Form 3160-5
(August 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OCD
NOV 14 2016
RECEIVED

Carlsbad Field Office
OCD Hobbs

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

5. Lease Serial No.
NMNM116047

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
SMALLS FEDERAL 7H

2. Name of Operator
COG PRODUCTION LLC

Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

9. API Well No.
30-025-43068-00-X1

3a. Address
2208 W MAIN STREET
ARTESIA, NM 88210

3b. Phone No. (include area code)
Ph: 575-748-6945

10. Field and Pool, or Exploratory
WC-025 G06 S223421L

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 28 T22S R34E SESW 190FSL 2010FWL

11. County or Parish, and State
LEA COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Operating LLC, respectfully requests approval for the following changes to the original approved APD.

BHL Change
From: 330' FNL & 1980' FWL
To: 230' FNL & 1980' FWL
C102 attached.

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Drilling Changes
Drilling program, updated BOP, updated choke schematics and directional plan attached.

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #355791 verified by the BLM Well Information System
For COG PRODUCTION LLC, sent to the Hobbs
Committed to AFMSS for processing by DEBORAH MCKINNEY on 10/27/2016 (17DLM0050SE)

Name *(Printed/Typed)* MAYTE X REYES — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 10/25/2016

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By MUSTAFA HAQUE — Title PETROLEUM ENGINEER — Date 11/03/2016

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Hobbs

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

MSB/OCD 11/16/2016

Additional data for EC transaction #355791 that would not fit on the form

32. Additional remarks, continued

COG would like to remove the Flex Hose Variance.

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating, LLC.
LEASE NO.:	NMNM-116047
WELL NAME & NO.:	Smalls Federal 7H
SURFACE HOLE FOOTAGE:	0190' FSL & 2010' FWL
BOTTOM HOLE FOOTAGE	0230' FNL & 1980' FWL
LOCATION:	Section 28, T. 22 S., R 34 E., NMPM
COUNTY:	Lea County, New Mexico

All previous COAs still apply, except for the following:

A. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) for Water Basin:
After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Capitan Reef
Possible water flows in the Artesia Group, Salado, and Capitan Reef.
Possible lost circulation in the Red Beds, Rustler, Artesia Group, Capitan Reef, and Delaware.

1. The **16** inch surface casing shall be set at approximately **2190** feet (**in a competent bed below the Magenta Dolomite, which is a Member of the Rustler, and if salt is encountered, set casing at least 25 feet above the salt**) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Special Capitan Reef requirements:

If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:

- **Switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.**

- **Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.**

Intermediate casing shall be kept fluid filled while running into hole to meet BLM minimum collapse requirements.

2. The minimum required fill of cement behind the **11-3/4** inch intermediate casing, is:

☒ Cement to surface. If cement does not circulate see A.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef.**

3. The minimum required fill of cement behind the **8-5/8** inch intermediate casing, is:

Operator has proposed DV tool at depth of 3910', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool:

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

☒ Cement to surface. If cement does not circulate see A.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef. Excess calculates to 20% - Additional cement might be required.**

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

4. The minimum required fill of cement behind the **5-1/2** inch production casing is:

☒ Cement should tie-back at least **50 feet above the Capitan Reef** (Top of Capitan Reef estimated at3982'). Operator shall provide method of verification.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API 53.

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **8-5/8** second intermediate casing shoe shall be **3000 (3M)** psi.

4. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

    a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

    b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

    c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

    d. The results of the test shall be reported to the appropriate BLM office.

    e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

    f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

MHH 11032016

COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 28, T 22 S. , R 34 E.
Well: Smalls Federal 7H
Wellbore: Wellbore #1
Plan: Plan#1 (Smalls Federal 7H /Wellbore #1)
Patriot 2

CONCHO

INTEGRITY Directional Services

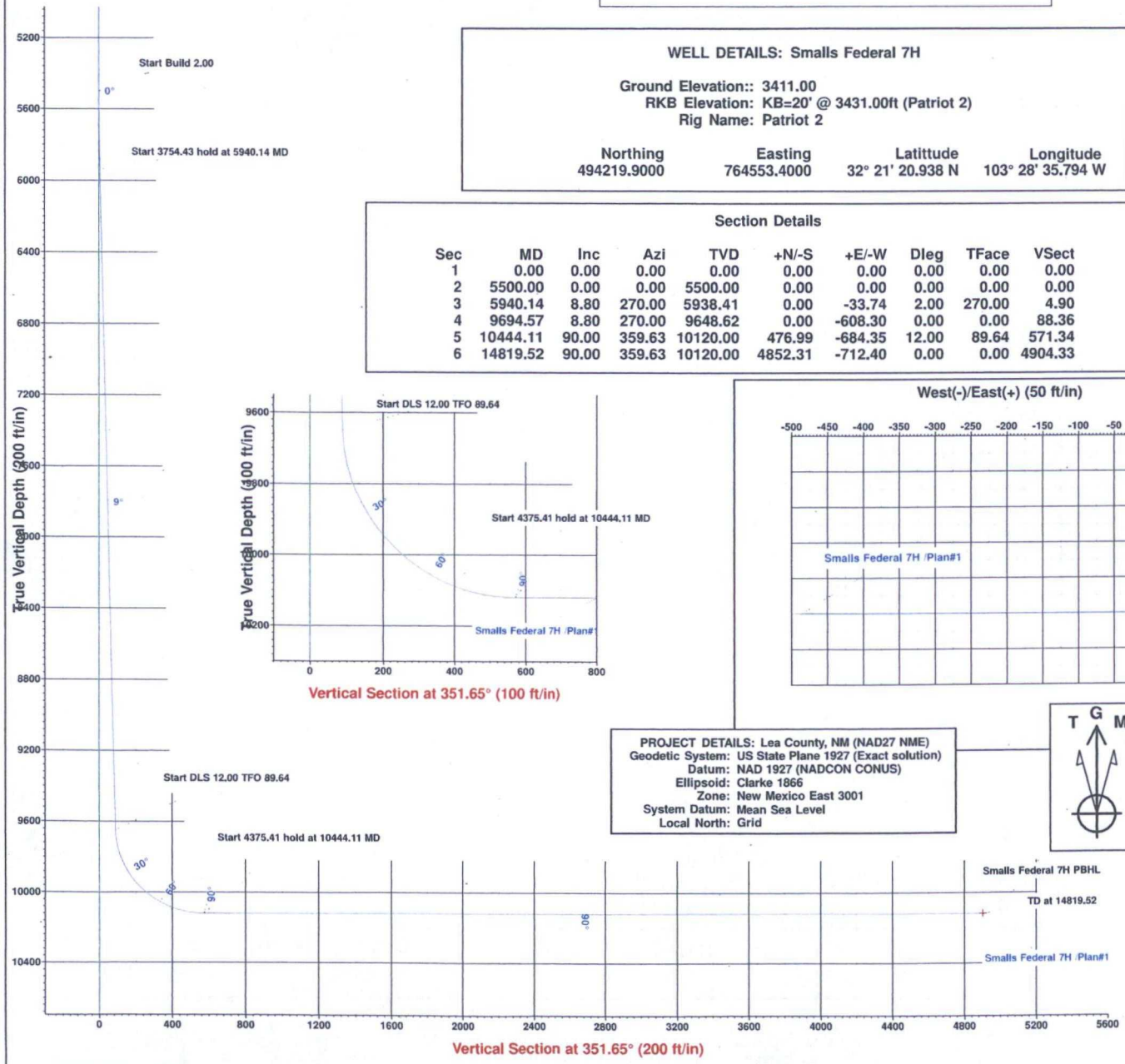
WELL DETAILS: Smalls Federal 7H

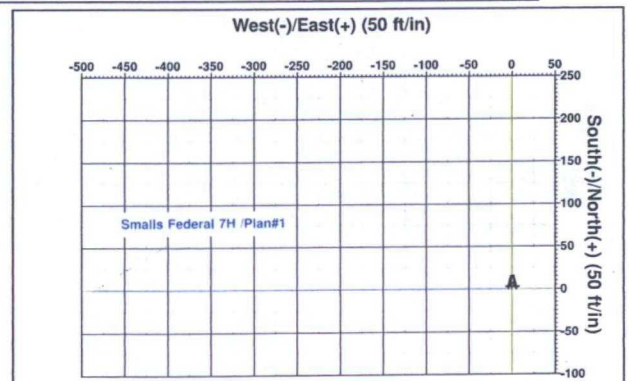
Ground Elevation:: 3411.00
RKB Elevation: KB=20' @ 3431.00ft (Patriot 2)
Rig Name: Patriot 2

Northing	Easting	Latittude	Longitude
494219.9000	764553.4000	32° 21' 20.938 N	103° 28' 35.794 W

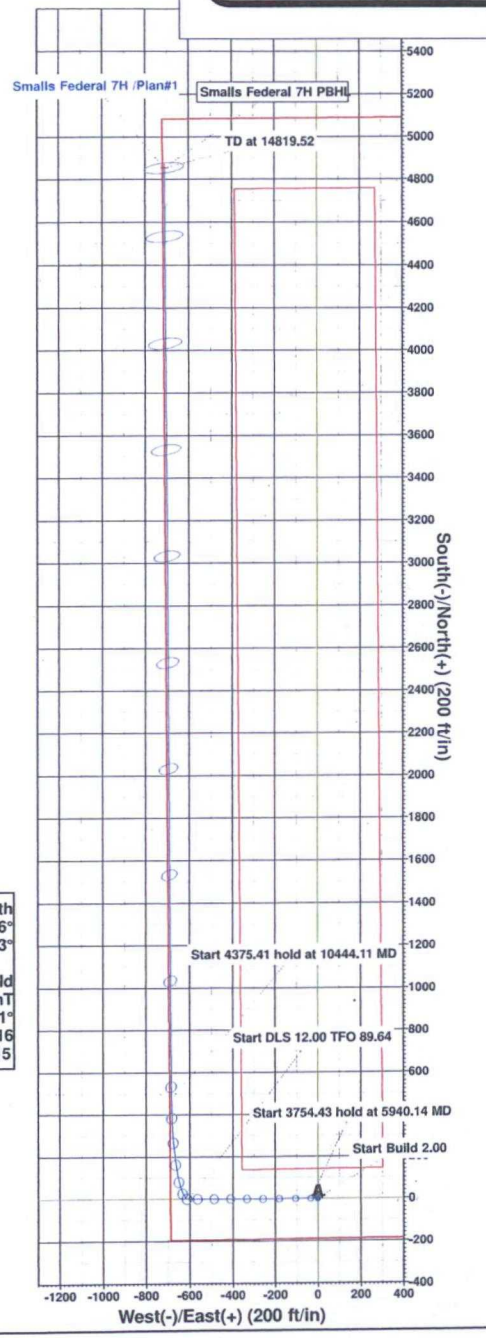
Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5500.00	0.00	0.00	5500.00	0.00	0.00	0.00	0.00	0.00
3	5940.14	8.80	270.00	5938.41	0.00	-33.74	2.00	270.00	4.90
4	9694.57	8.80	270.00	9648.62	0.00	-608.30	0.00	0.00	88.36
5	10444.11	90.00	359.63	10120.00	476.99	-684.35	12.00	89.64	571.34
6	14819.52	90.00	359.63	10120.00	4852.31	-712.40	0.00	0.00	4904.33





PROJECT DETAILS: Lea County, NM (NAD27 NME)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)
Sec. 28, T 22 S. , R 34 E.
Smalls Federal 7H

Wellbore #1

Plan: Plan#1

Standard Survey Report

24 October, 2016

INTEGRITY
Directional Services

Company:	COG Operating L L C	**Local Co-ordinate Reference:**	Well Smalls Federal 7H
Project:	Lea County, NM (NAD27 NME)	**TVD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Site:	Sec. 28, T 22 S. , R 34 E.	**MD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Well:	Smalls Federal 7H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan#1	**Database:**	EDM 5000.1 Multi User Db

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 Sec. 28, T 22 S. , R 34 E.

Site Position:		**Northing:**	494,207.1000 usft	**Latitude:**	32° 21' 20.937 N
From:	Map	**Easting:**	762,956.0000 usft	**Longitude:**	103° 28' 54.416 W
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.46 °

Well Smalls Federal 7H

Well Position	**+N/-S**	0.00 ft	**Northing:**	494,219.9000 usft	**Latitude:**	32° 21' 20.938 N
	+E/-W	0.00 ft	**Easting:**	764,553.4000 usft	**Longitude:**	103° 28' 35.794 W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	0.00 ft	**Ground Level:**	3,411.00 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/24/2016	6.99	60.21	48,093

Design Plan#1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	351.65

Survey Tool Program **Date** 10/24/2016

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	14,819.52	Plan#1 (Wellbore #1)	MWD	MWD - Standard

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00

Company:	COG Operating L L C	**Local Co-ordinate Reference:**	Well Smalls Federal 7H
Project:	Lea County, NM (NAD27 NME)	**TVD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Site:	Sec. 28, T 22 S. , R 34 E.	**MD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Well:	Smalls Federal 7H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan#1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

Company:	COG Operating L L C	**Local Co-ordinate Reference:**	Well Smalls Federal 7H
Project:	Lea County, NM (NAD27 NME)	**TVD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Site:	Sec. 28, T 22 S. , R 34 E.	**MD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Well:	Smalls Federal 7H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan#1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
5,600.00	2.00	270.00	5,599.98	0.00	-1.75	0.25	2.00	2.00	0.00
5,700.00	4.00	270.00	5,699.84	0.00	-6.98	1.01	2.00	2.00	0.00
5,800.00	6.00	270.00	5,799.45	0.00	-15.69	2.28	2.00	2.00	0.00
5,900.00	8.00	270.00	5,898.70	0.00	-27.88	4.05	2.00	2.00	0.00
5,940.14	8.80	270.00	5,938.41	0.00	-33.74	4.90	2.00	2.00	0.00
Start 3754.43 hold at 5940.14 MD									
6,000.00	8.80	270.00	5,997.57	0.00	-42.91	6.23	0.00	0.00	0.00
6,100.00	8.80	270.00	6,096.39	0.00	-58.21	8.46	0.00	0.00	0.00
6,200.00	8.80	270.00	6,195.21	0.00	-73.51	10.68	0.00	0.00	0.00
6,300.00	8.80	270.00	6,294.03	0.00	-88.82	12.90	0.00	0.00	0.00
6,400.00	8.80	270.00	6,392.85	0.00	-104.12	15.12	0.00	0.00	0.00
6,500.00	8.80	270.00	6,491.68	0.00	-119.42	17.35	0.00	0.00	0.00
6,600.00	8.80	270.00	6,590.50	0.00	-134.73	19.57	0.00	0.00	0.00
6,700.00	8.80	270.00	6,689.32	0.00	-150.03	21.79	0.00	0.00	0.00
6,800.00	8.80	270.00	6,788.14	0.00	-165.33	24.02	0.00	0.00	0.00
6,900.00	8.80	270.00	6,886.96	0.00	-180.64	26.24	0.00	0.00	0.00
7,000.00	8.80	270.00	6,985.79	0.00	-195.94	28.46	0.00	0.00	0.00
7,100.00	8.80	270.00	7,084.61	0.00	-211.24	30.69	0.00	0.00	0.00
7,200.00	8.80	270.00	7,183.43	0.00	-226.55	32.91	0.00	0.00	0.00
7,300.00	8.80	270.00	7,282.25	0.00	-241.85	35.13	0.00	0.00	0.00
7,400.00	8.80	270.00	7,381.07	0.00	-257.15	37.35	0.00	0.00	0.00
7,500.00	8.80	270.00	7,479.90	0.00	-272.46	39.58	0.00	0.00	0.00
7,600.00	8.80	270.00	7,578.72	0.00	-287.76	41.80	0.00	0.00	0.00
7,700.00	8.80	270.00	7,677.54	0.00	-303.06	44.02	0.00	0.00	0.00
7,800.00	8.80	270.00	7,776.36	0.00	-318.37	46.25	0.00	0.00	0.00
7,900.00	8.80	270.00	7,875.19	0.00	-333.67	48.47	0.00	0.00	0.00
8,000.00	8.80	270.00	7,974.01	0.00	-348.97	50.69	0.00	0.00	0.00
8,100.00	8.80	270.00	8,072.83	0.00	-364.28	52.91	0.00	0.00	0.00
8,200.00	8.80	270.00	8,171.65	0.00	-379.58	55.14	0.00	0.00	0.00
8,300.00	8.80	270.00	8,270.47	0.00	-394.88	57.36	0.00	0.00	0.00
8,400.00	8.80	270.00	8,369.30	0.00	-410.19	59.58	0.00	0.00	0.00
8,500.00	8.80	270.00	8,468.12	0.00	-425.49	61.81	0.00	0.00	0.00
8,600.00	8.80	270.00	8,566.94	0.00	-440.79	64.03	0.00	0.00	0.00
8,700.00	8.80	270.00	8,665.76	0.00	-456.10	66.25	0.00	0.00	0.00
8,800.00	8.80	270.00	8,764.58	0.00	-471.40	68.48	0.00	0.00	0.00
8,900.00	8.80	270.00	8,863.41	0.00	-486.70	70.70	0.00	0.00	0.00
9,000.00	8.80	270.00	8,962.23	0.00	-502.01	72.92	0.00	0.00	0.00
9,100.00	8.80	270.00	9,061.05	0.00	-517.31	75.14	0.00	0.00	0.00
9,200.00	8.80	270.00	9,159.87	0.00	-532.61	77.37	0.00	0.00	0.00
9,300.00	8.80	270.00	9,258.69	0.00	-547.92	79.59	0.00	0.00	0.00

Company:	COG Operating L L C	**Local Co-ordinate Reference:**	Well Smalls Federal 7H
Project:	Lea County, NM (NAD27 NME)	**TVD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Site:	Sec. 28, T 22 S. , R 34 E.	**MD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Well:	Smalls Federal 7H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan#1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,400.00	8.80	270.00	9,357.52	0.00	-563.22	81.81	0.00	0.00	0.00
9,500.00	8.80	270.00	9,456.34	0.00	-578.52	84.04	0.00	0.00	0.00
9,600.00	8.80	270.00	9,555.16	0.00	-593.83	86.26	0.00	0.00	0.00
9,694.57	8.80	270.00	9,648.62	0.00	-608.30	88.36	0.00	0.00	0.00
Start DLS 12.00 TFO 89.64									
9,700.00	8.83	274.25	9,653.98	0.03	-609.13	88.51	12.00	0.52	78.24
9,800.00	15.42	325.47	9,751.95	11.59	-624.38	102.17	12.00	6.59	51.22
9,900.00	26.14	341.24	9,845.38	43.51	-639.05	135.88	12.00	10.72	15.77
10,000.00	37.60	348.03	9,930.19	94.40	-652.51	188.18	12.00	11.47	6.80
10,100.00	49.30	351.98	10,002.68	162.03	-664.17	256.79	12.00	11.69	3.94
10,200.00	61.09	354.73	10,059.67	243.44	-673.51	338.69	12.00	11.79	2.75
10,300.00	72.92	356.91	10,098.67	335.08	-680.14	430.33	12.00	11.83	2.18
10,400.00	84.77	358.82	10,117.99	432.95	-683.76	527.68	12.00	11.85	1.92
10,444.11	90.00	359.63	10,120.00	476.99	-684.35	571.34	12.00	11.86	1.84
Start 4375.41 hold at 10444.11 MD									
10,500.00	90.00	359.63	10,120.00	532.88	-684.71	626.69	0.00	0.00	0.00
10,600.00	90.00	359.63	10,120.00	632.88	-685.35	725.72	0.00	0.00	0.00
10,700.00	90.00	359.63	10,120.00	732.88	-685.99	824.75	0.00	0.00	0.00
10,800.00	90.00	359.63	10,120.00	832.87	-686.64	923.78	0.00	0.00	0.00
10,900.00	90.00	359.63	10,120.00	932.87	-687.28	1,022.81	0.00	0.00	0.00
11,000.00	90.00	359.63	10,120.00	1,032.87	-687.92	1,121.84	0.00	0.00	0.00
11,100.00	90.00	359.63	10,120.00	1,132.87	-688.56	1,220.87	0.00	0.00	0.00
11,200.00	90.00	359.63	10,120.00	1,232.87	-689.20	1,319.90	0.00	0.00	0.00
11,300.00	90.00	359.63	10,120.00	1,332.86	-689.84	1,418.93	0.00	0.00	0.00
11,400.00	90.00	359.63	10,120.00	1,432.86	-690.48	1,517.96	0.00	0.00	0.00
11,500.00	90.00	359.63	10,120.00	1,532.86	-691.12	1,616.99	0.00	0.00	0.00
11,600.00	90.00	359.63	10,120.00	1,632.86	-691.76	1,716.02	0.00	0.00	0.00
11,700.00	90.00	359.63	10,120.00	1,732.86	-692.40	1,815.05	0.00	0.00	0.00
11,800.00	90.00	359.63	10,120.00	1,832.85	-693.05	1,914.09	0.00	0.00	0.00
11,900.00	90.00	359.63	10,120.00	1,932.85	-693.69	2,013.12	0.00	0.00	0.00
12,000.00	90.00	359.63	10,120.00	2,032.85	-694.33	2,112.15	0.00	0.00	0.00
12,100.00	90.00	359.63	10,120.00	2,132.85	-694.97	2,211.18	0.00	0.00	0.00
12,200.00	90.00	359.63	10,120.00	2,232.85	-695.61	2,310.21	0.00	0.00	0.00
12,300.00	90.00	359.63	10,120.00	2,332.84	-696.25	2,409.24	0.00	0.00	0.00
12,400.00	90.00	359.63	10,120.00	2,432.84	-696.89	2,508.27	0.00	0.00	0.00
12,500.00	90.00	359.63	10,120.00	2,532.84	-697.53	2,607.30	0.00	0.00	0.00
12,600.00	90.00	359.63	10,120.00	2,632.84	-698.17	2,706.33	0.00	0.00	0.00
12,700.00	90.00	359.63	10,120.00	2,732.84	-698.82	2,805.36	0.00	0.00	0.00
12,800.00	90.00	359.63	10,120.00	2,832.83	-699.46	2,904.39	0.00	0.00	0.00
12,900.00	90.00	359.63	10,120.00	2,932.83	-700.10	3,003.42	0.00	0.00	0.00
13,000.00	90.00	359.63	10,120.00	3,032.83	-700.74	3,102.45	0.00	0.00	0.00
13,100.00	90.00	359.63	10,120.00	3,132.83	-701.38	3,201.48	0.00	0.00	0.00
13,200.00	90.00	359.63	10,120.00	3,232.82	-702.02	3,300.51	0.00	0.00	0.00
13,300.00	90.00	359.63	10,120.00	3,332.82	-702.66	3,399.54	0.00	0.00	0.00

Company:	COG Operating L L C	**Local Co-ordinate Reference:**	Well Smalls Federal 7H
Project:	Lea County, NM (NAD27 NME)	**TVD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Site:	Sec. 28, T 22 S. , R 34 E.	**MD Reference:**	KB=20' @ 3431.00ft (Patriot 2)
Well:	Smalls Federal 7H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Plan#1	**Database:**	EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,400.00	90.00	359.63	10,120.00	3,432.82	-703.30	3,498.57	0.00	0.00	0.00
13,500.00	90.00	359.63	10,120.00	3,532.82	-703.94	3,597.60	0.00	0.00	0.00
13,600.00	90.00	359.63	10,120.00	3,632.82	-704.58	3,696.63	0.00	0.00	0.00
13,700.00	90.00	359.63	10,120.00	3,732.81	-705.23	3,795.66	0.00	0.00	0.00
13,800.00	90.00	359.63	10,120.00	3,832.81	-705.87	3,894.69	0.00	0.00	0.00
13,900.00	90.00	359.63	10,120.00	3,932.81	-706.51	3,993.72	0.00	0.00	0.00
14,000.00	90.00	359.63	10,120.00	4,032.81	-707.15	4,092.75	0.00	0.00	0.00
14,100.00	90.00	359.63	10,120.00	4,132.81	-707.79	4,191.79	0.00	0.00	0.00
14,200.00	90.00	359.63	10,120.00	4,232.80	-708.43	4,290.82	0.00	0.00	0.00
14,300.00	90.00	359.63	10,120.00	4,332.80	-709.07	4,389.85	0.00	0.00	0.00
14,400.00	90.00	359.63	10,120.00	4,432.80	-709.71	4,488.88	0.00	0.00	0.00
14,500.00	90.00	359.63	10,120.00	4,532.80	-710.35	4,587.91	0.00	0.00	0.00
14,600.00	90.00	359.63	10,120.00	4,632.80	-710.99	4,686.94	0.00	0.00	0.00
14,700.00	90.00	359.63	10,120.00	4,732.79	-711.64	4,785.97	0.00	0.00	0.00
14,800.00	90.00	359.63	10,120.00	4,832.79	-712.28	4,885.00	0.00	0.00	0.00
14,819.52	90.00	359.63	10,120.00	4,852.31	-712.40	4,904.33	0.00	0.00	0.00
TD at 14819.52									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Smalls Federal 7H PE	0.00	0.00	10,120.00	4,852.31	-712.40	499,072.2000	763,841.0000	32° 22' 9.008 N	103° 28' 43.647 W
- plan hits target center - Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
5500	5500	0	0	Start Build 2.00
5940	5938	0	-34	Start 3754.43 hold at 5940.14 MD
9695	9649	0	-608	Start DLS 12.00 TFO 89.64
10,444	10,120	477	-684	Start 4375.41 hold at 10444.11 MD
14,820	10,120	4852	-712	TD at 14819.52

Checked By: _____ Approved By: _____ Date: _____

COG Operating LLC, Smalls Federal 7H

1. Geologic Formations

TVD of target	10,120'	Pilot hole depth	N/A
MD at TD:	14,820'	Deepest expected fresh water:	605'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1888'	Water	
Top of Salt	2168'	Salt	
Tansill	3607'	Barren	
Yates	3678'	Oil/Gas	
Capitan Reef	3982'	Water	Possible lost circ
Delaware Group	5179'	Oil/Gas	Possible lost circ
Bone Spring	8475'	Oil/Gas	
2nd Bone Spring Sand	10004'	Target Zone	
3rd Bone Spring Sand	10899'	Oil/Gas	

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
20"	0	~~2120~~ 2190'	16"	75	J55	BTC	1.08	2.83	5.91
14.75"	0	3750	11.75	47	J55	STC	1.17	1.3	2.69
10.625"	0	5225	8.625	32	K55	STC	1.04	1.55	2.86
7.875"	0	14,820	5.5	17	P110	LTC	1.42	2.03	1.83
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas were used on all SF calculations.
- Intermediate casings will be kept >= 1/3 full; to avoid approaching collapse pressures. SF @ 1/3 full = 1.63 → SEE COA

	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?	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?	

2. Cementing Program — SEE COA

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	1450	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
1st Inter.	1450	13.5	1.75	9	12	Lead: Econocem HLC 65:35:6 + 5% Salt
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
2nd Int 1st Stage	400	12.7	1.98	10.6	16	1st stage Lead: Econocem HLC 65:35:6 + 5% Salt
	250	14.8	1.34	6.34	8	1st stage Tail: Class C + 2% CaCl
2nd Int 2nd Stage	600	13.5	1.75	9.11	12	2nd stage Lead: Class C + 4% Gel (DV @ ~1800')
	100	14.8	1.34	6.34	8	2nd stage Tail: Class C + 2% CaCl
5.5 Prod 1 Stage	800	11	2.81	17.4	48	Lead: Halliburton NeoCem Slurry
	850	13.2	1.4	6.9	16	Tail: Halliburton NeoCem Slurry

ow cement -SEE COA

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	95%
1st Intermediate	0'	110%
2nd Intermediate 1st Stage	DVT	150%
2nd Intermediate 2nd Stage	0	100% OH 20% CH Stage Tool at ~3910'
Production	3932'	40% OH to Tie In to 50' above capitan reef

Pilot hole depth: NA'
KOP: 9840'

4. Pressure Control Equipment → SEE COA

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
14-3/4"	20"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
10-5/8"	13-5/8"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
7-7/8"	11"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			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.

Y	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? No.
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. See attached schematic.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6-8.8	28-34	N/C
Surf shoe	11-3/4" Int shoe (3450')	Saturated Brine	10.0-10.2	28-34	N/C
11-3/4" Int shoe	8-5/8" Int. Shoe (5,550')	Fresh Water	8.4-8.6	28-34	N/C
8-5/8" Int shoe	Lateral TD	Cut Brine	8.6 – 9.2	28-34	N/C

*If lost circulation is encountered, will switch to fresh water.

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?	Pason PVT

6. Logging and Testing Procedures

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

Additional logs planned		Interval
X	Mud log	Production
	Triple Combo	Pilot Hole TD – Intermediate Casing
	GR-Neutron	Intermediate Casing - Surface

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	4840 psi
Abnormal Temperature	No

Mitigation measure for abnormal conditions.

- Lost circulation material/sweeps/mud scavengers.
- Maintain stock of LCM and weighting materials onsite.

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

	H2S is present
	H2S Plan attached

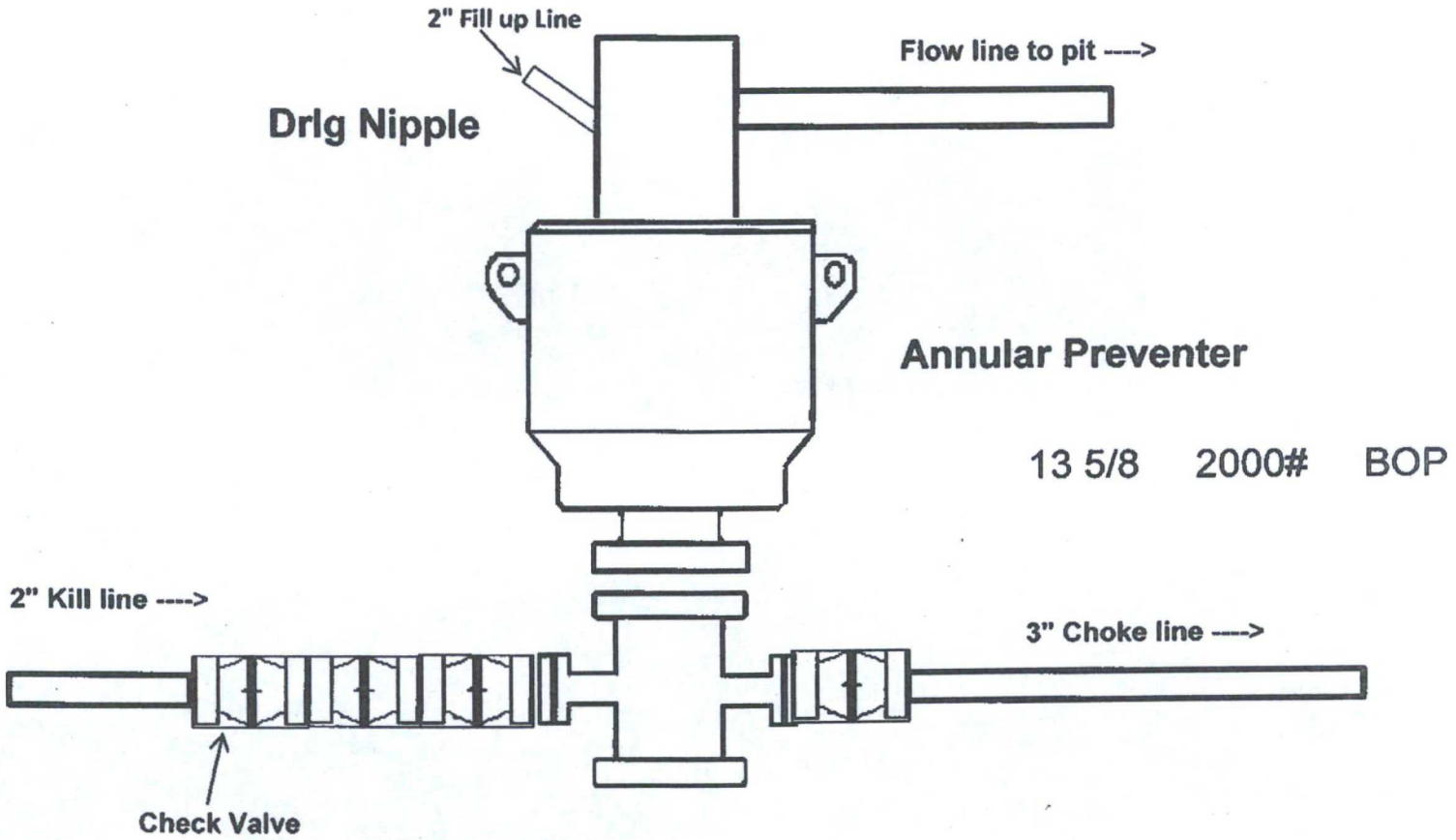
8. Other facets of operation

Is this a walking operation? NO.
Will be pre-setting casing? No.
Will well be hydraulically fractured? Yes.

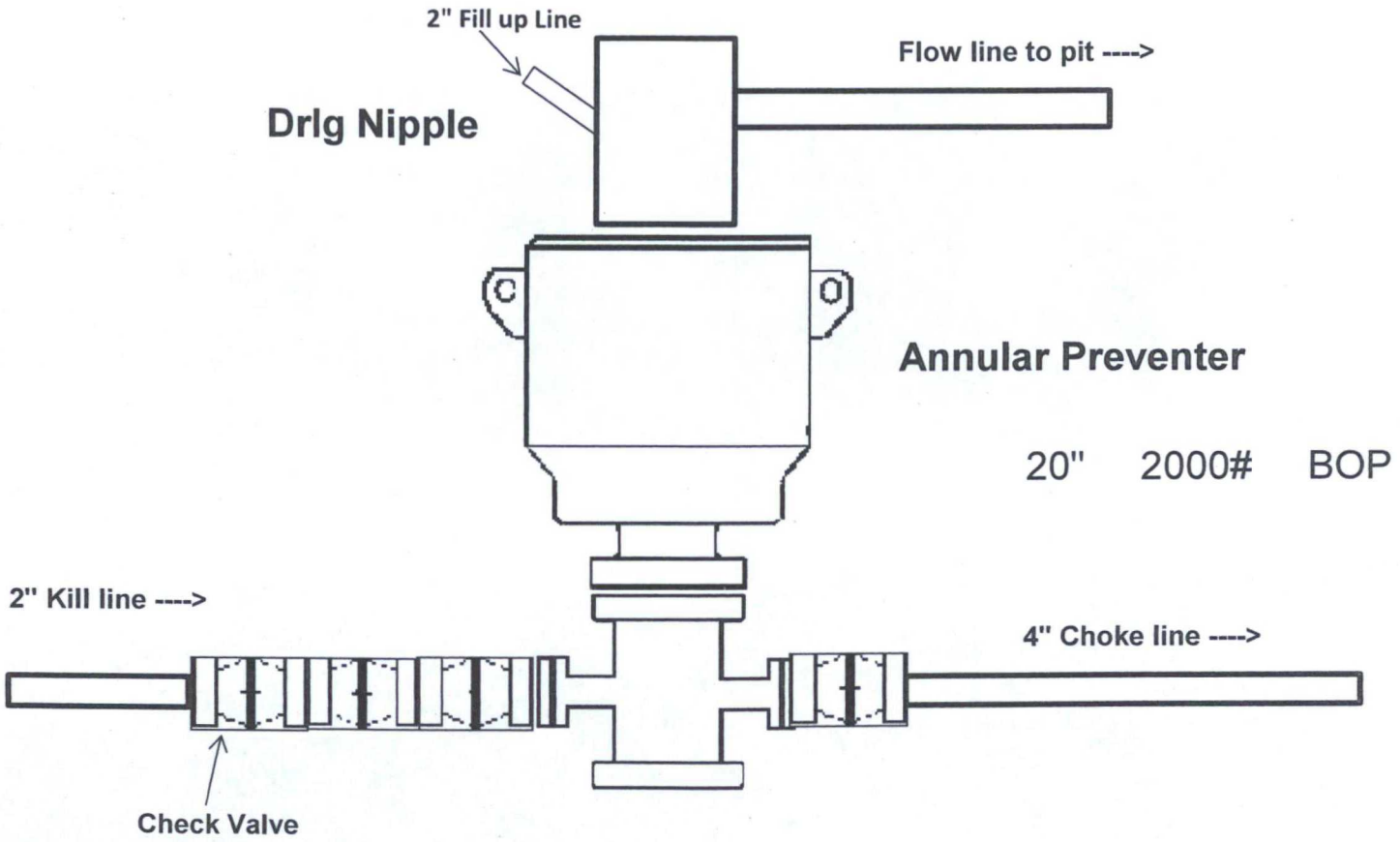
Attachments

- BOP & Choke Schematics
- Directional Plan
- Rig plat

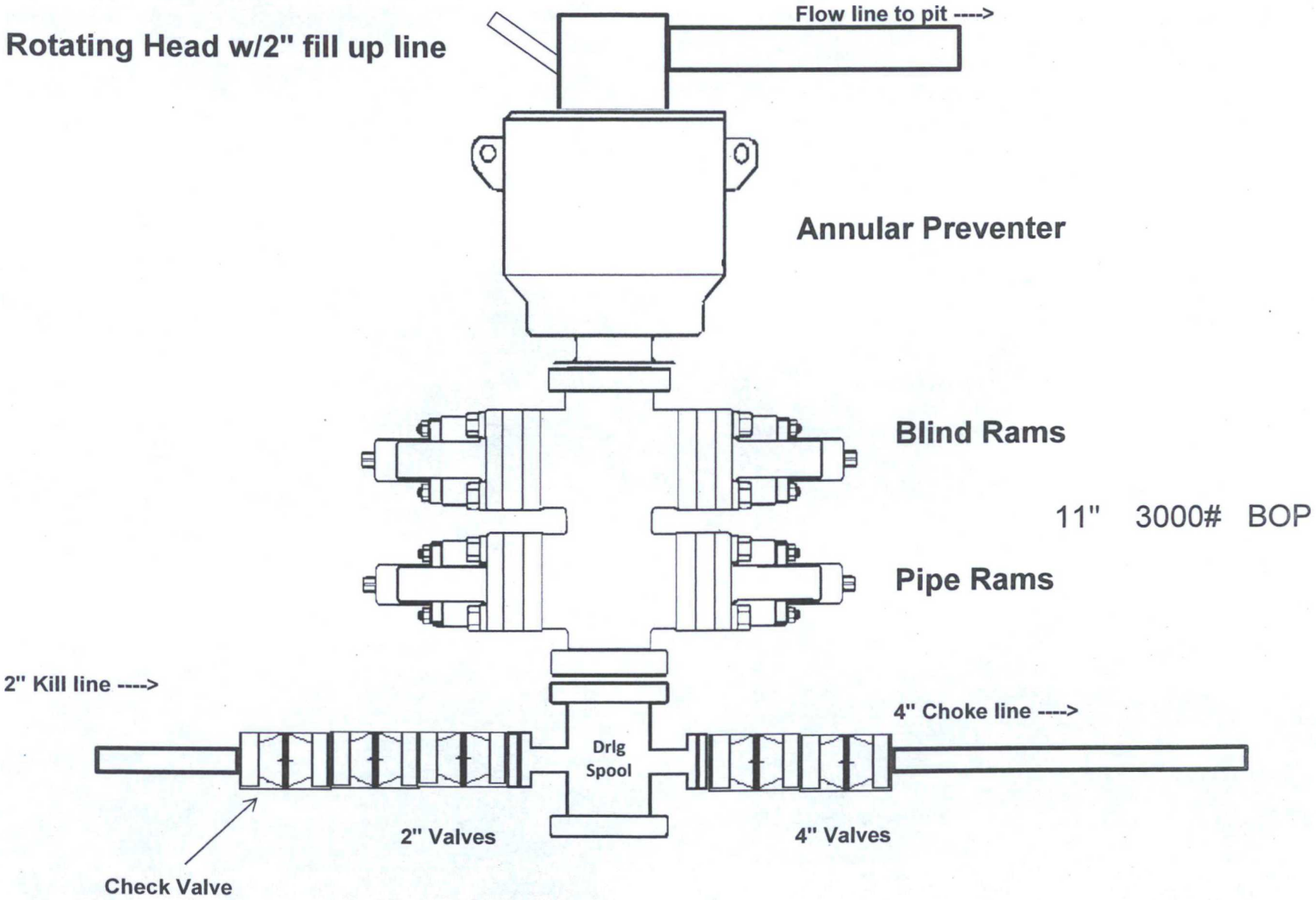
2,000 psi BOP Schematic



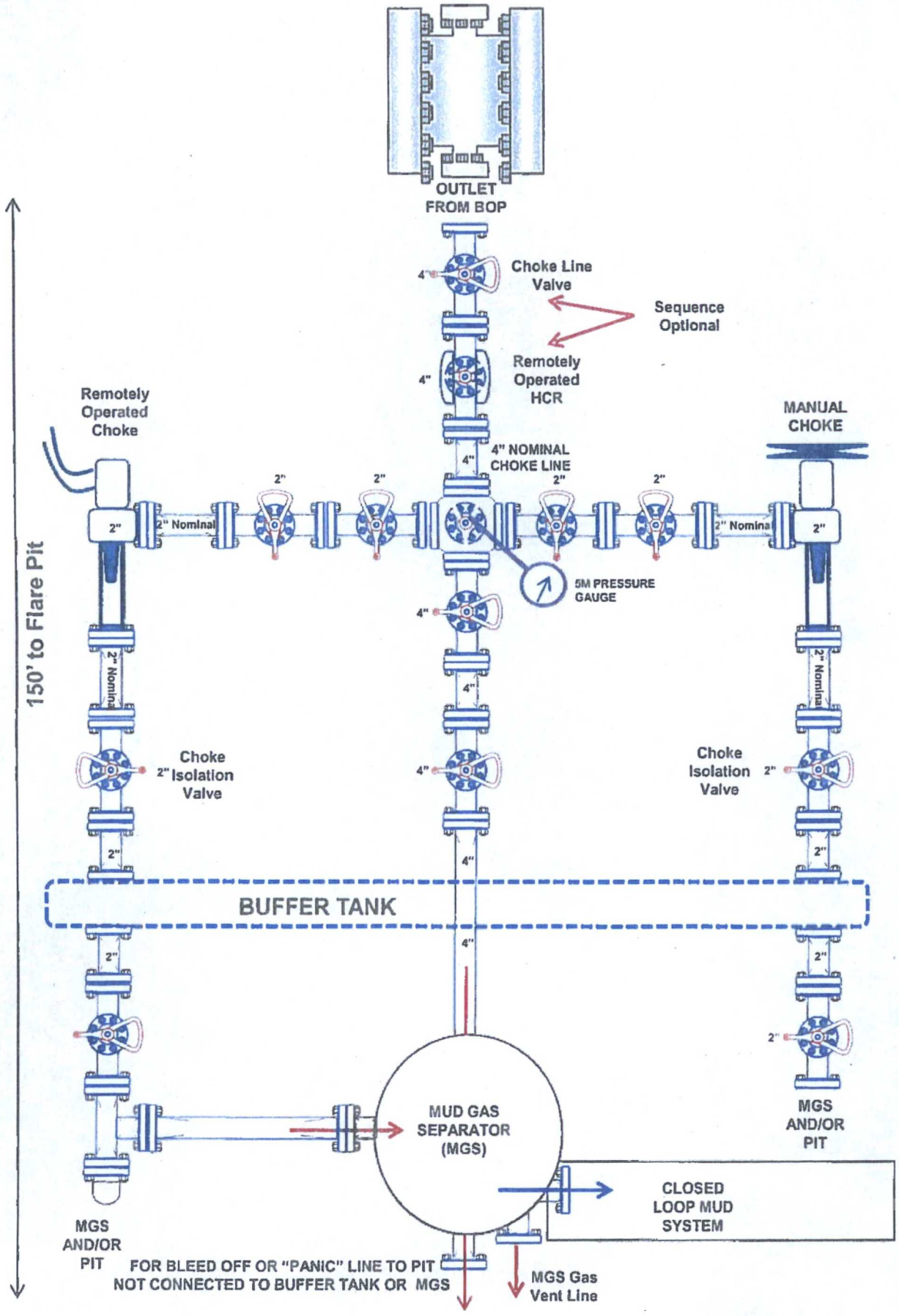
2,000 psi BOP Schematic



3,000 psi BOP Schematic



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



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