11-261

OCD-ARTESIA

Form 3160-3
(April 2004)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

# APPLICATION FOR PERMIT TO DRILL OR REENTER

5 Lease Serial No.
**NMLC-028784C**

6 If Indian, Allotee or Tribe Name
**N/A**

1a Type of work: ☑ DRILL ☐ REENTER

7 If Unit or CA Agreement, Name and No
**NMNM-88525X; Burch Keely Unit**

1b Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☐ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.
**BURCH KEELY UNIT #509**

2. Name of Operator
**COG Operating LLC**

9 API Well No.
**30-015-** 39459

3a Address
**550 W. Texas Ave., Suite 1300**
**Midland, TX 79701**

3b Phone No. *(include area code)*
**432-685-4384**

10 Field and Pool, or Exploratory
**Grayburg Jackson; SR-Q-Grbg-SA**

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface **274' FNL & 1545' FWL, Unit C**
At proposed prod. zone **330' FNL & 1650' FWL, Unit C**

11. Sec., T R. M. or Blk and Survey or Area
**Sec 13 T17S R29E**

14 Distance in miles and direction from nearest town or post office*
**2 miles from Loco Hills, NM**

12. County or Parish
**EDDY**

13. State
**NM**

| 15 Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg unit line, if any) | 16. No. of acres in lease | 17. Spacing Unit dedicated to this well |
|---|---|---|
| **274'** | **1440** | **40** |
| 18 Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft | 19 Proposed Depth | 20 BLM/BIA Bond No on file |
| **494'** | **4800' TVD; 4804' MD** | **NMB000740; NMB000215** |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.) | 22 Approximate date work will start* | 23. Estimated duration |
| **3638' GL** | **10/30/2011** | **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.
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 | Name *(Printed/Typed)* | Date |
|---|---|---|
| | **Kelly J. Holly** | **08/23/2011** |

Title **Permitting Tech**

| Approved by *(Signature)* | Name *(Printed/Typed)* | Date |
|---|---|---|
| /s/ Don Peterson | | SEP 20 2011 |
| 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)*

RECEIVED
SEP 22 2011
NMOCD ARTESIA

Roswell Controlled Water Basin

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

# MASTER DRILLING PROGRAM

## 1. Geologic Name of Surface Formation

Quaternary

## 2. Estimated Tops of Important Geologic Markers:

| | |
|---|---|
| Quaternary | Surface |
| Rustler | 220' |
| Salt | 360' |
| Base of Salt | 780' |
| Yates | 950' |
| Seven Rivers | 1235' |
| Queen | 1845' |
| Grayburg | 2220' |
| San Andres | 2540' |
| Glorieta | 4000' |
| Paddock | 4075' |
| Blinebry | 4620' |
| Tubb | 5520' |

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

| | | |
|---|---|---|
| Water Sand | 150' | Fresh Water |
| Grayburg | 2150' | Oil/Gas |
| San Andres | 2450' | Oil/Gas |
| Glorieta | 3900' | Oil/Gas |
| Paddock | 4075' | Oil/Gas |
| Blinebry | 4620' | Oil/Gas |
| Tubb | 5520' | Oil/Gas |

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to ~~300'~~ 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 ~~850'~~ 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 environment.

See COA

See COA

## 4. Casing Program

| Hole Size | Interval | OD Casing | Weight | Grade | Jt., Condition | Jt. | brst/clps/ten |
|---|---|---|---|---|---|---|---|
| 17 ½" See COA | 0-~~300~~ 315 | 13 3/8" | 48# | H-40orJ-55 | ST&C/New | ST&C | 9.22/3.943/15.8 |
| 11" COA | 0-~~850~~ 990 | 8 5/8" | 24or32# | J-55 | ST&C/New | ST&C | 3.03/2.029/7.82 |
| 7 7/8" | 0-TD 4800 | 5 1/2" | 15.5or17# | J-55orL-80 | LT&C/New | LT&C | 1.88/1.731/2.42 |

## 5. Cement Program

13 3/8" Surface Casing: Class C w/ 2% Cacl2 + 0.25 pps CF, 400 sx, yield 1.32, back to surface. 154% excess

8 5/8" Intermediate Casing:

**11" Hole:**

**Single Stage:** 50:50:10 C:Poz:Gel w/ 5% Salt +0.25% CF, 300 sx lead, yield-2.45 + Class C w/2% CaCl2, 200 sx tail, yield-1.32, back to surface. 363% excess

**Multi-Stage:** Stage 1: Class C w/2% CaCl2, 200 sx, yield - 1.32; 108% excess Stage 2: 50:50:10 C:Poz:Gel w/ 5% Salt +0.25% CF, 300 sx, yield - 2.45, back to surface, 726% excess; assumption for tool is lost circulation. Multi stage tool to be set at approximately, depending on hole conditions, 350' (50' below the surface casing). Cement volumes will be adjusted proportionately for depth changes of multi stage tool.

See COA

5 1/2" Production Casing:

**Single Stage:** LEAD 35:65:6 C:Poz:Gel w/ 5% Salt + 5 pps LCM + 0.2% SMS + 0.3% FL-52A + 0.125 pps CF, 500 sx, yield-2.05; + TAIL 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, 400 sx, yield-1.37, to 200' minimum tie back to intermediate casing. 75% excess back to surface.

**Multi-Stage:** Stage 1: (Assumed TD of 5450') 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, 500 sx, yield - 1.37, 35% excess; Stage 2:

See COA

LEAD 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, 450 sx, yield - 1.37, + TAIL Class C w/ 0.3% R-3 + 1.5% CD-32, 250sx, yield – 1.02 100% excess calculated back to surface. Multi stage tool to be set at approximately, depending on hole conditions, 2500'. 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 nippled 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 nippled 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-~~300'~~ 315 | Fresh Water | 8.5 | 28 | N.C. |
| ~~300~~-~~850'~~ 990 | Brine | 10 | 30 | N.C. |
| ~~850~~'-TD' | Cut Brine | 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.

## 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 Surface.

B. Drill Stem test is not anticipated.

C. No conventional coring is anticipated.

D. Further testing procedures will be determined after the 5 ½" 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 hole 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 10 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**
550 West Texas, Suite 1300
Midland, TX 79701

# DIRECTIONAL PLAN VARIANCE REQUEST

**Burch Keely Unit #509**
**EDDY, NM**

| | | |
|---|---|---|
| SHL | 274 FNL, 1545 FWL | Sec 13, T17S, R29E, Unit C |
| BHL | 330 FNL, 1650 FWL | Sec 13, T17S, R29E, Unit C |

COG Operating LLC, as Operator, desires that the APD reflect the footages as stated on the surveyor's plat. However, Operator also desires to avoid inadvertently drilling the well to a non-standard location. Therefore, due to the proximity of the plat bottom hole location to the pro-ration unit hard line(s), the attached directional plan is designed to avoid the hard lines by as much as fifty feet; said fifty feet being in either (or both) the north-south and/or east-west directions as applicable.

CONCHO

# COG Operating LLC

Eddy County, NM (NAN27 NME)
Burch Keely Unit #509
Burch Keely Unit #509

OH

Plan: Plan #1 7-7/8" Hole
SHL = 274' FNL & 1545' FWL
BHL = 380' FNL & 1660' FWL
Top of Paddock = 380' FNL & 1660' FWL @ 4200' TVD

# Standard Planning Report

23 August, 2011

Scientific Drilling
Directional Drilling Operations

| | | | |
|---|---|---|---|
| **Database:** | EDM-Julio | **Local Co-ordinate Reference:** | Site Burch Keely Unit #509 |
| **Company:** | COG Operating LLC | **TVD Reference:** | GL Elev @ 3638 00usft |
| **Project:** | Eddy County, NM (NAN27 NME) | **MD Reference:** | GL Elev @ 3638 00usft |
| **Site:** | Burch Keely Unit #509 | **North Reference:** | Grid |
| **Well:** | Burch Keely Unit #509 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #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** Burch Keely Unit #509

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 669,772 00 usft | **Latitude:** | 32° 50' 27 327 N |
| **From:** | Map | **Easting:** | 592,761 30 usft | **Longitude:** | 104° 1' 52 716 W |
| **Position Uncertainty:** | 0 00 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.16 ° |

**Well** Burch Keely Unit #509

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.00 usft | **Northing:** | 669,772 00 usft | **Latitude:** | 32° 50' 27.327 N |
| | **+E/-W** | 0.00 usft | **Easting:** | 592,761 30 usft | **Longitude:** | 104° 1' 52 716 W |
| **Position Uncertainty** | | 0.00 usft | **Wellhead Elevation:** | | **Ground Level:** | 3,638 00 usft |

**Wellbore** OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 2011/08/23 | 7 82 | 60.67 | 48,916 |

**Design** Plan #1 7-7/8" Hole

| | | | | | |
|---|---|---|---|---|---|
| **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 | 132 59 |

**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 | |
| 1,150 00 | 0 00 | 0 00 | 1,150 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | |
| 1,304 53 | 3 09 | 132 59 | 1,304 46 | -2 82 | 3 07 | 2 00 | 2 00 | 0 00 | 132 59 | |
| 4,049 61 | 3 09 | 132 59 | 4,045 54 | -102 98 | 112.03 | 0 00 | 0 00 | 0 00 | 0 00 | |
| 4,204 14 | 0 00 | 0 00 | 4,200 00 | -105 80 | 115 10 | 2.00 | -2 00 | 0 00 | 180 00 | TG1-BK #509 |
| 4,804.14 | 0 00 | 0 00 | 4,800 00 | -105 80 | 115 10 | 0 00 | 0 00 | 0 00 | 0 00 | PBHL-BK #509 |

| | | | |
|---|---|---|---|
| Database: | EDM-Julio | Local Co-ordinate Reference: | Site Burch Keely Unit #509 |
| Company: | COG Operating LLC | TVD Reference: | GL Elev @ 3638 00usft |
| Project: | Eddy County, NM (NAN27 NME) | MD Reference: | GL Elev @ 3638 00usft |
| Site: | Burch Keely Unit #509 | North Reference: | Grid |
| Well: | Burch Keely Unit #509 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | OH | | |
| Design: | Plan #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 |
| **West HL-BK #509 - North HL-BK #509** | | | | | | | | | |
| 1,150.00 | 0 00 | 0 00 | 1,150 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 | 0 00 |
| **KOP Start Build 2.00°/100'** | | | | | | | | | |
| 1,200 00 | 1.00 | 132 59 | 1,200 00 | -0 30 | 0 32 | 0.44 | 2.00 | 2 00 | 0 00 |
| 1,300.00 | 3 00 | 132 59 | 1,299 93 | -2 66 | 2 89 | 3 93 | 2 00 | 2 00 | 0 00 |
| 1,304 53 | 3 09 | 132 59 | 1,304 46 | -2 82 | 3.07 | 4 17 | 2 00 | 2 00 | 0 00 |
| **EOC hold 3.09°** | | | | | | | | | |
| 1,350 00 | 3 09 | 132 59 | 1,349 86 | -4.48 | 4 87 | 6 62 | 0 00 | 0 00 | 0 00 |
| **8-5/8" Casing** | | | | | | | | | |
| 1,400 00 | 3 09 | 132 59 | 1,399 79 | -6 30 | 6.86 | 9 31 | 0 00 | 0 00 | 0 00 |
| 1,500.00 | 3.09 | 132 59 | 1,499.64 | -9 95 | 10 83 | 14.71 | 0 00 | 0 00 | 0 00 |
| 1,600 00 | 3.09 | 132 59 | 1,599 50 | -13.60 | 14 80 | 20 10 | 0 00 | 0 00 | 0.00 |
| 1,700 00 | 3 09 | 132 59 | 1,699 35 | -17 25 | 18 77 | 25.49 | 0.00 | 0 00 | 0 00 |
| 1,800 00 | 3 09 | 132 59 | 1,799 20 | -20.90 | 22 74 | 30 88 | 0 00 | 0 00 | 0 00 |
| 1,900 00 | 3 09 | 132 59 | 1,899.06 | -24 55 | 26 70 | 36 27 | 0 00 | 0.00 | 0 00 |
| 2,000 00 | 3 09 | 132 59 | 1,998 91 | -28 20 | 30 67 | 41.66 | 0 00 | 0 00 | 0 00 |
| 2,100.00 | 3 09 | 132 59 | 2,098 77 | -31.84 | 34.64 | 47 06 | 0 00 | 0.00 | 0 00 |
| 2,200 00 | 3.09 | 132 59 | 2,198 62 | -35.49 | 38 61 | 52 45 | 0 00 | 0 00 | 0 00 |
| 2,300 00 | 3 09 | 132 59 | 2,298.48 | -39.14 | 42 58 | 57.84 | 0 00 | 0 00 | 0 00 |
| 2,400 00 | 3 09 | 132 59 | 2,398 33 | -42 79 | 46.55 | 63 23 | 0 00 | 0 00 | 0 00 |
| 2,500 00 | 3 09 | 132.59 | 2,498 19 | -46 44 | 50.52 | 68 62 | 0 00 | 0 00 | 0 00 |
| 2,600 00 | 3.09 | 132 59 | 2,598 04 | -50 09 | 54 49 | 74.01 | 0 00 | 0 00 | 0 00 |
| 2,700 00 | 3.09 | 132 59 | 2,697 90 | -53.74 | 58 46 | 79 41 | 0 00 | 0.00 | 0.00 |
| 2,800 00 | 3 09 | 132.59 | 2,797.75 | -57.39 | 62.43 | 84 80 | 0 00 | 0 00 | 0 00 |
| 2,900 00 | 3 09 | 132.59 | 2,897 60 | -61 03 | 66.40 | 90 19 | 0 00 | 0 00 | 0 00 |
| 3,000 00 | 3 09 | 132 59 | 2,997.46 | -64 68 | 70 37 | 95 58 | 0 00 | 0 00 | 0 00 |
| 3,100 00 | 3 09 | 132 59 | 3,097.31 | -68 33 | 74 34 | 100 97 | 0 00 | 0 00 | 0 00 |
| 3,200 00 | 3 09 | 132.59 | 3,197 17 | -71.98 | 78 31 | 106 36 | 0 00 | 0 00 | 0 00 |
| 3,300 00 | 3 09 | 132 59 | 3,297 02 | -75 63 | 82 28 | 111 76 | 0 00 | 0 00 | 0.00 |
| 3,400 00 | 3 09 | 132.59 | 3,396.88 | -79 28 | 86.25 | 117 15 | 0 00 | 0 00 | 0 00 |
| 3,500 00 | 3 09 | 132 59 | 3,496 73 | -82 93 | 90 22 | 122.54 | 0 00 | 0 00 | 0.00 |
| 3,600 00 | 3 09 | 132 59 | 3,596 59 | -86.58 | 94 19 | 127 93 | 0 00 | 0 00 | 0.00 |
| 3,700 00 | 3.09 | 132 59 | 3,696 44 | -90 22 | 98 15 | 133 32 | 0 00 | 0 00 | 0 00 |
| 3,800 00 | 3 09 | 132 59 | 3,796.30 | -93 87 | 102 12 | 138 71 | 0 00 | 0 00 | 0 00 |
| 3,900 00 | 3 09 | 132 59 | 3,896 15 | -97.52 | 106.09 | 144 10 | 0 00 | 0 00 | 0.00 |
| 4,000 00 | 3 09 | 132 59 | 3,996 00 | -101 17 | 110 06 | 149 50 | 0 00 | 0 00 | 0 00 |
| 4,049 61 | 3 09 | 132 59 | 4,045.54 | -102 98 | 112.03 | 152.17 | 0 00 | 0.00 | 0.00 |
| **Start Drop 2.00°/100'** | | | | | | | | | |
| 4,100.00 | 2.08 | 132 59 | 4,095 88 | -104 52 | 113 71 | 154 45 | 2 00 | -2 00 | 0 00 |
| 4,200 00 | 0 08 | 132 59 | 4,195 86 | -105.80 | 115 10 | 156 34 | 2 00 | -2 00 | 0.00 |
| 4,204 14 | 0 00 | 0 00 | 4,200 00 | -105.80 | 115 10 | 156.34 | 2 00 | -2 00 | 0.00 |
| **EOC hold 0.00° - Top of Paddock - TG1-BK #509** | | | | | | | | | |
| 4,804.14 | 0 00 | 0.00 | 4,800.00 | -105 80 | 115 10 | 156 34 | 0 00 | 0 00 | 0 00 |
| **PBHL-BK #509** | | | | | | | | | |

| | | | |
|---|---|---|---|
| **Database:** | EDM-Julio | **Local Co-ordinate Reference:** | Site Burch Keely Unit #509 |
| **Company:** | COG Operating LLC | **TVD Reference:** | GL Elev @ 3638 00usft |
| **Project:** | Eddy County, NM (NAN27 NME) | **MD Reference:** | GL Elev @ 3638.00usft |
| **Site:** | Burch Keely Unit #509 | **North Reference:** | Grid |
| **Well:** | Burch Keely Unit #509 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #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 |
|---|---|---|---|---|---|---|---|---|---|
| West HL-BK #509<br>- plan misses target center by 118 99usft at 0 00usft MD (0.00 TVD, 0 00 N, 0 00 E)<br>- Rectangle (sides W0 00 H150 00 D0 00) | 0 00 | 0 00 | 0 00 | -55.80 | 105 10 | 669,716 20 | 592,866 40 | 32° 50' 26 772 N | 104° 1' 51 486 W |
| North HL-BK #509<br>- plan misses target center by 118 99usft at 0 00usft MD (0 00 TVD, 0 00 N, 0.00 E)<br>- Rectangle (sides W150 00 H0 00 D0 00) | 0 00 | 0 00 | 0.00 | -55 80 | 105 10 | 669,716 20 | 592,866 40 | 32° 50' 26 772 N | 104° 1' 51 486 W |
| TG1-BK #509<br>- plan hits target center<br>- Point | 0 00 | 0 00 | 4,200 00 | -105 80 | 115 10 | 669,666 20 | 592,876 40 | 32° 50' 26 277 N | 104° 1' 51 370 W |
| PBHL-BK #509<br>- plan hits target center<br>- Circle (radius 50.00) | 0.00 | 0 01 | 4,800 00 | -105 80 | 115.10 | 669,666 20 | 592,876 40 | 32° 50' 26 277 N | 104° 1' 51 370 W |

**Casing Points**

| Measured Depth (usft) | Vertical Depth (usft) | Name | Casing Diameter (") | Hole Diameter (") |
|---|---|---|---|---|
| 1,350 00 | 1,349 86 | 8-5/8" Casing | 8-5/8 | 12-1/4 |

**Formations**

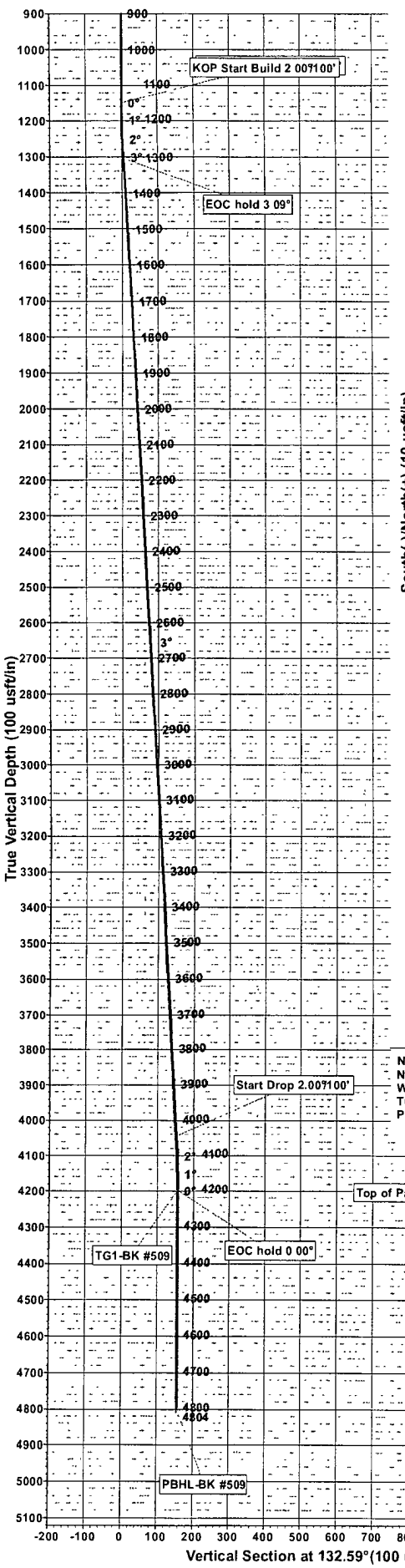
| Measured Depth (usft) | Vertical Depth (usft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---|---|---|---|---|---|
| 4,204 14 | 4,200 00 | Top of Paddock | | 0 00 | |

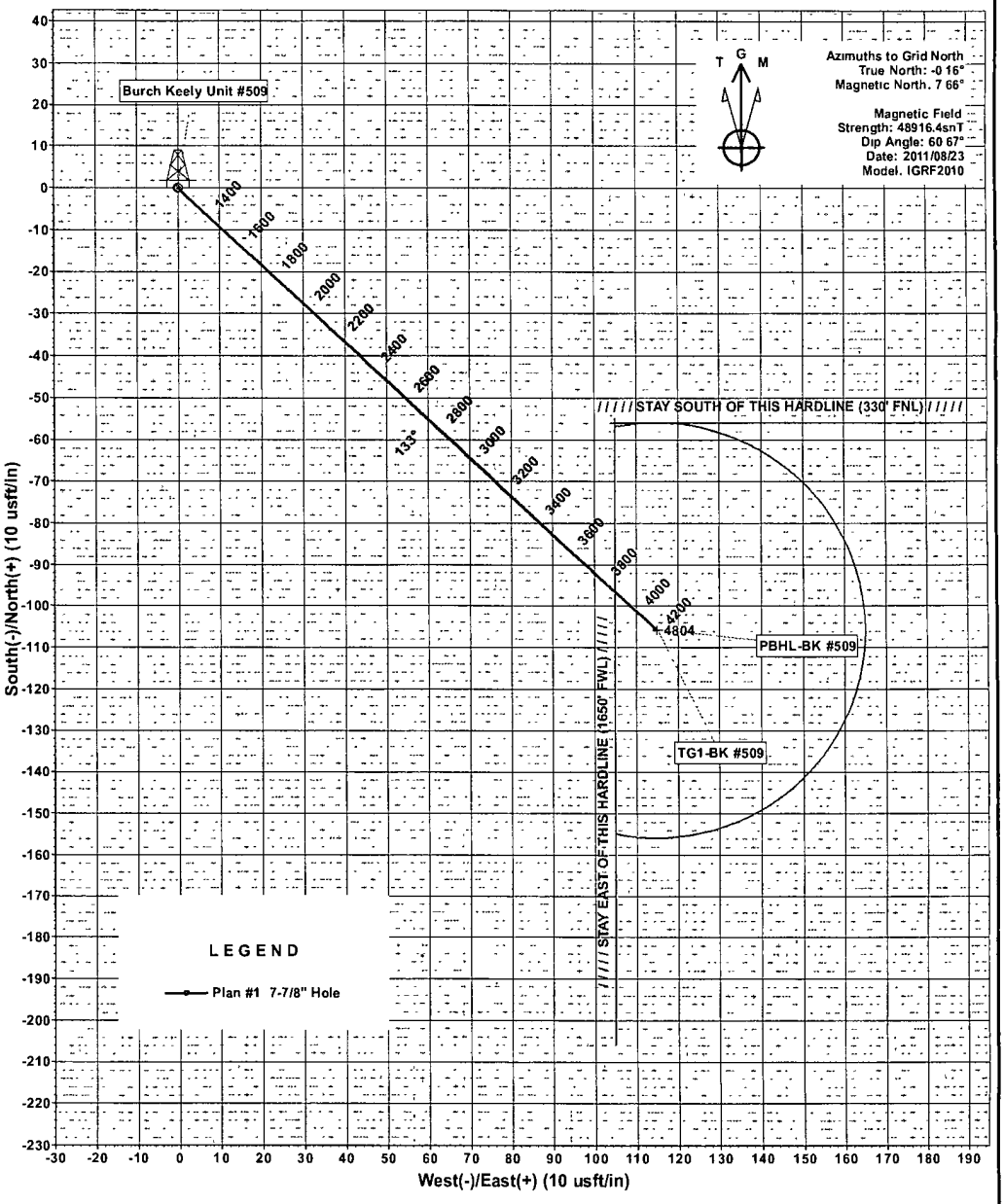
**Plan Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 1,150 00 | 1,150.00 | 0 00 | 0.00 | KOP Start Build 2 00°/100' |
| 1,304 53 | 1,304.46 | -2 82 | 3 07 | EOC hold 3.09° |
| 4,049 61 | 4,045 54 | -102 98 | 112 03 | Start Drop 2 00°/100' |
| 4,204 14 | 4,200.00 | -105 80 | 115 10 | EOC hold 0 00° |

Scientific Drilling for COG Operating LLC
Site: Eddy County, NM (NAN27 NME)
Well: Burch Keely Unit #509
Wellbore: OH
Design: Plan #1 7-7/8" Hole

Scientific Drilling
Directional Drilling Operations




**WELLBORE TARGET DETAILS (MAP CO-ORDINATES)**

| Name | TVD | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude | Shape |
|---|---|---|---|---|---|---|---|---|
| North HL-BK #509 | 0.00 | -55.80 | 105.10 | 669716.20 | 592866 40 | 32°50' 26.772 N | 104°1' 51 486 W | Rectangle (Sides. L0 00 W150.00) |
| West HL-BK #509 | 0.00 | -55.80 | 105.10 | 669716 20 | 592866 40 | 32°50' 26.772 N | 104°1' 51.486 W | Rectangle (Sides L15 0.00 W0.00) |
| TG1-BK #509 | 4200.00 | -105.80 | 115.10 | 669666 20 | 592876 40 | 32°50' 26.277 N | 104°1' 51.370 W | Point |
| PBHL-BK #509 | 4800.00 | -105.80 | 115.10 | 669666 20 | 592876 40 | 32°50' 26.277 N | 104°1' 51.370 W | Circle (Radius: 50.0 0) |

**SECTION DETAILS**

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | VSect | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0 00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 1150 00 | 0.00 | 0.00 | 1150.00 | 0 00 | 0.00 | 0 00 | 0 00 | 0 00 | |
| 3 | 1304.53 | 3.09 | 132.59 | 1304 46 | -2.82 | 3.07 | 2.00 | 132.59 | 4.17 | |
| 4 | 4049 61 | 3.09 | 132.59 | 4045 54 | -102 98 | 112.03 | 0 00 | 0 00 | 152.17 | |
| 5 | 4204 14 | 0 00 | 0.00 | 4200.00 | -105 80 | 115.10 | 2.00 | 180 00 | 156 34 | TG1-BK #509 |
| 6 | 4804.14 | 0 00 | 0.00 | 4800 00 | -105.80 | 115.10 | 0.00 | 0.00 | 156.34 | PBHL-BK #509 |

**WELL DETAILS. Burch Keely Unit #509**

Ground Level: 3638.00

| +N/-S | +E/-W | Northing | Easting | Latitude | Longitude | Slot |
|---|---|---|---|---|---|---|
| 0.00 | 0 00 | 669772.00 | 592761.30 | 32°50' 27.327 N | 104°1' 5 2 716 W | |

PROJECT DETAILS: Eddy County, NM (NAN27 NME)

Plan Plan #1 7-7/8" Hole (Burch Keely Unit #509/OH)

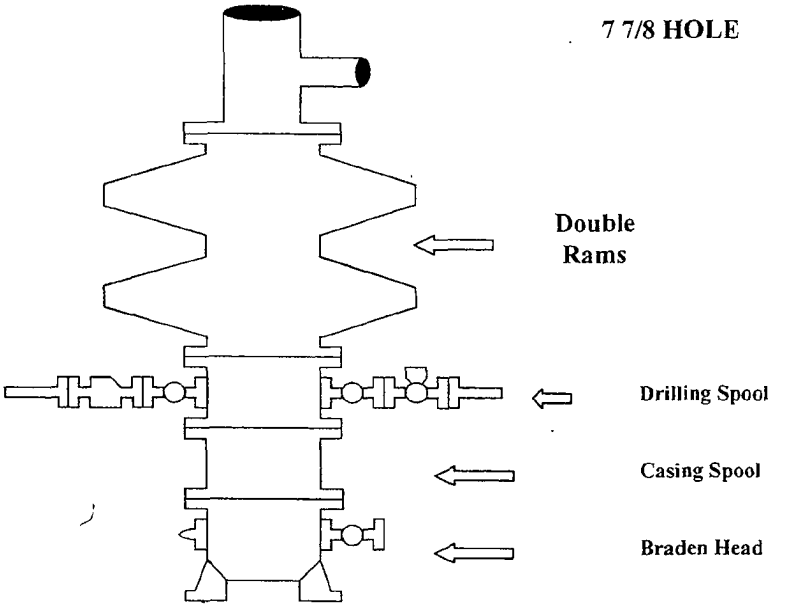
Geodetic System: US State Plane 1927 (Exact solution)
Datum NAD 1927 (NADCON CONUS)
Ellipsoid. Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

Created By: Julio Pina Date: 23-Aug-11
Checked _____ Date. _____
Reviewed: _____ Date: _____
Approved: _____ Date _____

# COG Operating LLC

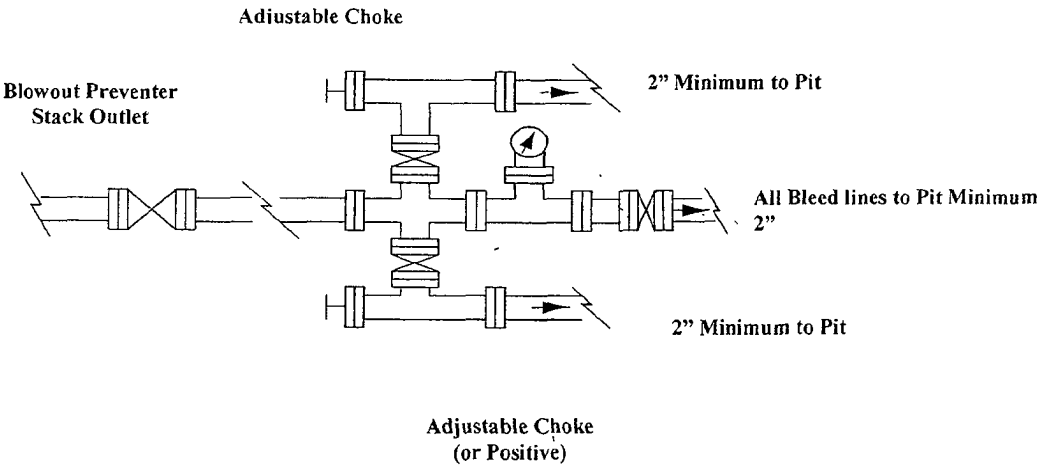
## Exhibit #9

## BOPE and Choke Schematic




Minimum 4" Nominal choke and kill lines

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.