.87	10,605.0	-2,399.9	5.4	2,399.9	0.00	0.00	0.00	
12,900.0	90.00	179.87	10,605.0	-2,499.9	5.7	2,499.9	0.00	0.00	0.00	
13,000.0	90.00	179.87	10,605.0	-2,599.9	5.9	2,599.9	0.00	0.00	0.00	
13,100.0	90.00	179.87	10,605.0	-2,699.9	6.1	2,699.9	0.00	0.00	0.00	
13,200.0	90.00	179.87	10,605.0	-2,799.9	6.4	2,799.9	0.00	0.00	0.00	
13,300.0	90.00	179.87	10,605.0	-2,899.9	6.6	2,899.9	0.00	0.00	0.00	
13,400.0	90.00	179.87	10,605.0	-2,999.9	6.8	2,999.9	0.00	0.00	0.00	
13,500.0	90.00	179.87	10,605.0	-3,099.9	7.0	3,099.9	0.00	0.00	0.00	
13,600.0	90.00	179.87	10,605.0	-3,199.9	7.3	3,199.9	0.00	0.00	0.00	



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3682.3usft (Original Well Elev)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	WELL @ 3682.3usft (Original Well Elev)
Site:	Mastiff Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #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)	
13,700.0	90.00	179.87	10,605.0	-3,299.9	7.5	3,299.9	0.00	0.00	0.00	
13,800.0	90.00	179.87	10,605.0	-3,399.9	7.7	3,399.9	0.00	0.00	0.00	
13,900.0	90.00	179.87	10,605.0	-3,499.9	7.9	3,499.9	0.00	0.00	0.00	
14,000.0	90.00	179.87	10,605.0	-3,599.9	8.2	3,599.9	0.00	0.00	0.00	
14,100.0	90.00	179.87	10,605.0	-3,699.9	8.4	3,699.9	0.00	0.00	0.00	
14,200.0	90.00	179.87	10,605.0	-3,799.9	8.6	3,799.9	0.00	0.00	0.00	
14,300.0	90.00	179.87	10,605.0	-3,899.9	8.8	3,899.9	0.00	0.00	0.00	
14,400.0	90.00	179.87	10,605.0	-3,999.9	9.1	3,999.9	0.00	0.00	0.00	
14,500.0	90.00	179.87	10,605.0	-4,099.9	9.3	4,099.9	0.00	0.00	0.00	
14,600.0	90.00	179.87	10,605.0	-4,199.9	9.5	4,199.9	0.00	0.00	0.00	
14,700.0	90.00	179.87	10,605.0	-4,299.9	9.8	4,299.9	0.00	0.00	0.00	
14,800.0	90.00	179.87	10,605.0	-4,399.9	10.0	4,399.9	0.00	0.00	0.00	
14,900.0	90.00	179.87	10,605.0	-4,499.9	10.2	4,499.9	0.00	0.00	0.00	
15,000.0	90.00	179.87	10,605.0	-4,599.9	10.4	4,599.9	0.00	0.00	0.00	
15,100.0	90.00	179.87	10,605.0	-4,699.9	10.7	4,699.9	0.00	0.00	0.00	
15,149.4	90.00	179.87	10,605.0	-4,749.3	10.8	4,749.3	0.00	0.00	0.00	
PBHL(MF#3H)										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
hit/miss target										
- Shape										
PBHL(MF#3H)	0.00	0.00	10,605.0	-4,749.3	11.0	451,675.10	701,596.20	32° 14' 24.323 N	103° 40' 52.728 W	
- plan misses target center by 0.2usft at 15149.4usft MD (10605.0 TVD, -4749.3 N, 10.8 E)										
- Point										



Mastiff Federal #3H
Lea County, NM (NAD27 NME)
Northing: (Y) 456424.40
Easting: (X) 701585.20
Design #1

NEXUS

DIRECTIONAL SOLUTIONS, L.P.



Azimuths to Grid North
True North: -0.35°
Magnetic North: 6.94°

Magnetic Field
48333.0nT
Dip Angle: 60.12°
Date: 4/29/2014
Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 6.94°
To convert a True Direction to a Grid Direction, Subtract 0.35°

WELL DETAILS:									
WELL @ 3682.3usft (Original Well Elev)									
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude				
0.0	0.0	456424.40	701585.20	32° 15' 11.321 N	103° 40' 52.520 W				

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
10127.5	0.00	0.00	10127.5	0.0	0.0	0.00	0.00	0.0	
10877.6	90.00	179.87	10605.0	-477.5	1.1	12.00	179.87	477.5	
15149.4	90.00	179.87	10605.0	-4749.3	10.8	0.00	0.00	4749.3	PBHL(MF#3H)

DESIGN TARGET DETAILS					
Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL(MF#3H)	10605.0	-4749.3	11.0	451675.10	701596.20

LEGEND

• Design #1

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001

Local Origin: Well #3H, Grid North

Latitude: 32° 15' 11.321 N
Longitude: 103° 40' 52.520 W

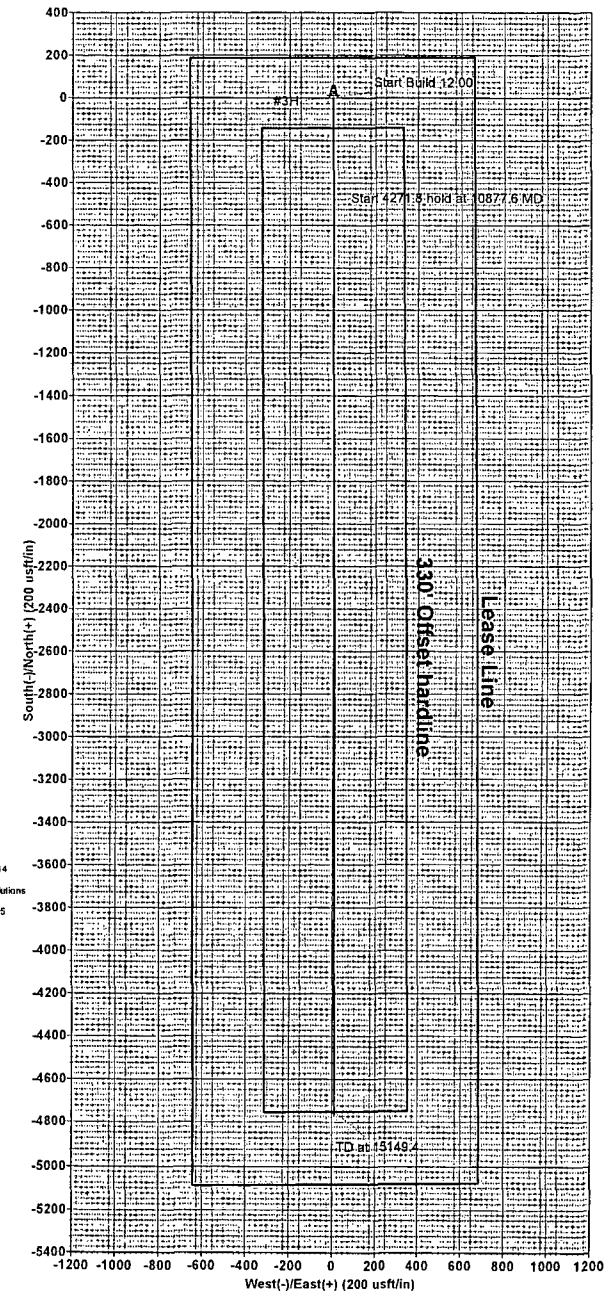
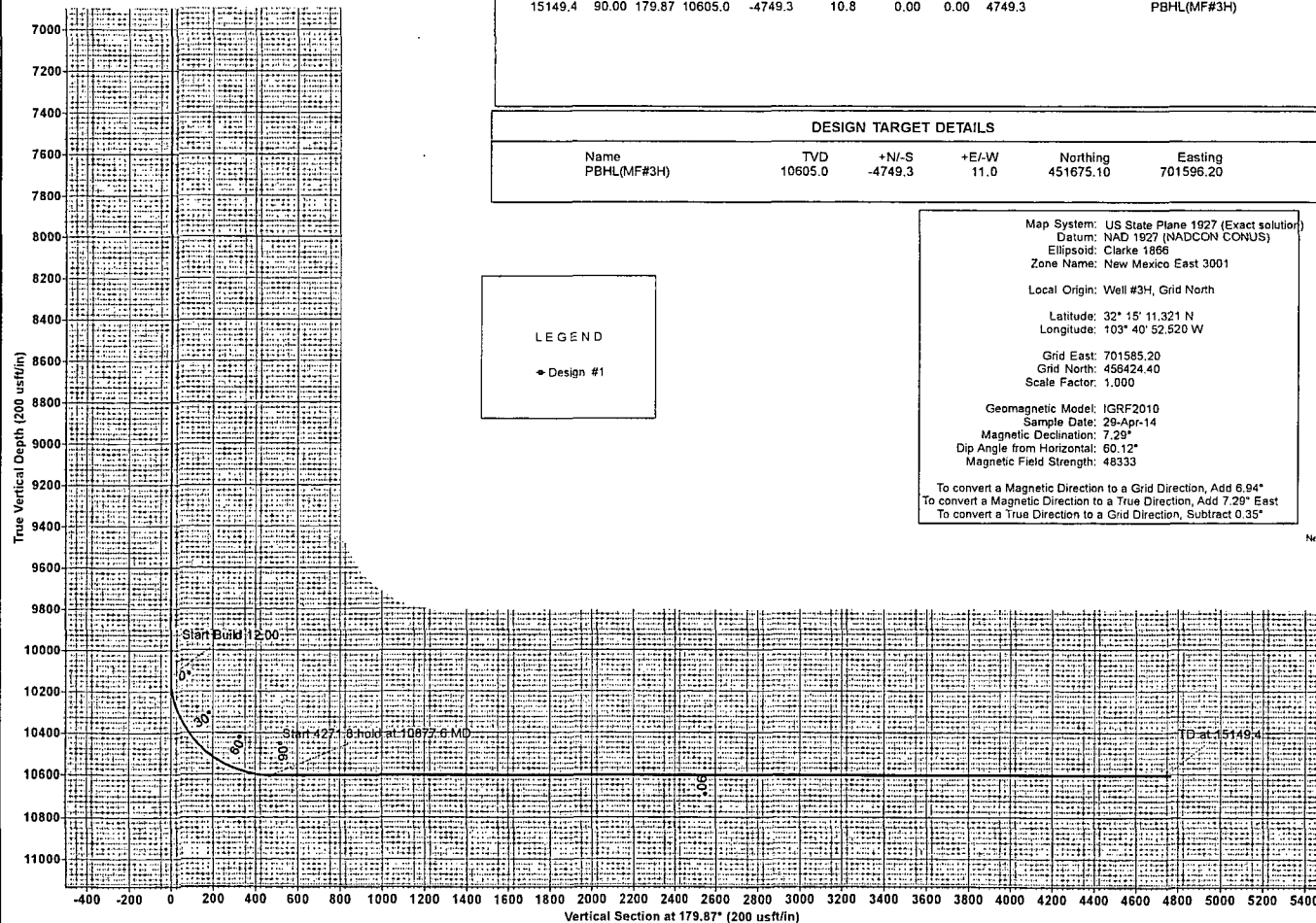
Grid East: 701585.20
Grid North: 456424.40
Scale Factor: 1.000

Geomagnetic Model: IGRF2010
Sample Date: 29-Apr-14
Magnetic Declination: 7.29°
Dip Angle from Horizontal: 60.12°
Magnetic Field Strength: 48333

To convert a Magnetic Direction to a Grid Direction, Add 6.94°
To convert a Magnetic Direction to a True Direction, Add 7.29° East
To convert a True Direction to a Grid Direction, Subtract 0.35°

Mail Ship
8:36, April 29 2014

Nexus Directional Solutions
3025 CR 1285
Odessa TX 79765



Run Time: 08:27 AM

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTRun Date: 04/29/2014
Page 1 of 1

LLD ACREAGE REPORT

Admin State: NM

Geo State: NM

MTR: 23 0240S 0320E

Section: 004

<u>Sur Type</u>	<u>Sur No</u>	<u>Lld Suff</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>Sur Note</u>	<u>Dup Flg</u>	<u>Sub Surf</u>	<u>Acreage</u>
			<u>NNSS</u>	<u>NNSS</u>	<u>NNSS</u>	<u>NNSS</u>				
A			--XX	--XX	XXXX	XXXX				480.000
L	1		X---	----	----	----				39.800
L	2		-X--	----	----	----				39.680
L	3		----	X---	----	----				39.560
L	4		----	-X--	----	----				39.440

Section 004 Total: 638.480

MTR Total Excluding Survey Notes C/D/R
and Sub Surf = Y 638.480Grand Total Excluding Survey Notes C/D/R
and Sub Surf = Y: 638.480



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
<u>C 01932</u>	C	ED		3	1	12	24S	32E		628633	3567188*	492		
<u>C 02350</u>		ED		4	3	10	24S	32E		625826	3566333*	60		
<u>C 03527 POD1</u>	C	LE		1	2	3	03	24S	32E	625770	3568487	500		
<u>C 03528 POD1</u>	C	LE		1	1	2	15	24S	32E	626040	3566129	541		
<u>C 03530 POD1</u>	C	LE		3	4	3	07	24S	32E	620886	3566156	550		
<u>C 03555 POD1</u>	C	LE		2	2	1	05	24S	32E	622709	3569231	600	380	220

Average Depth to Water: **380 feet**

Minimum Depth: **380 feet**

Maximum Depth: **380 feet**

Record Count: 6

PLSS Search:

Township: 24S

Range: 32E

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



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

No records found.

PLSS Search:

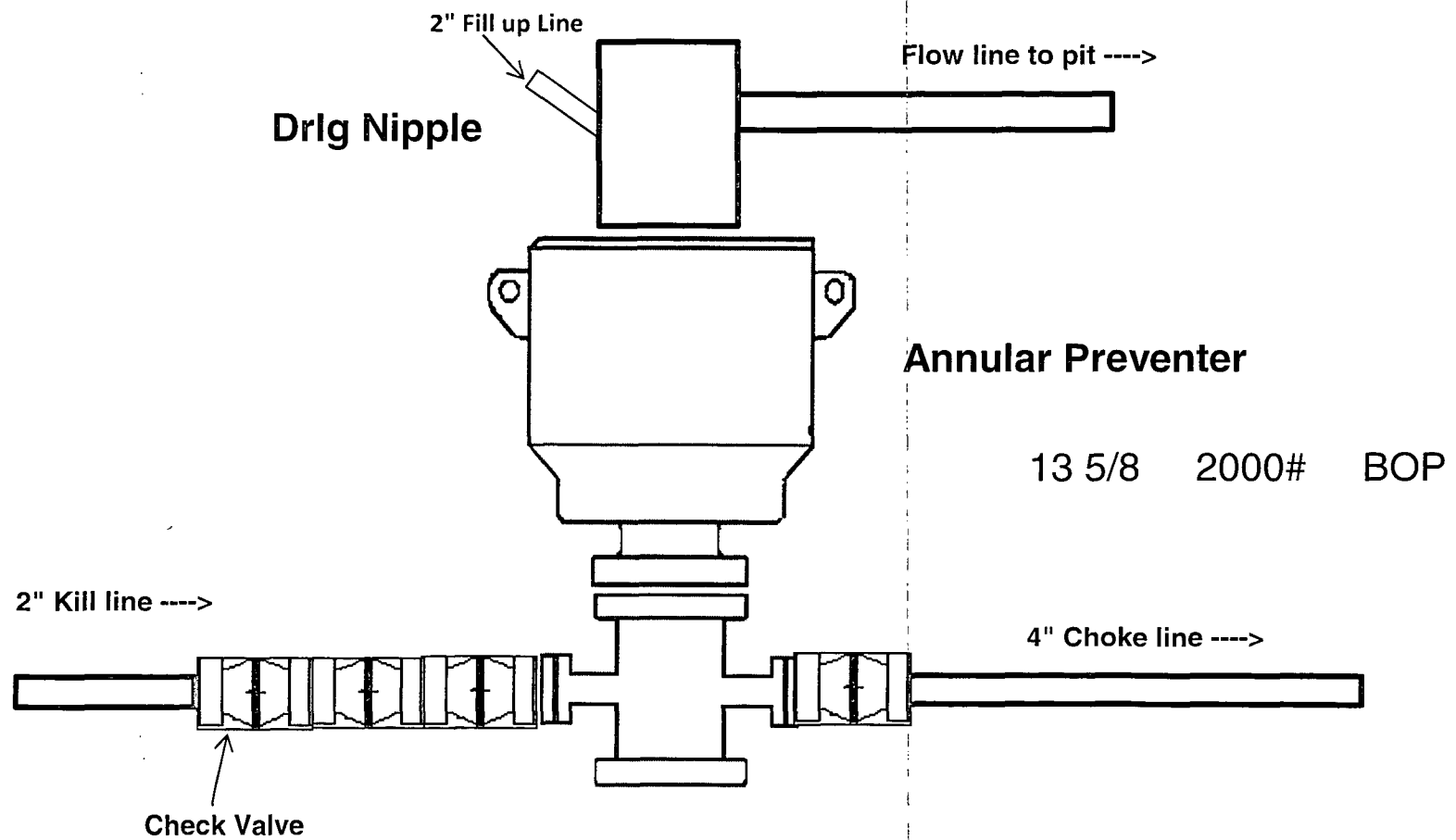
Section(s): 4

Township: 24S

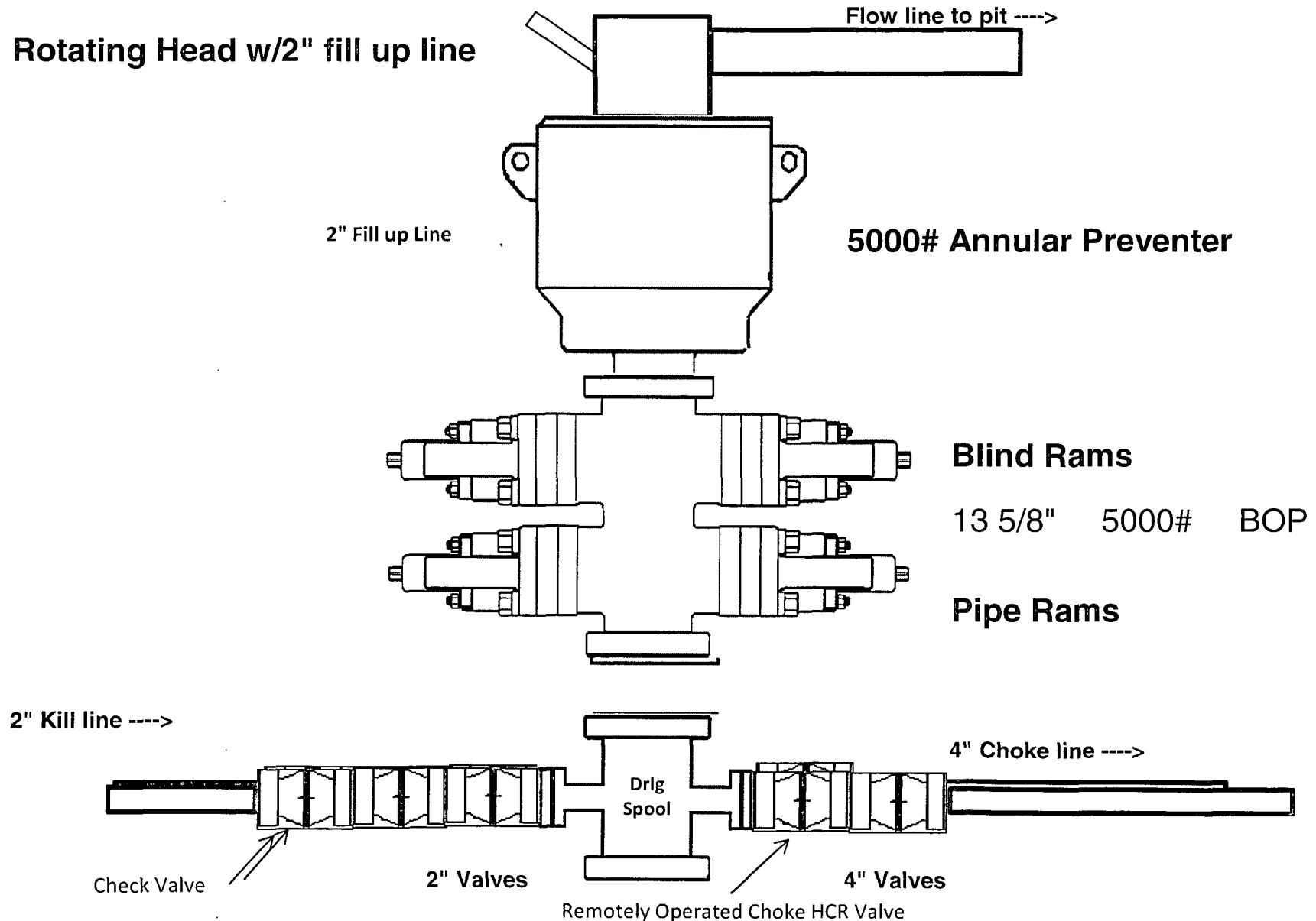
Range: 32E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

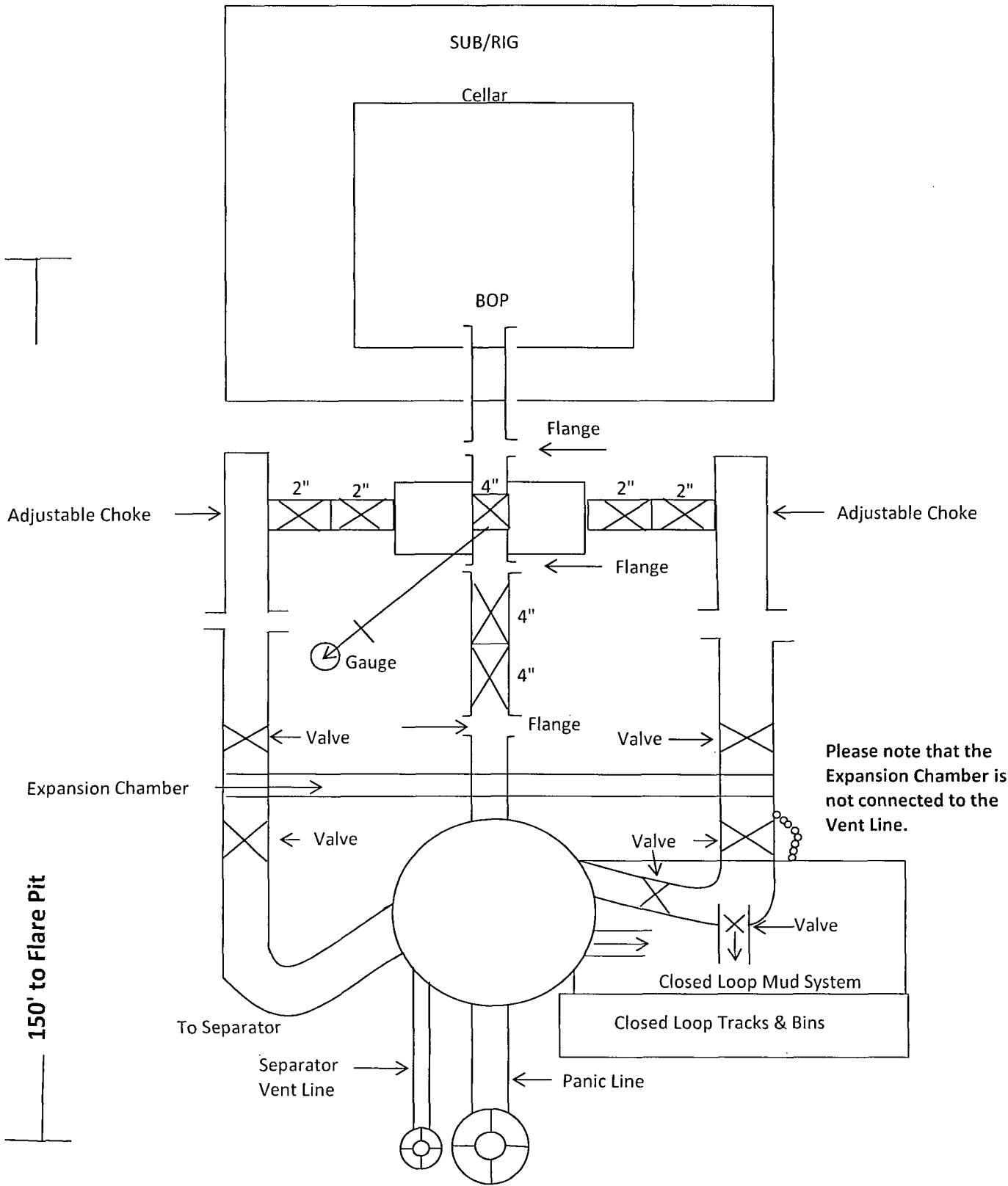
2,000 psi BOP Schematic



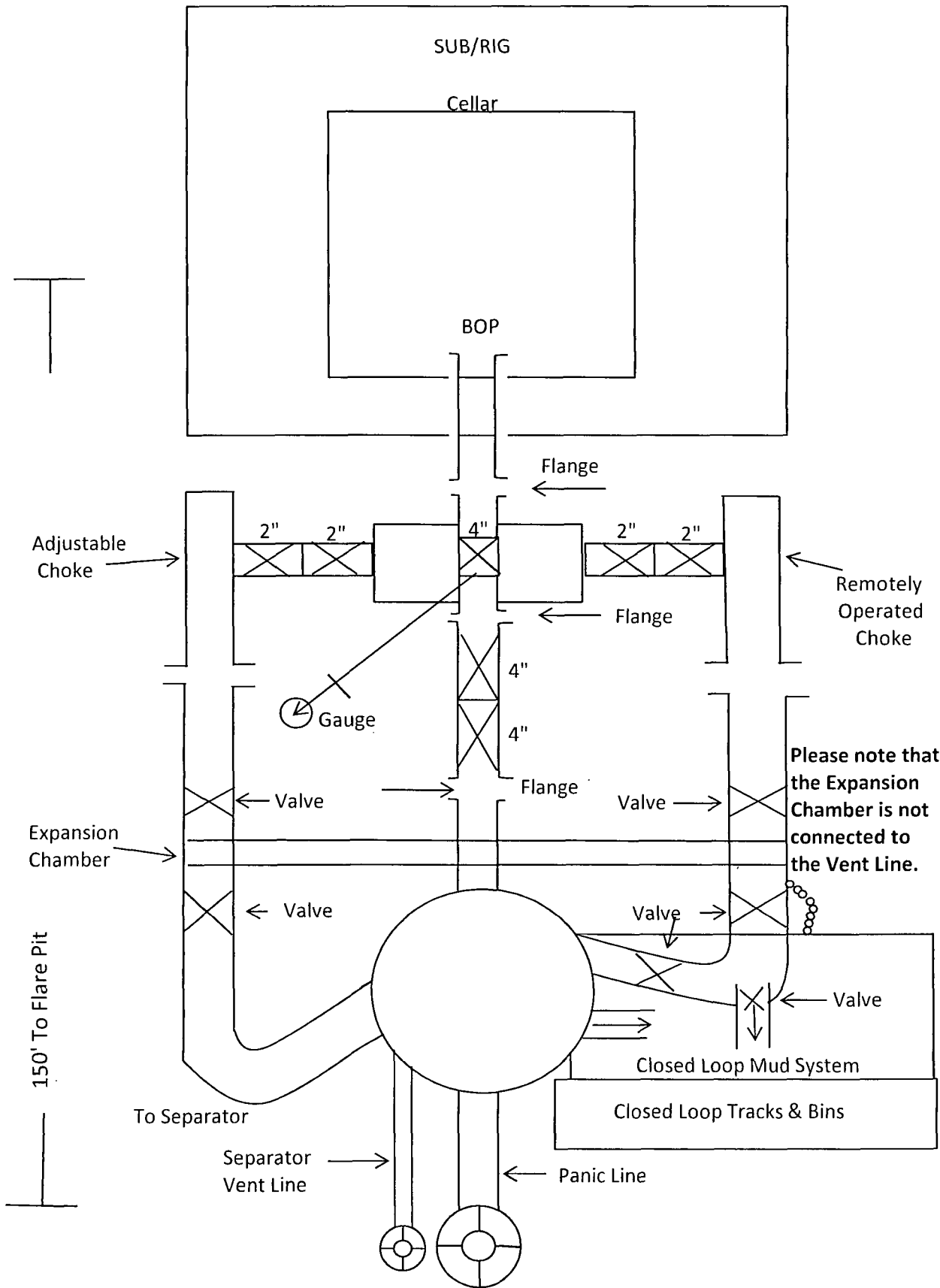
5,000 psi BOP Schematic



2M Choke Manifold Equipment



5M 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

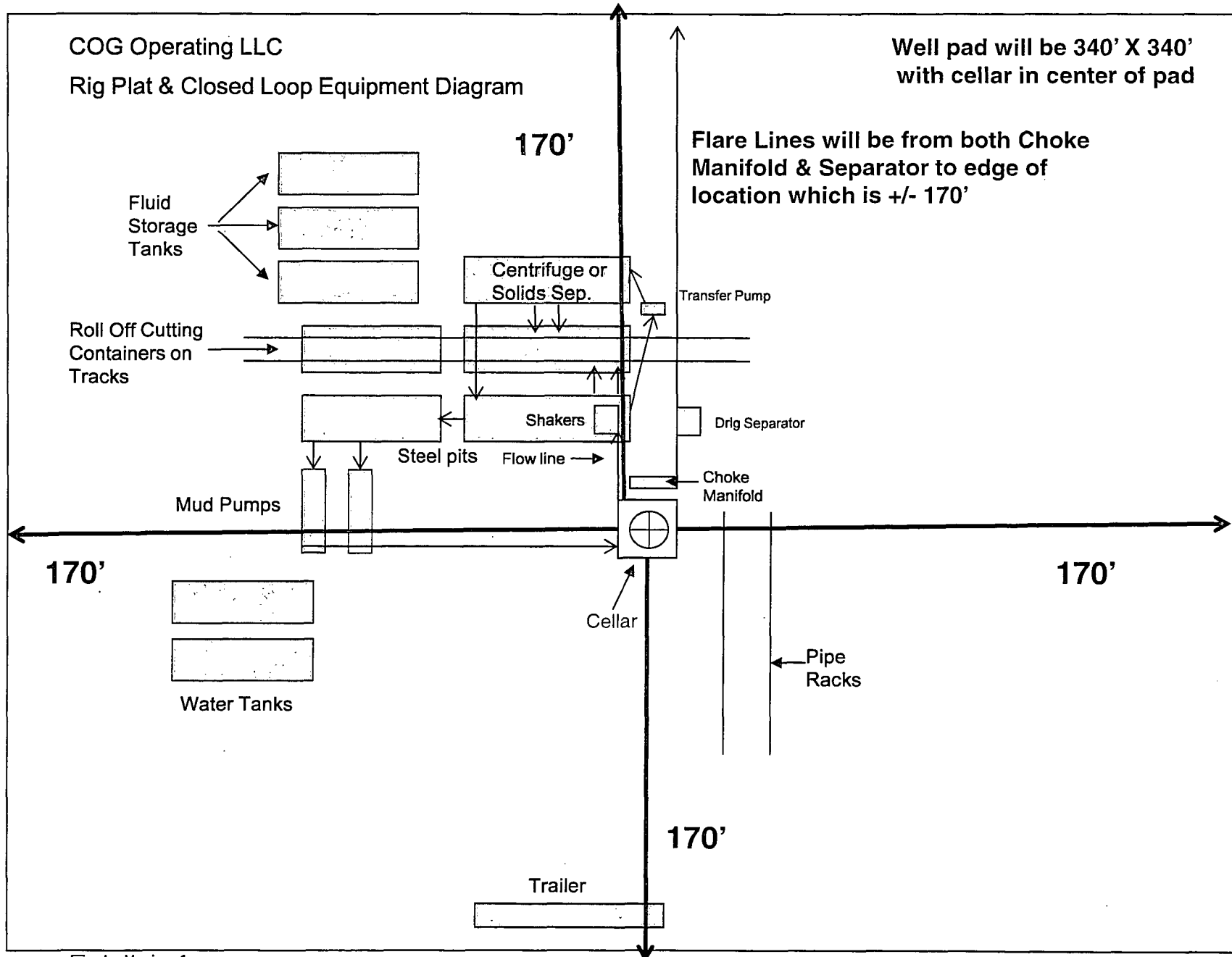


Exhibit 1

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