SECRETARY'S POTASH

14-112

Form 3160-3
(March 2012)

OCD Hobbs

HOBBS OCD

UNORTHODOX LOCATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SEP 22 2014

RECEIVED

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

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: SHL: NMNM058935, NMNM107392

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. (40118): Nightcap 6 Federal #4H

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

9. API Well No.: 30-025-42135

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

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

10. Field and Pool, or Exploratory (41460): Lusk; Bone Spring, South

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

At surface: 520' FSL & 280' FWL Lot #4 (SWSW) SHL Sec. 31-T19S - R32E

At proposed prod. Zone: 330' FSL & 380' FWL Lot #7 (SWSW) BHL Sec. 6 - T20S - R32E

11. Sec., T.R.M. or Blk and Survey or Area: Sec. 31- T19S - R32E

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

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): 280'

16. No. of acres in lease: SHL: 281.03, BHL: 636.47

17. Spacing Unit dedicated to this well: 156.66

18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft.: SHL: 405', BHL: 2983'

19. Proposed Depth: TVD: 9450' MD: 14,603'

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3498.5 GL

22. Approximate date work will start*: 7/1/2014

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.
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: 4/24/2014

Title: Regulatory Analyst

Approved by (Signature): Steve Caffey — Name (Printed/Typed): — Date: SEP 16 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 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)

Capitan Controlled Water Basin

K 09/22/14

SEE ATTACHED FOR CONDITIONS OF APPROVAL

pm

Approval Subject to General Requirements & Special Stipulations Attached

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 24th day of April, 2014.

Signed: Melanie J. Parker

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

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
NIGHTCAP 6 FEDERAL #4H
SHL: 520' FSL & 280' FWL, Lot 4
Sec 31 T19S R32E
BHL: 330' FSL & 380' FWL, Lot 7
Sec 6, T20S, R32E
Lea County, NM

1. Proration Unit Spacing: 156.66 Acres

2. Ground Elevation: 3523.6'

3. Proposed Depths: Horizontal:

KOP (Kick off Point) TVD=8829' MD=8829'
EOC (end of curve) TVD=9386' MD=11610'
Toe (end of lateral) TVD=9450' MD= 14603'

4. Estimated tops of geological markers:

Fresh Water	223'
Rustler	817'
Top of Salt	905'
BOS/Top of Tansil	2604'
Yates	2727'
Seven Rivers	2888'
Capitan Reef	3005'
BOR/ CYCN	4330'
Brushy Canyon	5558'
Bone Spring	7248'
1st.Bone Spring Sd.	8417'
2nd Bone Spring Sd.	9176'
3rd Bone Spring Sd.	10028'
Wolfcamp	10398'

5. Possible mineral bearing formations:

Yates	2727'	Oil/Gas
Seven Rivers	2888'	Oil/Gas
Capitan Reef	3005'	Brackish Water
BOR/ CYCN	4330'	Oil/Gas
Brushy Canyon	5558'	Oil/Gas
Bone Spring	7248'	Oil/Gas
1st.Bone Spring Sd.	8417'	Oil/Gas
2nd Bone Spring Sd.	9176'	Oil/Gas
3rd Bone Spring Sd.	10028'	Oil/Gas
Wolfcamp	10398'	Oil/Gas

2600' 915'

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 20" casing at ~~842'~~ (25' into Rustler) and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be isolated and protected by setting 13 3/8" casing at ~~2625'~~ (21' ~~into Tansill~~) and circulating cement back to surface in a single stage job. The Capitan Reef will be isolated and protected by setting 9 5/8" casing at 4345' (15' into Cherry Canyon) and circulating cement back to surface in a single stage job.. Any shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them as described in the following paragraph.

A 8 ¾" open hole will be drilled from 9 5/8" casing shoe to TD. 5 ½" production casing will be installed. This casing string will be cemented from the TD to surface in single stage job. If wellbore conditions arise that require immediate action and/or a change to this program, COG Operating LLC personnel will always react to protect the wellbore and/or environment.

6. Proposed Mud System

The well will be drilled to TD with a combination of fresh water, brine, cut brine mud systems. The applicable depths and properties of these systems are as follows:

See COA

DEPTH (MD)	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-842'915'2800'	Fresh Water	8.3-8.8	28-40	N.C.
842'-2625'	Brine	9.8-10.1	28-32	N.C.
2625'-4345'	Fresh Water	8.3-8.7	28-32	N.C.
4345'-8829'	FW/CutBrine mud	8.3-9.2	28-32	N.C.
8829'-14603'	Cut Brine mud	8.5-9.2	30-35	N.C.

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

Visual or electronic mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume.

The mud program has been designed to minimize the volume of H_2S circulated to surface. Proper mud weights, safe drilling practices and the use of H_2S scavengers will minimize hazards when penetrating H_2S bearing zones.

6. Proposed Casing Program

See COA

Hole Size	Interval MD	OD Casing	Weight	Grade	Condition	Jt.	brst/clps/ten
26"	0-842'915'	20" 0-842'	94#	J55	New	ST&C	2.51/1.40/11.37
17 ½"	842-2625'2800'	13 3/8" 0-2625'	61#	J55	New	ST&C	1.18/1.13/4.39
12 ¼"	2625'-4345'	9 5/8" 0-4345'	40#	J55	New	LT&C	2.14/1.29/3.46
8 ¾"	4345'-14603'	5 1/2" 0-14603'	17#	P110	New	LT&C	1.33/1.65/3.22

7. Proposed Cement Program

20" SURFACE: (Circulate to Surface)

		Description	Yield	Density	Water Requirements
lead: 1100 sks			1.75 cf/sk		
Tail: 0'-842'	~~375~~ sks	Class "C" w/2% CaCl2	1.32 cf/sk	14.8 ppg	6.3 gal/sk.
Excess 109% tail 500					

13 3/8" INTERMEDIATE: (Circulate to Surface)

Lead: 0'-2000' Excess 32%	1250 sks	Class "C"+ 4% Gel+ 2% $CaCl_2$+ 0.25 ppsCF	1.75 cf/sk	13.5 ppg	9.2 gal/sk.
See COA Tail: 2000'-~~2625'~~ Excess 29%	450 sks	Class C w/2% $CaCl_2$	1.35 cf/sk	14.8 ppg	6.3 gal/sk.

Combined Excess 31%

9 5/8" INTERMEDIATE: (DV Tool @ 2905'—100' above T/Capitan Reef)

Multi-Stage: (Cement circulated to surface)

		Description	Yield	Density	Water Requirement
1st Stage:					
Lead: 2905-3750' Excess 131%	350 sks	Class "C" w/ 4% Gel + 2% $CaCL_2$	1.75 cf/sk	13.5 ppg	9.2 gal/sk.
Tail: 3750'-4345' Excess 66%	250 sks	Class "C" w/1% $CaCl_2$	1.35 cf/sk	14.8 ppg	6.3 gal/sk.
DV Tool @ ~~2767'~~ 2905					
2nd Stage:					
Lead: 0'-2625' Excess 11%	625 sks	Class "C" w/ 4% Gel + 2% $CaCl_2$	1.75 cf/sk	13.5 ppg	9.2 gal/sk.

Tail: 2625'-2905' Excess 131%	150 sks	Class C w/2% CaCl2	1.35 cf/sk	14.8 ppg	6.3 gal/sk.

Combined Excess 1st & 2nd stage 59%

5 ½" PRODUCTION CASING: ★ to surface R-111-Potash ★

Single Stage: (Cement cal to surface) (~~Minimum tie-back 200' above 9 5/8" casing shoe~~)

1st Lead: 0'-8829' Excess 37%	1200 sks	EconoCem-H+ 0.5% Halad-322+ 5 pps Kol-Seal+ 0.25 pps D-Air 5000+ 0.2% HR-601	2.51 cf/sk	11.9 ppg	14.2 gal/sk.
Tail: 8829'-14603' Excess 28%	1500 sks	VersaCem+0.4% GasStop +0.3% CFR-3+1% Salt+ 0.1% HR-601	1.24 cf/sk	14.4 ppg	5.7 gal/sk.

Combined Lead & Tail Excess: 31%

8. Pressure Control Equipment:

A 20" X 2000 psi annular BOP will be installed on the 20" casing with mud cross, choke manifold, chokes, kill line, Kelly cock, safety valve and subs to fit all drill strings in use. (see attached BOPE drawings). This equipment will be nipped up on the 20" casing head and used to TD of 17 ½" hole. This unit will be hydraulically operated and will be hydrostatically tested by independent tester using test plug to 250/300 psig low and 1000 psig. high. Choke line valve, chokes, upper Kelly cock valve, safety valve shall be tested to 2000 psig.by independent tester..

After setting the 13 3/8" casing, the 20" X 2000 psi Hydril type annular preventer with mud cross, choke manifold, chokes will be rigged up again. Kill line, Kelly cock, safety valve and subs to fit all drill strings in use will be on location. (see attached BOPE drawings). Hydril and associated equipment will be tested using test plug to 250/300 psig low and 1000 psig high by independent tester using test plug. Choke line valve, chokes, upper Kelly cock valve, safety valve shall be tested to 2000 psig.by independent tester..

After setting 9 5/8" casing a 13 3/8" X 5000 psi annular and 13/5/8" X 5000 psi double ram BOPs will be rigged up and used to TD. This double ram BOP will be hydraulically operated and will be tested by independent tester using test plug to 250 psig/300 psig low and 3000 psig high. .Annular preventer will be hydraulically operated and will be tested to 250 psig/300 psig low and 1500 psig. high. Choke line valve, chokes, upper Kelly cock valve, safety valve shall also be tested to 250 psig/300 psig low and 3000 psig high by independent tester.

Note: as per Onshore Order #2 D.1 if an operator chooses to use higher rated equipment than that authorized in the Application for Permit to Drill (APD), testing procedures shall apply to the approved working pressures, not the upgraded higher working pressures" therefore test pressures of 3000 psig for dual rams & 1500 psig.for annular will be followed.

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string length 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.

9. Production Hole Drilling Summary:

Drill 8¾" hole to 8829'. Kick off at +/- 8829', building curve at 11°/100' to 82.00° inclination,178.32° az at 9309' MD/9080'TVD. Continue this inclination and azmith to 11374' MD/9367' TVD. Resume building angle at 3°/100' to 89.08° inclination at 11610' MD/9386' TVD. Continue this inclination and azmith to 14603' MD/9450' TVD. Run 5-1/2" production casing. 5 ½" to be run from surface thru kickoff point, curve and lateral to TD. 5 ½" casing will be isolated by a single stage cement job. Cement volume will be calculated to surface. Minimum tie-back is 200' above 9 5/8" casing shoe.

10. Auxiliary Well Control and Monitoring Equipment

A. Kelly cock will be kept in the drill string at all times.

B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

11. Logging, Testing and Coring Program:

A. Cased hole GR/CNL logs will be run in the vertical portion of the hole.

B. The mud logging program will consist of lagged 10' samples from 9 5/8" casing shoe to TD in Horizontal hole.

C. Drill Stem testing is not anticipated.

D. No conventional coring is anticipated.

E. Further testing procedures will be determined after the 5 ½" production casing has been cemented at TD based on drill shows and log evaluation.

12. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:

See COA

No abnormal pressures or temperatures are anticipated. The estimated bottom hole temperature at TD is 112° Fahrenheit and estimated maximum bottom hole pressure is 4063 psi. Wells in this area will penetrate formations that are known or could reasonably be expected to contain Hydrogen Sulfide. Therefore, a H_2S drilling operations plan is included with this APD. Hydrogen sulfide detection equipment will be operational and breathing equipment will be on location after drilling out the 20" casing shoe and until the 5 ½" casing is cemented. If while drilling the 17 ½" or 12 ¼" intermediate hole sections H_2S concentrations exceed 100 ppm the well will be shut-in and a remote operated choke installed. A remote operated choke will be installed as part of the 5000 psi BOP equipment rigged up after setting 9 5/8" casing and before drilling the 9 5/8" casing shoe. COG will comply with Onshore Order #6. All BOPE testing companies used by COG have H2S certified employees and will work on H2S locations. No major loss circulation zones have been reported in offsetting wells.

13. Anticipated Starting Date

Drilling operations will commence approximately on ***July 31, 2014*** with drilling and completion operations lasting approximately ***90*** days.

GEG 5.28.14

FID	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	TOWNSHIP	RANGE	SECTION	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	COG OPERATING LLC	WILD CAP STATE 006H	32.610617	-103.82999	19.0S	31E	36	330	S	380	W	13630	New (Not drilled or compl)
1	COG OPERATING LLC	WILD CAP STATE 007H	32.623326	-103.81961	19.0S	31E	36	330	N	1690	E	10955	New (Not drilled or compl)
2	COG OPERATING LLC	WILD CAP STATE COM 001	32.615161	-103.816218	19.0S	31E	36	1980	S	660	E	12941	Active
3	COG OPERATING LLC	WILD CAP STATE COM 002	32.618785	-103.824799	19.0S	31E	36	1980	N	1980	W	12950	Active
4	COG OPERATING LLC	WILD CAP STATE 003H	32.616041	-103.819452	19.0S	31E	36	2300	S	1650	E	9354	Active
5	COG OPERATING LLC	WILD CAP STATE 004H	32.623331	-103.815498	19.0S	31E	36	330	N	430	E	11082	New (Not drilled or compl)
6	ARGO ROYALTY CO	BURNER 001	32.607557	-103.800198	20.0S	32E	6	750	N	990	E	2925	Plugged
7	ENDURANCE RESOURCES LLC	POLEWSKI FEDERAL 001	32.62242	-103.811938	19.0S	32E	31	660	N	660	W	12976	Active
8	COG OPERATING LLC	STRING BEAN FEDERAL COM 002	32.615055	-103.799099	19.0S	32E	31	1980	S	660	E	12911	Active
9	SIETE OIL & GAS CORP	KACHINA FEDERAL 001	32.604258	-103.811898	20.0S	32E	6	1980	N	660	W	7460	Plugged
10	ASPEN OIL INC	PRINCESS D 002	32.619691	-103.808697	19.0S	32E	31	1650	N	1650	W	7150	Plugged
11	YATES PETROLEUM CORPORATION	FLOOD AFN FEDERAL 001	32.625141	-103.811948	19.0S	32E	30	330	S	660	W	7270	Active
12	TRITEX RESOURCES, L.L.C.	POLEWSKI FEDERAL 002	32.621505	-103.808678	19.0S	32E	31	990	N	1658	W	7303	Plugged
13	COG OPERATING LLC	CAP FEDERAL 001	32.607847	-103.807194	20.0S	32E	6	660	N	2100	W	12960	Active
14	COG OPERATING LLC	STRING BEAN FEDERAL COM 001	32.611515	-103.811896	19.0S	32E	31	660	S	660	W	12949	Active
15	COG OPERATING LLC	LIZARD POT FEDERAL 004H	32.614254	-103.816508	19.0S	31E	36	1650	S	750	E	9428	New (Not drilled or compl)
16	COG OPERATING LLC	DIRTY DOZEN STATE COM 001A	32.62231	-103.816053	19.0S	31E	36	701	N	601	E	0	New (Not drilled or compl)
17	COG OPERATING LLC	LIZARD POT FEDERAL 002H	32.61153	-103.824772	19.0S	31E	36	660	S	1980	W	9401	New (Not drilled or compl)
18	COG OPERATING LLC	LIZARD POT FEDERAL COM 003H	32.614254	-103.821599	19.0S	31E	36	1650	S	2310	E	4003	New (Not drilled or compl)
19	COG OPERATING LLC	DIRTY DOZEN FEDERAL COM 004H	32.614254	-103.816214	19.0S	31E	36	1650	S	660	E	9388	New (Not drilled or compl)
20	COG OPERATING LLC	DIRTY DOZEN STATE COM 002H	32.618792	-103.816235	19.0S	31E	36	1981	N	661	E	0	New (Not drilled or compl)
21	COG OPERATING LLC	LIZARD POT FEDERAL COM 001H	32.611525	-103.82908	19.0S	31E	36	660	S	660	W	9278	New (Not drilled or compl)
22	COG OPERATING LLC	DIRTY DOZEN FEDERAL COM 003H	32.614694	-103.816412	19.0S	31E	36	1810	S	720	E	9409	New (Not drilled or compl)

Nightcap 6 Federal #4H

NIGHTCAP 6 FEDERAL #1H, 2H & 4H

Melanie Parker <MParker@concho.com> Tue, Sep 16, 2014 at 7:50 AM
To: "Mason, Jennifer" <jamason@blm.gov>
Cc: Mayte Reyes <mreyes1@concho.com>

Jennifer,

The revised 20" Surface Casing Cement Program for the Nightcap 6 Federal #1H, 2H and 4H is:

Lead: 1100 sx Class "C" w/2% CC + 4% Gel, 1.75 cf/sx, 13.5 ppg, 9.2 gal/sx

Tail: 500 sx Class "C" w/2% CaCl2, 1.32 cf/sx, 14.8 ppg, 6.3 gal/sx

If you need anything more, please let me know.

Thank you!!

Melanie

575-748-6952 (direct)

From: Mason, Jennifer [mailto:jamason@blm.gov]
Sent: Tuesday, September 16, 2014 7:10 AM
To: Melanie Parker
Subject:

Did you ever find out the cement on the 20" casing for the nightcaps 1H, 2H, and 4H?

Thank you,

Jennifer Mason

Bureau of Land Management

Project: Lea County, NM (NAD27 NME)
Site: Nightcap 6 Federal
Well: #4H
Wellbore: WB1
Design: Plan #1 03-03-14

PHOENIX TECHNOLOGY SERVICES

Azimuths to Grid North
True North: -0.28°
Magnetic North: 7.11°

Magnetic Field
Strength: 48550.6snT
Dip Angle: 60.44°
Date: 03/03/2014
Model: IGRF2010_14

WELL DETAILS

Ground Level: 3498.50

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	586390.00	660307.00	32° 36' 39.64146 N	103° 48' 45.81464 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	8829.23	0.00	0.00	8829.23	0.00	0.00	0.00	0.00	0.00		KOP, 11°/100' Build
3	9636.96	88.85	171.05	9350.00	-504.20	79.41	11.00	171.05	507.26		LP, Begin 3°/100' Turn
4	9925.97	88.85	179.72	9355.82	-791.95	102.63	3.00	90.11	795.76		Hold 88.85° Inc, 179.72° Azm
5	14602.93	88.85	179.72	9450.00	-5467.90	125.30	0.00	0.00	5468.01	PBHL-Nightcap 6 Fed #4H	TD at 14602.93

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PP-Nightcap 6 Fed #4H	9357.07 - plan hits target center	-854.00	102.93	585536.00	660409.93	32° 36' 31.18583 N	103° 48' 44.66024 W	Point
PBHL-Nightcap 6 Fed #4H	9450.00 - plan hits target center	-5467.90	125.30	580922.10	660432.30	32° 35' 45.52849 N	103° 48' 44.66295 W	Point

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 #4H, Grid North

Latitude: 32° 36' 39.64146 N
Longitude: 103° 48' 45.81464 W

Grid East: 660307.00
Grid North: 586390.00
Scale Factor: 1.000

Geomagnetic Model: IGRF2010_14
Sample Date: 03-Mar-14
Magnetic Declination: 7.39°
Dip Angle from Horizontal: 60.44°
Magnetic Field Strength: 48551

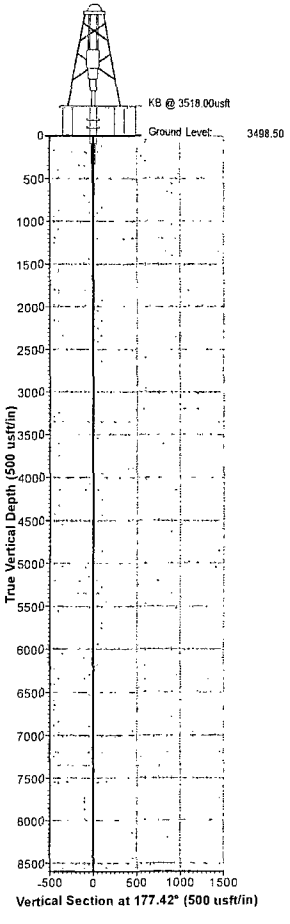
To convert a Magnetic Direction to a Grid Direction, Add 7.11°
To convert a Magnetic Direction to a True Direction, Add 7.39° East
To convert a True Direction to a Grid Direction, Subtract 0.28°

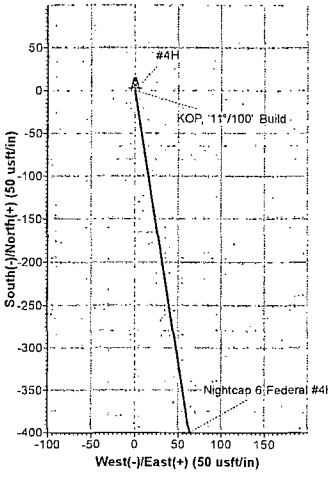
FORMATION TOP DETAILS

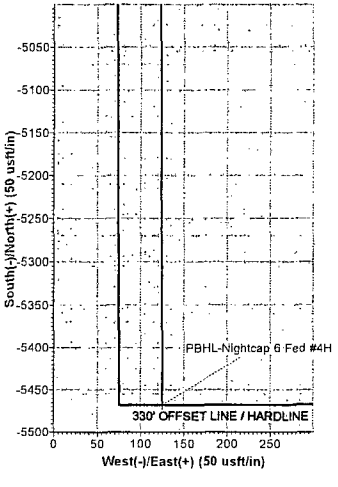
No formation data is available

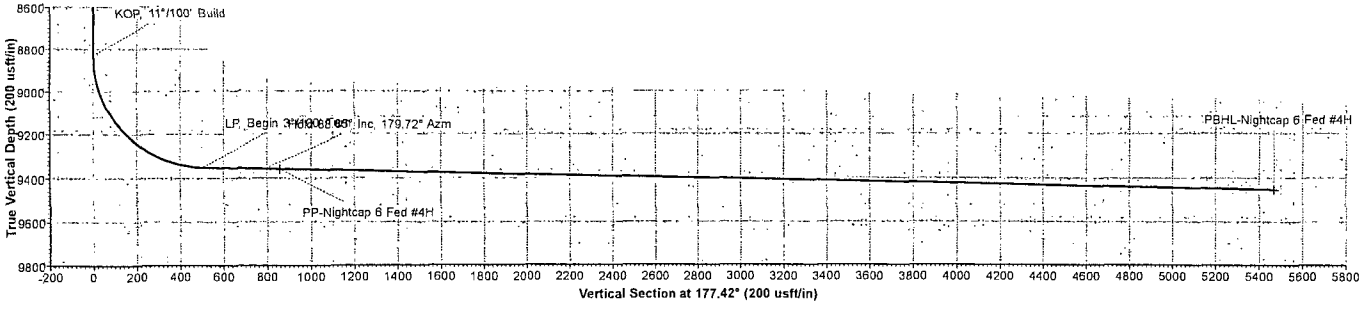
LEGEND

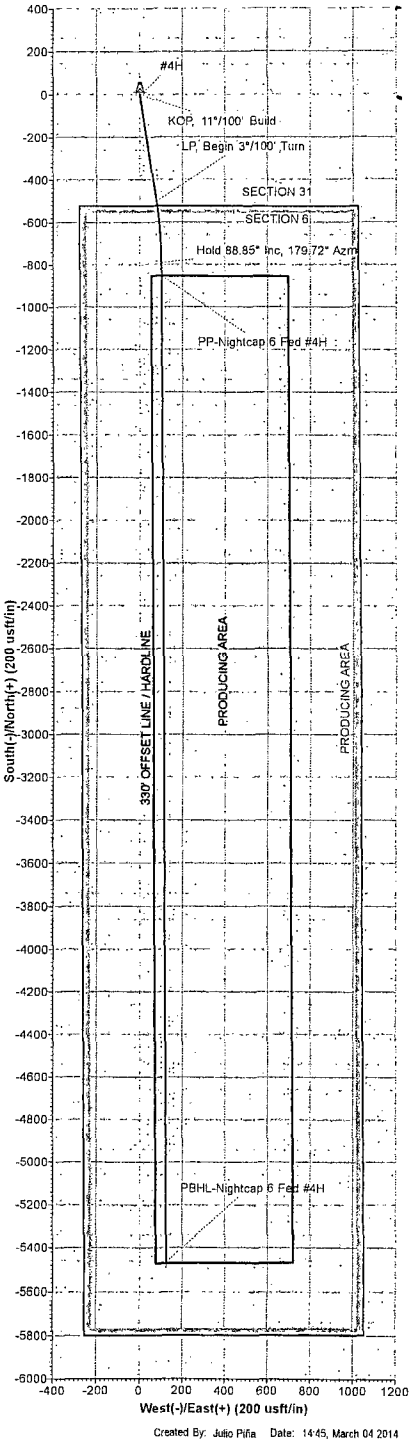
#4H, WB1, Surveys (Basic 46) V0
Plan #1 03-03-14











Created By: Julio Piña Date: 14:45, March 04 2014

CONCHO

COG Operating LLC

Lea County, NM (NAD27 NME)
Nightcap 6 Federal
#4H

WB1

Plan: Plan #1 03-03-14
Surface: 520' FSL, 280' FWL, Sec 31, T19S, R32E, Lot #4
PP: 330' FNL, 380' FWL, Sec 6, T20S, R32E, Lot #4
BHL: 330' FSL, 380' FWL, Sec 6, T20S, R32E, Lot #7

Standard Planning Report

04 March, 2014

PHOENIX
TECHNOLOGY SERVICES

Database:	GCR DB	**Local Co-ordinate Reference:**	Well #4H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3518.00usft
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3518.00usft
Site:	Nightcap 6 Federal	**North Reference:**	Grid
Well:	#4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 03-03-14		

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	Nightcap 6 Federal				
Site Position:		**Northing:**	587,656.00 usft	**Latitude:**	32° 36' 51.95144 N
From:	Map	**Easting:**	664,734.50 usft	**Longitude:**	103° 47' 53.97918 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.29 °

Well	#4H					
Well Position	**+N/-S**	-1,266.00 usft	**Northing:**	586,390.00 usft	**Latitude:**	32° 36' 39.64146 N
	+E/-W	-4,427.50 usft	**Easting:**	660,307.00 usft	**Longitude:**	103° 48' 45.81465 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,498.50 usft

Wellbore	WB1				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010_14	03/03/14	7.39	60.44	48,551

Design	Plan #1 03-03-14				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	0.00	0.00	0.00	177.42	

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	
8,829.23	0.00	0.00	8,829.23	0.00	0.00	0.00	0.00	0.00	0.00	
9,636.96	88.85	171.05	9,350.00	-504.20	79.41	11.00	11.00	0.00	171.05	
9,925.97	88.85	179.72	9,355.82	-791.95	102.63	3.00	0.00	3.00	90.11	
14,602.93	88.85	179.72	9,450.00	-5,467.90	125.30	0.00	0.00	0.00	0.00	PBHL-Nightcap 6 Fed

Database:	GCR DB	**Local Co-ordinate Reference:**	Well #4H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3518.00usft
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	KB @ 3518.00usft
Site:	Nightcap 6 Federal	**North Reference:**	Grid
Well:	#4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 03-03-14		

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
8,829.23	0.00	0.00	8,829.23	0.00	0.00	0.00	0.00	0.00	0.00
KOP, 11°/100' Build									
8,900.00	7.78	171.05	8,899.78	-4.74	0.75	4.77	11.00	11.00	0.00
9,000.00	18.78	171.05	8,996.96	-27.41	4.32	27.57	11.00	11.00	0.00
9,100.00	29.78	171.05	9,087.97	-67.97	10.70	68.38	11.00	11.00	0.00
9,200.00	40.78	171.05	9,169.47	-124.94	19.68	125.70	11.00	11.00	0.00
9,300.00	51.78	171.05	9,238.47	-196.23	30.90	197.42	11.00	11.00	0.00
9,400.00	62.78	171.05	9,292.44	-279.22	43.97	280.91	11.00	11.00	0.00
9,500.00	73.78	171.05	9,329.38	-370.85	58.40	373.10	11.00	11.00	0.00
9,600.00	84.78	171.05	9,347.94	-467.76	73.67	470.60	11.00	11.00	0.00
9,636.96	88.85	171.05	9,350.00	-504.20	79.41	507.26	11.00	11.00	0.00
LP, Begin 3°/100' Turn									
9,700.00	88.85	172.94	9,351.26	-566.62	88.18	570.01	3.00	0.00	3.00
9,800.00	88.84	175.94	9,353.28	-666.11	97.87	669.84	3.00	0.00	3.00
9,900.00	88.85	178.94	9,355.29	-765.98	102.33	769.81	3.00	0.00	3.00
9,925.97	88.85	179.72	9,355.82	-791.95	102.63	795.76	3.00	0.00	3.00
Hold 88.85° Inc, 179.72° Azm									
9,988.04	88.85	179.72	9,357.07	-854.00	102.93	857.76	0.00	0.00	0.00
PP-Nightcap 6 Fed #4H									
10,000.00	88.85	179.72	9,357.31	-865.96	102.99	869.71	0.00	0.00	0.00
10,100.00	88.85	179.72	9,359.32	-965.94	103.47	969.61	0.00	0.00	0.00
10,200.00	88.85	179.72	9,361.34	-1,065.92	103.96	1,069.51	0.00	0.00	0.00
10,300.00	88.85	179.72	9,363.35	-1,165.89	104.44	1,169.41	0.00	0.00	0.00
10,400.00	88.85	179.72	9,365.36	-1,265.87	104.93	1,269.31	0.00	0.00	0.00
10,500.00	88.85	179.72	9,367.38	-1,365.85	105.41	1,369.21	0.00	0.00	0.00
10,600.00	88.85	179.72	9,369.39	-1,465.83	105.90	1,469.11	0.00	0.00	0.00
10,700.00	88.85	179.72	9,371.40	-1,565.81	106.38	1,569.01	0.00	0.00	0.00
10,800.00	88.85	179.72	9,373.42	-1,665.79	106.87	1,668.91	0.00	0.00	0.00
10,900.00	88.85	179.72	9,375.43	-1,765.77	107.35	1,768.81	0.00	0.00	0.00
11,000.00	88.85	179.72	9,377.45	-1,865.74	107.83	1,868.71	0.00	0.00	0.00
11,100.00	88.85	179.72	9,379.46	-1,965.72	108.32	1,968.61	0.00	0.00	0.00
11,200.00	88.85	179.72	9,381.47	-2,065.70	108.80	2,068.50	0.00	0.00	0.00
11,300.00	88.85	179.72	9,383.49	-2,165.68	109.29	2,168.40	0.00	0.00	0.00
11,400.00	88.85	179.72	9,385.50	-2,265.66	109.77	2,268.30	0.00	0.00	0.00
11,500.00	88.85	179.72	9,387.51	-2,365.64	110.26	2,368.20	0.00	0.00	0.00
11,600.00	88.85	179.72	9,389.53	-2,465.62	110.74	2,468.10	0.00	0.00	0.00
11,700.00	88.85	179.72	9,391.54	-2,565.59	111.23	2,568.00	0.00	0.00	0.00
11,800.00	88.85	179.72	9,393.56	-2,665.57	111.71	2,667.90	0.00	0.00	0.00
11,900.00	88.85	179.72	9,395.57	-2,765.55	112.20	2,767.80	0.00	0.00	0.00
12,000.00	88.85	179.72	9,397.58	-2,865.53	112.68	2,867.70	0.00	0.00	0.00
12,100.00	88.85	179.72	9,399.60	-2,965.51	113.17	2,967.60	0.00	0.00	0.00
12,200.00	88.85	179.72	9,401.61	-3,065.49	113.65	3,067.50	0.00	0.00	0.00
12,300.00	88.85	179.72	9,403.62	-3,165.47	114.14	3,167.40	0.00	0.00	0.00
12,400.00	88.85	179.72	9,405.64	-3,265.44	114.62	3,267.30	0.00	0.00	0.00
12,500.00	88.85	179.72	9,407.65	-3,365.42	115.11	3,367.20	0.00	0.00	0.00
12,600.00	88.85	179.72	9,409.67	-3,465.40	115.59	3,467.09	0.00	0.00	0.00
12,700.00	88.85	179.72	9,411.68	-3,565.38	116.08	3,566.99	0.00	0.00	0.00
12,800.00	88.85	179.72	9,413.69	-3,665.36	116.56	3,666.89	0.00	0.00	0.00
12,900.00	88.85	179.72	9,415.71	-3,765.34	117.05	3,766.79	0.00	0.00	0.00
13,000.00	88.85	179.72	9,417.72	-3,865.32	117.53	3,866.69	0.00	0.00	0.00
13,100.00	88.85	179.72	9,419.73	-3,965.29	118.01	3,966.59	0.00	0.00	0.00
13,200.00	88.85	179.72	9,421.75	-4,065.27	118.50	4,066.49	0.00	0.00	0.00
13,300.00	88.85	179.72	9,423.76	-4,165.25	118.98	4,166.39	0.00	0.00	0.00

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Site:	Nightcap 6 Federal	North Reference:	Grid
Well:	#4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 03-03-14		

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)
13,400.00	88.85	179.72	9,425.78	-4,265.23	119.47	4,266.29	0.00	0.00	0.00
13,500.00	88.85	179.72	9,427.79	-4,365.21	119.95	4,366.19	0.00	0.00	0.00
13,600.00	88.85	179.72	9,429.80	-4,465.19	120.44	4,466.09	0.00	0.00	0.00
13,700.00	88.85	179.72	9,431.82	-4,565.17	120.92	4,565.99	0.00	0.00	0.00
13,800.00	88.85	179.72	9,433.83	-4,665.14	121.41	4,665.89	0.00	0.00	0.00
13,900.00	88.85	179.72	9,435.84	-4,765.12	121.89	4,765.79	0.00	0.00	0.00
14,000.00	88.85	179.72	9,437.86	-4,865.10	122.38	4,865.68	0.00	0.00	0.00
14,100.00	88.85	179.72	9,439.87	-4,965.08	122.86	4,965.58	0.00	0.00	0.00
14,200.00	88.85	179.72	9,441.89	-5,065.06	123.35	5,065.48	0.00	0.00	0.00
14,300.00	88.85	179.72	9,443.90	-5,165.04	123.83	5,165.38	0.00	0.00	0.00
14,400.00	88.85	179.72	9,445.91	-5,265.02	124.32	5,265.28	0.00	0.00	0.00
14,500.00	88.85	179.72	9,447.93	-5,364.99	124.80	5,365.18	0.00	0.00	0.00
14,600.00	88.85	179.72	9,449.94	-5,464.97	125.29	5,465.08	0.00	0.00	0.00
14,602.93	88.85	179.72	9,450.00	-5,467.90	125.30	5,468.01	0.00	0.00	0.00
TD at 14602.93 - PBHL-Nightcap 6 Fed #4H									

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
PP-Nightcap 6 Fed #4H - plan hits target center - Point	0.00	0.00	9,357.07	-854.00	102.93	585,536.00	660,409.93	32° 36' 31.18583 N	103° 48' 44.66024 W
PBHL-Nightcap 6 Fed # - plan hits target center - Point	0.00	0.01	9,450.00	-5,467.90	125.30	580,922.10	660,432.30	32° 35' 45.52849 N	103° 48' 44.66296 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
8,829.23	8,829.23	0.00	0.00	KOP, 11°/100' Build
9,636.96	9,350.00	-504.20	79.41	LP, Begin 3°/100' Turn
9,925.97	9,355.82	-791.95	102.63	Hold 88.85° Inc, 179.72° Azm
14,602.93	9,450.00	-5,467.90	125.30	TD at 14602.93

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

No records found.

PLSS Search:

Township: 20S **Range:** 32E

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

No records found.

PLSS Search:

Section(s): 6 **Township:** 20S **Range:** 32E

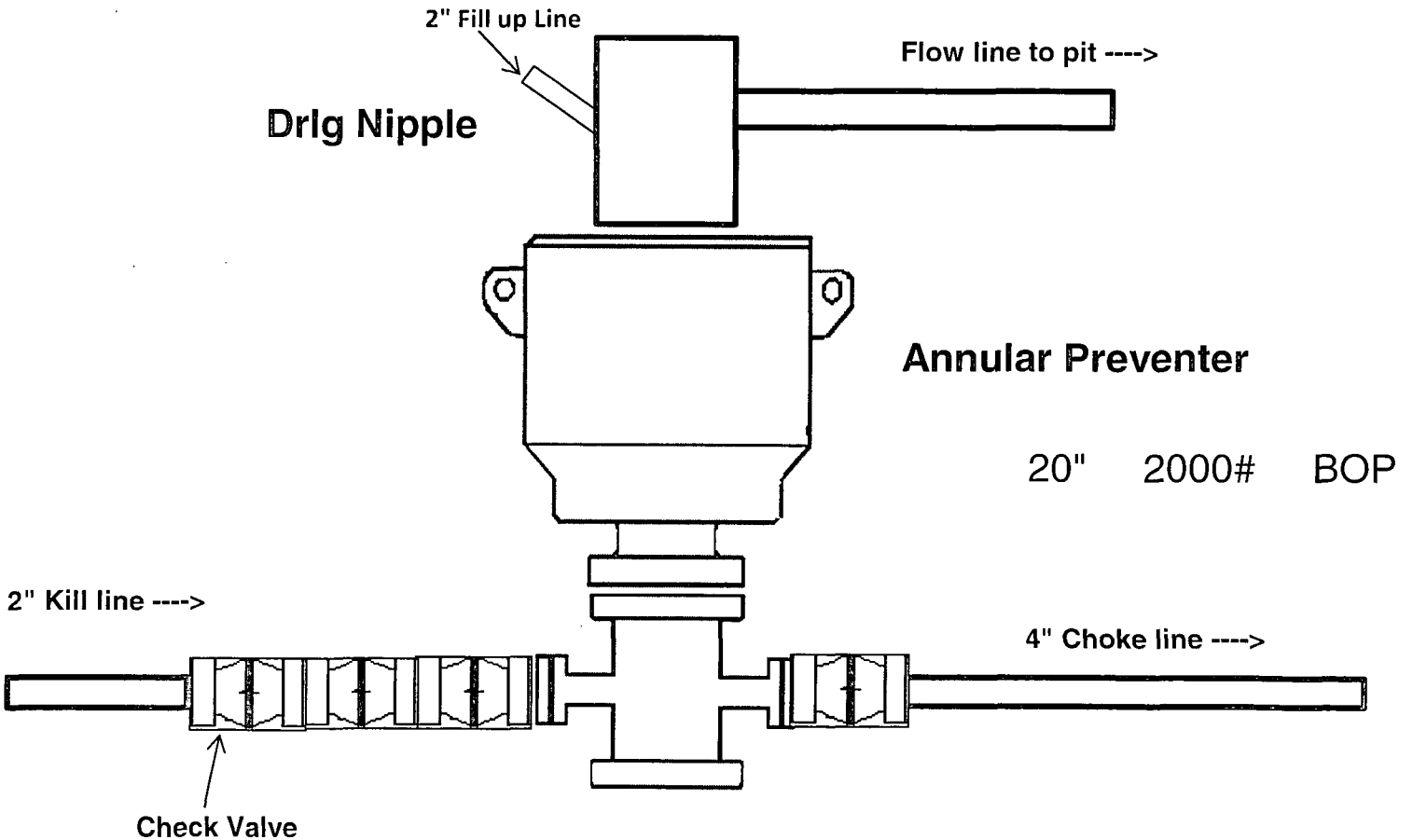
New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

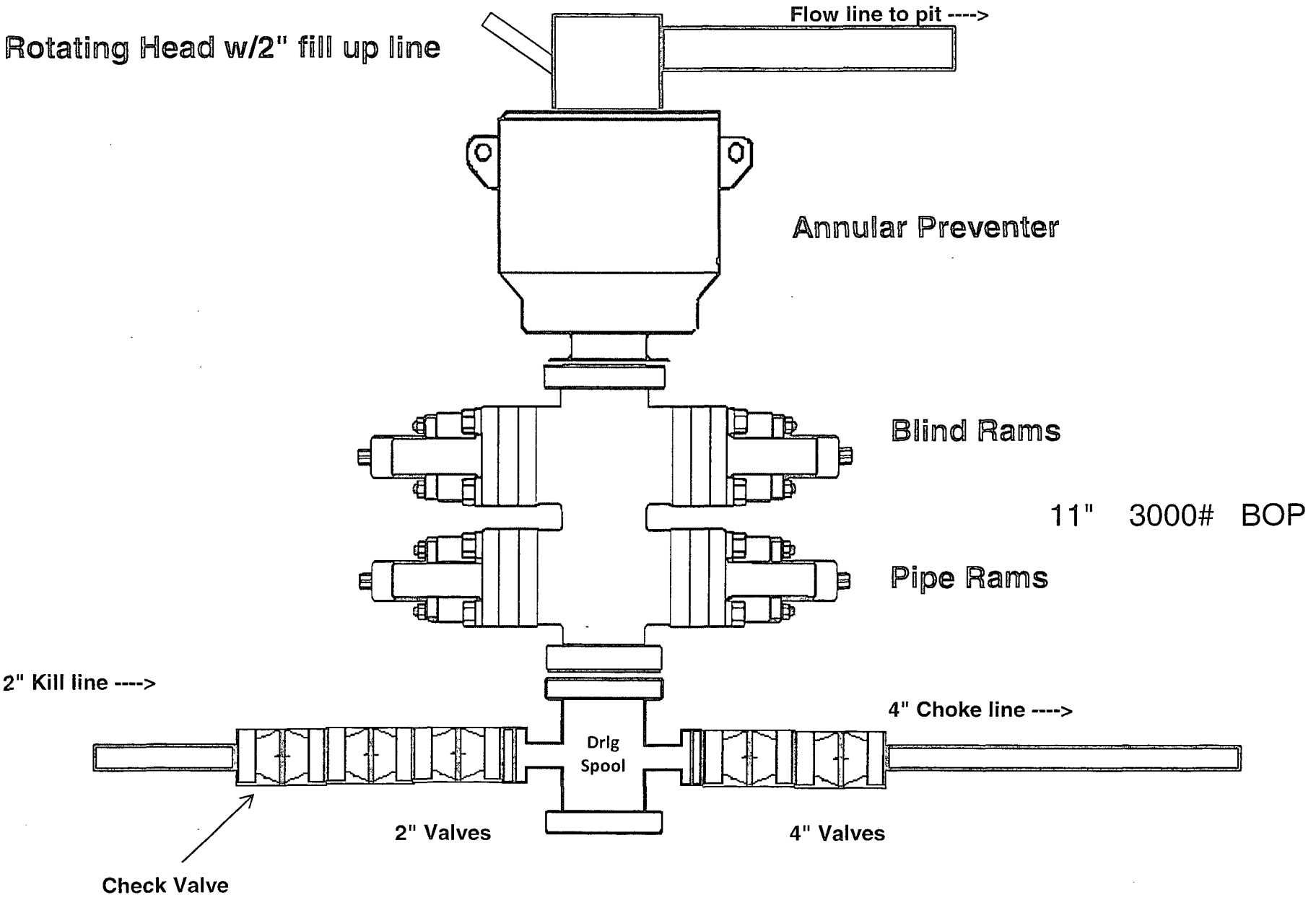
PLSS Search:

Section(s): 31 **Township:** 19S **Range:** 32E

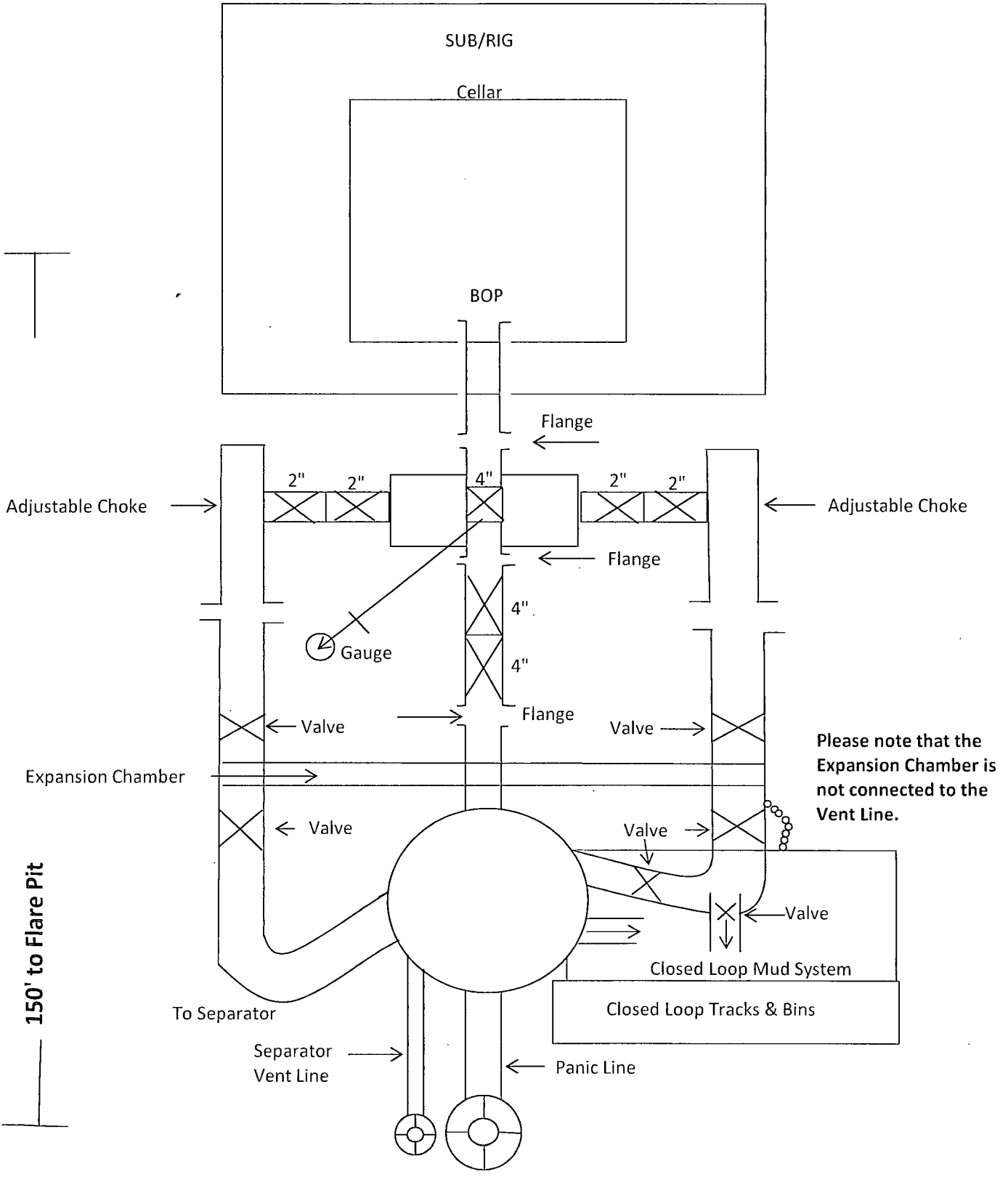
2,000 psi BOP Schematic



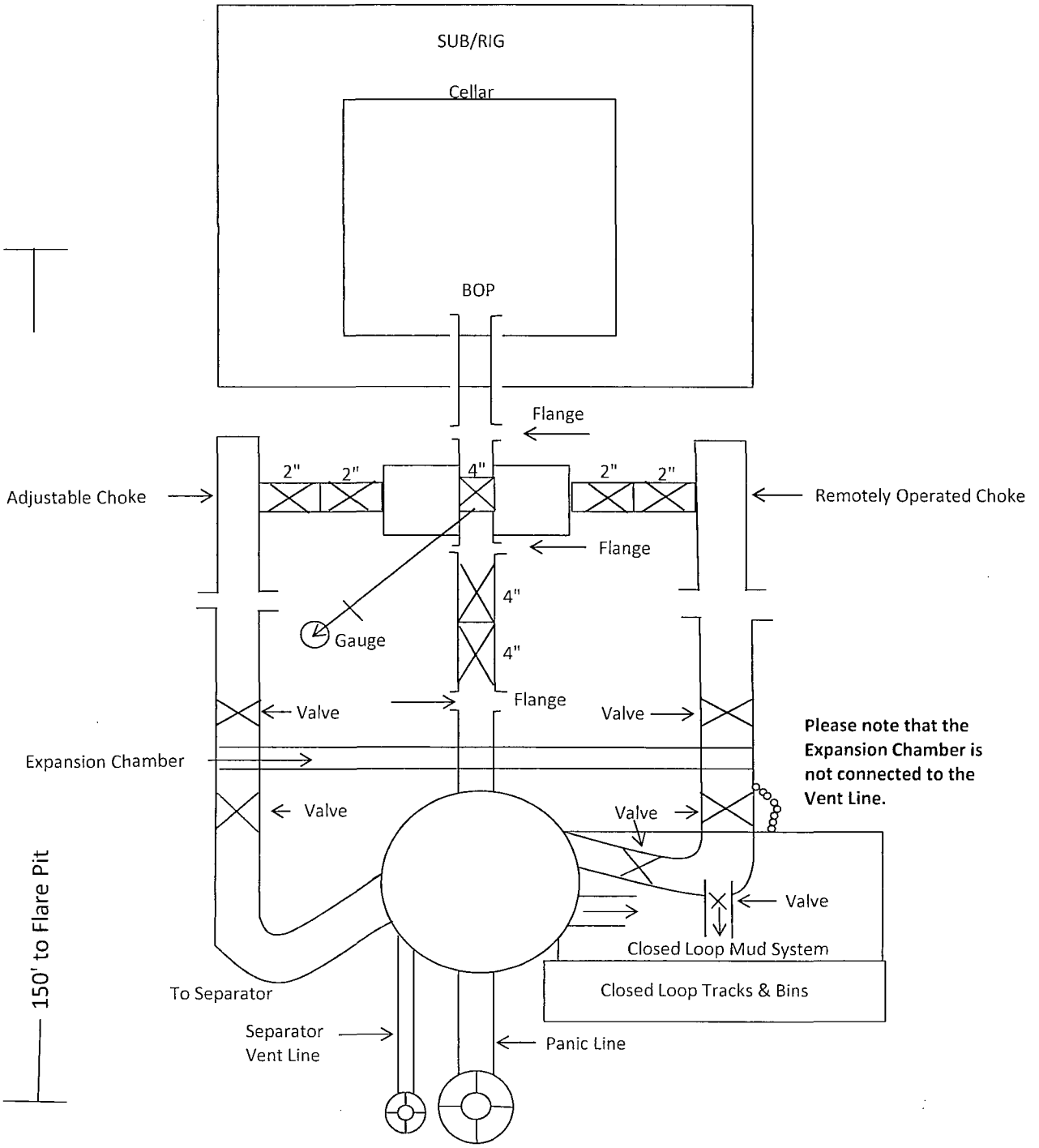
3,000 psi BOP Schematic



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'

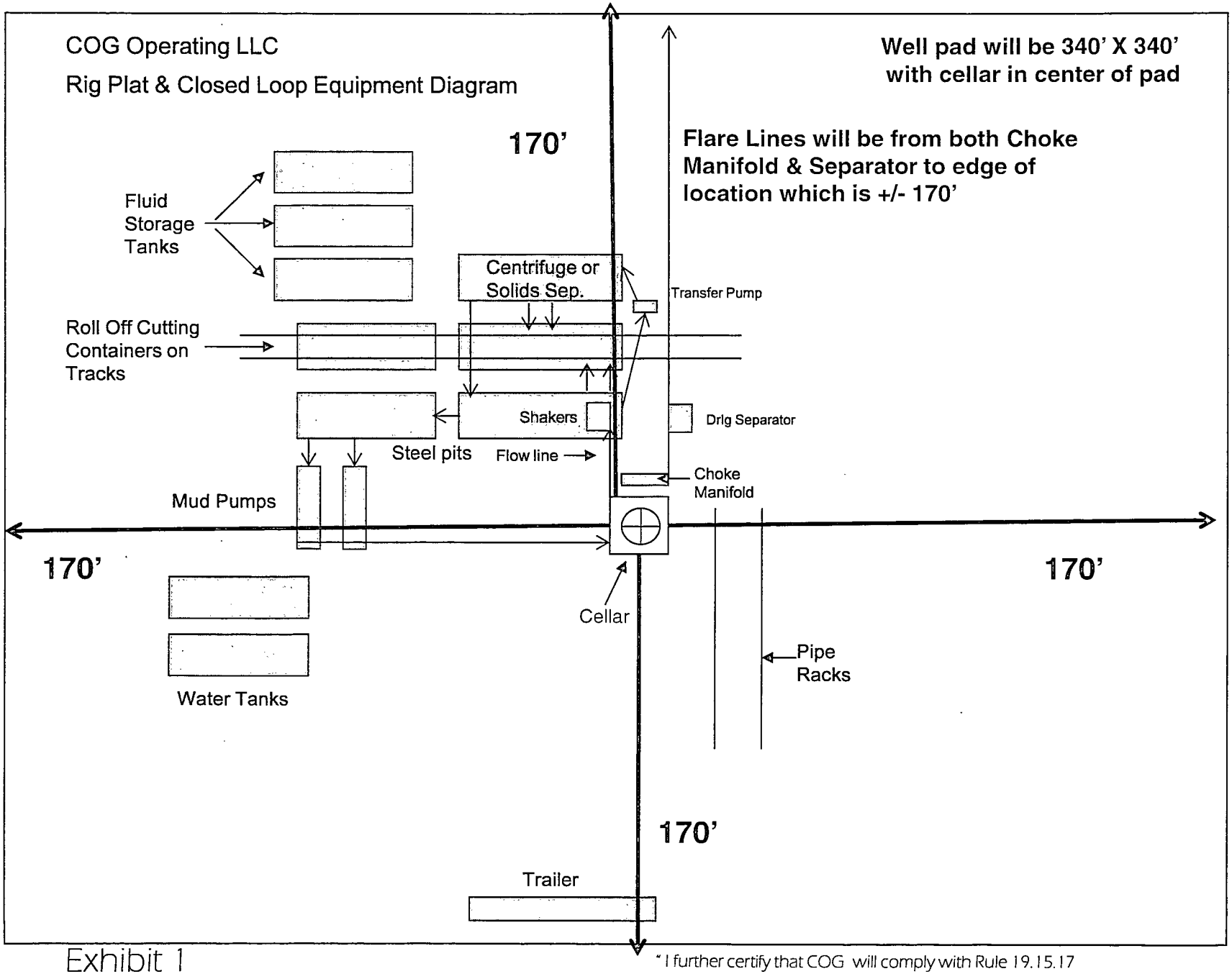


Exhibit 1

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

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

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