OCD Hobbs

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MAY 02 2011

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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-029509A

6. If Indian, Allotee or Tribe Name: N/A

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

8. Lease Name and Well No.: M C FEDERAL #64 (302519)

2. Name of Operator: COG Operating LLC (229137)

9. API Well No.: 30-025- 40125

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

3b. Phone No. (include area code): (432) 685-4385

10. Field and Pool, or Exploratory: Maljamar; Yeso, West (44500)

4. Location of Well (Report location clearly and in accordance with any State requirements.*)
At surface: SHL: 1891' FSL & 2146' FEL, Unit J
At proposed prod. zone: BHL: 1650' FSL & 2310' FEL, Unit J

11. Sec., T. R. M. or Blk. and Survey or Area: Sec 21, T17S, R32E

14. Distance in miles and direction from nearest town or post office*: 2.5 miles south of Maljamar NM

12. County or Parish: Lea

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No. of acres in lease	17. Spacing Unit dedicated to this well
1891'	640	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**
510'	7100' TVD 7112'MD	NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.)	**22. Approximate date work will start***	**23. Estimated duration**
4042' GL	03/31/2011	10 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: Robyn Odom — Name (Printed/Typed): Robyn M. Odom — Date: 02/22/2011

Title: Regulatory Analyst

Approved by (Signature): /s/ Don Peterson — Name (Printed/Typed): — Date: APR 25 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

Kz 05/02/11

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

MAY 04 2011

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410

DISTRICT IV
11885 S. ST. FRANCIS DR., SANTA FE, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

11885 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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Form C-102
Revised October 12, 2005
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code	Pool Name
30-025- 40125	44500	MALJAMAR; YESO, WEST

Property Code	Property Name	Well Number
302519	MC FEDERAL	64

OGRID No.	Operator Name	Elevation
229137	COG OPERATING, LLC	4042'

Surface Location

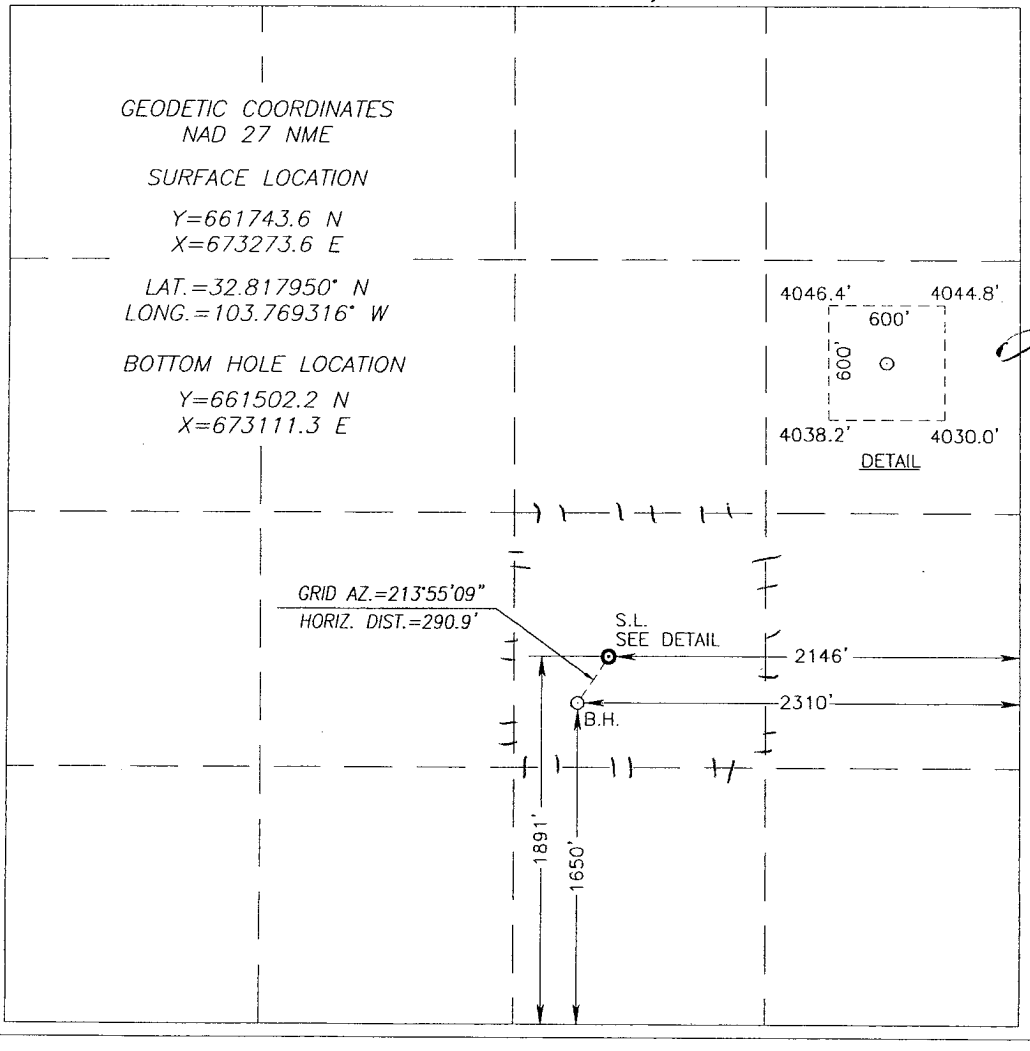
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	21	17-S	32-E		1891	SOUTH	2146	EAST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
J	21	17-S	32-E		1650	SOUTH	2310	EAST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
40			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 8/18/2010

Robyn Odom
Printed Name

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

RONALD J. EIDSON
NEW MEXICO
AUGUST 2, 2010

Date Surveyed: DSS
Signature & Seal of Professional Surveyor
3239
REGISTERED PROFESSIONAL SURVEYOR
08/10/2010
10.11.1013

Certificate No. GARY G. EIDSON 12641
RONALD J. EIDSON 3239

COG Operating LLC
Master Drilling Plan Revised 1-31-11
West Maljamar ; Yeso, West
Use for Sections 3-35, T17S, R32E
Lea County, NM

MASTER DRILLING PROGRAM

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1. Geologic Name of Surface Formation

Quaternary

2. Estimated Tops of Important Geologic Markers:

Quaternary	Surface
Rustler	680'
Top of Salt	900'
Base of Salt	1700'
Yates	2010'
Seven Rivers	2375'
Queen	2980'
Grayburg	3355'
San Andres	3700'
Glorietta	5260'
Paddock	5310'
Blinebry	5870'
Tubb	6810'

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

Water Sand	150'	Fresh Water
Grayburg	3355'	Oil/Gas
San Andres	3700'	Oil/Gas
Glorietta	5260'	Oil/Gas
Paddock	5310'	Oil/Gas
Blinebry	5870'	Oil/Gas
Tubb	6810'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to ~~650'~~ 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 ~~2100'~~ 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 COA

4. Casing Program

See COA

Hole Size	Interval	OD Casing	Weight	Grade	Jt., Condition	burst/collapse/tension
17 ½"	0-~~650'~~ 395	13 3/8"	48#	H-40orJ-55	ST&C/New	6.03/2.578/10.32
11"	0-~~2100'~~ 2140	8 5/8"	24or32#	J-55	ST&C/New	1.85/1.241/4.78
7 7/8"	0-T.D.	5 1/2"	15.5or17#	J-55orL-80	LT&C/New	1.59/1.463/2.05

5. Cement Program See COA

13 3/8" Surface Casing:

LEAD Class C, 4% Gel, 2% CaCl2, .25 pps CF, 325 sx, yield-1.75 + TAIL 200 sx w/ 2% CaCl2, 0.25 pps CF, yield-1.32. 133% excess

8 5/8" Intermediate Casing:

11" Hole:

Single Stage: LEAD 50:50:10 C:Poz:Gel w/ 5% Salt +0.25% CF, 375 sx, yield-2.45 + TAIL Class C w/2% CaCl2, 200 sx, yield-1.32, back to surface. 133% excess

Multi-Stage: Stage 1: Class C w/2% CaCl2, 400 sx, yield - 1.32; 48% excess Stage 2: Class C w/2% CaCl2, 200 sx, yield – 1.32, back to surface, 48% excess; assumption for tool is lost circulation. Multi stage tool to be set at approximately, depending on hole conditions, 700' (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. 30% excess back to surface.

Multi-Stage: Stage 1: (Assumed TD of 7000') 50:50:2, C:Poz:Gel w/ 5% Salt + 3

See COA

pps LCM + 0.6% SMS + 1% FL-25 + 1% BA-58 + 0.3% FL-52A + 0.125 pps CF, 500 sx, yield - 1.37, 13% excess; 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 43% excess calculated back to surface. Multi stage tool to be set at approximately, depending on hole conditions, 3500'. Cement volumes will be adjusted proportionately for depth changes of multi stage tool, assumption for tool is water flow.

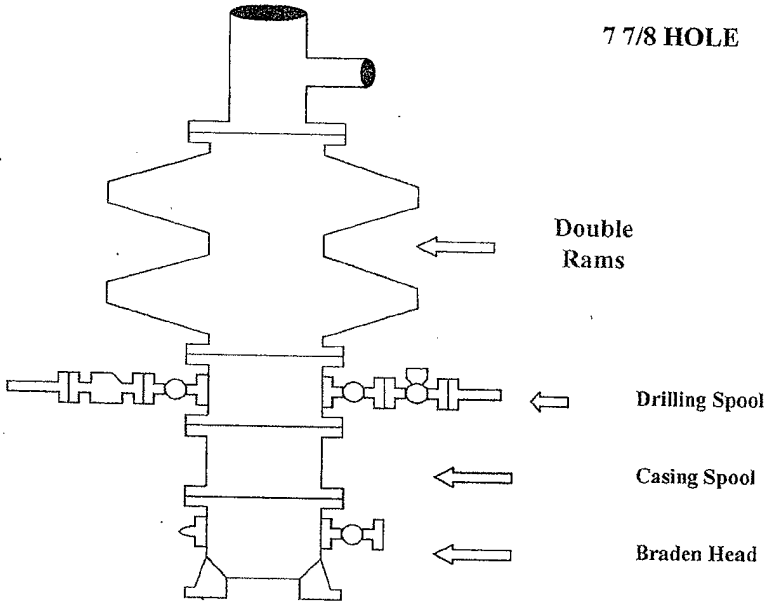
6. Minimum Specifications for Pressure Control

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.

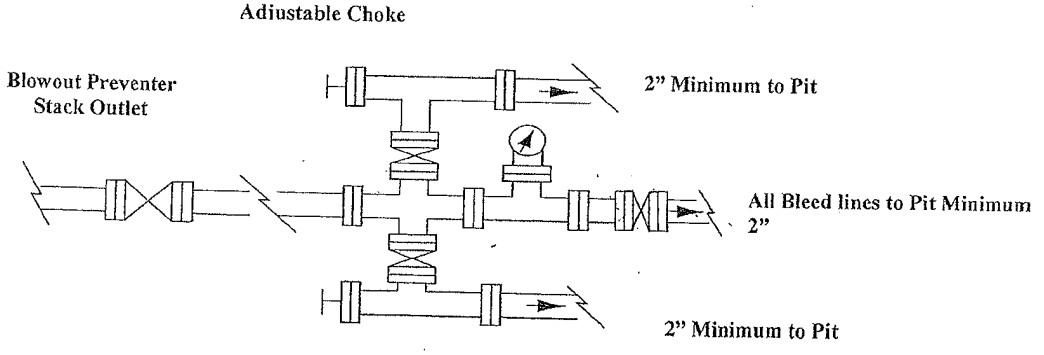
See COA

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



Adjustable Choke
(or Positive)

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.

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-~~650'~~ 815	Fresh Water	8.5	28	N.C.
~~650-2100'~~ 2140	Brine	10	30	N.C.
~~2100'~~-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 COR

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 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 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 15 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

Hydrogen Sulfide Drilling Operation Plan

I. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards an characteristics of hydrogen sulfide (H2S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H2S detectors alarms warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H2S on metal components. If high tensile tubular are to be used, personnel well be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H2S Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H2S zone (within 3 days or 500 feet) and weekly H2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H2S Drilling Operations Plan and the Public Protection Plan. **The concentrations of H2S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

II. H2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonable expected to contain H2S.

1. **Well Control Equipment:**

   A. Flare line.

   B. Choke manifold.

   C. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.

   D. Auxiliary equipment may include if applicable: annular preventer & rotating head.

2. **Protective equipment for essential personnel:**

   A. Mark II Survive air 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

3. **H2S detection and monitoring equipment:**

   A. 1 portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

4. **Visual warning systems:**

   A. Wind direction indicators as shown on well site diagram (Exhibit #8).

   B. Caution/Danger signs (Exhibit #7) shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

5. **Mud program:**

   A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices, and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.

6. **Metallurgy:**

   A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.

   B. All elastomers used for packing and seals shall be H2S trim.

7. **Communication:**

   A. Radio communications in company vehicles including cellular telephone and 2-way radio.

   B. Land line (telephone) communication at Office.

8. **Well testing:**

   A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H2S environment will use the closed chamber method of testing.

   B. There will be no drill stem testing.

EXHIBIT #7

WARNING

YOU ARE ENTERING AN H2S

AUTHORIZED PERSONNEL ONLY

1. BEARDS OR CONTACT LENSES NOT ALLOWED
2. HARD HATS REQUIRED
3. SMOKING IN DESIGNATED AREAS ONLY
4. BE WIND CONSCIOUS AT ALL TIMES
5. CHECK WITH COG OPERATING FOREMAN AT

COG OPERATING LLC
1-432-683-7443
1-575-746-2010

EDDY COUNTY EMERGENCY NUMBERS
ARTESIA FIRE DEPT. 575-746-5050
ARTESIA POLICE DEPT. 575-746-5000
EDDY CO. SHERIFF DEPT. 575-746-9888

LEA COUNTY EMERGENCY NUMBERS
HOBBS FIRE DEPT. 575-397-9308
HOBBS POLICE DEPT. 575-397-9285
LEA CO. SHERIFF DEPT. 575-396-1196

CONCHO

COG Operating LLC

Lea County, NM (NAD27 NME)
MC Federal #64
MC Federal #64

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Plan: Plan #1 - 7-7/8" Hole
SHL = 1891' FSL & 2146' FEL
BHL = 1660' FSL & 2300' FEL
Top of Paddock = 1660' FSL & 2300' FEL @ 5450' TVD

Standard Planning Report

18 November, 2010

Scientific Drilling
Directional Drilling Operations

Database:	EDM-Julio	**Local Co-ordinate Reference:**	Well MC Federal #64
Company:	COG Operating LLC	**TVD Reference:**	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	GL Elev @ 4042.00usft
Site:	MC Federal #64	**North Reference:**	Grid
Well:	MC Federal #64	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 - 7-7/8" Hole		

Project Lea County, NM (NAD27 NME)

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site MC Federal #64

Site Position:		**Northing:**	661,743.60 usft	**Latitude:**	32° 49' 4.621 N
From:	Map	**Easting:**	673,273.60 usft	**Longitude:**	103° 46' 9.538 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.31 °

Well MC Federal #64

Well Position	**+N/-S**	0.00 usft	**Northing:**	661,743.60 usft	**Latitude:**	32° 49' 4.621 N
	+E/-W	0.00 usft	**Easting:**	673,273.60 usft	**Longitude:**	103° 46' 9.538 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	4,042.00 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2010/11/18	7.79	60.72	49,006

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	213.35

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	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,465.14	5.30	213.35	2,464.76	-10.24	-6.74	2.00	2.00	0.00	213.35	
5,197.31	5.30	213.35	5,185.24	-221.16	-145.56	0.00	0.00	0.00	0.00	
5,462.45	0.00	0.00	5,450.00	-231.40	-152.30	2.00	-2.00	0.00	180.00	TG1-MC Fed #64
7,112.45	0.00	0.00	7,100.00	-231.40	-152.30	0.00	0.00	0.00	0.00	PBHL-MC Fed #64

Database:	EDM-Julio	**Local Co-ordinate Reference:**	Well MC Federal #64
Company:	COG Operating LLC	**TVD Reference:**	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	GL Elev @ 4042.00usft
Site:	MC Federal #64	**North Reference:**	Grid
Well:	MC Federal #64	**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
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8-5/8" Casing									
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP Start Build 2.00°/100'									
2,300.00	2.00	213.35	2,299.98	-1.46	-0.96	1.75	2.00	2.00	0.00
2,400.00	4.00	213.35	2,399.84	-5.83	-3.84	6.98	2.00	2.00	0.00
2,465.14	5.30	213.35	2,464.76	-10.24	-6.74	12.26	2.00	2.00	0.00
EOC hold 5.30°									
2,500.00	5.30	213.35	2,499.47	-12.93	-8.51	15.48	0.00	0.00	0.00
2,600.00	5.30	213.35	2,599.04	-20.65	-13.59	24.72	0.00	0.00	0.00
2,700.00	5.30	213.35	2,698.62	-28.37	-18.67	33.97	0.00	0.00	0.00
2,800.00	5.30	213.35	2,798.19	-36.09	-23.75	43.21	0.00	0.00	0.00
2,900.00	5.30	213.35	2,897.76	-43.81	-28.84	52.45	0.00	0.00	0.00
3,000.00	5.30	213.35	2,997.33	-51.53	-33.92	61.69	0.00	0.00	0.00
3,100.00	5.30	213.35	3,096.90	-59.25	-39.00	70.93	0.00	0.00	0.00
3,200.00	5.30	213.35	3,196.48	-66.97	-44.08	80.17	0.00	0.00	0.00
3,300.00	5.30	213.35	3,296.05	-74.69	-49.16	89.42	0.00	0.00	0.00
3,400.00	5.30	213.35	3,395.62	-82.41	-54.24	98.66	0.00	0.00	0.00
3,500.00	5.30	213.35	3,495.19	-90.13	-59.32	107.90	0.00	0.00	0.00
3,600.00	5.30	213.35	3,594.76	-97.85	-64.40	117.14	0.00	0.00	0.00
3,700.00	5.30	213.35	3,694.34	-105.57	-69.48	126.38	0.00	0.00	0.00
3,800.00	5.30	213.35	3,793.91	-113.29	-74.56	135.63	0.00	0.00	0.00
3,900.00	5.30	213.35	3,893.48	-121.01	-79.64	144.87	0.00	0.00	0.00
4,000.00	5.30	213.35	3,993.05	-128.73	-84.73	154.11	0.00	0.00	0.00
4,100.00	5.30	213.35	4,092.63	-136.45	-89.81	163.35	0.00	0.00	0.00
4,200.00	5.30	213.35	4,192.20	-144.17	-94.89	172.59	0.00	0.00	0.00
4,300.00	5.30	213.35	4,291.77	-151.89	-99.97	181.83	0.00	0.00	0.00
4,400.00	5.30	213.35	4,391.34	-159.61	-105.05	191.08	0.00	0.00	0.00
4,500.00	5.30	213.35	4,490.91	-167.33	-110.13	200.32	0.00	0.00	0.00
4,600.00	5.30	213.35	4,590.49	-175.05	-115.21	209.56	0.00	0.00	0.00
4,700.00	5.30	213.35	4,690.06	-182.77	-120.29	218.80	0.00	0.00	0.00
4,800.00	5.30	213.35	4,789.63	-190.49	-125.37	228.04	0.00	0.00	0.00
4,900.00	5.30	213.35	4,889.20	-198.21	-130.45	237.28	0.00	0.00	0.00
5,000.00	5.30	213.35	4,988.77	-205.93	-135.53	246.53	0.00	0.00	0.00
5,100.00	5.30	213.35	5,088.35	-213.65	-140.62	255.77	0.00	0.00	0.00
5,197.31	5.30	213.35	5,185.24	-221.16	-145.56	264.76	0.00	0.00	0.00
Start Drop 2.00°/100'									
5,200.00	5.25	213.35	5,187.92	-221.37	-145.70	265.01	2.00	-2.00	0.00
5,300.00	3.25	213.35	5,287.64	-227.55	-149.77	272.42	2.00	-2.00	0.00
5,400.00	1.25	213.35	5,387.56	-230.83	-151.93	276.34	2.00	-2.00	0.00
5,462.45	0.00	0.00	5,450.00	-231.40	-152.30	277.02	2.00	-2.00	234.83
EOC hold 0.00° - TG1-MC Fed #64									
7,112.45	0.00	0.00	7,100.00	-231.40	-152.30	277.02	0.00	0.00	0.00
PBHL-MC Fed #64									

Database:	EDM-Julio	**Local Co-ordinate Reference:**	Well MC Federal #64
Company:	COG Operating LLC	**TVD Reference:**	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27 NME)	**MD Reference:**	GL Elev @ 4042.00usft
Site:	MC Federal #64	**North Reference:**	Grid
Well:	MC Federal #64	**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
South HL-MC Fed #64 - plan misses target center by 290.89usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Rectangle (sides W100.00 H0.00 D0.00)	0.00	0.00	0.00	-241.40	-162.30	661,502.20	673,111.30	32° 49' 2.241 N	103° 46' 11.455 W
East HL-MC Fed #64 - plan misses target center by 290.89usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Rectangle (sides W0.00 H100.00 D0.00)	0.00	0.00	0.00	-241.40	-162.30	661,502.20	673,111.30	32° 49' 2.241 N	103° 46' 11.455 W
TG1-MC Fed #64 - plan hits target center - Circle (radius 10.00)	0.00	0.00	5,450.00	-231.40	-152.30	661,512.20	673,121.30	32° 49' 2.339 N	103° 46' 11.337 W
PBHL-MC Fed #64 - plan hits target center - Circle (radius 10.00)	0.00	0.00	7,100.00	-231.40	-152.30	661,512.20	673,121.30	32° 49' 2.339 N	103° 46' 11.337 W

Casing Points

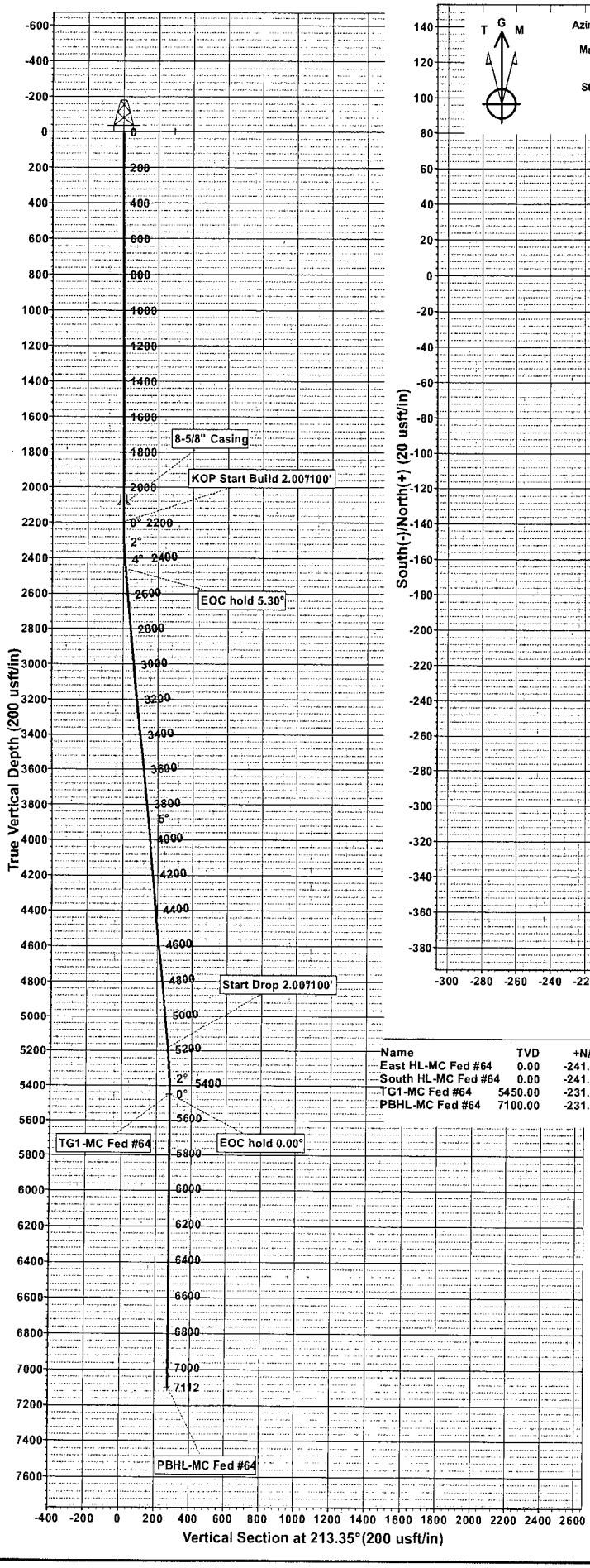
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,100.00	2,100.00	8-5/8" Casing	8-5/8	12-1/4

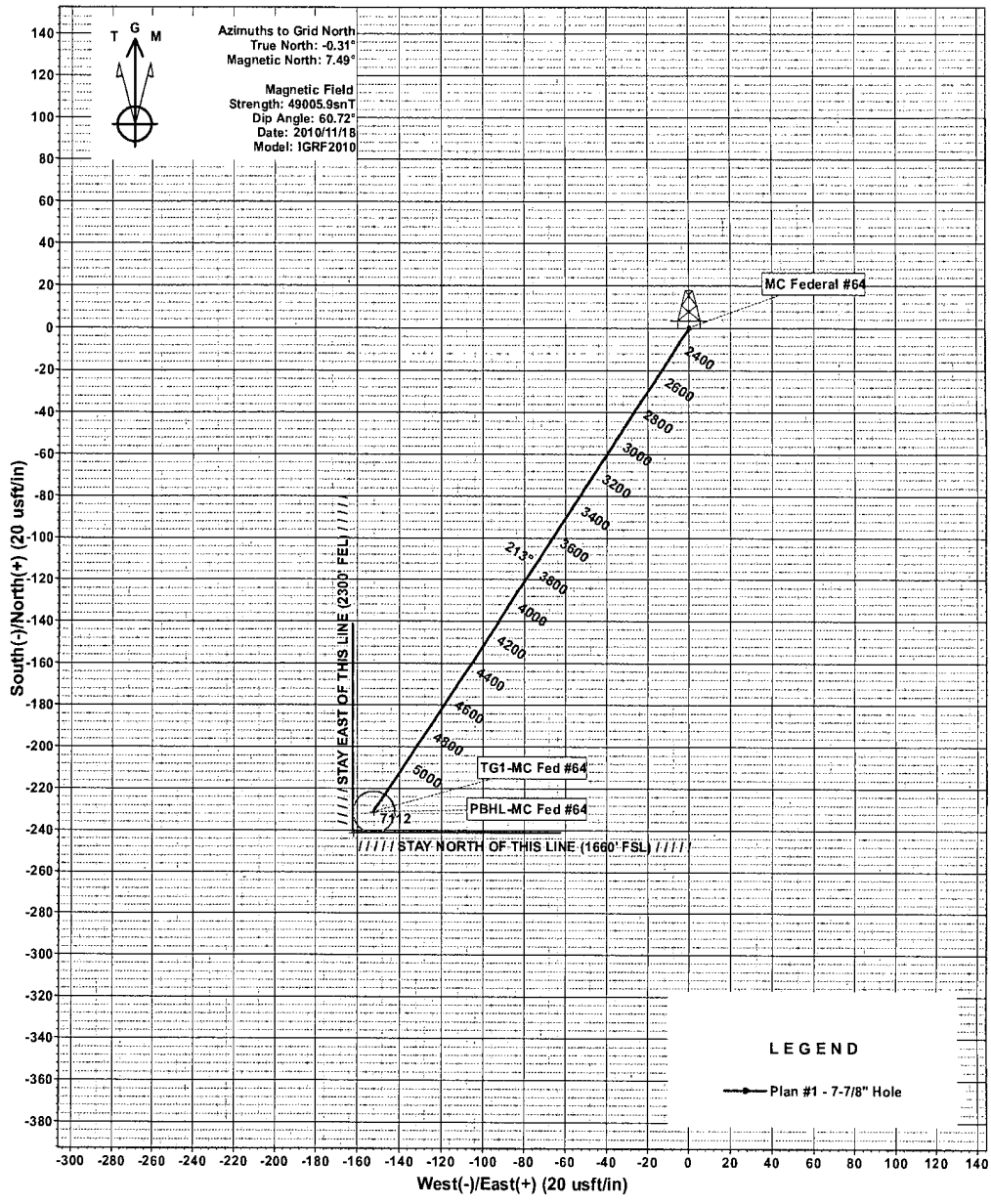
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,200.00	2,200.00	0.00	0.00	KOP Start Build 2.00°/100'
2,465.14	2,464.76	-10.24	-6.74	EOC hold 5.30°
5,197.31	5,185.24	-221.16	-145.56	Start Drop 2.00°/100'
5,462.45	5,450.00	-231.40	-152.30	EOC hold 0.00°

Scientific Drilling for COG Operating LLC
Site: Lea County, NM (NAD27 NME)
Well: MC Federal #64
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
East HL-MC Fed #64	0.00	-241.40	-162.30	661502.20	673111.30	32°49' 2.241 N	103°46' 11.455 W	Rectangle (Sides : L100.00 W0.00)
South HL-MC Fed #64	0.00	-241.40	-162.30	661502.20	673111.30	32°49' 2.241 N	103°46' 11.455 W	Rectangle (Side s: L0.00 W100.00)
TG1-MC Fed #64	5450.00	-231.40	-152.30	661512.20	673121.30	32°49' 2.339 N	103°46' 11.337 W	Circle (Radius: 1 0.00)
PBHL-MC Fed #64	7100.00	-231.40	-152.30	661512.20	673121.30	32°49' 2.339 N	103°46' 11.337 W	Circle (Radius: 10.00)

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	2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	0.00	0.00	
3	2465.14	5.30	213.35	2464.76	-10.24	-6.74	2.00	213.35	12.26	
4	5197.31	5.30	213.35	5185.24	-221.16	-145.56	0.00	0.00	264.76	
5	5462.45	0.00	0.00	5450.00	-231.40	-152.30	2.00	180.00	277.02	TG1-MC Fed #64
6	7112.45	0.00	0.00	7100.00	-231.40	-152.30	0.00	0.00	277.02	PBHL-MC Fed #64

WELL DETAILS: MC Federal #64

Ground Level: 4042.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	661743.60	673273.60	32°49' 4.621 N	103°46' 9 .538 W	

PROJECT DETAILS: Lea County, NM (NAD27 NME)

Plan: Plan #1 - 7-7/8" Hole (MC Federal #64/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: 18-Nov-10
Checked: _____ Date: _____
Reviewed: _____ Date: _____
Approved: _____ Date: _____