

ATS-13-155

Form 3160-3
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OGD
OGD Hobbs

FEB 21 2013

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

APPLICATION FOR PERMIT TO DRILL OR REENTER

RECEIVED

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. ⁵⁴¹ NMNM-0315712 / Fee
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 One Concho Center 600 W Illinois Ave Midland, TX 79701		8. Lease Name and Well No. 39744 Branex-COG Federal Com #5H
3b. Phone No. (include area code) (432) 685-4384		9. API Well No. 30-025- 41005
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface SHL: 2075' FSL & 115' FWL, UL L At proposed prod. zone BHL: 2310' FSL & 330' FEL, UL I		10. Field and Pool, or Exploratory Maljamar; Yeso, West 44500
14. Distance in miles and direction from nearest town or post office* 1.3 miles Southwest of Maljamar		11. Sec., T. R. M. or Blk. and Survey or Area Sec 9, T17S, R32E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drg. unit line, if any) 115'	16. No. of acres in lease 760	17. Spacing Unit dedicated to this well 160
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 519'	19. Proposed Depth TVD: 6574' MD: 11288'	20. BLM/BIA Bond No. on file NMB000740; NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 4068' GL	22. Approximate date work will start* 12/31/2012	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 10/10/2012
Title Permitting Tech		

Approved by (Signature) /s/ James A. Amos	Name (Printed/Typed)	Date FEB 20 2013
Title FIELD MANAGER	Office CARLSBAD FIELD OFFICE	

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 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.

*(Instructions on page 2)

Roswell Controlled Water Basin

Approval Subject to General Requirements
& Special Stipulations Attached

Kelly J. Holly
02/25/13

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

FEB 27 2013

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
BRANEX-COG FEDERAL COM #5H
SHL: 2075' FSL & 115' FWL, Unit L
BHL: 2310' FSL & 330' FEL, Unit I
Sec 9, T17S, R32E
Eddy County, NM

1. Proration Unit Spacing: 160 Acres
2. Ground Elevation: 4068'
3. Proposed Depths: EOC (End of curve) TVD = 6650', MD = 6931'
Toe (End of lateral) TVD = 6574', MD = 11288'
4. Estimated tops of geological markers:

Rustler	918'
Top of Salt	1470'
Base of Salt	2064'
Yates	2236'
Seven Rivers	2581'
Queen	3212'
Grayburg	3631'
San Andres	3964'
Glorieta	5450'
Paddock	5497'
Blinbry	5937'
Tubb	6870'

5. Possible mineral bearing formations:

Water Sand	150'	Fresh Water
Grayburg	3631'	
San Andres	3964'	
Glorieta	5450'	
Paddock	5497'	
Blinebry	5937'	
Tubb	6870'	

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to 943' (25' into Rustler) and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be protected by setting 9 5/8" casing to 2250' and circulating cement back to surface in a single or multi-stage job and/or with an ECP. Any shallower zones above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them or be isolated by external casing packers. This will be achieved by cementing from the KOP by single or multi-stage job using ECP & DV Tools as necessary. The 7" portion of the tapered 7" x 5 1/2" production casing will be cemented back to a minimum of 200' into the intermediate casing (although cement volume is actually calculated to surface). At the KOP the 7" casing will be tapered to 5 1/2" casing which will be run thru curve and lateral with external casing packers for zone isolation. 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.

See
COA

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
BRANEX-COG FEDERAL COM #5H
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6. Proposed Mud System

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

DEPTH (MD)	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-943'	Fresh Water	8.5	28	N.C.
943'-2250'	Brine	10	30	N.C.
2250'-6173'	Cut Brine	8.7-9.2	30	N.C.
6173'-6931'	Cut Brine/polymer mud	8.7-9.2	30	N.C.
6931'-11288'	Cut Brine/polymer mud	8.7-9.2	30	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.

6. Proposed Casing Program

Hole Size	Interval MD	OD Casing	Weight	Grade	Condition	Jt.	brst/clps/ten
17 1/2"	0-943'	13 3/8"	48#	H-40/J-55 Hybrid	New	ST&C	1.83/1.85/8.17
12 1/4"	943'- 2250'	9 5/8"	40#	J/K-55	New	ST&C	1.76/2.20/14.00
8 3/4"	2250'-0 6173'	7"	26#	L-80	New	LT&C	1.17/1.83/3.70
8 3/4"	6173'- 6931'	5 1/2"	17#	L-80	New	LT&C	2.08/2.82/4.36
7 7/8"	7215'- 11288'	5 1/2"	17#	L-80	New	LT&C	2.08/2.82/4.36

6931

Production string will be a tapered string with 7" 26# L-80 LTC run from surface to kick off point (6173') and then crossed over to 5 1/2" 17# L-80 LTC.

7. Proposed Cement Program

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

Lead: 0'-500'	400 sks	Class "C" w/4% Gel	1.69 cf/sk	13.5 ppg
Excess 95%		+2% CaCl ₂ + 0.25 pps CF		

Tail: 500'-943'	325 sks	Class C w/2% CaCl ₂	1.32 cf/sk	14.8 ppg
Excess 39%				

9 5/8" INTERMEDIATE:

Option #1: Single Stage (Circulate to Surface)

Lead:	400 sks	50:50:10 C:Poz:Gel	2.45 cf/sk	11.8 ppg
0'-1750'		w/ 5% Salt+ 0.25% CF		
Excess 61%		+5 pps LCM		

Tail:	200 sks	Class C w/2% CaCl ₂	1.32 cf/sk	14.8 ppg
1750'-2250'				
Excess 68%				

Option #2: Multi-stage w/ DV Tool @ +/-993' (DV Tool 50' below 13 3/8" csg. Shoe) (Circulate to Surface)

Stage #1:	200 sks	50:50:10 C:Poz:Gel	2.45 cf/sk	11.8 ppg
Lead:		w/5% Salt + 0.25% CF		
993'-1750'		+ 5 pps LCM		
Excess 107%				

Tail:	200 sks	Class C w/2% CaCl ₂	1.32 cf/sk	14.8 ppg
1750'-2250'				
Excess 68%				

Stage #2				
0'-993'	300 sks	50:50:10 C:Poz:Gel w/5%	2.45 cf/sk	11.8 ppg
Excess 98%		salt+ 0.25% CF +5 pps LCM		

Note: Multi-stage tool to be set depending on hole conditions at approximately 993' (50' below the surface casing shoe). Cement volumes will be adjusted proportionately for depth changes of multi-stage tool.

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
BRANEX-COG FEDERAL COM #5H
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7" X 5 1/2" TAPERED PRODUCTION CASING:

Cement details for 7" portion of tapered casing string as follows:

**Option #1: Single Stage (Cement cal to Surface)
DV Tool & ECP (external csg. Packer) @ 6173' KOP:**

Lead:	500 sks	35:65:6 C:Poz Gel w/5%	2.05 cf/sk	12.5 ppg
0'-4173'		salt+ 5 pps LCM+ 0.2 %		
(min. tie back 200'		SMS+ 0.3% FL-52A+		
above 9 5/8" shoe)		0.125 pps CF		
Excess 59 %				
Tail:	300 sks	50:50:2 C:Poz Gel w/5%	1.37 cf/sk	14.0 ppg
4173'-6173'		salt+ 3 pps LCM+ 0.6 %		
Excess 37%		SMS+ 0.3% FL-52A+		
		0.125 pps CF+1% FL-25+		
		1% BA-58		

Option #2: Multi-stage (2 Stages) w/DV Tool & ECP@ +/-6173'

Stage #1:

Lead:	500 sks	35:65:6 C:Poz Gel w/5%	2.05 cf/sk	12.5 ppg
2300'-5173'		salt+ 5 pps LCM+ 0.2 %		
Excess 58.7%		SMS+ 0.3% FL-52A+		
		0.125 pps CF		
Tail:	300 sks	50:50:2 C:Poz Gel w/ 5 %	1.37 cf/sk	14.0 ppg
5173'-6173'		salt+ 3 pps LCM + 0.6%		
Excess 36.5%		SMS+1 % FL-25+ 1%		
		BA-58+ 0.125 pps CF		

Stage #2: 2nd DV Tool @ 2300' (50' below 9 5/8" csg shoe) (Cement cal to Surface)

Lead:	350 sks	35:65:6 C:Poz Gel w/5%	1.37 cf/sk	14.0 ppg
0'-2300'		salt+ 5 pps LCM+ 0.2 %		
(min. tie back 200'		SMS+ 0.3% FL-52A+		
above 9 5/8" shoe)		0.125 pps CF		
Excess 32%				

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COG Operating, LLC
BRANEX-COG FEDERAL COM #5H
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Note: 5 1/2" casing will be run from KOP at 6173' thru curve and lateral to TD of 11288'MD/6574'TVD. Productive intervals will be isolated by a Peak Packer system or similar.

Note: Assumption for 2nd DV tool is water flow. Cement volumes will be adjusted proportionately for depth changes of multi-stage tool.

Note: FL-52A is fluid loss additive, R-3 is retarder.

Note: Multi-stage tool to be set depending on hole conditions at approximately 2300'
Cement volumes will be adjusted proportionately for depth changes of multi-stage tool.

8. Pressure Control Equipment:

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 Hydriil 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 and 4 1/2" drill pipe rams on the bottom. A 13-5/8" BOP will be used during the drilling of the well. A 13 5/8" permanent casing head will be installed on the 13 3/8" casing. The BOP will be nipped up on the 13 5/8" permanent casing head and tested to 2000 psig. After setting 9-5/8", permanent "B section" well head will be installed and the BOP will then be nipped up on the permanent B . BOP and well head will be tested by a third party to 2000 psig 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 will include a Kelly cock and floor safety valve, choke lines and a choke manifold with a 2000 psi WP rating all of which will also be tested to working pressure by independent tester also.

See
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9. Production Hole Drilling Summary:

Drill 8 3/4" hole and kick off at +/- 6173', building curve over +/- 758' to horizontal at 6931' MD/6650'TVD, Azm 87.05°. Drill 7 7/8" lateral section in a easterly direction (87.05° Azm) for +/-4356' lateral to TD at +/-11287' MD, 6574' TVD. Run 7" x 5-1/2" production casing. 7" to be run from surface to kickoff point and then changed over to 5 1/2" with DV Tool and ECP at kickoff point. 5 1/2" casing will be run from kickoff point to td and isolation packers set throughout lateral. 7" to be cemented from kickoff point to surface.

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. The following logs will be run in the vertical portion of the hole to KOP: SLB-PEX/HRLA, HNGS.

See
COA

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BRANEX-COG FEDERAL COM #5H
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- B. The mud logging program will consist of lagged 10' samples from KOP to TD in Horizontal hole.
- C. Drill Stem test is not anticipated.
- D. No conventional coring is anticipated.
- E. Further testing procedures will be determined after the 7" x 5 1/2" production casing has been cemented at TD based on drill shows and log evaluation.

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

No abnormal pressures or temperatures are anticipated. The estimated bottom hole temperature at TD is 90° Fahrenheit and estimated maximum bottom hole pressure is 2894 psi. Wells in the Majamar area will penetrate formations that are known or could reasonably be expected to contain Hydrogen Sulfide. Measurable gas volumes or Hydrogen Sulfide levels have not been encountered during drilling operations in this area, However as per Onshore order No. 6 a H2S drilling operations plan is included with this APD. No major loss of circulation zones has been reported in offsetting wells.

13. Anticipated Starting Date

Drilling operations will commence approximately on December 15, 2012 with drilling and completion operations lasting approximately 90 days.



COG Operating LLC

**Lea County, NM (NAD 83)
Branex-COG Federal Com
#5H**

OH

Plan: Plan #2

Standard Planning Report

03 October, 2012

Surface: 2075' FSL, 115' FWL, Sec 9, T17S, R32E, Unit L
BHL: 2310' FSL, 330' FEL, Sec 9, T17S, R32E, Unit I
PP: 2086' FSL, 330' FWL, Sec 9, T17S, R32E, Unit L



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM (NAD 83)
Site: Branex-COG Federal Com
Well: #5H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well #5H
 Well @ 4082.0usft (UDI #40 - 14' KB)
 Well @ 4082.0usft (UDI #40 - 14' KB)
 Grid
 Minimum Curvature

Project	Lea County, NM (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Branex-COG Federal Com		
Site Position:		Northing:	672,708.44 usft
From:	Map	Easting:	670,184.26 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 54.947 N
		Longitude:	103° 54' 49.587 W
		Grid Convergence:	0.23 °

Well	#5H		
Well Position	+N/-S	-233.5 usft	Northing: 672,474.90 usft
	+E/-W	3.0 usft	Easting: 670,187.30 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	Latitude: 32° 50' 52.636 N
			Longitude: 103° 54' 49.562 W
			Ground Level: 4,068.0 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
	IGRF200510	7/11/2012	(°)
			7.65
			Dip Angle
			(°)
			60.70
			Field Strength
			(nT)
			48,882

Design	Plan #2		
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
			(°)
			87.05

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
6,172.6	0.00	0.00	6,172.6	0.0	0.0	0.00	0.00	0.00	0.00	
6,930.9	91.00	87.05	6,650.0	25.0	485.2	12.00	12.00	0.00	87.05	
11,288.2	91.00	87.05	6,574.0	249.2	4,836.0	0.00	0.00	0.00	0.00	PBHL (B.COG#5H)



Planning Report



Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM (NAD 83)
Site: Branex-COG Federal Com
Well: #5H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference: Well #5H
TVD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
MD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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

Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM (NAD 83)
Site: Branex-COG Federal Corn
Well: #5H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference: Well #5H
TVD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
MD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
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
6,172.6	0.00	0.00	6,172.6	0.0	0.0	0.0	0.00	0.00	0.00
KOP - 6172.6' MD, 6172.6' TVD, 0.00° INC, 0.00° AZI, 0.0' VS									
6,175.0	0.29	87.05	6,175.0	0.0	0.0	0.0	11.95	11.95	0.00
6,200.0	3.29	87.05	6,200.0	0.0	0.8	0.8	12.00	12.00	0.00
6,225.0	6.29	87.05	6,224.9	0.1	2.9	2.9	12.00	12.00	0.00
6,250.0	9.29	87.05	6,249.7	0.3	6.2	6.3	12.00	12.00	0.00
6,275.0	12.29	87.05	6,274.2	0.6	10.9	10.9	12.00	12.00	0.00
6,300.0	15.29	87.05	6,298.5	0.9	16.9	16.9	12.00	12.00	0.00
6,325.0	18.29	87.05	6,322.4	1.2	24.1	24.1	12.00	12.00	0.00
6,350.0	21.29	87.05	6,345.9	1.7	32.5	32.6	12.00	12.00	0.00
6,375.0	24.29	87.05	6,369.0	2.2	42.2	42.3	12.00	12.00	0.00
6,400.0	27.29	87.05	6,391.5	2.7	53.1	53.1	12.00	12.00	0.00
6,425.0	30.29	87.05	6,413.4	3.4	65.1	65.2	12.00	12.00	0.00
6,450.0	33.29	87.05	6,434.7	4.0	78.2	78.3	12.00	12.00	0.00
6,475.0	36.29	87.05	6,455.2	4.8	92.5	92.6	12.00	12.00	0.00
6,500.0	39.29	87.05	6,474.9	5.6	107.8	107.9	12.00	12.00	0.00
6,525.0	42.29	87.05	6,493.9	6.4	124.1	124.2	12.00	12.00	0.00
6,550.0	45.29	87.05	6,511.9	7.3	141.4	141.5	12.00	12.00	0.00
6,575.0	48.29	87.05	6,529.0	8.2	159.5	159.8	12.00	12.00	0.00
6,600.0	51.29	87.05	6,545.2	9.2	178.6	178.8	12.00	12.00	0.00
6,625.0	54.29	87.05	6,560.3	10.2	198.5	198.8	12.00	12.00	0.00
6,643.2	56.47	87.05	6,570.6	11.0	213.4	213.7	12.00	12.00	0.00
330° PP - 6643.2' MD, 6570.6' TVD, 56.47° INC, 213.7° VS									
6,650.0	57.29	87.05	6,574.3	11.3	219.1	219.4	12.00	12.00	0.00
6,675.0	60.29	87.05	6,587.3	12.4	240.5	240.8	12.00	12.00	0.00
6,700.0	63.29	87.05	6,599.1	13.5	262.5	262.8	12.00	12.00	0.00
6,725.0	66.29	87.05	6,609.8	14.7	285.1	285.4	12.00	12.00	0.00
6,750.0	69.29	87.05	6,619.2	15.9	308.2	308.6	12.00	12.00	0.00
6,775.0	72.29	87.05	6,627.4	17.1	331.8	332.2	12.00	12.00	0.00
6,800.0	75.29	87.05	6,634.4	18.3	355.7	356.2	12.00	12.00	0.00
6,825.0	78.29	87.05	6,640.1	19.6	380.0	380.5	12.00	12.00	0.00
6,850.0	81.29	87.05	6,644.6	20.9	404.6	405.1	12.00	12.00	0.00
6,875.0	84.29	87.05	6,647.7	22.1	429.4	429.9	12.00	12.00	0.00
6,900.0	87.29	87.05	6,649.5	23.4	454.3	454.9	12.00	12.00	0.00
6,925.0	90.29	87.05	6,650.1	24.7	479.2	479.9	12.00	12.00	0.00
6,930.9	91.00	87.05	6,650.0	25.0	485.1	485.8	12.00	12.00	0.00
EOC - 6930.9' MD, 6650.0' TVD, 91.00° INC, 87.05° AZI, 485.8' VS									
7,000.0	91.00	87.05	6,648.8	28.6	554.1	554.8	0.01	0.01	0.00
7,100.0	91.00	87.05	6,647.0	33.7	654.0	654.8	0.00	0.00	0.00
7,200.0	91.00	87.05	6,645.3	38.8	753.8	754.8	0.00	0.00	0.00
7,300.0	91.00	87.05	6,643.6	44.0	853.7	854.8	0.00	0.00	0.00
7,400.0	91.00	87.05	6,641.8	49.1	953.5	954.8	0.00	0.00	0.00
7,500.0	91.00	87.05	6,640.1	54.3	1,053.4	1,054.8	0.00	0.00	0.00
7,600.0	91.00	87.05	6,638.3	59.4	1,153.2	1,154.8	0.00	0.00	0.00
7,700.0	91.00	87.05	6,636.6	64.6	1,253.1	1,254.7	0.00	0.00	0.00

Database:	Houston R5000 Database	Local Co-ordinate Reference:	Well #5H
Company:	COG Operating LLC	TVD Reference:	Well @ 4082.0usft (UDI #40 - 14' KB)
Project:	Lea County, NM (NAD 83)	MD Reference:	Well @ 4082.0usft (UDI #40 - 14' KB)
Site:	Branex-COG Federal Corn	North Reference:	Grid
Well:	#5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2		

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)
7,800.0	91.00	87.05	6,634.8	69.7	1,352.9	1,354.7	0.00	0.00	0.00
7,900.0	91.00	87.05	6,633.1	74.9	1,452.8	1,454.7	0.00	0.00	0.00
8,000.0	91.00	87.05	6,631.3	80.0	1,552.6	1,554.7	0.00	0.00	0.00
8,100.0	91.00	87.05	6,629.6	85.2	1,652.5	1,654.7	0.00	0.00	0.00
8,200.0	91.00	87.05	6,627.9	90.3	1,752.3	1,754.7	0.00	0.00	0.00
8,300.0	91.00	87.05	6,626.1	95.4	1,852.2	1,854.6	0.00	0.00	0.00
8,400.0	91.00	87.05	6,624.4	100.6	1,952.0	1,954.6	0.00	0.00	0.00
8,500.0	91.00	87.05	6,622.6	105.7	2,051.9	2,054.6	0.00	0.00	0.00
8,600.0	91.00	87.05	6,620.9	110.9	2,151.7	2,154.6	0.00	0.00	0.00
8,700.0	91.00	87.05	6,619.1	116.0	2,251.6	2,254.6	0.00	0.00	0.00
8,800.0	91.00	87.05	6,617.4	121.2	2,351.5	2,354.6	0.00	0.00	0.00
8,900.0	91.00	87.05	6,615.6	126.3	2,451.3	2,454.6	0.00	0.00	0.00
9,000.0	91.00	87.05	6,613.9	131.5	2,551.2	2,554.5	0.00	0.00	0.00
9,100.0	91.00	87.05	6,612.1	136.6	2,651.0	2,654.5	0.00	0.00	0.00
9,200.0	91.00	87.05	6,610.4	141.8	2,750.9	2,754.5	0.00	0.00	0.00
9,300.0	91.00	87.05	6,608.7	146.9	2,850.7	2,854.5	0.00	0.00	0.00
9,400.0	91.00	87.05	6,606.9	152.1	2,950.6	2,954.5	0.00	0.00	0.00
9,500.0	91.00	87.05	6,605.2	157.2	3,050.4	3,054.5	0.00	0.00	0.00
9,600.0	91.00	87.05	6,603.4	162.3	3,150.3	3,154.4	0.00	0.00	0.00
9,700.0	91.00	87.05	6,601.7	167.5	3,250.1	3,254.4	0.00	0.00	0.00
9,800.0	91.00	87.05	6,599.9	172.6	3,350.0	3,354.4	0.00	0.00	0.00
9,900.0	91.00	87.05	6,598.2	177.8	3,449.8	3,454.4	0.00	0.00	0.00
10,000.0	91.00	87.05	6,596.4	182.9	3,549.7	3,554.4	0.00	0.00	0.00
10,100.0	91.00	87.05	6,594.7	188.1	3,649.5	3,654.4	0.00	0.00	0.00
10,200.0	91.00	87.05	6,592.9	193.2	3,749.4	3,754.4	0.00	0.00	0.00
10,300.0	91.00	87.05	6,591.2	198.4	3,849.2	3,854.3	0.00	0.00	0.00
10,400.0	91.00	87.05	6,589.5	203.5	3,949.1	3,954.3	0.00	0.00	0.00
10,500.0	91.00	87.05	6,587.7	208.7	4,048.9	4,054.3	0.00	0.00	0.00
10,600.0	91.00	87.05	6,586.0	213.8	4,148.8	4,154.3	0.00	0.00	0.00
10,700.0	91.00	87.05	6,584.2	218.9	4,248.6	4,254.3	0.00	0.00	0.00
10,800.0	91.00	87.05	6,582.5	224.1	4,348.5	4,354.3	0.00	0.00	0.00
10,900.0	91.00	87.05	6,580.7	229.2	4,448.3	4,454.3	0.00	0.00	0.00
11,000.0	91.00	87.05	6,579.0	234.4	4,548.2	4,554.2	0.00	0.00	0.00
11,100.0	91.00	87.05	6,577.2	239.5	4,648.1	4,654.2	0.00	0.00	0.00
11,200.0	91.00	87.05	6,575.5	244.7	4,747.9	4,754.2	0.00	0.00	0.00
11,288.2	91.00	87.05	6,574.0	249.2	4,836.0	4,842.4	0.00	0.00	0.00

TD @ 11288.2' MD, 6574.0' TVD

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 (B.COG#5H)	0.00	0.00	6,574.0	248.9	4,836.0	672,723.80	675,023.30	32° 50' 54.905 N	103° 53' 52.861 W
- plan misses target center by 0.3usft at 11288.2usft MD (6574.0 TVD, 249.2 N, 4836.0 E)									
- Point									

Database: Houston R5000 Database
Company: COG Operating LLC
Project: Lea County, NM (NAD 83)
Site: Branex-COG Federal Com
Well: #5H
Wellbore: OH
Design: Plan #2

Local Co-ordinate Reference: Well #5H
TVD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
MD Reference: Well @ 4082.0usft (UDI #40 - 14' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Plan Annotations

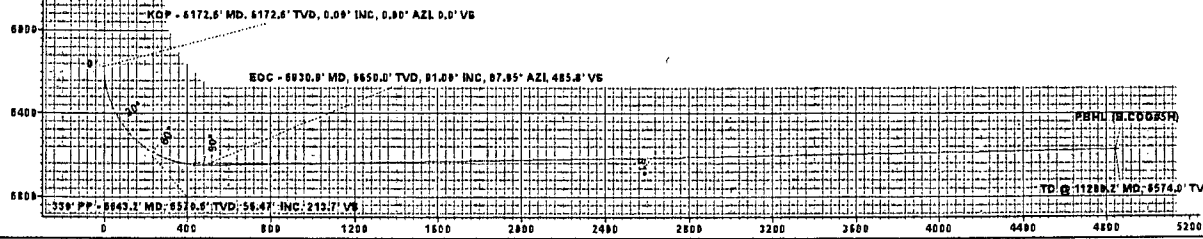
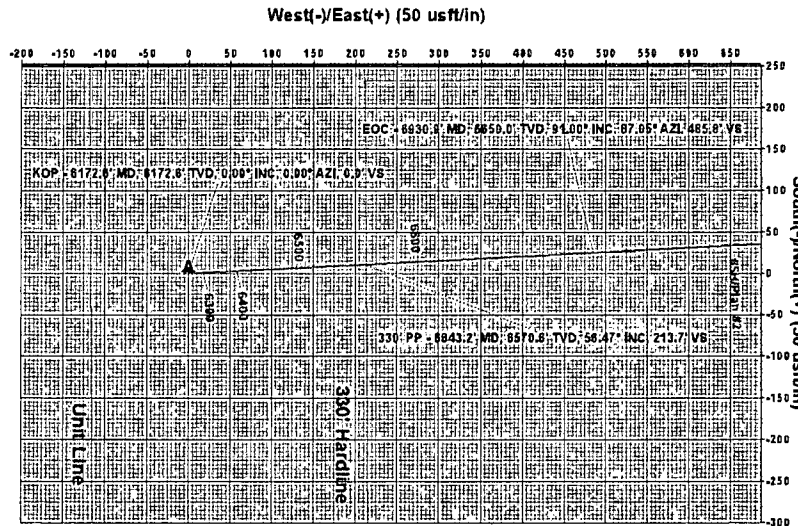
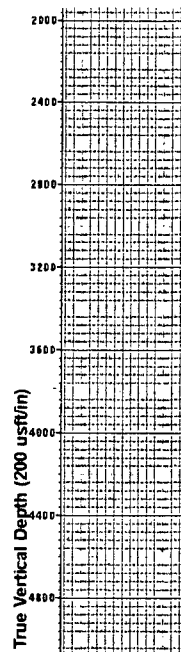
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,172.6	6,172.6	0.0	0.0	KOP - 6172.6' MD, 6172.6' TVD, 0.00° INC, 0.00° AZI, 0.0' VS
6,643.2	6,570.6	11.0	213.4	330' PP - 6643.2' MD, 6570.6' TVD, 56.47° INC, 213.7' VS
6,930.9	6,650.0	25.0	485.1	EOC - 6930.9' MD, 6650.0' TVD, 91.00° INC, 87.05° AZI, 485.8' VS
11,288.2	6,574.0	249.2	4,836.0	TD @ 11288.2' MD, 6574.0' TVD

COG Operating LLC
Project: Lea County, NM (NAD 83)
Site: Branex-COG Federal Com
Well: #5H
Wellbore: OH
Plan: Plan #2 (#5H/OH)

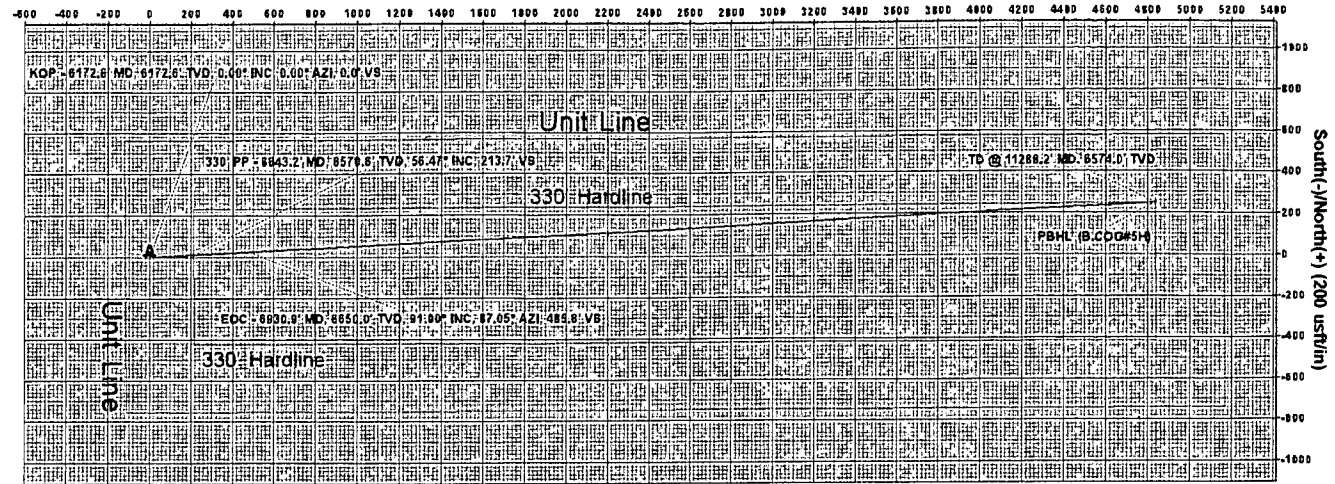


Azimuths to Grid North
True North: -0.23°
Magnetic North: 7.42°

Magnetic Field
Strength: 48881.5nT
Dip Angle: 60.70°
Date: 7/11/2012
Model: IGRF200510



West(-)/East(+) (200 usft/in)



Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	6172.6	0.00	0.00	6172.6	0.0	0.0	0.00	0.00	0.0	
3	6930.9	91.00	87.05	6650.0	25.0	485.2	12.00	87.05	485.8	
4	11288.2	91.00	87.05	6574.0	249.2	4836.0	0.00	0.00	4842.4	PBHL (B.COG#5H)

WELL DETAILS: #5H

Ground Elevation:: 4068.0
RKB Elevation: Well @ 4082.0usft (UDI #40 - 14' KB)
Rig Name: UDI #40 - 14' KB

Surface Hole Location

Northing Easting Latitude Longitude
672474.90 670187.30 32° 50' 52.636 N 103° 54' 49.562 W

DESIGN TARGET DETAILS

Name TVD +N/-S +E/-W Northing Easting
PBHL (B.COG#5H) 6574.0 248.9 4836.0 672723.80 675023.30

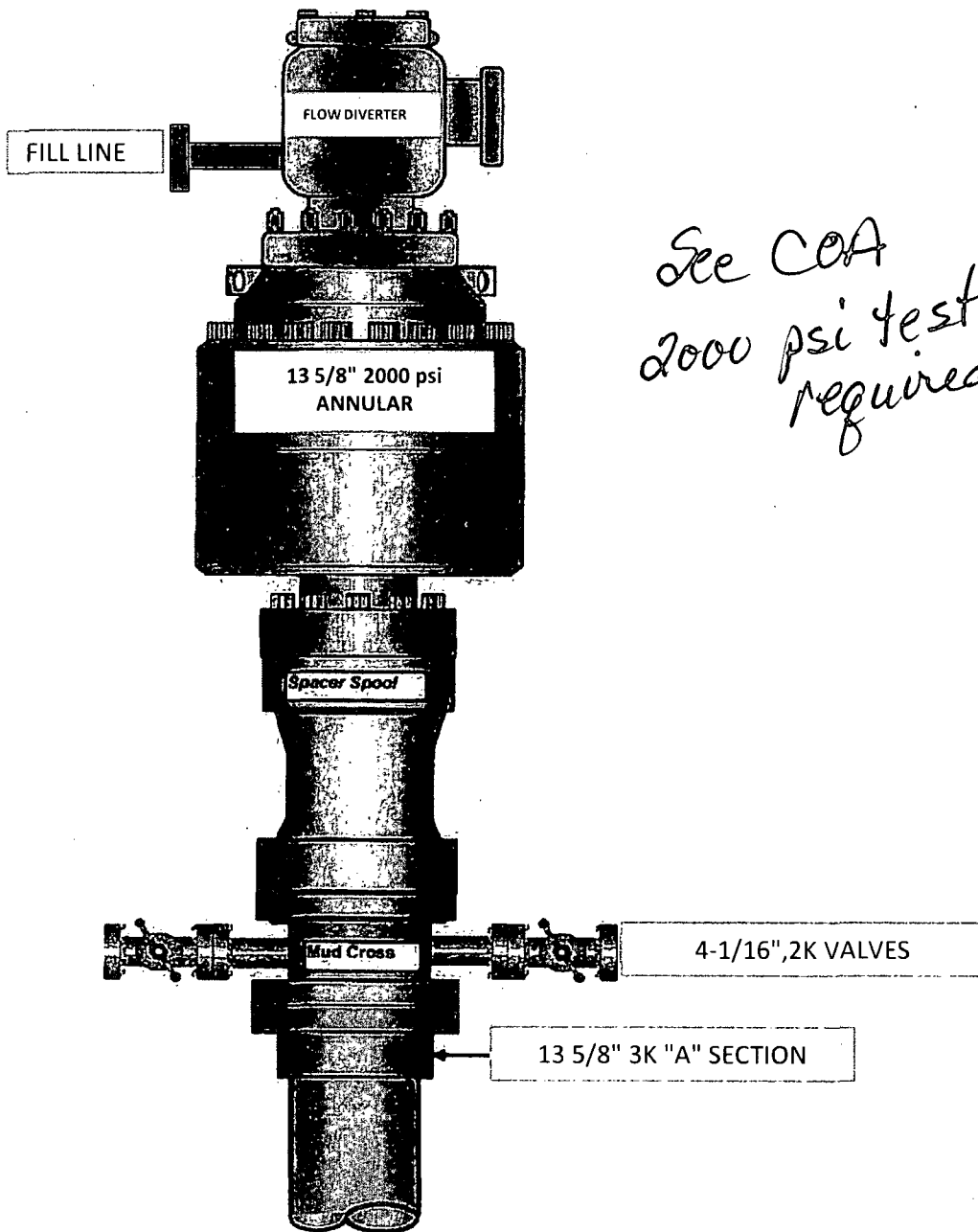
PROJECT DETAILS: Lea County, NM (NAD 83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid



Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #2 (#5H/OH)
Created By: Matt Higgins Date: 10:05, October 03 2012

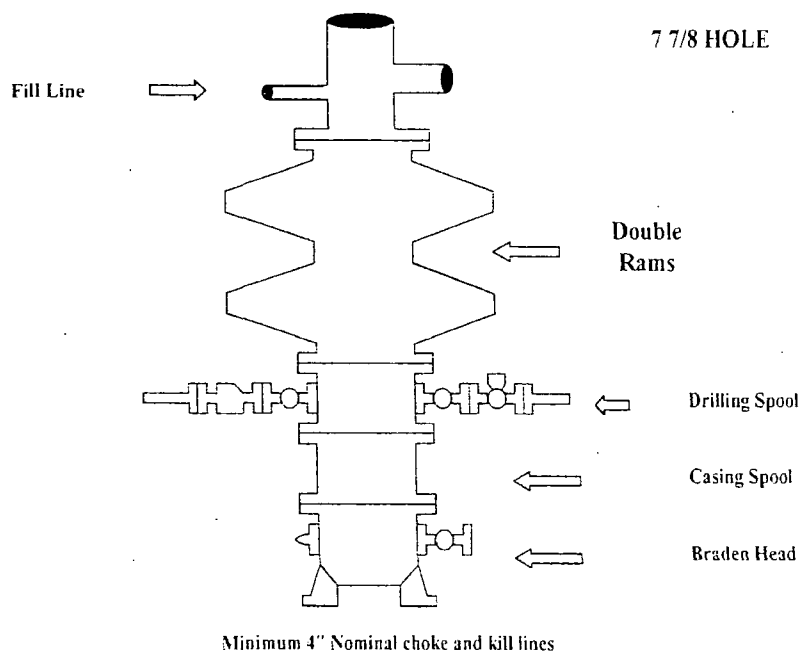
13 5/8" 2K ANNULAR



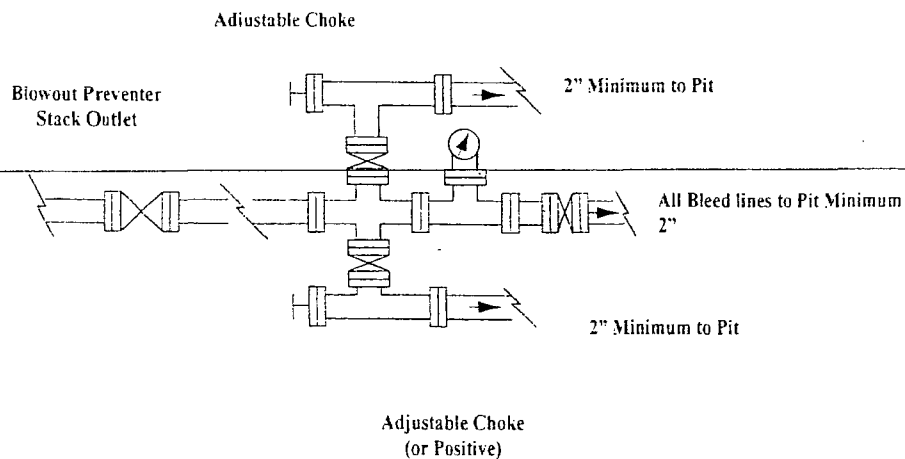
COG Operating LLC

Exhibit #9

BOPE and Choke Schematic



Choke Manifold Requirement (2000 psi WP)
No Annular Required

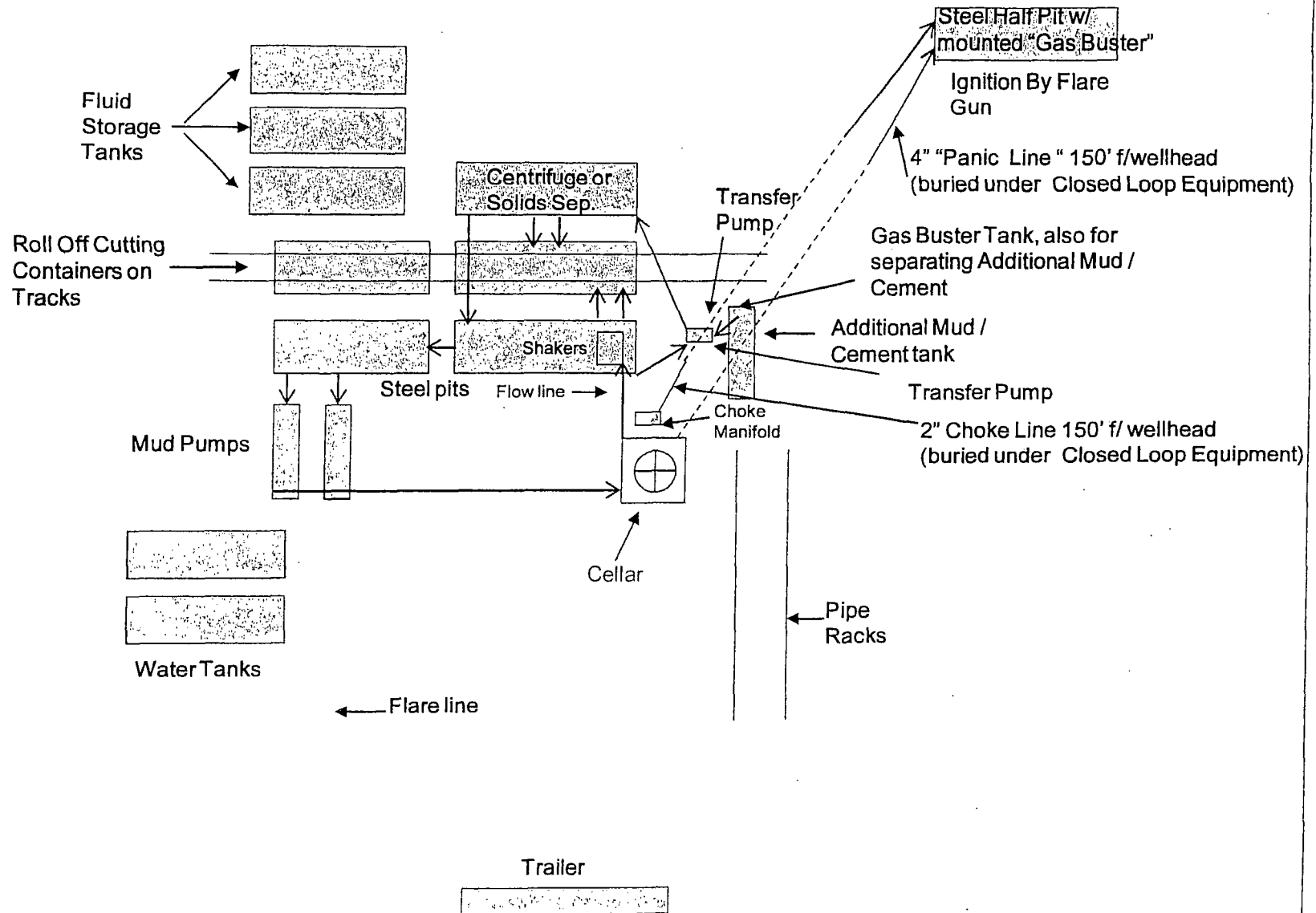


NOTES REGARDING THE BLOWOUT PREVENTERS

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.

COG Operating LLC
Closed Loop Equipment Diagram



All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

Cuttings will be hauled to either:

CRI (permit number R9166)

or

GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.