

AT5-11-66

OCD Artesia

Form 3160-3
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

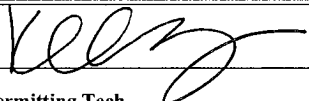
FORM APPROVED
OMB No 1004-0137
Expires March 31, 2007

1a. Type of work ☒ DRILL ☐ REENTER		5 Lease Serial No. NMLC049998A
1b. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other ☐ Single Zone ☐ Multiple Zone		6 If Indian, Allottee or Tribe Name N/A
2 Name of Operator COG Operating LLC		7 If Unit or CA Agreement, Name and No. N/A
3a Address 550 W. Texas Ave., Suite 1300 Midland, TX 79701		8 Lease Name and Well No. FOSTER EDDY #21
3b Phone No. (include area code) 432-685-4384		9 API Well No. 30-015- 39121
4 Location of Well (Report location clearly and in accordance with any State requirements *) At surface 940' FNL & 2050' FEL, Unit B At proposed prod zone 990' FNL & 2310' FEL, Unit B		10 Field and Pool, or Exploratory Cedar Lake; Glorieta-Yeso
14 Distance in miles and direction from nearest town or post office* 9 miles East of Loco Hills, NM		11 Sec, T, R, M or Blk and Survey or Area Sec 17 T17S R31E
15 Distance from proposed* location to nearest property or lease line, ft (Also to nearest drig unit line, if any) 940'	16 No of acres in lease 280	17 Spacing Unit dedicated to this well 40
18 Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft 330'	19 Proposed Depth TVD: 6600' MD: 6612' 6300' 6312'	20 BLM/BIA Bond No. on file 740 NMB000215
21 Elevations (Show whether DF, KDB, RT, GL, etc) 3736' GL	22 Approximate date work will start* 01/31/2011	23 Estimated duration 15 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 	Name (Printed/Typed) Kelly J. Holly	Date 12/15/2010
Title Permitting Tech		

Approved by (Signature) /s/ Don Peterson	Name (Printed/Typed) CARLSBAD FIELD OFFICE	Date MAY 13 2011
Title FIELD MANAGER		

Application approval 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.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 USC Section 1001 and Title 43 USC 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

*(Instructions on page 2)



Roswell Controlled Water Basin

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Approval Subject to General Requirements
& Special Stipulations Attached

MASTER DRILLING PROGRAM

1. Geologic Name of Surface Formation

Quaternary

2. Estimated Tops of Important Geologic Markers:

Quaternary	Surface
Rustler	375'
Top of Salt	600'
Base of Salt	1200'
Yates	1525'
Seven Rivers	1850'
Queen	2475'
Grayburg	2875'
San Andres	3175'
Glorietta	4700'
Paddock	4775'
Blaine	5250'
Tubb	6200'

3. Estimated Depths of Anticipated Fresh Water, Oil and Gas

Water Sand	150'	Fresh Water
Grayburg	2875'	Oil/Gas
San Andres	3175'	Oil/Gas
Glorieta	4700'	Oil/Gas
Paddock	4775'	Oil/Gas
Blaine	5250'	Oil/Gas
Tubb	6200'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to 450' and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be protected by setting 8 5/8" casing to 1800' and circulating cement, in a single or multi-stage job and/or with an ECP, back to the surface. Any shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them. This will be achieved by cementing, with a single or multi-stage job, the 5 1/2" production casing back 200' into the intermediate casing, to be run at TD. 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 the environment.

} See 6A

4. Casing Program

Hole Size	Interval	OD Casing	Weight	Grade	Jt., Condition	Jt.	burst/collapse/tension
17 1/2"	0-450'	13 3/8"	48#	H-40orJ-55	New	ST&C	8.71/3.724/14.91
11"	0-1800'	8 5/8"	24or32#	J-55	New	ST&C	2.91/1.46/5.65
7 7/8"	0-T.D.	5 1/2"	15.5 or 17#	J-55 or I-80	New	I-T&C	1.71/1.574/2.20

5. Cement Program *See COA*

13 3/8" Surface Casing:

Class C, 475 sx w/ 2% CaCl₂, 0.25 pps CF, yield-1.32, back to surface 100% excess

8 5/8" Intermediate Casing:

11" Hole:

Single Stage: LEAD 350 sx 50:50:10 C:Poz:Gel w/ 5% Salt +0.25% CF, yield-2.45 + TAIL 200 sx Class C w/2% CaCl₂, yield-1.32, back to surface. 145% excess

Multi-Stage: Stage 1: 350 sx Class C, w/2% CaCl₂, yield - 1.32. 40% excess
Stage 2: 200 sx Class C w/2% CaCl₂, yield - 1.32, back to surface, 108% excess
Multi stage tool to be set at approximately, depending on hole conditions, 500' (50' below the surface casing). Cement volumes will be adjusted proportionately for depth changes of multi stage tool.

5 1/2" Production Casing:

Single Stage: LEAD 500 sx 35:65:6 C:Poz:Gel w/ 5% Salt + 5 pps LCM + 0.2% SMS + 0.3% FL-52A + 0.125 pps CF, yield-2.05 + TAIL 400 sx 50:50:2 C:Poz:Gel w/ 5% Salt + 3 pps LCM + 0.6% SMS + 1% FL-25 + 1% BA-58 + 0.3% FL-52A + 0.125 pps CF, yield-1.37, to 200' minimum tie back to intermediate casing. 44.4% open hole excess, cement calculated back to surface.

*See
COA*

Multi-Stage: Stage 1: (Assumed TD of 6700') 500 sx 50:50:2, C:Poz:Gel w/ 5% Salt + 3 pps LCM + 0.6% SMS + 1% FL-25 + 1% BA-58 + 0.3% FL-52A + 0.125 pps CF, yield - 1.37, 7% excess; minimum volume, will be adjusted up after caliper is

run. Stage 2: LEAD 450 sx 50:50:2
C:Poz:Gel w/ 5% Salt + 3' pps LCM + 0.6%
SMS + 1% FL-25 + 1% BA-58 + 0.3% FL-
52A + 0.125 pps CF, yield - 1.37, + TAIL
250 sx Class C w/ 0.3% R-3 + 1.5% CD-32,
yield - 1.02 152% open hole excess, cement
calculated back to surface. Multi stage tool
to be set at approximately, depending on
hole conditions, 3000'. Cement volumes
will be adjusted proportionately for depth
changes of multi stage tool, assumption for
tool is water flow.

6. Minimum Specifications for Pressure Control

The blowout preventer equipment (BOP) shown in Exhibit #9 will consist of a double ram-type (2000 psi WP) preventer, and in some cases possibly a 2000 psi Hydril type annular preventer as provided for in Onshore Order #2. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top of 4 1/2" drill pipe rams on the bottom. A 13-5/8" or 11" BOP will be used, depending on the rig selected, during the drilling of the well. The BOP will be nipped up on the 13 3/8" surface casing with BOP equipment and tested to 2000 psi. When 11" BOP is used the special drilling flange will be utilized on the 13-3/8" head to allow testing the BOP with a retrievable test plug. After setting 8-5/8" the BOP will then be nipped up on the 8 5/8" intermediate casing and tested by a third party to 2000 psi and used continuously until total depth is reached. 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 (Exhibit #10) will include a Kelly cock and floor safety valve, choke lines and a choke manifold (Exhibit #11) with a 2000 psi WP rating.

The majority of the rigs currently in use have a 13-5/8" BOP, so no special provision is needed for most wells in the area for conventionally testing the BOP with a test plug. However, due to the vagaries of rig scheduling, it might be that one of the few rigs with 11" BOP's might be called upon to drill any specific well in the area. Note that intermediate hole size is always 11". Therefore, COG Operating LLC respectfully requests a variance to the requirement of 13-5/8" BOP on 13-3/8" casing. When that circumstance is encountered the special flange will be utilized to allow testing the entire BOP with a test plug, without subjecting the casing to test pressure. The special flange also allows the return to full-open capability if desired. *see CoA*

7. Types and Characteristics of the Proposed Mud System

The well will be drilled to TD with a combination of brine, cut brine and polymer mud system. The applicable depths and properties of this system are as follows:

DEPTH	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-450' 415	Fresh Water	8.5	28	N.C.
450-1800'	Brine	10	30	N.C.
1800'-TD	Cut Brine	8.7-9.1	29	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.

8. 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.

9. Logging, Testing and Coring Program See COA

- A. The electric logging program will consist of GR-Dual Laterolog, Spectral Density, Dual Spaced Neutron, CSNG Log and will be run from TD to 8 5/8" casing shoe.
- B. Drill Stem test is not anticipated.
- C. No conventional coring is anticipated.
- D. Further testing procedures will be determined after the 5 1/2" production casing has been cemented at TD, based on drill shows and log evaluation.

10. Abnormal Conditions, Pressure, Temperatures and Potential Hazards

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 110 degrees and the estimated maximum bottom hold pressure is 2300 psig. Measurable gas volumes or Hydrogen Sulfide levels have not been encountered during drilling operations in this area, although a Hydrogen Sulfide Drilling Operation Plan is attached to this program. No major loss of circulation zones has been reported in offsetting wells.

11. Anticipated Starting Date and Duration of Operations

Road and location work will not begin until approval has been received from the BLM. As this is a Master Drilling plan, please refer to the Form 3160-3 for the anticipated start date. Once commenced, drilling operations should be finished in approximately 12 days. If the well is productive, an additional 30 days will be required for completion and testing before a decision is made to install permanent facilities.



COG Operating LLC

Eddy County, NM (NAN27 NME)

Foster Eddy #21

Foster Eddy #21

OH

Plan: Plan #1 Rev 1 7-7/8" Hole

Standard Planning Report

28 March, 2011





Scientific Drilling
Planning Report



Database:	EDM-Julio	Local Co-ordinate Reference:	Site Foster Eddy #21
Company:	COG Operating LLC	TVD Reference:	GL Elev @ 3736 00usft
Project:	Eddy County, NM (NAN27 NME)	MD Reference:	GL Elev @ 3736 00usft
Site:	Foster Eddy #21	North Reference:	Grid
Well:	Foster Eddy #21	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 Rev 1 7-7/8" Hole		

Project	Eddy County, NM (NAN27 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	Foster Eddy #21		
Site Position:		Northing:	669,258 20 usft
From:	Map	Easting:	636,334 90 usft
Position Uncertainty:	0 00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 50' 20 721 N
		Longitude:	103° 53' 22 012 W
		Grid Convergence:	0 24 °

Well	Foster Eddy #21		
Well Position	+N/-S	0 00 usft	Northing:
	+E/-W	0 00 usft	Easting:
Position Uncertainty	0 00 usft	Wellhead Elevation:	Ground Level:
			3,736 00 usft

Wellbore	OH		
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Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	2011/03/28	7 81	60 71	48,971

Design	Plan #1 Rev 1 7-7/8" Hole		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0 00	0 00	0 00
			260 52

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 00	0 00	0 00	0 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	
2,275 51	5 51	260 52	2,275 08	-2 18	-13 06	2 00	2 00	0 00	260 52	
4,636 25	5 51	260 52	4,624 92	-39 52	-236 64	0 00	0 00	0 00	0 00	
4,911 76	0 00	0 00	4,900 00	-41 70	-249 70	2 00	-2 00	0 00	180 00	TG1-Foster #21
6,311 76	0 00	0 00	6,300 00	-41 70	-249 70	0 00	0 00	0 00	0 00	PBHL-Foster #21



Scientific Drilling
Planning Report



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Site:	Foster Eddy #21	North Reference:	Grid
Well:	Foster Eddy #21	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 Rev 1 7-7/8" Hole		

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
East HL-Foster #21 - North HL-Foster #21									
1,900 00	0 00	0 00	1,900 00	0 00	0 00	0 00	0 00	0 00	0 00
8-5/8" Casing									
2,000 00	0 00	0 00	2,000 00	0 00	0 00	0 00	0 00	0 00	0 00
KOP Start Build 2.00°/100'									
2,100 00	2 00	260 52	2,099 98	-0 29	-1 72	1 75	2 00	2 00	0 00
2,200 00	4 00	260 52	2,199 84	-1 15	-6 88	6 98	2 00	2 00	0 00
2,275 51	5 51	260 52	2,275 09	-2 18	-13 06	13 24	2 00	2 00	0 00
EOC hold 5.51°									
2,300 00	5 51	260 52	2,299 46	-2 57	-15 38	15 59	0 00	0 00	0 00
2,400 00	5 51	260 52	2,399 00	-4 15	-24 85	25 19	0 00	0 00	0 00
2,500 00	5 51	260 52	2,498 54	-5 73	-34 32	34 79	0 00	0 00	0 00
2,600 00	5 51	260 52	2,598 08	-7 31	-43 79	44 40	0 00	0 00	0 00
2,700 00	5 51	260 52	2,697 61	-8 89	-53 26	54 00	0 00	0 00	0 00
2,800 00	5 51	260 52	2,797 15	-10 48	-62 73	63 60	0 00	0 00	0 00
2,900 00	5 51	260 52	2,896 69	-12 06	-72 20	73 20	0 00	0 00	0 00
3,000 00	5 51	260 52	2,996 23	-13 64	-81 67	82 80	0 00	0 00	0 00
3,100 00	5 51	260 52	3,095 77	-15 22	-91 14	92 41	0 00	0 00	0 00
3,200 00	5 51	260 52	3,195 30	-16 80	-100 62	102 01	0 00	0 00	0 00
3,300 00	5 51	260 52	3,294 84	-18 38	-110 09	111 61	0 00	0 00	0 00
3,400 00	5 51	260 52	3,394 38	-19 97	-119 56	121 21	0 00	0 00	0 00
3,500 00	5 51	260 52	3,493 92	-21 55	-129 03	130 82	0 00	0 00	0 00
3,600 00	5 51	260 52	3,593 46	-23 13	-138 50	140 42	0 00	0 00	0 00
3,700 00	5 51	260 52	3,692 99	-24 71	-147 97	150 02	0 00	0 00	0 00
3,800 00	5 51	260 52	3,792 53	-26 29	-157 44	159 62	0 00	0 00	0 00
3,900 00	5 51	260 52	3,892 07	-27 87	-166 91	169 22	0 00	0 00	0 00
4,000 00	5 51	260 52	3,991 61	-29 46	-176 38	178 83	0 00	0 00	0 00
4,100 00	5 51	260 52	4,091 15	-31 04	-185 85	188 43	0 00	0 00	0 00
4,200 00	5 51	260 52	4,190 68	-32 62	-195 33	198 03	0 00	0 00	0 00
4,300 00	5 51	260 52	4,290 22	-34 20	-204 80	207 63	0 00	0 00	0 00
4,400 00	5 51	260 52	4,389 76	-35 78	-214 27	217 24	0 00	0 00	0 00
4,500 00	5 51	260 52	4,489 30	-37 36	-223 74	226 84	0 00	0 00	0 00
4,600 00	5 51	260 52	4,588 83	-38 95	-233 21	236 44	0 00	0 00	0 00
4,636 25	5 51	260 52	4,624 92	-39 52	-236 64	239 92	0 00	0 00	0 00
Start Drop 2.00°/100'									
4,700 00	4 24	260 52	4,688 44	-40 41	-241 98	245 34	2 00	-2 00	0 00
4,800 00	2 24	260 52	4,788 27	-41 34	-247 55	250 98	2 00	-2 00	0 00
4,900 00	0 24	260 52	4,888 24	-41 70	-249 68	253 13	2 00	-2 00	0 00
4,911 76	0 00	0 00	4,900 00	-41 70	-249 70	253 16	2 00	-2 00	846 11
EOC hold 0.00° - TG1-Foster #21									
6,311 76	0 00	0 00	6,300 00	-41 70	-249 70	253 16	0 00	0 00	0 00
PBHL-Foster #21									



Scientific Drilling
Planning Report



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Site:	Foster Eddy #21	North Reference:	Grid
Well:	Foster Eddy #21	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 Rev 1 7-7/8" Hole		

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
East HL-Foster #21 - plan misses target center by 264 80usft at 0 00usft MD (0 00 TVD, 0 00 N, 0 00 E) - Rectangle (sides W0 00 H200 00 D0 00)	0 00	0 00	0 00	-51 70	-259 70	669,206 50	636,075 20	32° 50' 20 220 N	103° 53' 25 059 W
North HL-Foster #21 - plan misses target center by 264 80usft at 0 00usft MD (0 00 TVD, 0 00 N, 0 00 E) - Rectangle (sides W200 00 H0 00 D0 00)	0 00	0 00	0 00	-51 70	-259 70	669,206 50	636,075 20	32° 50' 20 220 N	103° 53' 25 059 W
TG1-Foster #21 - plan hits target center - Point	0 00	0 00	4,900 00	-41 70	-249 70	669,216 50	636,085 20	32° 50' 20 319 N	103° 53' 24 941 W
PBHL-Foster #21 - plan hits target center - Circle (radius 10 00)	0 00	0 01	6,300 00	-41 70	-249 70	669,216 50	636,085 20	32° 50' 20 319 N	103° 53' 24 941 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,900 00	1,900 00	8-5/8" Casing	8-5/8	12-1/4

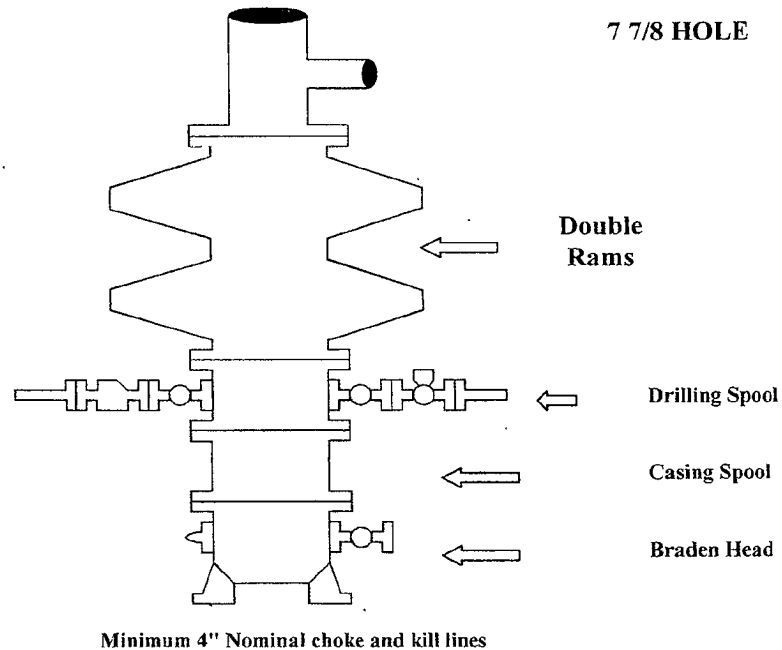
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
2,000 00	2,000 00	0 00	0 00	KOP Start Build 2 00°/100'
2,275 51	2,275 09	-2 18	-13 06	EOC hold 5 51°
4,636 25	4,624 92	-39 52	-236 64	Start Drop 2 00°/100'
4,911 76	4,900 00	-41 70	-249 70	EOC hold 0 00°

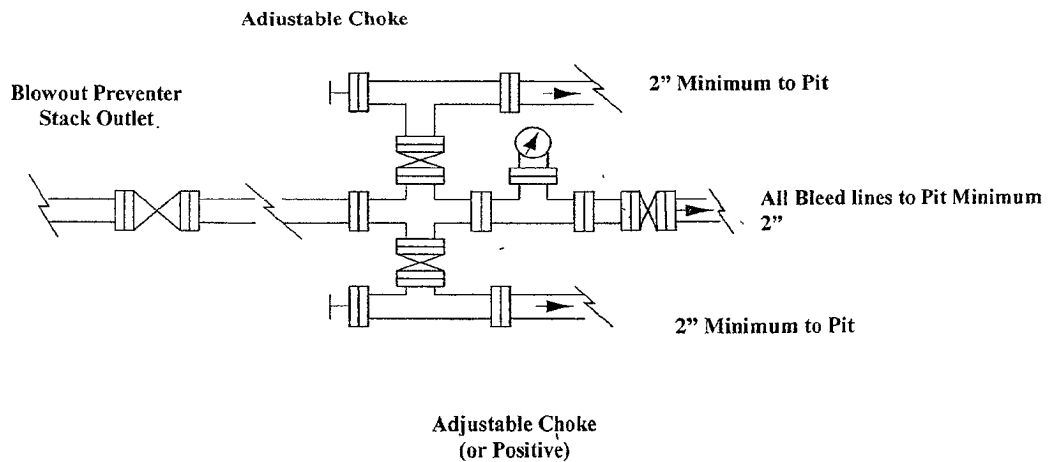
COG Operating LLC

Exhibit #9

BOPE and Choke Schematic



Choke Manifold Requirement (2000 psi WP)
No Annular Required



NOTES REGARDING THE BLOWOUT PREVENTERS
Master Drilling Plan
Eddy County, New Mexico

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.