

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

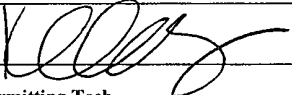
## APPLICATION FOR PERMIT TO DRILL OR REENTER


1a Type of work. <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5 Lease Serial No. NMNM-094593
1b Type of Well. <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6 If Indian, Allottee or Tribe Name N/A
2 Name of Operator COG Operating LLC [229137]		7 If Unit or CA Agreement, Name and No N/A
3a Address 550 W. Texas, Suite 100 Midland TX 79701		8 Lease Name and Well No Fir Federal #4 [91836]
3b Phone No. (include area code) (432) 685-4384		9 API Well No. 30-015- 39462
4 Location of Well (Report location clearly and in accordance with any State requirements*) At surface 2235' FSL & 330' FWL, UL L ✓ At proposed prod zone		10 Field and Pool, or Exploratory Red Lake; Glorieta-Yeso, Northeast
14 Distance in miles and direction from nearest town or post office* 2 miles North of Loco Hills, NM		11 Sec., T. R. M. or Blk. and Survey or Area Sec 25, T17S, R27E
15 Distance from proposed* location to nearest property or lease line, ft (Also to nearest drg unit line, if any) 330'	16 No. of acres in lease 40	17 Spacing Unit dedicated to this well 40
18 Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft 730'	19 Proposed Depth 4700' ✓	20 BLM/BIA Bond No. on file NMB000740; NMB000215
21 Elevations (Show whether DF, KDB, RT, GL, etc.) 3575' GL ✓	22 Approximate date work will start* 09/30/2011	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 06/17/2011
Title Permitting Tech		

Approved by (Signature)  James A. Ames	Name (Printed/Typed) James A. Ames	Date SEP 21 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.

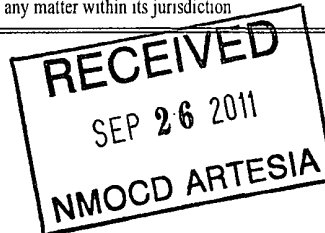
Conditions of approval, if any, are attached.

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)

Roswell Controlled Water Basin

SEE ATTACHED FOR  
CONDITIONS OF APPROVALAPPROVAL SUBJECT TO  
GENERAL REQUIREMENTS  
AND SPECIAL STIPULATIONS  
ATTACHED

## DRILLING PROGRAM

### 1. Geologic Name of Surface Formation

Quaternary

### 2. Estimated Tops of Important Geologic Markers:

Quaternary	Surface
Top of Salt	0'
Base of Salt	100'
Yates	250'
Seven Rivers	450'
Queen	950'
Grayburg	1400'
San Andres	1750'
Glorieta	3100'
Yeso Group	3200'
Tubb	4600'

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

Water Sand	150'	Fresh Water
Grayburg	1400'	Oil/Gas
San Andres	1750'	Oil/Gas
Glorieta	3100'	Oil/Gas
Yeso Group	3200'	Oil/Gas
Tubb	4600'	Oil/Gas

See  
COA

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 1000' 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 (although cement volume is actually calculated to surface), 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

See COA

Hole Size	Interval	OD Casing	Weight	Grade	Jt., Condition	Jt.	brst/clps/ten
17 1/2"	0-300'	13 3/8"	48#	H-40orJ-55	ST&C/New	ST&C	9.22/3.943/15.8
11"	0-1000'	8 5/8"	24or32#	J-55orK-55	ST&C/New	ST&C	3.03/2.029/7.82
7 7/8"	0-TD	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% CaCl<sub>2</sub> + 0.25 pps CF, 350 sx, yield 1.32, back to surface. 122% excess

8 5/8" Intermediate Casing:

**11" Hole:**

**Single Stage:** 50:50:10 C:Poz:Gel w/ 5% Salt + 0.25% CF, 200 sx lead, yield-2.45 + Class C, 200 sx tail, yield-1.32, back to surface. 197% excess

**Multi-Stage:** Stage 1: Class C w/2% CaCl<sub>2</sub>, 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 400 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. 52% open hole excess, cement calculated back to surface (no need for excess in casing overlap).

**Multi-Stage:** Stage 1: (Assumed TD of 4800' to DV at 2500') 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

See  
COA  
High  
Cave/Karst

See  
COA

pps CF, 500 sx, yield - 1.37, 56% excess;  
this is a minimum volume and will be  
adjusted up after caliper is run. Stage 2:  
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, 250 sx, yield - 1.02 88%  
excess calculated back to surface (no need  
for excess in casing overlap). 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  
use of 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:

*\* See COA*

*Use Fresh Water Mud to 1000'*

DEPTH	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-300'	Fresh Water	8.5	28	N.C.
300-1000'	<del>Brine</del>	10	30	N.C.
1000'-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 temperature at TD is 100 degrees and the estimated maximum bottom hole pressure is 1900 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.

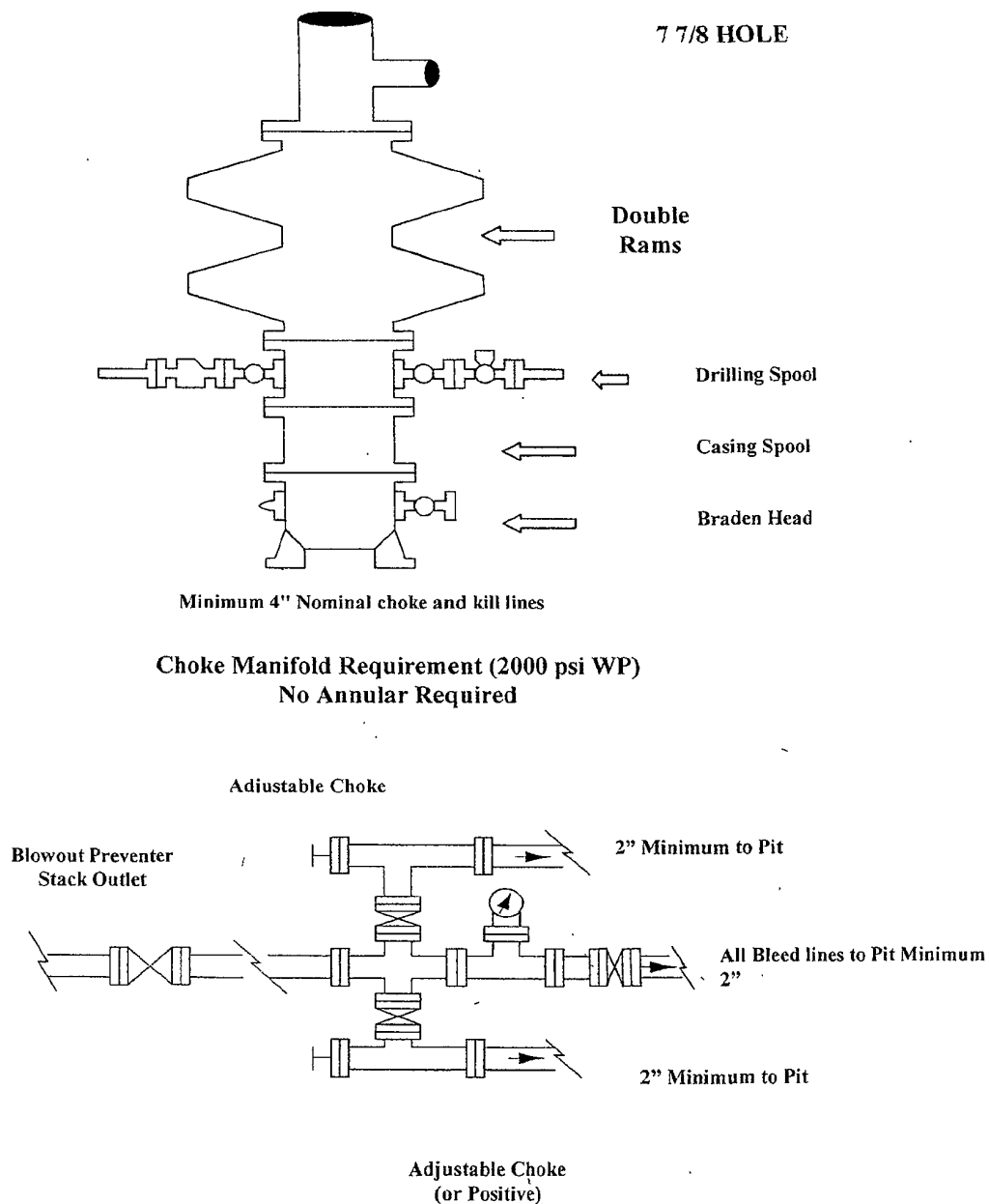
**11. Anticipated Starting Date and Duration of Operations**

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

## Exhibit #9

### BOPE and Choke Schematic



**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.





United States Department of the Interior  
Bureau of Land Management  
Carlsbad Field Office



Refer To: 3160-3

COPY

To: AFM, Lands & Minerals, CFO

From: Geologist, CFO

Subject: Geologic Review of Application for Permit to Drill

Operator: **COG Operating LLC.**

Well Name and Number: **Fir Federal 4**

Location: T17S, R27E, Sec. 25; 2235' FSL & 330' FWL (Unit L)

County: Eddy

State: NM

Lease No.: NMNM-94593

Date Received: 29 July 2011

1. Surface Elevation: **3575' GR** Surface Geology: **Artesia Group**

2. Geologic Marker Tops (from reports on surrounding wells):

Well:	Dogwood Federal 1 3001532927 T17S R27E Sec 25 2310 FNL, 1650 FWL GR 3573	State 25 #1 3001531927 T17S R27E Sec 25 1650 FSL, 990 FEL GR 3586	Birch Federal 1 3001530868 T17S R27E Sec 25 2185 FNL, 1650 FEL KB 3559	Spruce Federal 1 3001524092 T17S R27E Sec 25 1650 FSL, 2310 FWL GR 3582	Fir Federal 4 PROPOSED WELL T17S R27E Sec 25 2235 FSL, 330 FWL GR 3575
Geologic Marker	Depth*	Depth*	Depth*	Depth*	Estimated Depth†
Yates	230	214		215	225
Seven Rivers	453	440	426	440	425
Queen	960	953	925	964	940
San Andres	1760	1722	1720	1737	1725
Glorieta	3110	3105	3096	3100	3080
Tubb	4590	4580	4530	4617	4545
Abo	5287	5293	5210	5245	5210

\*Depths primarily from IHS database

†Determined from IHS contouring.

3. Fresh Water Information: According to well data from the New Mexico Office of the State Engineer's Water Rights Reporting System, there are nineteen wells within a six-mile radius of the proposed well, with water depths ranging from 8 to 931 feet.

Deepest Expected Fresh Water: above 260 feet.

Does Surface Casing cover all anticipated usable fresh water zones? No; set casing in a competent bed below cave depth and usable water zones at approximately 375'.

Operator has proposed to set an intermediate string to protect the salt? Operator's proposed intermediate casing set point of 1,000 feet should protect any water wells above 1000 feet, such as the well in Section 17 of T17S, R27E.

Controlled Water Basin:

Capitan \_\_\_\_ Carlsbad \_\_\_\_ Roswell X Lea \_\_\_\_

4. Geologic Hazards?

H<sub>2</sub>S X Karst X Abnormal Pressures \_\_\_\_ Other X

Remarks: H<sub>2</sub>S has been reported within one mile of proposed project in Section 25 (SWSW, NWSE, and SWSE) of T17S, R27E; measuring 1400 ppm, 5500ppm and 800 ppm in the gas stream of an unknown formation. H<sub>2</sub>S was also reported in Section 26 (NWNE) of T17S, R27E; measuring 2400 ppm in the gas stream.

There exists the possibility of lost circulation in the Grayburg and San Andres formations.

The location of the proposed well is within a high potential for the occurrence of karst type features down to a depth of 350 feet.

5. Other Mineral Deposits: Possible caliche, gravel and sand.

6. Potash:

Secretary's Oil-Potash Area \_\_\_\_ R-111-P Area \_\_\_\_ Not Applicable X

7. Other References:

GIS H<sub>2</sub>S List.

IHS Enerdeq® Well Data.

New Mexico Office of the State Engineer::New Mexico Water Rights Reporting System, 12 August 2011,  
<<http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html>>.

Oil Conservation Division of the New Mexico Energy, Minerals and Natural Resources Department well log and well file imaging website, 12 August 2011,  
<<http://ocdimage.emnrd.state.nm.us/imaging/>>.

Oil and Gas P&A Files.

8. No known active mining claims are located in this vicinity.

Geologist : James Rutley Date: 12 August 2011

DISTRICT 2 -- CHECKLIST FOR INTENTS TO DRILL

Operator COE Ope OGRID # 229134  
 Well Name & # FIR FEDERAL #4 Surface Type (F) (S) (P)  
 Location: UL 1 Sect 25 Township 17S s, RNG 27E, Sub-surface Type (F) (S) (P)

CODE 302464

A. Date C101 rec'd 9/26/2011 C101 reviewed 9/28/2011

B. 1. Check mark, Information is OK on Forms:

OGRID ✓, BONDING F, PROP CODE ✓, WELL # 4, SIGNATURE 8  
 2. Inactive Well list as of: 9/28/2011 # wells 3023, # Inactive wells 8

a. District Grant APD but see number of inactive wells:

No letter required ✓; Sent Letter to Operator       , to Santa Fe       

3. Additional Bonding as of: 9/28/2011

a. District Denial because operator needs addition bonding:

No Letter required ✓; Sent Letter to Operator       , To Santa Fe       

b. District Denial because of Inactive well list and Financial Assurance:

No Letter required ✓; Sent Letter to Operator       , To Santa Fe       

C. C102 YES       , NO       , Signature       

1. Pool RED LAKE; GLORIETA-YESO; NE, Code       

a. Dedicated acreage 40, What Units       

b. SUR. Location Standard ✓; Non-Standard Location       

c. Well shares acres: Yes ✓, No       , # of wells        plus this well #       

2. 2<sup>nd</sup>. Operator in same acreage, Yes       , No       

Agreement Letter       , Disagreement letter       

3. Intent to Directional Drill Yes       , No ✓

a. Dedicated acreage       , What Units       

b. Bottomhole Location Standard       , Non-Standard Bottomhole       

4. Downhole Commingle: Yes       , No ✓

a. Pool #2       , Code       , Acres       

Pool #3       , Code       , Acres       

Pool #4       , Code       , Acres       

5. POTASH Area Yes       , No ✓

D. Blowout Preventer Yes ✓, No       

E. H2S Yes ✓, No       

F. C144 Pit Registration Yes       , No       

G. Does APD require Santa Fe Approval:

1. Non-Standard Location: Yes       , No ✓, NSL #       

2. Non-Standard Proration: Yes       , No       , NSP #       

3. Simultaneous Dedication: Yes       , No ✓, SD #       

Number of wells        Plus #       

4. Injection order Yes       , No ✓; PMX #        or WFX #       

5. SWD order Yes       , NO ✓; SWD #       

6. DHC from SF       ; DHC-HOB       ; Holding       

more than 4 wells.

7. OCD Approval Date 9/28/2011

API #30-015-39462

8. Reviewers TES

oddy.