

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENTFORM APPROVED  
OMB NO. 1004-0135  
Expires: July 31, 2010**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*5. Lease Serial No.  
NMLC029415A

6. If Indian, Allottee or Tribe Name

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

**SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other8. Well Name and No.  
PUCKETT 13 FEDERAL COM 5H2. Name of Operator  
COG OPERATING LLCContact: KANICIA CASTILLO  
E-Mail: kcastillo@concho.com9. API Well No.  
30-015-396573a. Address  
600 WEST ILLINOIS AVE  
MIDLAND, TX 797013b. Phone No. (include area code)  
Ph: 432-685-433210. Field and Pool, or Exploratory  
FREN;GLORIETA-YESO, EAST

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 13 T17S R31E Mer NMP NWNE 140FNL 1907FEL

11. County or Parish, and State

EDDY COUNTY, NM

## 12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

| TYPE OF SUBMISSION                                   | TYPE OF ACTION                                |                                           |                                                    |                                           |
|------------------------------------------------------|-----------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| <input checked="" type="checkbox"/> Notice of Intent | <input type="checkbox"/> Acidize              | <input type="checkbox"/> Deepen           | <input type="checkbox"/> Production (Start/Resume) | <input type="checkbox"/> Water Shut-Off   |
| <input type="checkbox"/> Subsequent Report           | <input type="checkbox"/> Alter Casing         | <input type="checkbox"/> Fracture Treat   | <input type="checkbox"/> Reclamation               | <input type="checkbox"/> Well Integrity   |
| <input type="checkbox"/> Final Abandonment Notice    | <input type="checkbox"/> Casing Repair        | <input type="checkbox"/> New Construction | <input type="checkbox"/> Recomplete                | <input checked="" type="checkbox"/> Other |
|                                                      | <input type="checkbox"/> Change Plans         | <input type="checkbox"/> Plug and Abandon | <input type="checkbox"/> Temporarily Abandon       | Drilling Operations                       |
|                                                      | <input type="checkbox"/> Convert to Injection | <input type="checkbox"/> Plug Back        | <input type="checkbox"/> Water Disposal            |                                           |

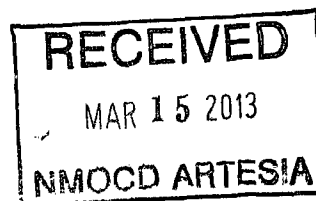
13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomple horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recomple in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Operating LLC requests approval to drill and complete a second lateral in the Puckett 13 Federal Com #5. This deepening will originate in the Yeso and will finish in the Yeso described in the attached drilling procedure and directional plan.

**SEE ATTACHED FOR  
CONDITIONS OF APPROVAL**

Accepted for record

NMOCD 10/3/13



14. I hereby certify that the foregoing is true and correct.

**Electronic Submission #199383 verified by the BLM Well Information System  
For COG OPERATING LLC, sent to the Carlsbad  
Committed to AFMSS for processing by KURT SIMMONS on 02/20/2013 ( )**

Name (Printed/Typed) KANICIA CASTILLO

Title PREPARER

Signature (Electronic Submission)

Date 02/19/2013

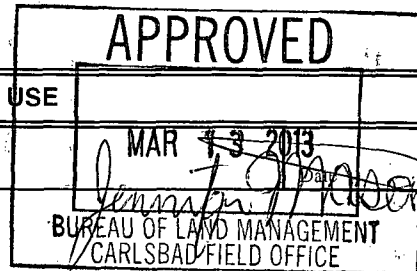
**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By

Title

Conditions of approval, if any, are attached. Approval of this notice 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.

Office



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.

**\*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\* OPERATOR-SUBMITTED \*\***

## Puckett 13 Federal #5H MIDDLE LATERAL PROGRAM

### 1. Estimated Tops of Important Geologic Markers

Yeso Group +/- 5299'

### 2. Estimated Depths of Anticipated Fresh Water, 130'.

This deepening originates in the Yeso and will finish in the Yeso. The entire Yeso group is an oil and gas bearing interval.

### 3. Casing Program

| Hole Size | Interval     | OD Casing | Weight | Grade** | Jt./Condition | Burst/collapse/tension |
|-----------|--------------|-----------|--------|---------|---------------|------------------------|
| 6-1/8"    | 5600'-10768' | 4.5"      | 13.5#  | L-80    | LTC/New       | 3.98/4.09/3.21 (L80)   |

### 4. Cement Program

4.5" Liner: No cement planned; external packers will be used for stimulation isolation.

**NOTE: COG OPERATING LLC REQUESTS A VARIANCE TO THE LINER TOP FLUID ENTRY OR PRESSURE TEST BECAUSE THE NEW LATERAL WILL BE COMPLETED IN THE SAME ZONE AS THE CURRENT PERFS AND THE ENTIRE INTERVAL IS RECOGNIZED BY THE OCD AS ONE INTERVAL (YESO). AS PER ONSHORE ORDER NO. 2 SECT III: REQUIREMENTS, PART B. CASING AND CEMENTING REQUIREMENTS, SUBPART b. "NO TEST SHALL BE REQUIRED FOR LINERS THAT DO NOT INCORPORATE OR NEED A SEAL MECHANISM." COG BELIEVES WE MEET THE CRITERIA TO NOT BE REQUIRED TESTING THE LINER TOP BECAUSE THERE IS NO NEED FOR A SEAL MECHANISM.**

**NOTE: COG OPERATING LLC REQUESTS A VARIANCE TO THE 200' MINIMUM TIE BACK TO THE PRODUCTION CASING BECAUSE THE BOTTOM LATERAL IS PRODUCTIVE FROM THE YESO BELOW THIS PROPOSED LATERAL, COG DESIRES TO NOT COVER THAT OR MAKE IT INACCESSIBLE WITH A LINER OVERLAP.**

### 5. Minimum Specifications for Pressure Control

The BOP equipment will be a 2000 psi double ram type hydraulically operated preventer. This equipment will be nipped up to a 7-1/16" 3K flange. The pipe rams are located above blind rams. The BOP is tested to 2000 psi prior to drilling new formation. Access to the annulus will be through the valves on the 7-1/16" casing head.

### 6. Types and Characteristics of the Proposed Mud System

This well will be drilled from the window that is cut in the 7" casing to TD with FW/CBW drilling mud.

### 7. Auxillary Well Control and Monitoring Equipment

- A. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

### 8. Logging, Testing, and Coring Program

- A. The electric logging program will consist of MWD GR, which will be run from TD to 7" production casing sidetrack.
- B. No drill stem tests.
- C. No conventional coring anticipated.

- D. Further testing procedures will be determined after the 4-1/2" casing has been run to TD, based on drill shows and log evaluation.

#### 9. Abnormal Conditions, Pressure, Temperatures, and Potential Hazards

No abnormal pressures or temperatures are anticipated. The estimated bottomhole temperature at TD is 110 degrees and the estimated maximum bottomhole pressure is 2300 psig. The drilling starts in the Yeso and ends in the Yeso. The section of Yeso being drilled has very low permeability (less than 1 md).

#### 10. Anticipated Starting Date and Duration of Operations

There will be no road or location work required as this is an existing well location. Once commenced, drilling operations should be finished in approximately 20 days. If the well is productive, an additional 30-90 days will be required for completion and testing before a decision is made to remove the whipstock and RBP separating the laterals, to commingle the production from the two laterals.

#### 11. Centralizer Program

Centralizers will not be run or required due to the lack of cement and the centralizing nature of the external casing packers.

#### 12. Summary Drilling and Completion Program

##### Preparatory/2<sup>ND</sup> Lateral Procedure

1. Pull test anchors. MIRU pulling unit.
2. TOH with production equipment (tally and stand back tubing) and LD.
3. PU 6-1/8" bit and scraper, TIH to 6000'. TOH.
4. RU wireline. Run GR/CCL correlation log from 5900' to 5200'.
5. Set RBP at +/- 6000'. RU pump truck, test casing and RBP to 1000 psi for 30 minutes. TIH OE, spot 15' sand on RBP. TOH, LD tubing, RD BOPE, RD pulling unit.
6. MIRU Key or Basic workover rig & horizontal package. NU hydraulic 6" 3M double BOP w/2-7/8" pipe rams on top & blind rams on bottom. Wellhead has 7-1/16" 3M series flanged connection. Move in and rig up pumps, closed loop solids control equipment, power swivel, frac tanks, generators, pipe racks, and other equipment. Use independent tester to test BOP, casing & RBP to 500 psi for 30 minutes, close blind rams in BOP and test BOP above rams to 2000/250 psi for 30 minutes and document on report.
7. PU & TIH w/spacer, anchor, retrievable whipstock (3° slide), starting mill, & UBHO on workstring. (Line up UBHO & whipstock face on surface. Gyro stinger should be inserted into UBHO to check for compatibility and orientation.) TIH to within 20' of setting depth. Pull up to next connection & RU Gyro. Take check shot & orient whipstock while working out all torque.
8. If orientation is satisfactory, set anchor (bottom of anchor 2' above casing collar, at approximately 5600'). Pull 5,000# upstrain to check anchor set, then set down 20-30,000# weight to shear running bolt. RD Gyro.

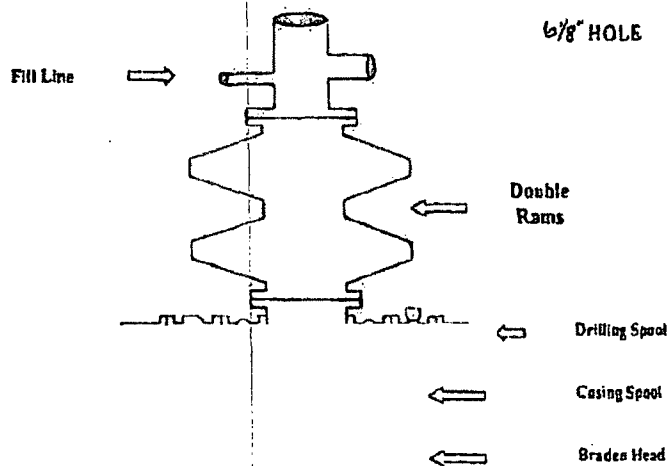
9. After obtaining free torque, record Pick-Up & Slack-Off weights. Make starting cut through casing wall (approximately 30" total). Sweep with high viscosity polymer pills (if needed) to clean hole. Install two (2) or more ditch magnets at flowline. TOH.
10. TIH with window mill, watermelon mill, & string mill on workstring. Mill window from 5560' to 5660', plus 5' of open hole (KOP - +/-5600')(or depth required by directional company). Circulate hole clean. TOH. (Trip & ream through finished window several times to make sure it is fully open. Check mill gauges after laying down.) Fax in the fisherman's diagram of the window. Verify that the depths on the diagram match the depths on the morning report.
11. PU 6-1/8" bit, downhole motor, muleshoe (UBHO sub), (2) monel drill collars (Install MWD probe inside NMDC and obtain offset), XO flow sub, & muleshoe sub f/gyro on workstring. Surface test motor and MWD. TIH to btm filling pipe as necessary.
12. PU swivel and establish circulation (130 gpm). RU Gyro. Time drill away from casing using continuous readout gyro for checking well path and tool face. Magnetic interference may occur, particularly while motor is in the window. If necessary, use gyro single shots for drilling away from casing. Once MWD readouts can function without magnetic influence from casing, RD Gyro & drill remaining curve at 164-200 GPM to EOC ( $\pm 6,457'$  MD 6,150' TVD) using MWD.
13. Build curve at 11.0°/100' BUR to planned inclination of 91.0° and azimuth (after gyro correction) of 184.65°. Survey as needed to ensure curve is built according to plan. Sweep hole with high viscosity polymer pills (if needed) for good hole cleaning. Sweep hole at least once per day.
14. At EOC, TOH. PU & TIH w/6-1/8" **PDC** bit, downhole motor, muleshoe (UBHO sub), (2) monel drill collars (Install MWD probe inside NMDC and obtain offset) & XO flow sub on 3-1/2" drill pipe or PH-6 workstring. TIH very carefully with bit through the casing window to prevent bit damage. Ream curve as necessary to remove any severe "kinks" or doglegs.
15. Drill the lateral section with the angle hold motor in the oriented and rotary mode as necessary. Drill at 91.0° inclination, 184.65° azimuth for a total of 5015' horizontal section at lease line (estimated to be at 10,768' MD, 6,075' TVD). Take surveys every 30' or as needed to maintain inclination and direction.
16. At TD, circ hole clean. Make reamer runs as required. TOH, LD DP and tools.
17. Run 4.5", 13.5# L-80 EUE 8rd LTC casing. With external casing packers for zonal stage treatment isolation (+/-15 stages), open hole liner hanger/packer at +/-5610', J-latch at +/-5600'; casing to surface. Set packers and liner hanger.
18. ND BOPE, NU WH w/cap.
19. RDMO rig.

## Completion Procedure

1. RU frac valve. Frac as per Completion Engineer's design, pumping down balls to open frac sleeves to treat zones isolated between open-hole packers. Rig down frac company.
2. After frac, rig up coiled tubing unit. Drill out sleeves.
3. Flow well back until fluid recovery reduces to 10 barrel/hour. Test well, including running pumping equipment as required for long-term lateral production testing.
4. Rig up Pulling unit. NU BOPE.
5. Release frac string from liner hanger. TOH. PU work string and TIH.
6. Retrieve whipstock. Retrieve RBP at +/-5775'.
7. Run production equipment & place on pump with both laterals commingled.
8. Report test results.

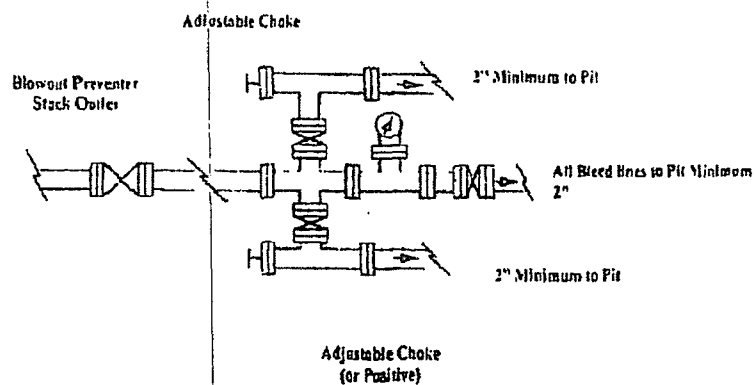
# COG Operating LLC

## BOPE and Choke Schematic



Minimum 4" Nominal choke and Mill floes

Choke Manifold Requirement (2000 psi WP)  
No Annular Required



**NOTES REGARDING THE BLOWOUT PREVENTERS**

Master Drilling Plaza  
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, 1000 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 cork on Kelly.
9. Extension wrenches and bands 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.

**Puckett 13 Federal #5H  
Blinebry/Paddock Horizontal  
Eddy County, New Mexico**

|                |                         |
|----------------|-------------------------|
| <u>Surface</u> | <u>Lateral Terminus</u> |
| 140' FNL       | 330' FSL                |
| 1907' FEL      | 2310' FEL               |
| S-13           | S-13                    |
| T17S, R31E     |                         |

**Proposed Wellbore**

**API: 30-015-39657**

**KB: 14'  
GL: 3961'**

Bit Size: 17-1/2"

13-3/8" 48# H40/J55 STC @ 740'  
Torque 3220

350 sx C w/ 2% CaCl2, 4% gel 13.5 ppg, 1.74 cf/sk

450 sx C w/ 2% CaCl2 14.8 ppg, 1.35 cf/sk

320 sacks CIRCULAT D TO SURFACE

Rustler @ 682'

Bit Size: 12-1/4"

Base of Salt @ 1872

9-5/8" 40# J55 LTC @ 2000'

Yates @ 2028'

300 sx 50:50:10 Poz:C:gel w/ 5 pps LCM-1  
5% NaCl, 11.8 ppg, 2.45 cf/sk

200 sx C w/ 2% CaCl2 14.8 ppg, 1.34 cf/sk

TOC 440', 1" w/ 134 sx to surf, circ 29 sx

Queen @ 2980'

San Andres @ 3739'

Glorietta @ 5248'

Yeso @ 5299'

Middle Blineb : KOP @ 5600'  
Liner Hanger/Pkr @ 5630';  
Landing point @ 6457' MD, 6150' TVD  
TD 10768' MD, 6075' TVD  
91° inclination, 184.65° azm, vertical  
section 4827'

*5600' KOP*  
*5610 Top of Liner*

PRODUCTION HOLE MUD.  
CBW 8.8-9.5 ppg, FV 28-29, WL  
NC (6457'-10768')

Bit Size: 6-1/8"

4-1/2" 13.5# L80 LTC LSA 5630' - 10768'  
w Peak packers and sieves for 15 stage completion

Bit Size: Vertical & Curve & Lateral - 8-3/4"

~4332' VS Lateral 180.54° AZ

TAPERED STRING 7" 26# L80 LTC @ 6123'; 5-1/2" 17# 11,205' MD,  
L80 6123' -11,205' 6600' TVD  
75:25 followed by 600 sx Acid Soluble TOC (by CBL) at  
400'



DISTRICT I  
1625 N. French Dr. NM  
Phone: (575) 393-6161 Fax: (575) 3  
D I  
Phone: (575) 748-1283 Fax: (575) 7

Phone: (505) 3 1 Fax: NM 87410 170  
IV  
Concho Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, New Mexico 87505

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

Name  
PUCKETT 13 FEDE COM  
Operator Name  
COG OPERATING, LLC

Surface Location

Range N line  
31-E NORTH

Bottom Hole Location If D' F

| UL or lot No. | Section | Range | Lot Idn | Feet from the | N line | Feet the | East/West line | County |
|---------------|---------|-------|---------|---------------|--------|----------|----------------|--------|
| O             | 13      | 31-E  |         | 330           | SO     | 2310     | EAST           | EDDY   |

NO ALLOW LE BE ASSI TO THIS COMPLETION UNTIL ALL

HAVE BEEN LIDATED 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 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.

2/19/13

Signature

Date

Kanicia Castillo

Printed Name

kcastillo concho.co

E-mail d

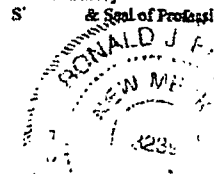
SURVEYOR CERTIFICATION

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.

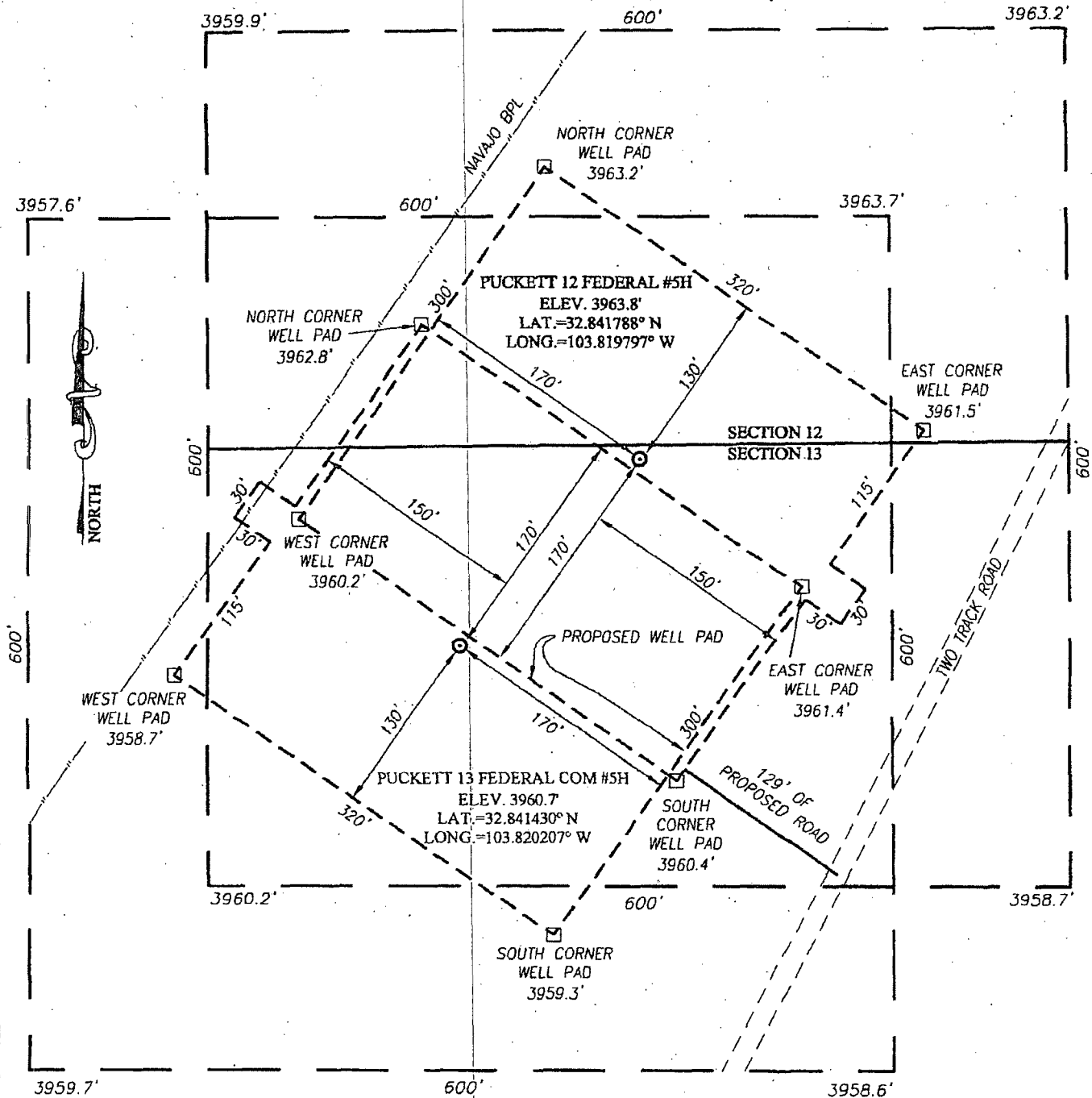
JUNE 22, 2011

Date of Survey

S' & Seal of Professional Surveyor:



**SECTIONS 12 & 13, TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.**  
 EDDY COUNTY NEW MEXICO



100 0 100 200 Feet  
 Scale: 1" = 100'

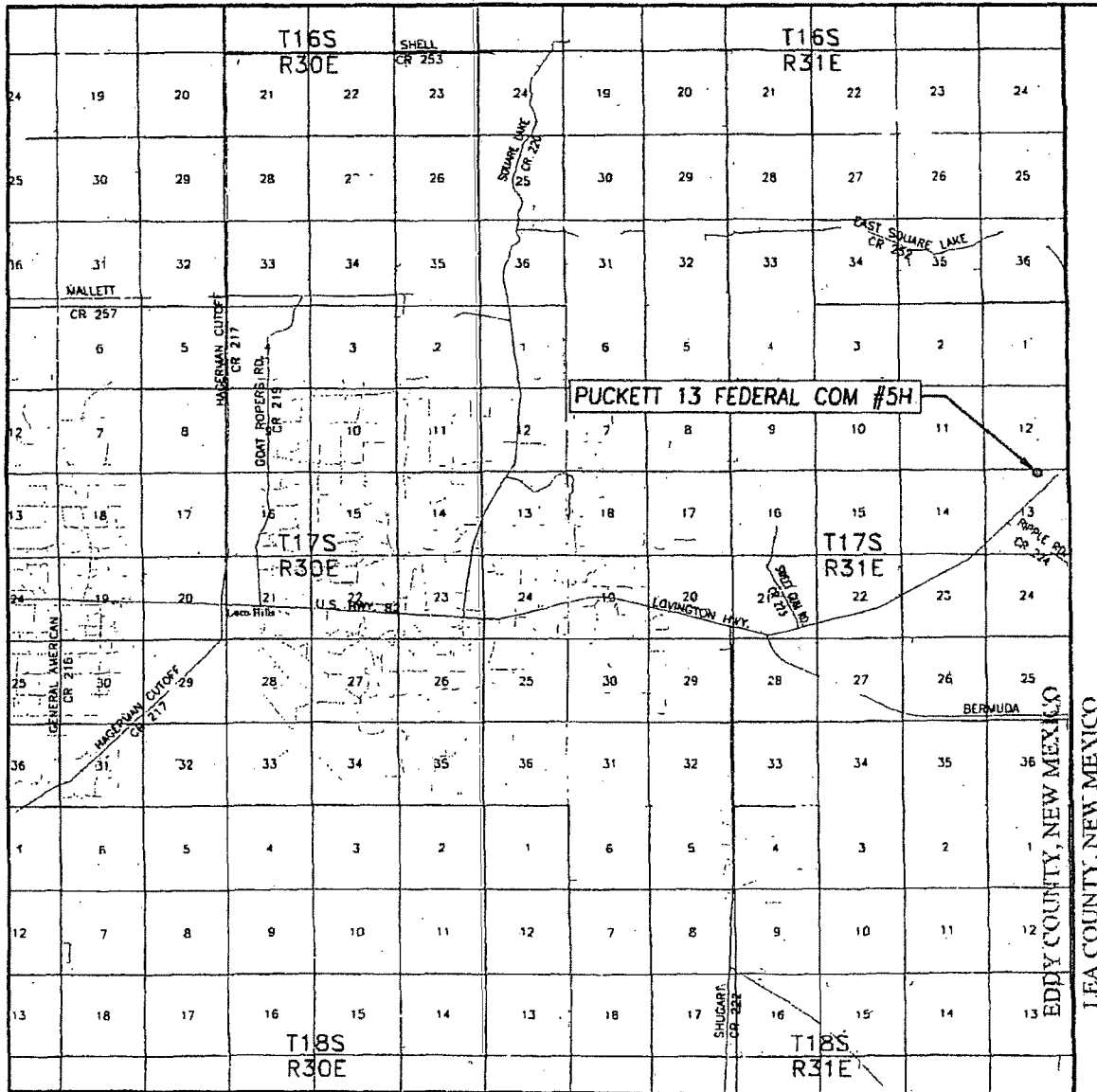
**JOHN WEST SURVEYING COMPANY**  
 PROVIDING SURVEYING SERVICES SINCE 1946  
 412 N. DAL PASO  
 HOBBS, N.M. 88240  
 (575) 393-3117

**COG OPERATING, LLC**

PUCKETT 12 & 13 FEDERAL #5H WELLS  
 IN SECTIONS 12 & 13, TOWNSHIP 17 SOUTH,  
 RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

|                         |                     |
|-------------------------|---------------------|
| Survey Date: 6/22/11    | Sheet 1 of 1 Sheets |
| W.O. Number: 11.13.1807 | Dr By: LA           |
| Date: 8/29/11           | 11131807            |
|                         | Scale: 1" = 100'    |

# VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 13 TWP 17-S RGE. 31-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 140' FNL & 1907' FEL

ELEVATION 3961'

OPERATOR COG OPERATING, LLC

LEASE PUCKETT 13 FEDERAL COM

NY

# Plan Proposal

FOR

COG Operating, LLC  
Puckett 13 Federal Com #5H  
Eddy Co., NM

Design #1

Presented By:

Aaron Boger  
Account Manager

Bret Wolford  
Well Planner

SHL

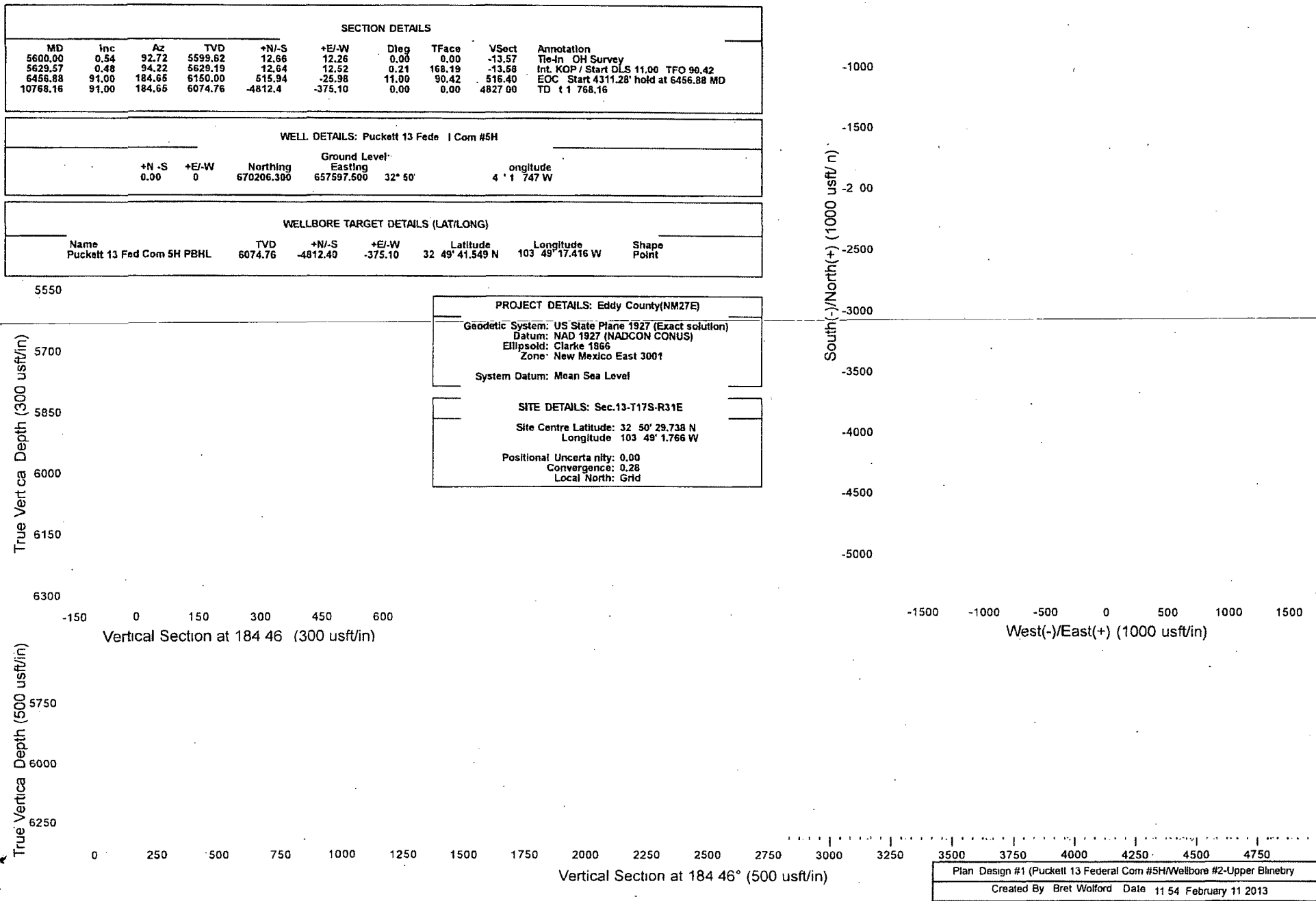
140' FNL & 1907' FEL  
Penetration Point

330' FNL & 1907' FEL

PBHL

330' FSL & 2310' FEL

WATER





## **COG Operating, LLC**

**Eddy County(NM27E)**

**Sec.13-T17S-R31E**

**Puckett 13 Federal Com #5H**

**Wellbore #2-Upper Blinebry**

**Plan: Design #1**

## **Standard Planning Report**

**11 February, 2013**

# **Archer**



Archer  
Planning Report

# Archer

|           |                            |                              |                                 |
|-----------|----------------------------|------------------------------|---------------------------------|
| Database: | EDM 5000.1 Single User Db  | Local Co-ordinate Reference: | Well Puckett 13 Federal Com #5H |
| Company:  | COG Operating LLC          | TVD Reference:               | WELL @ 3975.00usft              |
| Project:  | Eddy County NM27E          | MD Reference:                | WELL @ 3975.00usft              |
| Site:     | Sec.13-T17S-R31E           | North Reference:             | Grid                            |
| Well:     | Puckett 13 Federal Com #5H | Survey Calculation Method:   | Minimum Curvature               |
| Wellbore: | Wellbore #2-Upper Blinebry |                              |                                 |
| Design:   | Design #1                  |                              |                                 |

|         |                                 |               |                |
|---------|---------------------------------|---------------|----------------|
| Project | Eddy County(NM27E)              | System Datum: | Mean Sea Level |
| Map am: | US State Plane 1927 Exa (u i n) |               |                |
| Geo m:  | NAD 1927 (NADCON CONU )         |               |                |
| Map i:  | New Mexico East 30 1            |               |                |

|                       |                  |                   |                  |
|-----------------------|------------------|-------------------|------------------|
| Site                  | Sec.13-T17S-R31E |                   |                  |
| Station:              |                  | Northing:         | 670 270.300 usft |
| From:                 | Ma               | Easting:          | 658 534 000 usft |
| Position Uncertainty: | usft             | Slot Radius:      | 13-3 16"         |
|                       |                  | Latitude:         | 32 50' 29.738 N  |
|                       |                  | Longitude:        | 103 49' 1 766 W  |
|                       |                  | Grid Convergence: | 0.28             |

|                      |                            |                     |                  |
|----------------------|----------------------------|---------------------|------------------|
| Well                 | Puckett 13 Federal Com #5H |                     |                  |
| Well Position        | 14.00 usft                 | Northing:           | 670 206 300 usft |
|                      | 16.50 usft                 | Easting:            | 657 597.500 usft |
| Position Uncertainty | 0.00 usft                  | Wellhead Elevation: | usft             |
|                      |                            | Latitude:           | 32 51' 150 N     |
|                      |                            | Longitude:          | 103 49' 7 7 W    |
|                      |                            | Ground Level:       | 3 1.00 usft      |

|           |                            |             |                     |
|-----------|----------------------------|-------------|---------------------|
| Wellbore  | Wellbore #2-Upper Blinebry |             |                     |
| Magnetics | Model Name                 | Sample Date | Declination (°)     |
|           | IGRF2010                   | 02 11 13    | 60.67               |
|           |                            |             | Dip Angle (°)       |
|           |                            |             | Field Strength (nT) |
|           |                            |             | 48                  |

|                   |                         |             |                        |
|-------------------|-------------------------|-------------|------------------------|
| Design:           | Design #1               |             |                        |
| Audit Notes:      |                         |             |                        |
| Version:          | Phase:                  | PLAN        | Tie On Depth: 5,600.00 |
| Vertical section: | Depth From (TVD) (usft) | +N-S (usft) | +E-W (usft)            |
|                   | 6,074.76                |             | 184.46                 |

| 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               |
| 5,600.00              | 0.54            | 92.72       | 5,599.62              | 12.66       | 12.26       | 0.00                    | 0.00                   | 0.00                  | 0.00    |                      |
| 5,629.57              | 0.48            | 94.22       | 5,629.19              | 12.64       | 12.52       | 0.21                    | -0.20                  | 5.06                  | 168.19  |                      |
| 6,456.88              | 91.00           | 184.65      | 6,150.00              | -515.94     | -25.98      | 11.00                   | 10.94                  | 10.93                 | 90.42   | Puckett 13 Fed Com ! |
| 10,768.16             | 91.00           | 184.65      | 6,074.76              | -4,812.40   | -375.10     | 0.00                    | 0.00                   | 0.00                  | 0.00    | Puckett 13 Fed Com ! |



Archer  
Planning Report

# Archer

Database: EDM 5000.1 Single User Db  
Company: COG Operating LLC  
Project: Eddy County(NM27E  
Site: Sec.13-T17S-R31E  
Well: Puckett 13 Federal Com #5H  
Wellbore: Wellbore #2-Upper Blinbry  
Design: Design #1

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

Well Puckett 13 Federal Com #5H  
WELL @ 3975.00usft  
WELL @ 3975.00usft  
Grid  
Minimum Curvature

### Planned Survey

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 0.00                        | 0.00               | 0.00           | 0.00                        | 0.00            | .00             | 0.00                          | 0.00                          | 0.00                         | 0.00                        |
| 100.00                      | 0.34               | 211.66         | 100.00                      | -0.25           | 0.16            | 0.26                          | 0.34                          | 0.34                         | 0.00                        |
| 200.00                      | 0.31               | 209.45         | 200.00                      | -0.74           | 0.44            | 0.77                          | 0.03                          | 0.03                         | -2.21                       |
| 300.00                      | 0.51               | 207.08         | 300.00                      | -1.37           | 0.78            | 1.43                          | 0.20                          | 0.20                         | -2.37                       |
| 400.00                      | 0.52               | 198.50         | 399.99                      | -2.20           | -1.13           | 2.28                          | 0.08                          | 0.01                         | -8.58                       |
| 500.00                      | 0.46               | 205.94         | 499.99                      | -2.99           | -1.45           | 3.09                          | 0.09                          | -0.06                        | 7.44                        |
| 600.00                      | 0.55               | 203.39         | 599.8                       | -3.79           | -1.81           | 3.92                          | 0.09                          | 0.09                         | -2.55                       |
| 700.00                      | 0.53               | 214.45         | 699.9                       | -4.61           | -2.26           | 4.78                          | 0.11                          | 0.02                         | 11.06                       |
| 800.00                      | 0.59               | 225.56         | 799.97                      | -5.36           | 2.89            | 5.56                          | 0.12                          | 0.06                         | 11.11                       |
| 900.00                      | 0.33               | 227.55         | 899.9                       | -5.91           | -3.47           | 6.16                          | 0.26                          | -0.26                        | 1.99                        |
| 1,000.00                    | 0.51               | 228.90         | 999.9                       | -6.40           | -4.02           | 6.69                          | 0.18                          | 0.18                         | 1.35                        |
| 1,100.00                    | 0.51               | 221.15         | 1,099.9                     | -7.03           | -4.65           | 7.37                          | 0.07                          | .00                          | -7.75                       |
| 1,200.00                    | 0.49               | 221.23         | 1,199                       | -7.68           | -5.22           | 8.06                          | 0.02                          | .02                          | 0.08                        |
| 1,300.00                    | 0.50               | 197.92         | 1,299                       | .4              | 5.64            | 8.83                          | 0.20                          | .01                          | -23.31                      |
| 1,400.00                    | 0.69               | 181.09         | 1,399                       | -44             | 5.79            | 9.86                          | 0.26                          | .19                          | -16.83                      |
| 1,500.00                    | 0.75               | 173.37         | 1,499                       | 1.9             | 5.72            | 11.10                         | 0.11                          | .06                          | -7.72                       |
| 1,600.00                    | 0.95               | 166.37         | 1,599                       | 12.14           | 5.45            | 12.53                         | 0.22                          | .20                          | -7.00                       |
| 1,700.00                    | 1.03               | 110.60         | 1,699                       | 13.7            | .41             | 13.57                         | 0.93                          | .08                          | -55.77                      |
| 1,800.00                    | 1.24               | 104.50         | 1,799                       | 13.5            | 2.53            | 14.01                         | 0.24                          | .21                          | -6.10                       |
| 1,900.00                    | .24                | 104.64         | 1,899                       | -14.40          | 0.43            | 14.39                         | 0.00                          | .00                          | 0.14                        |
| 2,000.00                    | 21                 | 103.80         | 1,999                       | -14             | 1.64            | 14.75                         | 0.03                          | .03                          | -0.84                       |
| 2,100.00                    | 19                 | 82.09          | 2,099                       | 15.3            | 3.69            | 14.70                         | 0.45                          | .2                           | -21.71                      |
| 2,200.00                    | 86                 | 89.28          | 2,199                       | -4              | 5               | 14.41                         | 0.35                          | .33                          | 7.19                        |
| 2,300.00                    | 82                 | 81.07          | 2,299                       | -14             | 6               | 14.18                         | 0.13                          | .04                          | -8.21                       |
| 2,400.00                    | 71                 | 76.31          | 2,399                       | -1              | 8               | 13.82                         | 0.13                          | .11                          | -4.76                       |
| 2,500.00                    | 59                 | 57.87          | 2,4                         | 14              | 9.2             | 13.32                         | 0.24                          | 0.12                         | -18.44                      |
| 2,600.00                    | 4                  | 30.90          | 2                           | 13              | 9.1             | 12.67                         | 0.28                          | 0.15                         | -26.97                      |
| 2,700.00                    | 4                  | 7.46           | 2                           | 12              | 10              | 11.94                         | 0.18                          | 0.00                         | -23.44                      |
| 2,800.00                    | 2                  | 358.48         | 2                           | -1              | 10.0            | 11.10                         | 0.11                          | 0.08                         | -8.98                       |
| 2,900.00                    |                    | 351.69         | 2                           | 1               | 10.1            | 10.18                         | 0.08                          | 0.04                         | -6.79                       |
| 3,000.00                    | 0.67               | 348.75         | 2,999.77                    | -               | 9.3             | 9.14                          | 0.11                          | 0.11                         | -2.94                       |
| 3,100.00                    | 0.67               | 345.90         | 3,099.76                    | -8.80           | 9.67            | 8.02                          | 0.03                          | 0.00                         | -2.85                       |
| 3,200.00                    | 0.71               | 342.69         | 3,199.76                    | -7.64           | 9.5             | 6.89                          | 0.06                          | 0.04                         | -3.21                       |
| 3,300.00                    | 0.69               | 341.38         | 3,299.75                    | -6.48           | 8.97            | 5.76                          | 0.03                          | 0.02                         | -1.31                       |
| 3,400.00                    | 0.66               | 347.34         | 3,399.74                    | -5.34           | 8.65            | 4.66                          | 0.08                          | -0.03                        | 5.96                        |
| 3,500.00                    | 0.63               | 351.74         | 3,499.74                    | -4.24           | 8.44            | 3.57                          | 0.06                          | 0.03                         | 4.40                        |
| 3,600.00                    | 0.60               | 0.32           | 3,599.73                    | -3.17           | 8.37            | 2.51                          | 0.10                          | 0.03                         | 8.58                        |
| 3,700.00                    | 0.56               | 1.68           | 3,699.72                    | 2.16            | 8.39            | 1.50                          | 0.04                          | 0.04                         | 1.36                        |
| 3,800.00                    | 0.65               | 6.90           | 3,799.72                    | 1.1             | 8.47            | 0.45                          | 0.11                          | 0.09                         | 5.22                        |
| 3,900.00                    | 0.96               | 357.88         | 3,899.71                    | 0               | 8.51            | -0.95                         | 0.33                          | 0.31                         | -9.02                       |
| 4,000.00                    | 0.93               | 354.21         | 3,999.70                    | 1               | 8.39            | -2.58                         | 0.07                          | 0.03                         | -3.67                       |
| 4,100.00                    | 1.02               | 352.16         | 4,099.68                    | 3               | 8.19            | -4.25                         | 0.10                          | 0.09                         | -2.05                       |
| 4,200.00                    | 0.98               | 353.02         | 4,199.67                    | 5               | 7.96            | -5.96                         | 0.04                          | 0.04                         | 0.86                        |
| 4,300.00                    | 0.75               | 359.92         | 4,299.65                    | 6               | 7.86            | -7.45                         | 0.25                          | -0.23                        | 6.90                        |
| 4,400.00                    | 62                 | 358.63         | 4,399.65                    | 8               | 7.8             | -8.64                         | 0.13                          | -0.3                         | -1.29                       |
| 4,500.00                    | 0.31               | 15.70          | 4,499.64                    | 8               | 7.9             | -9.44                         | 0.34                          | -0.1                         | 17.07                       |
| 4,600.00                    | 0.31               | 23.28          | 4,599.64                    | 9               | .0              | -9.97                         | 0.04                          | 0.00                         | 7.58                        |
| 4,700.00                    | 0.19               | 6.99           | 4,699.64                    | 9.7             | 8.2             | -10.39                        | 0.14                          | -0.2                         | -16.29                      |
| 4,800.00                    | 0.24               | 18.37          | 4,799.64                    | 10              | 8.3             | -10.76                        | 0.07                          | 0.5                          | 11.38                       |
| 4,900.00                    | 0.3                | 40.62          | 4,899.64                    | 10.5            | 8.54            | -11.18                        | 0.13                          | 0.7                          | 22.25                       |
| 5,000.00                    | 0.39               | 41.74          | 4,999.64                    | 11.0            | 8.94            | -11.67                        | 0.08                          | 0.8                          | 1.12                        |
| 5,100.00                    | 0.32               | 63.63          | 5,099.64                    | 11.38           | 9.42            | -12.08                        | 0.15                          | -0.7                         | 21.89                       |
| 5,200.00                    | 0.35               | 28.87          | 5,199.63                    | 11.78           | 9.82            | -12.50                        | 0.20                          | 0.3                          | -34.76                      |
| 5,300.00                    | 0.35               | 40.74          | 5,299.63                    | 12.27           | 10.17           | -13.03                        | 0.07                          | 0.0                          | 11.87                       |





Archer  
Planning Report

# Archer

|           |                            |                              |                                 |
|-----------|----------------------------|------------------------------|---------------------------------|
| Database: | EDM 5000.1 Single User Db  | Local Co-ordinate Reference: | Well Puckett 13 Federal Com #5H |
| Company:  | COG Operating LLC          | TVD Reference:               | WELL @ 3975.00usft              |
| Project:  | Eddy County(NM27E)         | MD Reference:                | WELL @ 3975.00usft              |
| Site:     | Sec.13-T17S-R31E           | North Reference:             | Grid                            |
| Well:     | Puckett 13 Federal Com #5H | Survey Calculation Method:   | Minimum Curvature               |
| Wellbore: | Wellbore #2-Upper Blinbry  |                              |                                 |
| Design:   | Design #1                  |                              |                                 |

Planned Survey

| Measured<br>Depth<br>(usft)             | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(100usft) | Turn<br>Rate<br>(100usft) |
|-----------------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|----------------------------|---------------------------|
| 5 400.00                                | 0.32               | 84.7           | 5 399.63                    | 12.53           | 0.64            | -13.32                        | 0.25                          | .0                         | 43.73                     |
| 5 500.00                                | 0.50               | 82.1           | 5 499.63                    | 12.62           | 11.35           | -13.46                        | 0.18                          | 0.1                        | -2.33                     |
| Tie-In / OH Survey                      |                    |                |                             |                 |                 |                               |                               |                            |                           |
| 5 600.00                                | 0.54               | 92.72          | 5 599.6                     | 12.66           | 12.26           | -13.57                        | 0.10                          | 0.0                        | 10.58                     |
| Int. KOP / Start DLS 11.00° TFO 90.42   |                    |                |                             |                 |                 |                               |                               |                            |                           |
| 5 629.57                                | 0.48               | 94.2           | 5 629.1                     | 12.64           | 12.52           | -13.58                        | 0.21                          | -0.0                       | 5.06                      |
| 5 650.00                                | 2.29               | 72.6           | 5 649.62                    | 12.23           | 12.66           | -13.18                        | 11.00                         |                            | 383.52                    |
| 5 700.00                                | 7.76               | 181.11         | 5 699.41                    | 7.86            | 12.             | -8.82                         | .00                           | 10                         | 17.10                     |
| 5 750.00                                | 13.25              | 182.60         | 5 748.55                    | -1.25           | 12.0            | 0.28                          | .00                           | 10.                        | 2.98                      |
| 5 800.00                                | 18.75              | 183.22         | 5 796.59                    | 1.              | 1.              | 14.05                         | .00                           | 10.9                       | 1.25                      |
| 5 850.00                                | 24.25              | 183.57         | 5 843.10                    | -               | 1               | 32.37                         | 1.00                          | 11.0                       | 0.70                      |
| 5 900.00                                | 29.75              | 183.80         | 5 891.7                     | 5               | 1               | 55.05                         | .00                           | 11.00                      | 0.45                      |
| 5 950.00                                | 35.25              | 183.96         | 5 939.7                     | 7               | 7               | 81.90                         | .00                           | 11.00                      | 0.32                      |
| 6 000.00                                | 40.75              | 184.08         | 5 987.17                    | -13             | 1               | 112.67                        | .00                           | 11.00                      | 0.24                      |
| 6 050.00                                | 46.25              | 184.18         | 6 034.3                     | -7.7            | 7               | 147.07                        | .00                           | 11.00                      | 0.20                      |
| 6 100.00                                | 51.75              | 184.26         | 6 081.2                     | -5.34           | 0               | 184.79                        | .00                           | 11.00                      | 0.16                      |
| PP @ 6106' MD                           |                    |                |                             |                 |                 |                               |                               |                            |                           |
| 6 106.00                                | 52.41              | 184.27         | 6 087.1                     | .0              | 45              | 189.52                        | .00                           | 11.00                      | 0.15                      |
| 6 150.00                                | 5.24               | 184.33         | 6 132.0                     | 9               | 15              | 225.48                        | .00                           | 11.00                      | 0.14                      |
| 6 200.00                                | 62.74              | 184.39         | 6 179.2                     | 269.7           | -6.44           | 268.76                        | .00                           | 11.00                      | 0.12                      |
| 6 250.00                                | 68.24              | 184.45         | 6 112.98                    | -314.42         | 0.00            | 314.24                        | .00                           | 11.00                      | 0.11                      |
| 6 300.00                                | 3.74               | 184.50         | 6 129.25                    | -36.53          | -1.             | 361.50                        | .00                           | 11.00                      | 0.10                      |
| 6 350.00                                | 79.24              | 184.55         | 6 140.93                    | -409.98         | -17             | 410.09                        | .00                           | 11.00                      | 0.10                      |
| 6 400.00                                | 84.4               | 184.59         | 6 147.89                    | -459.31         | -2.0            | 459.59                        | .00                           | 11.00                      | 0.09                      |
| 6 450.00                                | 90.4               | 184.64         | 6 150.7                     | -509.08         | 25.             | 509.52                        | .00                           | 11.00                      | 0.09                      |
| EOC / Start 4311.28° hold at 6456.88 MD |                    |                |                             |                 |                 |                               |                               |                            |                           |
| 6 456.88                                | 91.00              | 184.65         | 6 150.00                    | -515.94         | -25.98          | 516.40                        | 11.0                          | 11.00                      | 0.09                      |
| 6 500.00                                | 91.00              | 184.65         | 6 149.25                    | -558.91         | -29.47          | 559.51                        | 0.0                           | 0.00                       | 0.00                      |
| 6 600.00                                | 91.00              | 184.65         | 6 147.50                    | -658.57         | -37.57          | 659.50                        | 0.0                           | 0.00                       | 0.00                      |
| 6 700.00                                | 91.00              | 184.65         | 6 145.76                    | -758.23         | -45.66          | 759.48                        | 0.0                           | 0.00                       | 0.00                      |
| 6 800.00                                | 91.00              | 184.65         | 6 144.01                    | -857.88         | -53.76          | 859.47                        | 0.0                           | 0.00                       | 0.00                      |
| 6 900.00                                | 91.00              | 184.65         | 6 142.27                    | -957.54         | -61.86          | 959.45                        | 0.0                           | 0.00                       | 0.00                      |
| 7 000.00                                | 91.00              | 184.65         | 6 140.52                    | -1,057.19       | -69.96          | 1,059.43                      | 0.0                           | 0.00                       | 0.00                      |
| 7 100.00                                | 91.00              | 184.65         | 6 138.78                    | -1,156.85       | -78.06          | 1,159.42                      | 0.0                           | 0.00                       | 0.00                      |
| 7 200.00                                | 91.00              | 184.65         | 6 137.03                    | -1,256.51       | -86.15          | 1,259.40                      | 0.0                           | 0.00                       | 0.00                      |
| 7 300.00                                | 91.00              | 184.65         | 6 135.29                    | -1,356.16       | -94.25          | 1,359.39                      | 0.00                          | 0.00                       | 0.00                      |
| 7 400.00                                | 91.00              | 184.65         | 6 133.54                    | -1,455.82       | -102.35         | 1,459.37                      | 0.00                          | 0.00                       | 0.00                      |
| 7 500.00                                | 91.00              | 184.65         | 6 131.79                    | -1,555.48       | -110.45         | 1,559.36                      | 0.00                          | 0.00                       | 0.00                      |
| 7 600.00                                | 91.00              | 184.65         | 6 130.05                    | -1,655.13       | -118.54         | 1,659.34                      | 0.00                          | 0.00                       | 0.00                      |
| 7 700.00                                | 91.00              | 184.65         | 6 128.30                    | -1,754.79       | -126.64         | 1,759.32                      | 0.00                          | 0.00                       | 0.00                      |
| 7 800.00                                | 91.00              | 184.65         | 6 126.56                    | -1,854.45       | -134.74         | 1,859.31                      | 0.0                           | 0.00                       | 0.00                      |
| 7 900.00                                | 91.00              | 184.65         | 6 124.81                    | -1,954.10       | -142.84         | 1,959.29                      | 0.0                           | 0.00                       | 0.00                      |
| 8 000.00                                | 91.00              | 184.65         | 6 123.07                    | -2,053.76       | -150.94         | 2,059.28                      | 0.0                           | 0.00                       | 0.00                      |
| 8 100.00                                | 91.00              | 184.65         | 6 121.32                    | -2 153.41       | -159.03         | 2,159.26                      | 0.00                          | 0                          | 0.00                      |
| 8 200.00                                | 91.00              | 184.65         | 6 119.58                    | -2,253.07       | -167.13         | 2,259.25                      | 0.00                          | 0.                         | 0.00                      |
| 8 300.00                                | 91.00              | 184.65         | 6 117.83                    | -2,352.73       | -175.23         | 2,359.23                      | 0.00                          | 0.0                        | 0.00                      |
| 8 400.00                                | 91.00              | 184.65         | 6 116.09                    | -2,452.38       | -183.33         | 2,459.21                      | 0.00                          | 0.                         | 0.00                      |
| 8 500.00                                | 91.00              | 184.65         | 6 114.34                    | -2,552.04       | -191.43         | 2,559.20                      | 0.00                          | 0.                         | 0.00                      |
| 8 600.00                                | 91.00              | 184.65         | 6 112.60                    | -2,651.70       | -199.52         | 2,659.18                      | 0.00                          | 0                          | 0.00                      |
| 8 700.00                                | 91.00              | 184.65         | 6 110.85                    | -2,751.35       | -207.62         | 2,759.17                      | 0.00                          | 0.                         | 0.00                      |
| 8 800.00                                | 91.00              | 184.65         | 6 109.11                    | -2,851.01       | -215.72         | 2,859.15                      | 0.0                           | 0.0                        | 0.00                      |
| 8 900.00                                | 91.00              | 184.65         | 6 107.36                    | -2,950.66       | -223.82         | 2,959.13                      | 0.0                           | 0.0                        | 0.00                      |
| 9 000.00                                | 91.00              | 184.65         | 6 105.62                    | -3,050.32       | -231.92         | 3 059.12                      | 0.0                           | 0.00                       | 0.00                      |

Database: EDM 5000.1 Single User Db  
 Company: COG Operating, LLC  
 Project: Eddy County NM27E)  
 Site: Sec.13-T17S-R31E  
 Well: Puckett 13 Federal Com #5H  
 Wellbore: Wellbore #2-Upper Blinbry  
 Design: Design #1

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

Well Puckett 13 Federal Com #5H  
 WELL @ 3975.00usft  
 WELL @ 3975.00usft  
 Grid  
 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) |
|-----------------------|-----------------|-------------------|-----------------------|--------------|--------------|-------------------------|-------------------------|----------------------|---------------------|
| 9,100.00              | 91.00           | 184.65            | 6,103.87              | -3 49 98     | -240 1       | 3,159.10                | 0.00                    | 0.00                 | 0.00                |
| 9,200.00              | 91.00           | 184.65            | 6,102.13              | -3 249.63    | -248 1       | 3,259.09                | 0.00                    | 0.00                 | 0.00                |
| 9,300.00              | 91.00           | 184.65            | 6,100.38              | -3 349 29    | -256 1       | 3,359.07                | 0.00                    | 0.00                 | 0.00                |
| 9,400.00              | 91.00           | 184.65            | 6,098.64              | -3 448 95    | -264 1       | 3,459.06                | 0.00                    | 0.00                 | 0.00                |
| 9,500.00              | 91.00           | 184.6             | 6,096.89              | -3 548 6     | -272.41      | 3,559.04                | 0.00                    | 0.00                 | 0.00                |
| 9,600.00              | 91.00           | 184.              | 6,095.14              | -3 648 26    | -280. 0      | 3,659.02                | 0.00                    | 0.00                 | 0.00                |
| 9,700.00              | 91.00           | 184.65            | 6,093.40              | -3 747 9     | -288. 0      | 3,759.01                | 0.00                    | 0.00                 | 0.00                |
| 00                    | 91.00           | 184.              | 6,091.65              | -3 847.57    | -2 0         | 3,858.99                | 0.00                    | 0                    | 0.00                |
| 00                    | 91.00           | 184.65            | 6,089.91              | -3 947.23    | - 0          | 3,958.98                | 0.00                    | 0.                   | 0.00                |
| 1 00                  | 91.00           | 184.65            | 6,088.16              | -4 046 88    | 312.90       | 4,058.96                | 0.00                    | 0.0                  | 0.00                |
| 1 00                  | 91.00           | 184.65            | 6,086.42              | -4,146 54    | -320.99      | 4,158.95                | 0.00                    | 0.                   | 0.00                |
| 1 0                   | 91.00           | 184.65            | 6,084.7               | -4,246 20    | 329.09       | 4,258.93                | 0.00                    | 0.                   | 0.00                |
| 1 0                   | 91.00           | 184.65            | 6,082.3               | -4,345 8     | 337.19       | 4,358.91                | 0.00                    | 0                    | 0.00                |
| 1 0                   | 91.00           | 184.65            | 6,081.18              | -4,445.5     | -345 29      | 4,458.90                | 0.00                    | 0.                   | 0.00                |
| 1 .00                 | 91.00           | 184.65            | 6,079.44              | -4,545 17    | -353 38      | 4,558.88                | 0.00                    | 0.0                  | 0.00                |
| 1 00                  | 91.00           | 184.65            | 6,077.69              | -4,644 2     | -36 .48      | 4,658.87                | 0.00                    | 0.0                  | 0.00                |
| 1 00                  | 91.00           | 184.65            | 6,075.95              | -4,744. 8    | -369.58      | 4,758.85                | 0.00                    | 0.00                 | 0.00                |
| TI                    | 8.16 - Puc1     | 3 Fed Com 5H PBHL |                       |              |              |                         |                         |                      |                     |
| 1 16                  | 91.00           | 184.5             | 6 74 6                | -4 812 0     | -3 5 10      | 4,827.00                | 0.00                    | 0.00                 | 0.00                |

## 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

Puckett 13 Fed Com 5H 0.00 0.00 6 074.76 -4 812.40 -375.10 665 393.900 657 222.400 32 49' 41.549 N 103 49' 17.416 W  
 - plan hits target center  
 - Point

## Plan Annotations

Measured Depth (usft)

Vertical Depth (usft)

Local Coordinates  
 +N/-S (usft) +E/-W (usft)

Comment

5,600.00 5,599.62 12.66 12.26 Tie-In OH Survey  
 5,629.57 5,629.19 12.64 12.52 Int KOP / Start DLS 11.00 TFO 90 42  
 6,106.00 6,041.91 -190.06 -0.45 PP @ 6106' MD  
 6,456.88 6,150.00 -515.94 -25.98 EOC Start 4311.28' hold at 6456.88 MD  
 10,768.16 6,074.76 -4,812.40 -375 10 TD at 10768.16



## **COG Operating, LLC**

**Eddy County(NM27E)**

**Sec.13-T17S-R31E**

**Puckett 13 Federal Com #5H**

**Wellbore #2-Upper Blinebry**

**Design #1**

## **Anticollision Report**

**11 February, 2013**

# **Archer**

|                    |                     |                              |                                 |
|--------------------|---------------------|------------------------------|---------------------------------|
| Company:           | COG Operating LLC   | Local Co-ordinate Reference: | Well Puckett 13 Federal Com #5H |
| Project:           | Eddy County NM27E   | TVD Reference:               | WELL @ 3975.00usft              |
| Reference Site:    | T17S-R31E           | MD Reference:                | WELL @ 3975.00usft              |
| Site Error:        | 5ft                 | North Reference:             | Grid                            |
| Reference Well:    | T 13 Federa Com #5H | Survey Calculation Method:   | Minimum Curvature               |
| Well Error:        | 5ft                 | Output errors are at         | 2.00 sigma                      |
| Reference Wellbore | re #2-Upper Blinbry | Database:                    | EDM 5000.1 Single User Db       |
| Reference Design:  | #1                  | Offset TVD Reference:        | Reference Datum                 |

|               |                                                                 |                |                     |
|---------------|-----------------------------------------------------------------|----------------|---------------------|
| Reference     | ign #1                                                          | Error Model:   | ISCWSA              |
| Filter type   | GLOBAL FILTER Using user defined selection & filtering criteria | Scan Method:   | Closest Approach 3D |
| Interval      | 10s                                                             | Error Surface: | Elliptical Conic    |
| Depth Range   | limited                                                         | Casing Method: | Not applied         |
| Results Limit | Maximum centre-to-centre distance of 9999.98 usft               |                |                     |
| Warning Level | 2.0 Sigma                                                       |                |                     |

| Survey Tool Program |           | Date                                  |           |                |  |
|---------------------|-----------|---------------------------------------|-----------|----------------|--|
| From (usft)         | To (usft) | Survey (Wellbore)                     | Tool Name | Description    |  |
| 100.00              | 5600.00   | Survey #1 (Wellbore #1-OH)            | MWD       | MWD - Standard |  |
| 5,600.00            | 10768.16  | Design #1 (Wellbore #2-Upper Blinbry) | MWD       | MWD - Standard |  |

| Summary                                              |  | Reference             | Offset                | Distance               |                         | Warning             |
|------------------------------------------------------|--|-----------------------|-----------------------|------------------------|-------------------------|---------------------|
| Site Name                                            |  | Measured Depth (usft) | Measured Depth (usft) | Between Centres (usft) | Between Ellipses (usft) | Separation Factor   |
| Offset Well - Wellbore - Design                      |  |                       |                       |                        |                         |                     |
| Sec.13-T17S-R31E                                     |  |                       |                       |                        |                         |                     |
| Puckett 13 Federal Com #5H - Wellbore #1-OH - Wellbo |  | 5,600.00              | 5600.00               | 0.00                   | 0.00                    | 0.000 Level 1 CC SF |
| Puckett 13 Federal Com #5H - Wellbore #1-OH - Wellbo |  | 5629.57               | 5629.57               | 0.00                   | -0.12                   | 0.000 Level 1 ES    |

| Offset Design          |                       |                       |                       |                  |               |                        |                                     |                                     |                        | Sec.13-T17S-R31E - Puckett 13 Federal Com #5H - Wellbore #1-OH - Wellbore #1 |                           |                    |         |                   |    |         |  |  |  | Offset Error: 0.00 usft |
|------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|------------------------|-------------------------------------|-------------------------------------|------------------------|------------------------------------------------------------------------------|---------------------------|--------------------|---------|-------------------|----|---------|--|--|--|-------------------------|
| Survey Program 100-MWD |                       | Reference             |                       | Offset           |               | Semi Major Axis        |                                     | Azimuth                             |                        | Distance                                                                     |                           | Minimum Separation |         | Separation Factor |    | Warning |  |  |  |                         |
| Measured Depth (usft)  | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Azimuth from North (°) | Offset Wellbore Centre +N/-S (usft) | Offset Wellbore Centre +E/-W (usft) | Between Centres (usft) | Between Ellipses (usft)                                                      | Minimum Separation (usft) | Separation Factor  |         |                   |    |         |  |  |  |                         |
| 5600.00                | 5599.62               | 5600.00               | 5599.62               | 0.00             | 0.00          | 0.00                   | 12.66                               | 12.26                               | 0.00                   | 0.00                                                                         | 0.00                      | 0.000              | Level 1 | CC                | SF |         |  |  |  |                         |
| 5629.57                | 5629.19               | 5629.57               | 5629.19               | 0.06             | 0.06          | -86.09                 | 12.64                               | 12.52                               | 0.00                   | -0.12                                                                        | 0.12                      | 0.000              | Level 1 |                   |    |         |  |  |  |                         |
| 5629.57                | 5629.19               | 5629.57               | 5629.19               | 0.06             | 0.06          | -86.09                 | 12.64                               | 12.52                               | 0.00                   | -0.12                                                                        | 0.12                      | 0.000              | Level 1 | ES                |    |         |  |  |  |                         |
| 5650.00                | 5649.62               | 5649.98               | 5649.62               | 0.11             | 0.11          | 3.59                   | 12.63                               | 12.68                               | 0.40                   | 0.19                                                                         | 0.21                      | 1.935              |         |                   |    |         |  |  |  |                         |
| 5700.00                | 5699.41               | 5699.79               | 5699.41               | 0.21             | 0.21          | 3.59                   | 12.58                               | 13.02                               | 4.73                   | 4.39                                                                         | 0.34                      | 13.865             |         |                   |    |         |  |  |  |                         |
| 5750.00                | 5748.55               | 5748.96               | 5748.58               | 0.44             | 0.31          | 3.69                   | 12.49                               | 13.26                               | 13.76                  | 13.39                                                                        | 0.38                      | 36.454             |         |                   |    |         |  |  |  |                         |
| 5800.00                | 5796.59               | 5791.10               | 5796.72               | 0.62             | 0.41          | 3.80                   | 12.3                                | 13.5                                | 27.37                  | 26.8                                                                         | 0.59                      | 46.673             |         |                   |    |         |  |  |  |                         |
| 5850.00                | 5843.10               | 5843.68               | 5843.30               | 0.76             | 0.51          | 3.86                   | 12.08                               | 13.66                               | 45.48                  | 44.81                                                                        | 6                         | 68.408             |         |                   |    |         |  |  |  |                         |
| 5900.00                | 5887.63               | 5888.31               | 5887.93               | 0.89             | 0.61          | 3.90                   | 11.88                               | 13                                  | 67.97                  | 62                                                                           | 7                         | 88.816             |         |                   |    |         |  |  |  |                         |
| 5950.00                | 5929.79               | 5930.43               | 5930.04               | 1.00             | 0.69          | 3.92                   | 11.72                               | 13                                  | 94.66                  | 93.59                                                                        | 8                         | 88.023             |         |                   |    |         |  |  |  |                         |
| 6000.00                | 5969.1                | 5969.64               | 5969.25               | 1.10             | 0.77          | 3.93                   | 11.65                               | 13.5                                | 125.37                 | 124.04                                                                       | 1.33                      | 94.344             |         |                   |    |         |  |  |  |                         |
| 6050.00                | 6005.43               | 6006.07               | 6005.69               | 1.21             | 0.85          | 3.96                   | 11.63                               | 13                                  | 159.74                 | 158.1                                                                        | 1.73                      | 92.391             |         |                   |    |         |  |  |  |                         |
| 6100.00                | 6038.22               | 6039.36               | 6038.98               | 1.39             | 0.92          | 4.02                   | 11.54                               | 13.2                                | 197.37                 | 195.12                                                                       | 2.26                      | 87.454             |         |                   |    |         |  |  |  |                         |
| 6150.00                | 6067.25               | 6073.50               | 6073.11               | 1.67             | 0.99          | 4.05                   | 11.27                               | 13.63                               | 237.85                 | 235.26                                                                       | 2.60                      | 91.605             |         |                   |    |         |  |  |  |                         |
| 6200.00                | 6092.25               | 6135.07               | 6134.4                | 1.99             | 1.13          | 3.99                   | 6.10                                | 12.75                               | 279.05                 | 276.24                                                                       | 2.80                      | 99.542             |         |                   |    |         |  |  |  |                         |
| 6250.00                | 6112.98               | 6209.83               | 6207.18               | 2.37             | 1.35          | 3.90                   | -10.69                              | 10.78                               | 318.67                 | 315.77                                                                       | 2.90                      | 109.905            |         |                   |    |         |  |  |  |                         |
| 6300.00                | 6129.25               | 6312.4                | 6301.0                | 2.79             | 1.60          | 3.37                   | -50.46                              | 4.69                                | 355.99                 | 352.99                                                                       | 3.00                      | 118.660            |         |                   |    |         |  |  |  |                         |
| 6350.00                | 6141.93               | 6451.52               | 6411.5                | 3.26             | 1.94          | 2.72                   | -132                                | -4.31                               | 388.32                 | 385.26                                                                       | 3.06                      | 127.066            |         |                   |    |         |  |  |  |                         |
| 6400.00                | 6141.89               | 6633.46               | 6511                  | 3.76             | 2.97          | -0.42                  | 278.46                              | -22.74                              | 412.25                 | 409.04                                                                       | 3.21                      | 128.605            |         |                   |    |         |  |  |  |                         |
| 6450.00                | 6150.07               | 6772.22               | 6561.6                | 4.29             | 4.14          | -6.08                  | 08.66                               | -36.11                              | 425.64                 | 423.10                                                                       | 2.54                      | 167.563            |         |                   |    |         |  |  |  |                         |
| 6456.88                | 6150.00               | 6784.80               | 6566.1                | 4.37             | 4.26          | -6.66                  | 20.8                                | -37.07                              | 427.27                 | 424.91                                                                       | 2.36                      | 160.927            |         |                   |    |         |  |  |  |                         |
| 6500.00                | 6149.25               | 6868.41               | 6581.3                | 4.85             | 5.08          | -14.26                 | -502.99                             | -43.68                              | 435.02                 | 432.27                                                                       | 2.76                      | 157.766            |         |                   |    |         |  |  |  |                         |
| 6600.00                | 6147.50               | 7009.66               | 6591.5                | 6.06             | 6.66          | -51.55                 | -643.7                              | -57.08                              | 445.05                 | 441.35                                                                       | 3.70                      | 120.431            |         |                   |    |         |  |  |  |                         |
| 6700.00                | 6145.76               | 7121.09               | 6593.43               | 7.37             | 8.01          | -78.99                 | -754.02                             | -67.31                              | 448.22                 | 443.58                                                                       | 4.64                      | 96.571             |         |                   |    |         |  |  |  |                         |

CC - Min centre to center distance or convergent point SF - min separation factor ES - minimum ellipse separation

Archer  
Anticollision Report

# Archer

|                    |                        |                              |                                 |
|--------------------|------------------------|------------------------------|---------------------------------|
| Company:           | COG Operating LC       | Local Co-ordinate Reference: | Well Puckett 13 Federal Com #5H |
| Project:           | Eddy County NM27E      | TVD Reference:               | WELL @ 3975.00usft              |
| Reference Site:    | c1 T17S R31E           |                              | WELL @ 3975.00usft              |
| Site Error:        | 0 u                    |                              | Grid                            |
| Reference Well:    | uc 13 Federal Com #5H  |                              | Minimum Curvature               |
| Well Error:        | 0.00 u                 |                              | 2.00 sigma                      |
| Reference Wellbore | W1 or 2 Upper Blinbery |                              | EDM 5000. Single User Db        |
| Reference Design:  | in 1                   |                              | Reference Datum                 |

| Offset Design S - 7S- 31E- uck 13 federal Com 5H- W1 bore #1-OH - Wellbore #1 |                       |                       |                       |                  |               |                        |                                     |         |                 |                      |       |         | Offset Site Error: | 0.00 usft |
|-------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|------------------------|-------------------------------------|---------|-----------------|----------------------|-------|---------|--------------------|-----------|
| Survey Program: 100-MWD                                                       |                       |                       |                       |                  |               |                        |                                     |         |                 |                      |       |         | Offset Well Error: | 0.00 usft |
| Reference                                                                     |                       | Offset                |                       | Semi Major Axis  |               |                        | Distance                            |         |                 |                      |       |         |                    |           |
| Measured Depth (usft)                                                         | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Azimuth from North (°) | Offset Wellbore Centre +N/-S (usft) | +E/ ( ) | Between Centres | Between Ellipses ( ) | Se or | Warning |                    |           |
| 6 800.00                                                                      | 6 1 01                | 7 222                 | 6 593.85              | 8.74             | 9.32          | -81.57                 | -854.55                             | -76.28  | 450.41          | 444.79               | 5.62  | 80.117  |                    |           |
| 6 900.00                                                                      | 6 1 2 27              | 7 323.48              | 6 593.96              | 10.18            | 10.72         | -85.28                 | -955.60                             | -85.31  | 452.31          | 445.64               | 6.67  | 67.777  |                    |           |
| 7 000.00                                                                      | 6 1 0 52              | 7 423                 | 6 593.84              | 11.68            | 12.11         | -85.99                 | -1 055.48                           | -94.49  | 453.99          | 446.21               | 7.78  | 58.373  |                    |           |
| 7 100.00                                                                      | 6 1 38.78             | 7 524                 | 6 593.77              | 13.21            | 13.45         | -86.51                 | 1 155.27                            | 103.93  | 455.74          | 446.80               | 8.93  | 51.021  |                    |           |
| 7 200.00                                                                      | 6 1 37.03             | 7 628                 | 6 593.24              | 14.78            | 14.91         | -5.93                  | -1 259.25                           | -112.56 | 456.98          | 446.83               | 10.14 | 45.052  |                    |           |
| 7 300.00                                                                      | 6 1 35.29             | 7 74 68               | 6 590.89              | 16.38            | 16.61         | -119.46                | -1 371.24                           | 120.94  | 456.63          | 445.20               | 11.43 | 39.952  |                    |           |
| 400.00                                                                        | 6 1 33.54             | 7 8                   | 6 586                 | 18.00            | 18.10         | -117.7                 | 1 469.35                            | 128.05  | 454.09          | 441.43               | 12.66 | 35.869  |                    |           |
| 7 500.00                                                                      | 6 1 31.80             | 7 9                   | 6 584.2               | 19.65            | 19.52         | 118.01                 | -1 556.42                           | -131.01 | 453.05          | 43.19                | 13.86 | 32.682  |                    |           |
| 7 580.95                                                                      | 6 1 30.38             | 8 0                   | 6 582.51              | 20.99            | 20.63         | 113.67                 | 1 642.83                            | -132.25 | 452.43          | 43.60                | 14.83 | 30.498  |                    |           |
| 7 600.00                                                                      | 6 1 30.05             | 8 0                   | 6 582.28              | 21.31            | 20.88         | -108.84                | -1 659.94                           | -132.64 | 452.47          | 43.41                | 15.06 | 30.043  |                    |           |
| 7 70.00                                                                       | 6 1 28.30             | 8                     | 6 581.99              | 22.99            | 22.24         | -81.69                 | -1 753.44                           | -135.8  | 453.78          | 43.48                | 1.30  | 2.844   |                    |           |
| 7 800.00                                                                      | 6 1 26.56             | 8                     | 6 582.58              | 24.68            | 23.66         | -51.98                 | -1 849.64                           | -140.89 | 456.08          | 43.50                | 17.58 | 25.945  |                    |           |
| 7 900.00                                                                      | 6 1 24.81             | 8                     | 6 583.6               | 26.38            | 25.19         | -39.45                 | -1 949.37                           | -146.73 | 458.90          | 4.000                | 1.90  | 24.2    |                    |           |
| 8 000.00                                                                      | 6 1 23.07             | 8 434.70              | 6 583.1               | 28.09            | 27.05         | -160.12                | -2 064.14                           | -154.69 | 460.37          | 440.03               | 2.34  | 22.63   |                    |           |
| 8 100.00                                                                      | 6 1 21.32             | 8 538.47              | 6 580.36              | 29.81            | 28.77         | -162.35                | -2 167.48                           | -163.51 | 459.27          | 437.55               | 2.72  | 21.143  |                    |           |
| 8 200.00                                                                      | 6 1 19.58             | 8 638.31              | 6 577.22              | 31.54            | 30.38         | -160.55                | -2 266.92                           | -172.02 | 457.88          | 4.480                | 2.09  | 19.834  |                    |           |
| 8 3 0                                                                         | 6 1 17.83             | 8 734.09              | 6 574.68              | 33.27            | 31.86         | -156.10                | -2 362.37                           | -179.50 | 456.96          | 432.54               | 24.43 | 1.707   |                    |           |
| 8 325.51                                                                      | 6 1 17.39             | 8 7 7.62              | 6 574.21              | 33.72            | 32.22         | -152.38                | -2 458.82                           | -181.31 | 456.91          | 432.14               | 24.76 | 1.0     |                    |           |
| 8 400.00                                                                      | 6 1 16.09             | 8 826.60              | 6 573.4               | 35.01            | 33.27         | -120.96                | -2 454.56                           | -186.96 | 457.38          | 431.63               | 25.5  | 17.75   |                    |           |
| 8 500.00                                                                      | 6 1 14.34             | 8 930.53              | 6 572.48              | 36.76            | 34.96         | -141.38                | -2 558.08                           | -196.25 | 458.20          | 431.03               | 27.17 | 16.865  |                    |           |
| 8 6 0.00                                                                      | 6 1 12.60             | 9 038.02              | 6 570.3               | 38.51            | 36.79         | -152.9                 | -2 665.05                           | -206.39 | 457.68          | 429.07               | 28.62 | 15.993  |                    |           |
| 8 700.00                                                                      | 6 1 10.85             | 9 45.55               | 6 566.4               | 40.27            | 38.60         | 158.4                  | -2 2.09                             | -215.83 | 455.74          | 425.67               | 30.0  | 15.56   |                    |           |
| 8 800.00                                                                      | 6 1 09.11             | 9 246.44              | 6 56.56               | 42.02            | 40.28         | 158.61                 | 2 8 2.49                            | -224.14 | 452.04          | 420.56               | 31.48 | 14.3    |                    |           |
| 8 90.00                                                                       | 6 1 07.36             | 9 3 6.53              | 6 557.26              | 43.79            | 41.73         | 146.05                 | -2 962.21                           | -231.59 | 450.11          | 417.30               | 32.81 | 13      |                    |           |
| 8 959.31                                                                      | 6 1 06.33             | 9 391.6               | 6 556.01              | 44.83            | 42.60         | -130.42                | -3 017.00                           | -23.10  | 449.83          | 416.2                | 33.6  | 13.376  |                    |           |
| 9 000.00                                                                      | 6 1 05.62             | 9 430.8               | 6 555.30              | 45.55            | 43.23         | -121.1                 | -3 056.02                           | -241.34 | 449.89          | 415.6                | 34.2  | 13.154  |                    |           |
| 9 100.00                                                                      | 6 1 03.87             | 9 530.98              | 6 554.11              | 47.32            | 44.85         | 116.20                 | -3 155.62                           | -2 7    | 450.42          | 41.7                 | 35.64 | 12.639  |                    |           |
| 9 200.00                                                                      | 6 1 02.13             | 9 632.59              | 6 552.20              | 49.09            | 46.54         | 118.15                 | -3 258.72                           | -2 6    | 450.33          | 413                  | 37.09 | 12.143  |                    |           |
| 9 212.79                                                                      | 6 1 01.9              | 9 645.10              | 6 551.98              | 49.32            | 46.75         | -117.03                | -3 289.18                           | -2 8    | 450.32          | 413                  | 37.27 | 12.084  |                    |           |
| 9 300.00                                                                      | 6 1 00.38             | 9 29.56               | 6 550.72              | 50.87            | 48.13         | -10.08                 | -3 353.34                           | -2 1    | 450.55          | 412                  | 38.49 | 11.706  |                    |           |
| 9 40.00                                                                       | 6 0 98.64             | 9 829.98              | 6 549.79              | 52.64            | 49.77         | -110.12                | -3 453.50                           | -7 73   | 451.35          | 411                  | 39.9  | 1       |                    |           |
| 9 50.00                                                                       | 6 0 96.89             | 0                     | 6 548.04              | 54.42            | 51.53         | -129.69                | -3 557.69                           | -283.36 | 451.37          | 410                  | 41.34 | 0       |                    |           |
| 9 59.14                                                                       | 6 0 95.20             | 1 9.                  | 6 545.99              | 56.15            | 53.14         | 12.80                  | -3 652.55                           | -279.48 | 450.94          | 408                  | 42.69 | 10      |                    |           |
| 9 60.00                                                                       | 6 0 95.15             | 1 03.1                | 6 545.94              | 56.20            | 53.18         | 127.2                  | -3 655.26                           | 2 9.70  | 450.94          | 408                  | 42.3  | 10      |                    |           |
| 9 700.00                                                                      | 6 0 93.40             | 10 33                 | 6 544.29              | 57.98            | 54.87         | -129.1                 | -3 755.84                           | -2 8.35 | 451.07          | 40                   | 44.8  | 10      |                    |           |
| 9 731.37                                                                      | 6 0 92.85             | 10 164.18             | 6 543.67              | 58.54            | 55.38         | -128.52                | -3 786.76                           | -300.67 | 450.99          | 4 7                  | 44.62 | 10.7    |                    |           |
| 9 800.00                                                                      | 6 0 91.65             | 10 223.13             | 6 543.23              | 59.77            | 56.35         | 75.78                  | 3 845.57                            | 3 4.59  | 451.65          | 408.13               | 45.52 | 9.921   |                    |           |
| 9 900.00                                                                      | 6 0 89.91             | 10 320.36             | 6 544.28              | 61.55            | 5 97          | -49.31                 | -3 947.64                           | -3 0.14 | 454.43          | 407.5                | 46.92 | 9.686   |                    |           |
| 10 000.00                                                                     | 6 0 88.5              | 10 424.57             | 6 544.82              | 63.34            | 59.75         | 86.35                  | 0 6.68                              | 6.12    | 456.67          | 406.3                | 48.37 | 9.442   |                    |           |
| 10 10.00                                                                      | 6 0 86.42             | 10 528.26             | 6 544.38              | 65.13            | 61.54         | -170.39                | 0.22                                | 321.62  | 457.98          | 406.16               | 49.82 | 9.192   |                    |           |
| 10 200.00                                                                     | 6 0 84.6              | 10 638.6              | 6 542.19              | 66.92            | 63.43         | 173.95                 | 0.53                                | 327.56  | 457.74          | 406.1                | 51.34 | 8.916   |                    |           |
| 10 300.00                                                                     | 6 0 82.93             | 10 7 6.4              | 6 539.43              | 68.71            | 65.06         | 161.65                 | 3 7.60                              | -333.29 | 456.67          | 403.91               | 52.77 | 8.654   |                    |           |
| 10 372.9                                                                      | 6 0 81.68             | 10 805.12             | 6 53.95               | 70.00            | 66.19         | 146.78                 | -4 426.54                           | -3      | 456.40          | 402.0                | 53.0  | 8.484   |                    |           |
| 10 00.00                                                                      | 6 0 81.18             | 10 832.05             | 6 537.51              | 70.50            | 66.64         | 143.00                 | -4 453.40                           | 3 4     | 456.43          | 402.                 | 54.9  | 8.422   |                    |           |
| 10 500.00                                                                     | 6 0 79.44             | 10 935.93             | 6 535.40              | 72.29            | 68.39         | 148.30                 | -4 557.04                           | 4       | 456.18          | 400.50               | 55.8  | 8.193   |                    |           |
| 10 600.00                                                                     | 6 0 77.69             | 11 041.51             | 6 532.06              | 74.0             | 70.23         | 151.92                 | -4 652.39                           | -5      | 454.81          | 397.1                | 57.0  | 7.952   |                    |           |
| 10 700.00                                                                     | 6 0 75.95             | 11 144.0              | 7 79                  | 75.87            | 72.01         | 14.94                  | -4 764.78                           | -356.86 | 452.48          | 393.75               | 58.73 | 7.705   |                    |           |
| 10 748.18                                                                     | 6 0 75.11             | 11 181.0              | 6 8                   | 76.7             | 72.65         | 121.3                  | -4 801.61                           | -358.47 | 451.42          | 392.0                | 59.8  | 7.603   |                    |           |
| 10 768.16                                                                     | 6 0 74.76             | 11 181.0              | 6 8                   | 77.10            | 72.65         | 5.03                   | -4 801.61                           | -358.47 | 451.86          | 392.34               | 59.2  | 7.592   |                    |           |

CC - M n centre to center distance or convergent point SF - m n separation factor, ES - m n ellipse separation



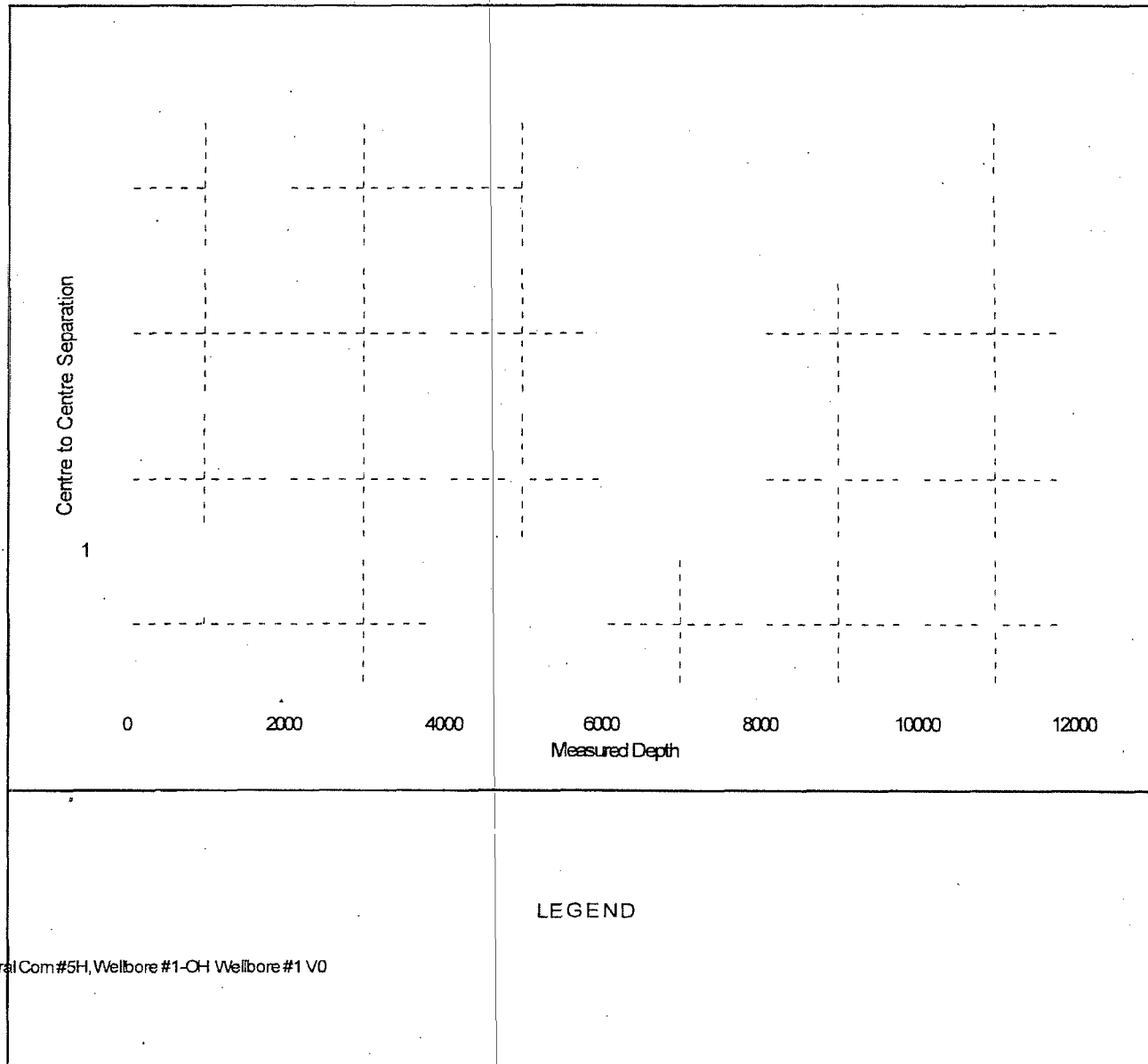
**Archer**  
Anticollision Report



|                           |                            |                                     |                                 |
|---------------------------|----------------------------|-------------------------------------|---------------------------------|
| <b>Company:</b>           | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well Puckett 13 Federal Com #5H |
| <b>Project:</b>           | Eddy County(NM27E)         | <b>TVD Reference:</b>               | WELL @ 3975.00usft              |
| <b>Reference Site:</b>    | Sec.13-T17S-R31E           | <b>MD Reference:</b>                | WELL @ 3975.00usft              |
| <b>Site Error:</b>        | 0.00 usft                  | <b>North Reference:</b>             | Grid                            |
| <b>Reference Well:</b>    | Puckett 13 Federal Com #5H | <b>Survey Calculation Method:</b>   | Minimum Curvature               |
| <b>Well Error:</b>        | 0.00 usft                  | <b>Output errors are at</b>         | 2.00 sigma                      |
| <b>Reference Wellbore</b> | Wellbore #2-Upper Blinbry  | <b>Database:</b>                    | EDM 5000.1 Single User Db       |
| <b>Reference Design:</b>  | Design #1                  | <b>Offset TVD Reference:</b>        | Reference Datum                 |

Reference Depths are relative to WELL @ 3975.00usft  
Offset Depths are relative to Offset Datum  
Central Meridian is 104 20' 0.000 W

Coordinates are relative to. Puckett 13 Federal Com #5H  
Coordinate System s US State Plane 1927 (Exact solution New Mex co East 30  
Grid Convergence at Surface s 0.28



LEGEND

aral Com #5H, Wellbore #1-OH Wellbore #1 V0

CC - Min centre to center distance or convergent point SF - min separation factor, ES - min ellipse separation



**Archer**  
Anticollision Report

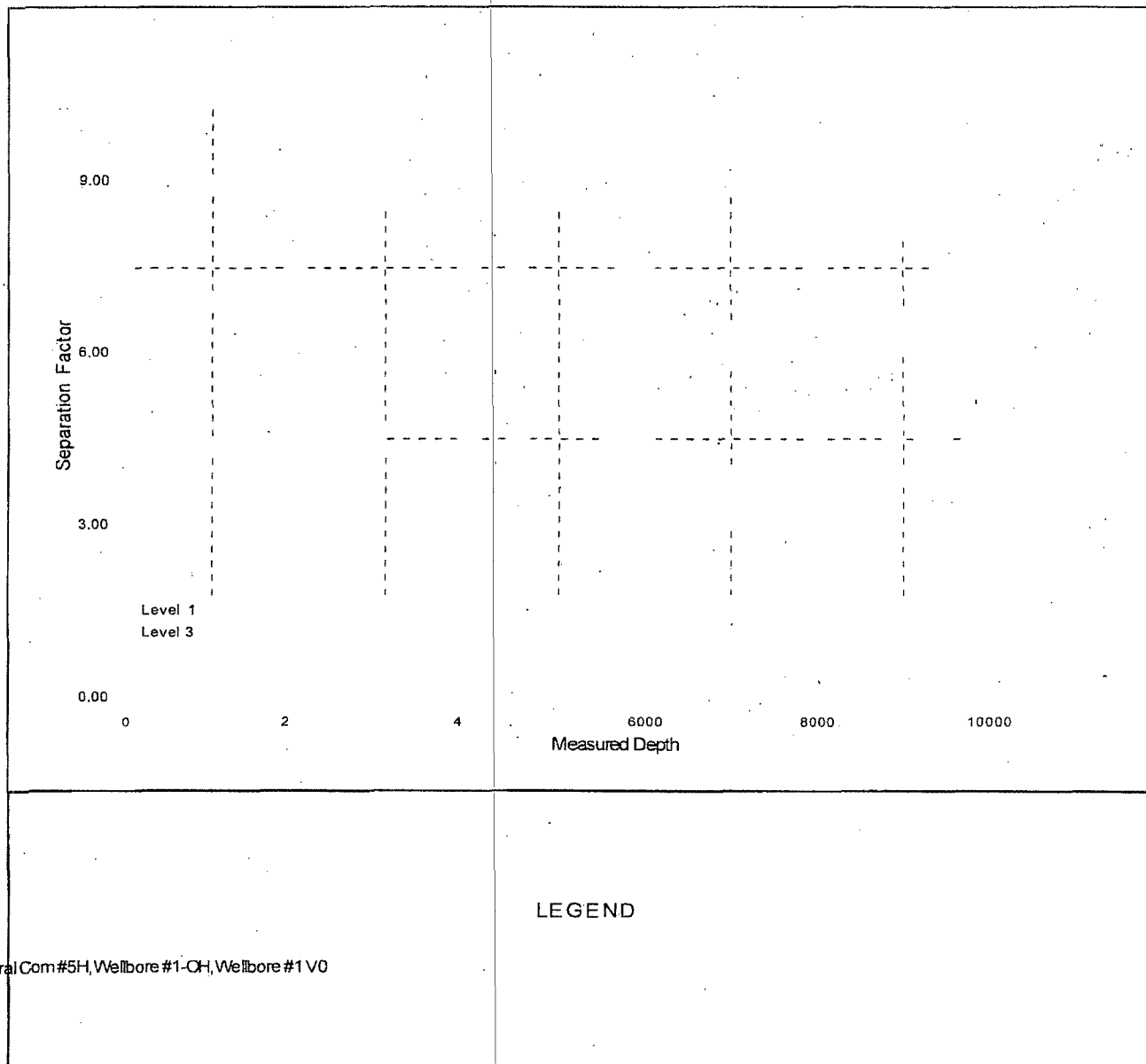


**Company:** COG Operating LLC  
**Project:** Eddy County(NM27E  
**Reference Site:** Sec.13-T17S-R31E  
**Site Error:** 0.00 usft  
**Reference Well:** Puckett 13 Federal Com #5H  
**Well Error:** 0.00 usft  
**Reference Wellbore:** Wellbore #2-Upper Blinbry  
**Reference Design:** Design #1

**Local Co-ordinate Reference:** Well Puckett 13 Federal Com #5H  
**TVD Reference:** WELL @ 3975.00usft  
**MD Reference:** WELL @ 3975.00usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** EDM 5000.1 Single User Db  
**Offset TVD Reference:** Reference Datum

Reference Depths are relative to WELL @ 3975.00usft  
Offset Depths are relative to Offset Datum  
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to Puckett 13 Federal Com #5H  
Coordinate System is US State Plane 1927 (Exact solution New Mex co East 30  
Grid Convergence at Surface is 0.28



DISTRICT I  
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DISTRICT II  
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Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III  
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Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
**OIL CONSERVATION DIVISION**  
1220 South St. Francis Dr.  
Santa Fe, New Mexico 87505

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office

☐ AMENDED REPORT

**WELL LOCATION AND ACREAGE DEDICATION PLAT**

|                            |                                         |                                       |
|----------------------------|-----------------------------------------|---------------------------------------|
| API Number<br>30-015-39657 | Pool Code<br>97213                      | Pool Name<br>Fren;Glorieta-Yeso, East |
| Property Code<br>38922     | Property Name<br>PUCKETT 13 FEDERAL COM | Well Number<br>5H                     |
| OGRID No.<br>229137        | Operator Name<br>COG OPERATING, LLC     | Elevation<br>3961'                    |

| Surface Location |         |          |       |         |               |                  |               |                |        |
|------------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| UL or lot No.    | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
| B                | 13      | 17-S     | 31-E  |         | 140           | NORTH            | 1907          | EAST           | EDDY   |

| 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 |
| O                                              | 13              | 17-S               | 31-E      |         | 330           | SOUTH            | 2310          | EAST           | EDDY   |
| Dedicated Acres<br>160                         | Joint or Infill | Consolidation Code | Order No. |         |               |                  |               |                |        |

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

|                                                                                                                                                                                                                     |                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>GEODETIC COORDINATES<br/>NAD 27 NME</p> <p>SURFACE LOCATION<br/>Y=670206.3 N<br/>X=657597.5 E</p> <p>LAT.=32.841430° N<br/>LONG.=103.820207° W</p> <p>BOTTOM HOLE LOCATION<br/>Y=665393.9 N<br/>X=657222.4 E</p> | <p>SECTION, QUARTER &amp; SIXTEENTH CORNER COORDINATES</p> <p>① - Y=670340.7, X=656865.1 E</p> <p>② - Y=670350.6, X=658184.2 E</p> <p>③ - Y=665061.6, X=656892.2 E</p> <p>④ - Y=665070.9, X=658212.9 E</p> | <p>140'</p> <p>S.L.</p> <p>SEE DETAIL</p> <p>PP: 330' FNL &amp; 1907' FEL</p> <p>3957.6' 3963.7'</p> <p>600'</p> <p>3959.7' 3958.6'</p> <p>DETAIL</p> <p>GRID. AZ.=184°27'24"</p> <p>HORIZ. DIST.=4828.3'</p> <p>B.H.</p> <p>2310'</p>                                                                                                                                                                                                                                                                                                 | <p><b>OPERATOR CERTIFICATION</b></p> <p>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.</p> <p><i>K C</i> 2/19/13</p> <p>Signature Date</p> <p>Kanicia Castillo</p> <p>Printed Name</p> <p>kcastillo@concho.com</p> <p>E-mail Address</p> |
|                                                                                                                                                                                                                     |                                                                                                                                                                                                            | <p><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>JUNE 22, 2011</p> <p>Date of Survey</p> <p>Signature &amp; Seal of Professional Surveyor:</p> <p><i>Ronald F. Eidson</i> 2/20/2012</p> <p>Certification Number Gary E. Eidson 12641</p> <p>Ronald F. Eidson 3239</p> <p>AF PROFESSIONAL SURVEYOR WSC W.O.: 12.13.0229</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



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| Property Code<br>38922     | Property Name<br>PUCKETT 13 FEDERAL COM | Well Number<br>5H                      |
| OGRID No.<br>229137        | Operator Name<br>COG OPERATING, LLC     | Elevation<br>3961'                     |

Surface Location

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|--------|
| B             | 13      | 17-S     | 31-E  |         | 140           | NORTH            | 1907          | EAST           | EDDY   |

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 |
|------------------------|-----------------|--------------------|-----------|---------|---------------|------------------|---------------|----------------|--------|
| O                      | 13              | 17-S               | 31-E      |         | 356           | SOUTH            | 2265          | EAST           | EDDY   |
| Dedicated Acres<br>160 | Joint or Infill | Consolidation Code | Order No. |         |               |                  |               |                |        |

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

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="text-align: center;"> <p><b>GEODETIC COORDINATES</b><br/>NAD 27 NME</p> <p><b>SURFACE LOCATION</b><br/>Y=670206.3' N<br/>X=657597.5' E<br/>LAT.=32.841430' N<br/>LONG.=103.820207' W</p> <p><b>BOTTOM HOLE LOCATION</b><br/>Y=665393.9 N<br/>X=657222.4 E</p> <p><b>SECTION, QUARTER &amp; SIXTEENTH CORNER COORDINATES</b><br/>           (A) - Y=670340.7, X=656865.1 E<br/>           (B) - Y=670350.6, X=658184.2 E<br/>           (C) - Y=665061.6, X=656892.2 E<br/>           (D) - Y=665070.9, X=658212.9 E         </p> </div> | <p style="text-align: center;"><b>OPERATOR CERTIFICATION</b></p> <p>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.</p> <p style="text-align: right;"> <br/>         Signature<br/>         Date 6/27/12       </p> <p style="text-align: right;">         Chasity Jackson<br/>         Printed Name<br/>         cjackson@concho.com<br/>         E-mail Address       </p> <hr/> <p style="text-align: center;"><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p style="text-align: right;">JUNE 22, 2011</p> <p>Date of Survey</p> <p style="text-align: right;"> <br/>         Signature of Professional Surveyor: Ronald E. Eidson<br/>         Certificate Number: Gary O. Eidson 12641<br/>         Professional Seal: Ronald E. Eidson 3239<br/>         AF. JWSC W.O.: 12.13.0229       </p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## PECOS DISTRICT CONDITIONS OF APPROVAL

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| <b>OPERATOR'S NAME:</b>      | <b>COG Operating LLC</b>                                    |
| <b>LEASE NO.:</b>            | <b>NMLC-029415A</b>                                         |
| <b>WELL NAME &amp; NO.:</b>  | <b>Puckett 13 Federal Com 5H</b>                            |
| <b>SURFACE HOLE FOOTAGE:</b> | <b>0140' FNL &amp; 1907' FEL</b>                            |
| <b>BOTTOM HOLE FOOTAGE</b>   | <b>0330' FSL &amp; 2310' FEL Sec. 13, T. 17 S., R 31 E.</b> |
| <b>LOCATION:</b>             | <b>Section 13, T. 17 S., R 31 E., NMPM</b>                  |
| <b>COUNTY:</b>               | <b>Eddy County, New Mexico</b>                              |

1. Set RBP at 5900' and test as described in step 5 of operator's preparatory / 2<sup>nd</sup> lateral procedure section. Submit results to BLM.
2. Variance to liner tie back is approved. Variance requested for not testing seal per Onshore Order NO.2 Section III b. is approved.
3. Surface disturbance beyond the existing pad must have prior approval.
4. A closed loop system is required. The operator shall properly dispose of drilling/circulating contents at an authorized disposal site. Tanks are required for all operations, no excavated pits.
5. Functional H<sub>2</sub>S monitoring equipment shall be on location.
6. Submit the BLM Form 3160-4 **Recompletion Report** within 30 days of the date all BLM approved procedures are complete.

### **PRESSURE CONTROL**

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 2000 (2M) psi and the proposed blowout preventer (BOP) and related equipment (BOPE) meets minimum requirement.

3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
  - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (18 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
  - c. The results of the test shall be reported to the appropriate BLM office.
  - d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
  - e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

### **WASTE MATERIAL AND FLUIDS**

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**JAM 031313**