

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Artesia

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

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMLC029415B
2. Name of Operator COG OPERATING LLC		6. If Indian, Allottee or Tribe Name
3a. Address ONE CONCHO CENTER 600 W ILLINOIS AVENUE MIDLAND, TX 79701		7. If Unit or CA/Agreement, Name and/or No.
3b. Phone No. (include area code) Ph: 432-685-4332		8. Well Name and No. PUCKETT 12 FEDERAL 7H
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 12 T17S R31E SESE 15FSL 819FEL		9. API Well No. 30-015-39476-00-S1
		10. Field and Pool, or Exploratory FREN
		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			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Drilling Operations
	☐ Convert to Injection	☐ Plug Back	☐ 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 recompleat 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 recompletion 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 12 Federal Com #7. This re-entry will originate in the Yeso and will finish in the Yeso described in the attached drilling procedure and directional plan.

Accepted for record
NMOCD *Wade* 6/7/2013
**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

RECEIVED
JUN 03 2013
NMOCD ARTESIA

APPROVED
MAY 29 2013
PJF
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

14. I hereby certify that the foregoing is true and correct. Electronic Submission #207057 verified by the BLM Well Information System For COG OPERATING LLC, sent to the Carlsbad Committed to AFMSS for processing by JOHNNY DICKERSON on 05/10/2013 (13JLD0785SE)	
Name (Printed/Typed) KANICIA CASTILLO	Title PREPARER
Signature (Electronic Submission)	Date 05/09/2013

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By <u>EDWARD FERNANDEZ</u>	Title <u>PETROLEUM ENGINEER</u>	Date <u>05/29/2013</u>
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 <u>Carlsbad</u>

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.

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

CONDITIONS OF APPROVAL

Sundry dated 05/09/2013

COG Operating LLC

NMLC029415B

Puckett 12 Federal 7H

30-015-39476

Section 12, T. 17 S., R 31 E., NMPM

Eddy County, New Mexico

- 1. Surface disturbance beyond the existing pad must have prior approval.**
- 2. Closed loop system required.**
- 3. H2S monitoring equipment should be onsite for personnel protection from surrounding oil operations. Operator should not encounter H2S while deepening.**
- 4. Variance for liner top fluid entry and not testing seal also approved based on NMOCD classification of formations in this area as the Yeso group - Pool 26770.**
- 5. Variance of proposed liner tie back is approved in order to have access to bottom lateral.**
- 6. 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.**
- 7. 2000 (2M) BOP to be used. All blowout preventer (BOP) and related equipment (BOPE) shall comply with reasonable well control requirements. A two ram system with a blind ram and a pipe ram designed for the size of the work string shall be adequate. Tapered work strings will require an additional pipe ram. The manifold shall comply with Onshore Oil and Gas Order #2 Attachment I (2M Diagrams of Choke Manifold Equipment). The accumulator system shall have an immediately available power source to close the rams and retain 200 psi above pre-charge. The pre-charge test shall follow requirements in Onshore Order #2.**
- 8. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness BOP/BOPE testing.**
- 9. 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.**
- 10. Steel tanks to be used.**
- 11. Work to be completed in 90 days**
- 12. Subsequent sundry and completion report required when work is complete.**

EGF 052413

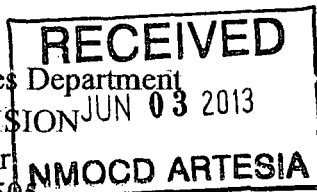
DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
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 30-015-39476	Pool Code 26770	Pool Name Fren;Glorieta-Yeso
Property Code 38858	Property Name PUCKETT 12 FEDERAL	Well Number 7H
OGRID No: 229137	Operator Name COG OPERATING, LLC	Elevation 3965'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	12	17-S	31-E		15	SOUTH	819	EAST	EDDY

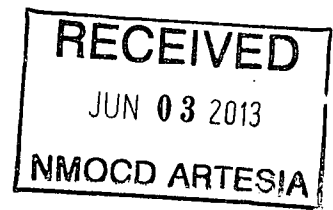
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	12	17-S	31-E		330	NORTH	990	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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

DETAIL 3964.9' 3968.4' 600' 600' 3959.7' 3964.4' GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=670369.4 N X=658684.5 E LAT.=32.841864° N LONG.=103.816666° W BOTTOM HOLE LOCATION Y=675304.1 N X=658485.4 E CORNER COORDINATES TABLE A - Y=675631.7 N, X=658153.1 E B - Y=675640.7 N, X=659473.2 E C - Y=670350.6 N, X=658184.2 E D - Y=670360.5 N, X=659503.3 E Penetration Point 330' FSL & 866' FEL HORIZ. DIST.=990.0' GRID. AZ.=357°41'21" S.L. SEE DETAIL C 15' 819'	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>K. C.</i> 5/9/13 Signature Date Kanicia Castillo Printed Name kcastillo@concho.com E-mail Address 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 28, 2011 Date of Survey Signature of Registered Professional Surveyor: <i>Ronald J. Eidson</i> NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR 3239 Certificate No. 12641 Ronald J. Eidson 3239 AP Rev. 11/07/2012 JWSC W.O.: 12.13.0228
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Puckett 12 Federal #7H MIDDLE LATERAL PROGRAM

1. Estimated Tops of Important Geologic Markers

Yeso Group +/- 5317'

2. Estimated Depths of Anticipated Fresh Water, 132'.

This re-entry 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"	5645'-10858'	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 of lateral with FW/CBW drilling mud. Visual or electronic mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volumes.

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 96 degrees and the estimated maximum bottomhole pressure is 2700 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/2ND 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" 2M 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 rig pump 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 5700'). Pull 5,000# upstrain to check anchor set, then set down 20-30,000#

weight to shear running bolt. RD Gyro.

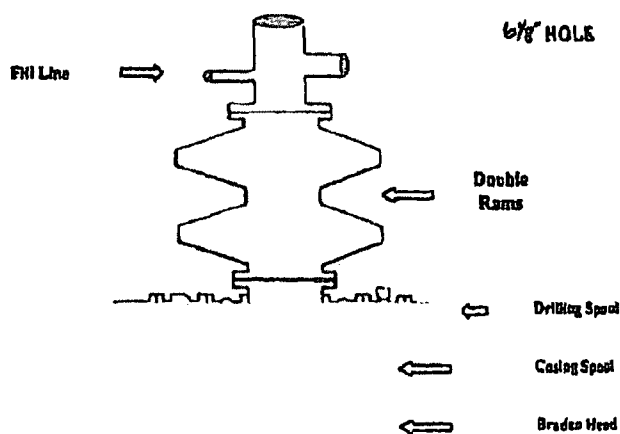
9. After obtaining free torque, record Pick-Up & Slack-Off weights. Make starting cut through casing wall (approximately 30" total). Sweep with high viscosity polymer pills (if needed) to clean hole. Install two (2) or more ditch magnets at flowline. TOH.
10. TIH with window mill, watermelon mill, & 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 $11.0^\circ/100'$ 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' vertical 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 packer at 5630', PBR/top of liner at 5610', drill pipe to surface. Cement 4 1/2" liner from 10768' to 5610' with 215 sacks of acid soluble cement (15#/gal, 2.60 cu.ft./sk)-- 15% excess. Set external casing packer, release drill pipe from liner, circulate excess cement off of liner top, trip out of hole with drill pipe. TIH w/7" RBP on drill pipe and set RBP at 5000'. TOH w/drill pipe.
18. ND BOPE, NU WH w/cap.
19. RDMO rig.

Completion Procedure

1. MIRU PU. NU BOPE. Retrieve 7" RBP @ +/-5000'. Install 7" x 4 1/2" window isolation assembly.
2. TCP (tubing conveyed perforating gun) perforate toe (1st stage) of upper lateral. ND BOPE. NU frac stack. RDMO PU.
3. RU frac equipment /WL equipment. Fracture stimulate lateral in 10 stages using plug and perf method. RD frac/WL Equipment.
4. Flow well back up casing to recover load.
5. MIRU PU. NU BOPE. Drill out frac plugs and clean out lateral to PBTD.
6. Install pumping equipment. Put upper lateral on production to test.
7. MIRU PU. NUBOPE. Pull pumping equipment.
8. Retrieve whipstock. Retrieve RPB @ +/- 5775'.
9. Install pumping equipment and put well on production with both laterals commingled.
10. Report production test results.

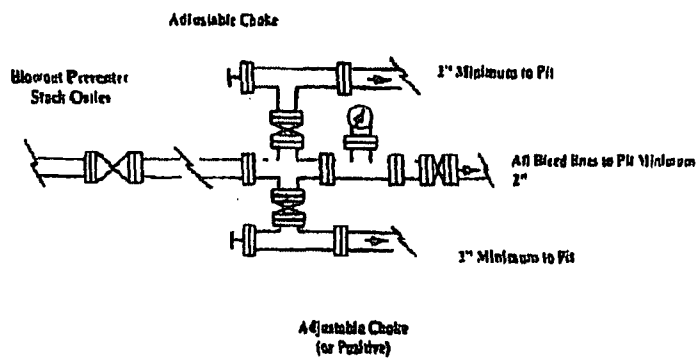
COG Operating LLC

BOPE and Choke Schematic



Minimum 4" Nominal choke and M1 Hoses

Choke Manifold Requirement (2000 psi WP)
No Annular Required



NOTES REGARDING THE BLOWOUT PREVENTERS

Blaster Drilling Plan
Eddy County, Kern District

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hand 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 12 Federal #7H
Blinebry/Paddock Horizontal
Eddy County, New Mexico**

Surface Lateral Terminus

15' FSL 330' FNL

819' FEL 990' FEL

S-12 S-12

T17S, R31E

Proposed Wellbore

API: 30-015-39476

**KB: 14'
GL: 3965'**

Bit Size: 17-1/2"

13-3/8" 48# H40/J55 STC @ 748'
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 CIRCULATED TO
SURFACE

Rustler @ 687'

Bit Size: 12-1/4"

9-5/8" 40# J55 LTC @ 2032'

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

Base of Salt @ 1788'

Yates @ 2029'

Queen @ 2989'

San Andres @ 3743'

Glorietta @ 5243'

Yeso @ 5323'

PRODUCTION HOLE MUD:
CBW 8.8-9.5 ppg, FV 28-29, WL
NC (5675'-10858')

Middle Blinebry: KOP @ 5615'
Liner Hanger/Pkr @ 5630';
Landing point @ 6457' MD, 6150' TVD
TD 10858' MD, 6073' TVD
91° Inclination, 358.14° azm, vertical
section 4939'

Bit Size: 6-1/8"

4-1/2" 13.5# L80 LTC LSA 5688' - 10858'
w/ Peak packers and sleeves for 15 stage completion

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

~5,173' VS Lateral 178.3° AZ

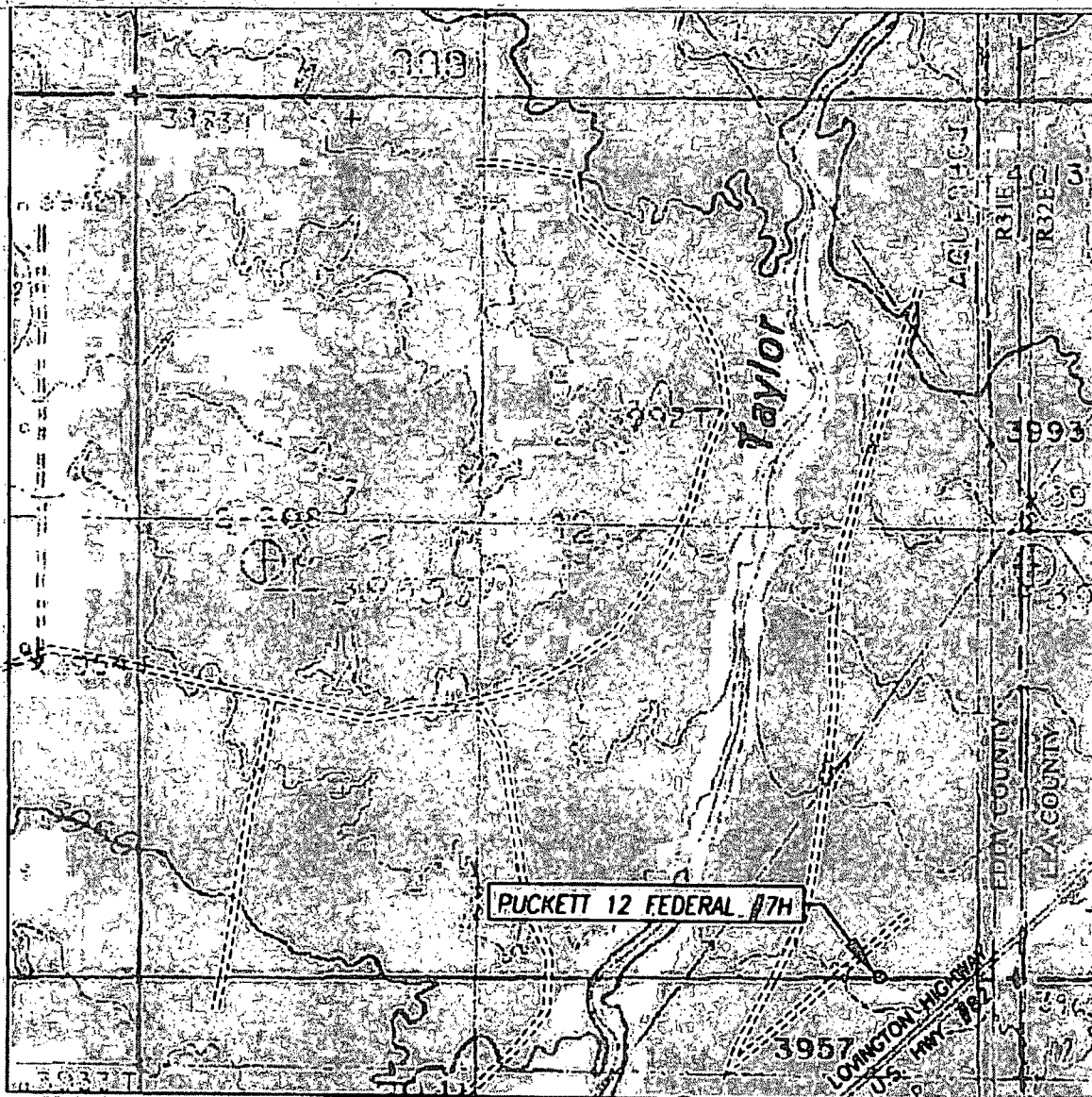
TAPERED STRING 7" 26# L80 LTC @ 5965'; 5-1/2" 17#
L80 5965' -11,481' 600 sx 35:65:8 followed by 400 sx
75:25 followed by 600 sx Acid Soluble TOC (by CBL) at
400'

11,496' MD,
6522' TVD

Bird: 7/2/12

*Revision
see step #17
& completion
Procedure*

LOCATION VERIFICATION MAP



SCALE: 1" = 1000'

CONTOUR INTERVAL:
MALJAMAR, N.M. = 10'

SEC. 12 TWP. 17-S RGE. 31-E
 SURVEY N.M.P.M.
 COUNTY EDDY STATE NEW MEXICO
 DESCRIPTION 15' FSL & 819' FEL
 ELEVATION 3965'
 OPERATOR COG OPERATING, LLC
 LEASE PUCKETT 12 FEDERAL
 U.S.G.S. TOPOGRAPHIC MAP
 MALJAMAR, N.M.



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

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

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Property Code 38858	Property Name PUCKETT 12 FEDERAL	Well Number 7H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3965'

Surface Location

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Bottom Hole Location If Different From Surface

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Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
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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

DETAIL 3964.9' 3968.4' 600' 600' 3959.7' 3964.4' GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=670369.4 N X=658684.5 E LAT.=32.841864° N LONG.=103.816666° W BOTTOM HOLE LOCATION Y=675304.1 N X=658485.4 E CORNER COORDINATES TABLE A - Y=675631.7 N, X=658153.1 E B - Y=675640.7 N, X=659473.2 E C - Y=670350.6 N, X=658184.2 E D - Y=670360.5 N, X=659503.3 E Penetration Point 330' FSL & 866' FEL S.L. SEE DETAIL C 15' 819'	Project Area Producing Area HORIZ. DIST. = 4940.0' GRID. AZ. = 357°41'21"	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>KC</i> 5/9/13 Signature Date Kanicia Castillo Printed Name kcastillo@concho.com E-mail Address 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 28, 2011 Date of Survey <i>Ronald J. Eidson</i> Signature of Registered Professional Surveyor NEW MEXICO REGISTERED SURVEYOR 3239 Certificate Number: 12641 Ronald J. Eidson 3239 AF Rev. 11/07/2012 JWSC W.O.: 12.13.0228
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Plan Proposal

FOR

COG Operating, LLC
Puckett 12 Federal #7H (Dual Hz)
Eddy Co., NM

Design #2

Presented By:

Aaron Boger
Account Manager

Bret Wolford
Well Planner

SHL
15' FSL & 819' FEL
Penetration Point
330' FSL & 866' FEL
PBHL
330' FNL & 990' FEL
Sec 12-T17S-R31E

Archer



COG Operating, LLC

Eddy County(NM27E)

Sec.12-T17S-R31E

Puckett 12 Federal #7H

Wellbore #2 (Dual Hz)

Plan: Design #2

Standard Planning Report

16 April, 2013

Archer



Archer
Planning Report

Archer

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3879.00usft
Project:	Eddy County(NM27E)	MD Reference:	WELL @ 3879.00usft
Site:	Sec 12-T17S-R31E	North Reference:	(Grid)
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual H2)		
Design:	Design #2		

Project:	Eddy County(NM27E)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Sec 12-T17S-R31E		
Site Position:	Map	Northing:	670,399.300 usft
From:		Easting:	659,013.500 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Grid Convergence:	0.28 "

Well:	Puckett 12 Federal #7H		
Well Position	+N-S	-29.80 usft	Northing:
	+E-W	-229.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Ground Level:	3,985.00 usft

Wellbore:	Wellbore #2 (Dual H2)		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	04/18/13	7.52
			Dip Angle
			60.87
			Field Strength
			48,773

Design:	Design #2		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			5,815.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			357.69

Plan Sections	Measured Depth	Inclination	Azimuth	Vertical Depth	+N-S	+E-W	Dogleg Rate	Build Rate	Turn Rate	TFO	Target
	(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
	5,815.00	0.70	12.60	5,814.19	7.10	-39.33	0.00	0.00	0.00	0.00	
	5,835.12	0.58	0.75	5,834.30	7.32	-39.30	0.94	-0.69	-58.91	-142.64	
	6,457.29	91.00	358.14	6,150.00	536.99	-56.27	11.00	11.00	-0.32	-2.81	Puckett 12 Fed #7H F
	10,657.60	91.00	358.14	6,073.20	4,934.50	-169.10	0.00	0.00	0.00	0.00	Puckett 12 Fed #7H F

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Picked: 12 Federal #7H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3979.00usft
Project:	Eddy County(NM27E)	MD Reference:	WELL @ 3979.00usft
Site:	Sec 12-T17S-R31E	North Reference:	Grid
Well:	Puckett, 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual H2)		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N-S (usft)	E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.78	164.64	100.00	-0.64	0.18	-0.85	0.78	0.76	0.00	0.00
200.00	0.72	170.65	199.99	-1.90	0.45	-1.92	0.09	-0.04	6.01	6.01
300.00	0.66	181.33	299.98	-3.27	0.54	-3.29	0.20	0.14	10.68	10.68
400.00	0.78	188.13	399.97	-4.69	0.42	-4.71	0.13	-0.08	6.80	6.80
500.00	0.83	189.83	499.96	-6.08	0.20	-6.08	0.06	0.05	1.70	1.70
600.00	0.75	194.24	599.95	-7.43	-0.08	-7.42	0.10	-0.08	4.41	4.41
700.00	0.76	229.43	699.94	-8.49	-0.74	-8.46	0.46	0.01	35.19	35.19
800.00	0.27	258.08	799.94	-8.98	-1.48	-8.92	0.53	-0.49	26.65	26.65
900.00	0.18	179.83	899.94	-9.20	-1.71	-9.12	0.29	-0.09	-76.25	-76.25
1,000.00	0.43	197.43	999.94	-9.71	-1.82	-9.83	0.28	0.25	17.60	17.60
1,100.00	0.54	210.41	1,099.93	-10.48	-2.17	-10.30	0.15	0.11	12.98	12.98
1,200.00	0.27	285.56	1,199.93	-10.90	-2.64	-10.79	0.44	-0.27	55.15	55.15
1,300.00	0.61	102.24	1,299.93	-11.03	-2.38	-10.93	0.87	0.34	-163.32	-163.32
1,500.00	0.48	114.13	1,499.92	-11.60	-0.55	-11.57	0.09	-0.06	5.94	5.94
1,600.00	0.48	114.13	1,599.92	-11.94	0.21	-11.84	0.00	0.00	0.00	0.00
1,700.00	0.71	97.10	1,699.91	-12.19	1.21	-12.23	0.29	0.23	-17.03	-17.03
1,800.00	0.74	64.71	1,799.90	-11.99	2.41	-12.08	0.41	0.03	-32.38	-32.38
1,900.00	1.04	59.49	1,899.89	-11.25	3.77	-11.40	0.31	0.30	-5.22	-5.22
2,000.00	1.00	68.40	1,999.87	-10.47	5.37	-10.68	0.16	-0.04	8.91	8.91
2,100.00	0.82	73.95	2,099.88	-10.00	6.70	-10.26	0.39	-0.38	5.55	5.55
2,200.00	0.33	96.99	2,199.86	-9.84	7.51	-10.13	0.31	-0.29	13.04	13.04
2,300.00	0.64	98.91	2,299.88	-9.92	8.34	-10.25	0.33	0.31	12.92	12.92
2,400.00	0.48	103.15	2,399.85	-10.11	9.29	-10.47	0.18	-0.18	3.24	3.24
2,500.00	0.30	139.65	2,499.85	-10.40	9.85	-10.76	0.28	-0.16	38.50	38.50
2,600.00	0.25	203.27	2,599.85	-10.80	9.93	-11.19	0.29	-0.05	83.82	83.82
2,700.00	0.48	224.35	2,699.85	-11.30	9.55	-11.67	0.28	0.23	21.08	21.08
2,800.00	0.62	237.91	2,799.84	-11.88	8.80	-12.23	0.19	0.14	13.56	13.56
2,900.00	0.89	253.81	2,899.83	-12.39	7.59	-12.68	0.34	0.27	15.90	15.90
3,000.00	1.10	257.05	2,999.82	-12.82	5.91	-13.05	0.22	0.21	3.24	3.24
3,100.00	1.19	257.45	3,099.80	-13.26	3.98	-13.41	0.09	0.09	0.40	0.40
3,200.00	1.15	280.23	3,199.78	-13.69	1.98	-13.72	0.07	-0.04	2.78	2.78
3,300.00	1.37	257.98	3,299.75	-14.07	-0.20	-14.05	0.23	0.22	-2.25	-2.25
3,400.00	1.33	261.79	3,399.73	-14.49	-2.51	-14.38	0.10	-0.04	3.81	3.81
3,500.00	1.48	260.09	3,499.70	-14.87	-4.82	-14.66	0.14	0.13	-1.70	-1.70
3,600.00	1.38	285.98	3,599.67	-15.18	-7.37	-14.87	0.17	-0.08	5.89	5.89
3,700.00	1.41	271.29	3,699.64	-15.23	-9.81	-14.83	0.13	0.03	5.31	5.31
3,800.00	1.85	282.51	3,799.60	-14.86	-12.91	-14.34	0.54	0.44	11.22	11.22
3,900.00	1.58	290.27	3,899.55	-14.04	-15.46	-13.40	0.37	-0.29	7.79	7.79
4,000.00	1.58	295.65	3,999.51	-12.97	-17.97	-12.24	0.15	0.00	5.38	5.38
4,100.00	1.80	298.69	4,099.48	-11.78	-20.44	-10.92	0.05	0.04	1.04	1.04
4,200.00	1.55	295.03	4,199.44	-10.56	-22.92	-9.63	0.07	-0.05	-1.68	-1.68
4,300.00	1.41	295.87	4,299.41	-9.45	-25.25	-8.42	0.14	-0.14	0.84	0.84
4,400.00	1.27	311.22	4,399.38	-8.18	-27.19	-7.08	0.38	-0.14	15.35	15.35
4,500.00	1.38	312.67	4,499.35	-6.94	-28.91	-5.47	0.11	0.11	1.45	1.45
4,600.00	1.42	311.30	4,599.32	-5.00	-30.72	-3.78	0.05	0.04	-1.37	-1.37
4,700.00	1.32	307.69	4,699.29	-3.48	-32.57	-2.17	0.13	-0.10	-3.81	-3.81
4,800.00	1.15	319.41	4,799.27	-2.01	-34.13	-0.64	0.30	-0.17	11.72	11.72
4,900.00	1.11	317.70	4,899.25	-0.54	-35.43	0.89	0.05	-0.04	-1.71	-1.71
5,000.00	0.93	322.53	4,999.23	0.82	-36.58	2.30	0.20	-0.18	4.83	4.83
5,100.00	0.81	315.75	5,099.22	1.97	-37.57	3.49	0.18	-0.12	-6.78	-6.78
5,200.00	0.75	313.77	5,199.21	2.93	-38.53	4.48	0.07	-0.08	-1.98	-1.98
5,300.00	0.58	323.93	5,299.21	3.78	-39.29	5.38	0.22	-0.19	10.16	10.16
5,400.00	0.70	358.13	5,399.20	4.79	-39.62	6.38	0.37	0.14	32.20	32.20

Database:	EDM 5000.1 (Single User Db)	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3979.0000
Project:	Eddy County (NM27E)	MD Reference:	WELL @ 3979.0000
Site:	Sec 12-117S-R31E	North Reference:	Grid
Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual H2)		
Design:	Design #2		

Planned Survey									
Measured Depth (uoft)	Inclination (°)	Azimuth (°)	Vertical Depth (uoft)	N/S (uoft)	E/W (uoft)	Vertical Section (uoft)	Dogleg Rate (°/100uoft)	Build Rate (°/100uoft)	Turn Rate (°/100uoft)
5,500.00	0.46	3.20	5,499.20	5.80	-39.64	7.39	0.25	-0.24	7.07
5,521.00	0.70	28.10	5,520.20	6.00	-39.58	7.59	1.57	1.14	109.05
5,552.00	0.70	3.60	5,551.19	6.35	-39.48	7.94	0.88	0.00	-72.58
5,583.00	0.70	15.70	5,582.19	6.73	-39.42	8.31	0.48	0.00	39.03
Site In / OH Survey									
5,615.00	0.70	12.60	5,614.19	7.10	-39.33	8.68	0.12	0.00	-9.69
Int KOP / Start DLS 11600 TFO 2.61									
5,635.12	0.56	0.75	5,634.30	7.32	-39.30	8.90	0.94	-0.69	-58.91
5,650.00	2.20	358.81	5,649.19	7.68	-39.30	9.28	11.00	11.00	-13.06
5,700.00	7.70	358.33	5,698.98	11.99	-39.42	13.57	11.00	11.00	-6.95
5,750.00	13.20	358.25	5,748.13	21.05	-39.69	22.63	11.00	11.00	-0.16
5,800.00	18.70	358.22	5,796.19	34.78	-40.12	38.37	11.00	11.00	-0.07
5,850.00	24.20	358.20	5,842.71	53.04	-40.69	54.64	11.00	11.00	-0.04
5,900.00	29.70	358.18	5,887.26	75.68	-41.41	77.29	11.00	11.00	-0.52
5,950.00	35.20	358.18	5,929.44	102.48	-42.28	104.10	11.00	11.00	-0.02
6,000.00	40.70	358.17	5,980.85	133.20	-43.24	134.84	11.00	11.00	-0.01
6,050.00	46.20	358.16	6,005.14	187.56	-44.34	189.21	11.00	11.00	-0.01
6,100.00	51.70	358.16	6,037.68	205.23	-45.54	206.90	11.00	11.00	-0.01
6,150.00	57.20	358.18	6,067.02	245.87	-46.85	247.56	11.00	11.00	-0.01
6,200.00	62.70	358.15	6,092.05	286.11	-48.24	290.82	11.00	11.00	-0.01
PP @ 322# MD									
6,228.00	65.78	358.15	6,104.22	314.31	-49.08	316.03	11.00	11.00	-0.01
6,250.00	68.20	358.15	6,112.82	334.55	-49.71	336.28	11.00	11.00	-0.01
6,300.00	73.70	358.15	6,129.14	381.77	-51.24	383.52	11.00	11.00	-0.01
6,350.00	79.20	358.14	6,140.85	430.33	-52.81	432.11	11.00	11.00	-0.01
6,400.00	84.70	358.14	6,147.85	479.79	-54.41	481.60	11.00	11.00	-0.01
6,450.00	90.20	358.14	6,150.08	529.70	-56.03	531.53	11.00	11.00	0.00
EOG / Start 6400.50 / Hold at 8467.29 MD									
6,457.29	91.00	358.14	6,150.00	538.68	-56.27	538.82	11.00	11.00	0.00
6,500.00	91.00	358.14	6,149.25	579.88	-57.65	581.52	0.00	0.00	0.00
6,600.00	91.00	358.14	6,147.51	679.80	-60.90	681.50	0.00	0.00	0.00
6,700.00	91.00	358.14	6,145.76	779.53	-64.15	781.48	0.00	0.00	0.00
6,800.00	91.00	358.14	6,144.02	879.46	-67.39	881.46	0.00	0.00	0.00
6,900.00	91.00	358.14	6,142.27	979.39	-70.64	981.44	0.00	0.00	0.00
7,000.00	91.00	358.14	6,140.53	1,079.33	-73.88	1,081.43	0.00	0.00	0.00
7,100.00	91.00	358.14	6,138.78	1,179.28	-77.13	1,181.41	0.00	0.00	0.00
7,200.00	91.00	358.14	6,137.04	1,279.19	-80.37	1,281.39	0.00	0.00	0.00
7,300.00	91.00	358.14	6,135.29	1,379.12	-83.62	1,381.37	0.00	0.00	0.00
7,400.00	91.00	358.14	6,133.55	1,479.05	-86.87	1,481.35	0.00	0.00	0.00
7,500.00	91.00	358.14	6,131.80	1,578.99	-90.11	1,581.33	0.00	0.00	0.00
7,600.00	91.00	358.14	6,130.06	1,678.92	-93.36	1,681.32	0.00	0.00	0.00
7,700.00	91.00	358.14	6,128.31	1,778.85	-96.60	1,781.30	0.00	0.00	0.00
7,800.00	91.00	358.14	6,126.57	1,878.78	-99.85	1,881.28	0.00	0.00	0.00
7,900.00	91.00	358.14	6,124.82	1,978.71	-103.10	1,981.26	0.00	0.00	0.00
8,000.00	91.00	358.14	6,123.08	2,078.65	-106.34	2,081.24	0.00	0.00	0.00
8,100.00	91.00	358.14	6,121.33	2,178.58	-109.59	2,181.22	0.00	0.00	0.00
8,200.00	91.00	358.14	6,119.59	2,278.51	-112.83	2,281.21	0.00	0.00	0.00
8,300.00	91.00	358.14	6,117.84	2,378.44	-116.08	2,381.19	0.00	0.00	0.00
8,400.00	91.00	358.14	6,116.10	2,478.37	-119.32	2,481.17	0.00	0.00	0.00
8,500.00	91.00	358.14	6,114.35	2,578.31	-122.57	2,581.15	0.00	0.00	0.00
8,600.00	91.00	358.14	6,112.60	2,678.24	-125.82	2,681.13	0.00	0.00	0.00
8,700.00	91.00	358.14	6,110.86	2,778.17	-129.06	2,781.11	0.00	0.00	0.00
8,800.00	91.00	358.14	6,109.11	2,878.10	-132.31	2,881.10	0.00	0.00	0.00

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Project:	Eddy County (NM27E)	MD Reference:	WELL @ 3979.00usft
Site:	Sec 12 T17S R31E	North Reference:	Grid
Well:	Puckett, 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #2 (Dual Hz)		
Design:	Design #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,900.00	91.00	358.14	8,107.37	2,978.03	-135.55	2,981.08	0.00	0.00	0.00
9,000.00	91.00	358.14	8,105.62	3,077.67	-138.80	3,081.06	0.00	0.00	0.00
9,100.00	91.00	358.14	8,103.88	3,177.80	-142.05	3,181.04	0.00	0.00	0.00
9,200.00	91.00	358.14	8,102.13	3,277.83	-145.29	3,281.02	0.00	0.00	0.00
9,300.00	91.00	358.14	8,100.39	3,377.78	-148.54	3,381.00	0.00	0.00	0.00
9,400.00	91.00	358.14	8,098.64	3,477.69	-151.78	3,480.99	0.00	0.00	0.00
9,500.00	91.00	358.14	8,096.90	3,577.63	-155.03	3,580.97	0.00	0.00	0.00
9,600.00	91.00	358.14	8,095.15	3,677.56	-158.27	3,680.95	0.00	0.00	0.00
9,700.00	91.00	358.14	8,093.41	3,777.49	-161.52	3,780.93	0.00	0.00	0.00
9,800.00	91.00	358.14	8,091.66	3,877.42	-164.77	3,880.91	0.00	0.00	0.00
9,900.00	91.00	358.14	8,089.92	3,977.36	-168.01	3,980.89	0.00	0.00	0.00
10,000.00	91.00	358.14	8,088.17	4,077.29	-171.26	4,080.88	0.00	0.00	0.00
10,100.00	91.00	358.14	8,086.43	4,177.22	-174.50	4,180.86	0.00	0.00	0.00
10,200.00	91.00	358.14	8,084.68	4,277.15	-177.75	4,280.84	0.00	0.00	0.00
10,300.00	91.00	358.14	8,082.94	4,377.08	-180.99	4,380.82	0.00	0.00	0.00
10,400.00	91.00	358.14	8,081.19	4,477.02	-184.24	4,480.80	0.00	0.00	0.00
10,500.00	91.00	358.14	8,079.45	4,576.95	-187.49	4,580.79	0.00	0.00	0.00
10,600.00	91.00	358.14	8,077.70	4,676.88	-190.73	4,680.77	0.00	0.00	0.00
10,700.00	91.00	358.14	8,075.95	4,776.81	-193.98	4,780.75	0.00	0.00	0.00
10,800.00	91.00	358.14	8,074.21	4,876.74	-197.22	4,880.73	0.00	0.00	0.00
TD at 10857.80 - Puckett, 12 Fed #7H PBHL									
10,857.80	91.00	358.14	8,073.20	4,934.50	-199.10	4,938.52	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Puckett 12 Fed #7H PB	0.00	0.00	6,073.20	4,934.50	-199.10	675,303.900	658,485.400	32° 51' 19.547 N	103° 49' 2.046 W
- plan hits target center									
- Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates N/S (usft)	E/W (usft)	Comment
5,815.00	5,814.19	7.10	-38.33	Tie-In / OH Survey
5,835.12	5,834.30	7.32	-39.30	Int. KOP / Start DLS 11.00° TFO -2.61
6,228.00	6,104.22	314.31	-49.06	PP @ 6228' MD
6,457.29	6,150.00	538.98	-56.27	EOC / Start 4400.50' hold at 6457.29 MD
10,857.80	8,073.20	4,934.50	-199.10	TD at 10857.80



COG Operating, LLC

Eddy County(NM27E)

Sec.12-T17S-R31E

Puckett 12 Federal #7H

Wellbore #2 (Dual Hz)

Design #2

Anticollision Report

16 April, 2013

Archer

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County (NM275)	TVD Reference:	WELL @ 3878.00usft
Reference Station:	Sec 12, T17S, R31E	MD Reference:	WELL @ 3878.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 Sigma
Reference Wellbore:	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 (Single User Db)
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference:	Design #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 8,999.98 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	04/18/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	5,500.00	Gyro Survey-OH (Wellbore #2 (Dual Hz))	GVD_DP_MS	Gyrodatta gyro-compensating and drop	
5,521.00	5,615.00	MWD Survey-OH (Wellbore #2 (Dual Hz))	MWD	MWD - Standard	
5,615.00	10,857.80	Design #2 (Wellbore #2 (Dual Hz))	MWD	MWD - Standard	

Summary	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centers (usft)	Minimum Separation (usft)	Warning
Site Name					
Offset Well - Wellbore - Design					
Sec 12, T17S, R31E					
Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1	5,835.12	5,835.12	0.00	-13.28	0.000 Level 1, CC, ES, SF

Offset Design										Offset Error		5.00 usft											
Survey Program										100-MWD/5000-MWD		Offset Error		5.00 usft									
Measured Depth		Vertical Depth		Reference Depth		Offset		Actual		Offset Method		Center		Between		Between		Minimum		Separation		Warning	
Depth	(usft)	Depth	(usft)	Depth	(usft)	Depth	(usft)	Depth	(usft)	From North	(ft)	us-ft	(m)	us-ft	Center	Edwards	(usft)	(usft)	(usft)	Factor			
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	100.00	100.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.84	0.18	0.00	-0.19	0.19	0.000	Level 1							
200.00	199.98	200.00	199.99	0.23	0.31	0.00	0.00	-1.90	0.45	0.00	-0.54	0.54	0.000	Level 1									
300.00	299.98	300.00	299.98	0.32	0.53	0.00	0.00	-2.27	0.54	0.00	-0.84	0.84	0.000	Level 1									
400.00	399.97	400.00	399.97	0.33	0.74	0.00	0.00	-4.89	0.42	0.00	-1.13	1.13	0.000	Level 1									
500.00	499.96	500.00	499.96	0.45	0.96	0.00	0.00	-6.68	0.20	0.00	-1.40	1.40	0.000	Level 1									
600.00	599.95	600.00	599.95	0.51	1.17	0.00	0.00	-7.43	-0.08	0.00	-1.67	1.67	0.000	Level 1									
700.00	699.94	700.00	699.94	0.56	1.38	0.00	0.00	-8.48	-0.74	0.00	-1.92	1.92	0.000	Level 1									
800.00	799.94	800.00	799.94	0.60	1.58	0.00	0.00	-9.88	-1.48	0.00	-2.18	2.18	0.000	Level 1									
900.00	899.94	900.00	899.94	0.63	1.78	0.00	0.00	-9.20	-1.71	0.00	-2.41	2.41	0.000	Level 1									
1,000.00	999.94	1,000.00	999.94	0.63	2.00	0.00	0.00	-9.71	-1.87	0.00	-2.68	2.68	0.000	Level 1									
1,100.00	1,099.93	1,100.00	1,099.93	0.72	2.21	0.00	0.00	-10.48	-2.17	0.00	-2.92	2.92	0.000	Level 1									
1,200.00	1,199.93	1,200.00	1,199.93	0.76	2.42	0.00	0.00	-10.80	-2.64	0.00	-3.11	3.11	0.000	Level 1									
1,300.00	1,299.93	1,300.00	1,299.93	0.78	2.63	0.00	0.00	-11.03	-2.38	0.00	-3.30	3.30	0.000	Level 1									
1,400.00	1,399.92	1,400.00	1,399.92	0.87	3.04	0.00	0.00	-11.03	-0.55	0.00	-3.54	3.54	0.000	Level 1									
1,500.00	1,499.92	1,500.00	1,499.92	0.90	3.25	0.00	0.00	-11.84	0.21	0.00	-3.68	4.08	0.000	Level 1									
1,600.00	1,599.92	1,600.00	1,599.92	0.92	3.45	0.00	0.00	-12.19	1.21	0.00	-4.30	4.30	0.000	Level 1									
1,700.00	1,699.91	1,700.00	1,699.91	0.94	3.68	0.00	0.00	-11.88	2.41	0.00	-4.54	4.54	0.000	Level 1									
1,800.00	1,799.89	1,800.00	1,799.89	0.96	3.87	0.00	0.00	-11.25	3.77	0.00	-4.77	4.77	0.000	Level 1									
2,000.00	1,999.87	2,000.00	1,999.87	0.98	4.08	0.00	0.00	-10.47	6.37	0.00	-5.00	5.00	0.000	Level 1									
2,100.00	2,099.86	2,100.00	2,099.85	1.01	4.29	0.00	0.00	-10.00	6.70	0.00	-5.23	5.23	0.000	Level 1									
2,200.00	2,199.86	2,200.00	2,199.85	1.03	4.50	0.00	0.00	-9.84	7.51	0.00	-5.48	5.48	0.000	Level 1									
2,300.00	2,299.86	2,300.00	2,299.86	1.06	4.71	0.00	0.00	-9.02	8.34	0.00	-5.73	5.73	0.000	Level 1									
2,400.00	2,399.85	2,400.00	2,399.85	1.09	4.92	0.00	0.00	-10.11	6.29	0.00	-5.97	5.97	0.000	Level 1									

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

Company:	COG Operating LLC	Local Coordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3979.00uR
Reference Site:	Sec 12, T17S, R31E	MD Reference:	WELL @ 3979.00uR
Site Error:	0.00 uR	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 uR	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #2 (Dust 1)	Database:	EDM 5000.1 Single User/DB
Reference Design:	Design #2	Offset/TVD Reference:	Reference Datum

Offset Design: [Sec 12, T17S, R31E] Puckett 12 Federal #7H Wellbore #1 Wellbore #1														Offset Site Error: 0.00 uR
Survey Program: 100-MWD, 5000-MWD														Offset Well Error: 0.00 uR
Reference: Other														
Sand Major Axis														
Measured	Vertical	Measured	Vertical	Reference	Other	Adjusted	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning		
Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth		
(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)	(uR)		
2,500.00	2,499.85	2,500.00	2,499.85	1.12	5.13	0.00	-10.40	8.85	0.00	-8.24	8.24	0.000 Level 1		
2,600.00	2,599.85	2,500.00	2,499.85	1.14	5.35	0.00	-10.80	8.93	0.00	-8.41	8.41	0.000 Level 1		
2,700.00	2,699.85	2,700.00	2,699.85	1.16	5.56	0.00	-11.20	9.06	0.00	-8.63	8.63	0.000 Level 1		
2,800.00	2,799.84	2,800.00	2,799.84	1.18	5.78	0.00	-11.60	9.20	0.00	-8.86	8.86	0.000 Level 1		
2,900.00	2,899.83	2,900.00	2,899.83	1.20	5.99	0.00	-12.00	9.34	0.00	-9.09	9.09	0.000 Level 1		
3,000.00	2,899.82	3,000.00	2,899.82	1.22	6.21	0.00	-12.40	9.48	0.00	-9.32	9.32	0.000 Level 1		
3,100.00	3,099.80	3,100.00	3,099.80	1.23	6.42	0.00	-12.80	9.66	0.00	-9.57	9.57	0.000 Level 1		
3,200.00	3,199.78	3,200.00	3,199.78	1.25	6.63	0.00	-13.20	9.86	0.00	-9.83	9.83	0.000 Level 1		
3,300.00	3,299.75	3,300.00	3,299.75	1.27	6.84	0.00	-13.60	10.07	0.00	-10.09	10.09	0.000 Level 1		
3,400.00	3,399.73	3,400.00	3,399.73	1.29	7.06	0.00	-14.00	10.29	0.00	-10.35	10.35	0.000 Level 1		
3,500.00	3,499.70	3,500.00	3,499.70	1.31	7.27	0.00	-14.40	10.51	0.00	-10.61	10.61	0.000 Level 1		
3,600.00	3,599.67	3,600.00	3,599.67	1.32	7.48	0.00	-14.80	10.73	0.00	-10.87	10.87	0.000 Level 1		
3,700.00	3,699.64	3,700.00	3,699.64	1.34	7.69	0.00	-15.20	10.95	0.00	-11.13	11.13	0.000 Level 1		
3,800.00	3,799.60	3,800.00	3,799.60	1.36	7.90	0.00	-15.60	11.17	0.00	-11.39	11.39	0.000 Level 1		
3,900.00	3,899.55	3,900.00	3,899.55	1.38	8.11	0.00	-16.00	11.39	0.00	-11.65	11.65	0.000 Level 1		
4,000.00	3,899.51	4,000.00	3,899.51	1.39	8.31	0.00	-16.40	11.61	0.00	-11.91	11.91	0.000 Level 1		
4,100.00	4,099.48	4,100.00	4,099.48	1.41	8.52	0.00	-16.80	11.83	0.00	-12.17	12.17	0.000 Level 1		
4,200.00	4,199.44	4,200.00	4,199.44	1.42	8.73	0.00	-17.20	12.05	0.00	-12.43	12.43	0.000 Level 1		
4,300.00	4,299.41	4,300.00	4,299.41	1.44	8.94	0.00	-17.60	12.27	0.00	-12.69	12.69	0.000 Level 1		
4,400.00	4,399.38	4,400.00	4,399.38	1.45	9.14	0.00	-18.00	12.49	0.00	-12.95	12.95	0.000 Level 1		
4,500.00	4,499.35	4,500.00	4,499.35	1.47	9.35	0.00	-18.40	12.71	0.00	-13.21	13.21	0.000 Level 1		
4,600.00	4,599.32	4,600.00	4,599.32	1.48	9.57	0.00	-18.80	12.93	0.00	-13.47	13.47	0.000 Level 1		
4,700.00	4,699.29	4,700.00	4,699.29	1.50	9.78	0.00	-19.20	13.15	0.00	-13.73	13.73	0.000 Level 1		
4,800.00	4,799.27	4,800.00	4,799.27	1.51	9.99	0.00	-19.60	13.37	0.00	-13.99	13.99	0.000 Level 1		
4,900.00	4,899.25	4,900.00	4,899.25	1.53	10.19	0.00	-20.00	13.59	0.00	-14.25	14.25	0.000 Level 1		
5,000.00	4,899.23	5,000.00	4,899.23	1.55	10.39	0.00	-20.40	13.81	0.00	-14.51	14.51	0.000 Level 1		
5,100.00	5,099.22	5,100.00	5,099.22	1.56	10.60	0.00	-20.80	14.03	0.00	-14.77	14.77	0.000 Level 1		
5,200.00	5,199.21	5,200.00	5,199.21	1.58	10.81	0.00	-21.20	14.25	0.00	-15.03	15.03	0.000 Level 1		
5,300.00	5,299.21	5,300.00	5,299.21	1.60	11.01	0.00	-21.60	14.47	0.00	-15.29	15.29	0.000 Level 1		
5,400.00	5,399.20	5,400.00	5,399.20	1.61	11.22	0.00	-22.00	14.69	0.00	-15.55	15.55	0.000 Level 1		
5,500.00	5,499.20	5,500.00	5,499.20	1.62	11.43	0.00	-22.40	14.91	0.00	-15.81	15.81	0.000 Level 1		
5,621.00	5,620.20	5,621.00	5,620.20	1.62	11.47	0.00	-22.80	15.13	0.00	-16.07	16.07	0.000 Level 1		
5,652.00	5,651.19	5,652.00	5,651.19	1.63	11.54	0.00	-23.20	15.35	0.00	-16.33	16.33	0.000 Level 1		
5,683.00	5,682.19	5,683.00	5,682.19	1.63	11.60	0.00	-23.60	15.57	0.00	-16.59	16.59	0.000 Level 1		
5,615.00	5,614.19	5,615.00	5,614.19	1.64	11.67	0.00	-24.00	15.79	0.00	-16.85	16.85	0.000 Level 1		
5,635.12	5,634.30	5,635.12	5,634.30	1.65	11.71	0.00	-24.40	16.01	0.00	-17.11	17.11	0.000 Level 1, CC, ES, SF		
5,639.48	5,639.06	5,639.48	5,639.06	1.66	11.72	-178.20	7.36	-19.30	0.02	-15.27	13.29	0.001 Level 1		
5,650.00	5,649.18	5,650.00	5,649.18	1.66	11.74	-178.48	7.45	-19.31	0.22	-15.10	13.22	0.017 Level 1		
5,700.00	5,699.58	5,699.58	5,699.58	1.68	11.85	178.81	8.03	-19.34	3.97	-8.58	13.54	0.293 Level 1		
5,750.00	5,749.13	5,749.13	5,749.13	1.73	11.96	177.97	8.57	-19.25	12.48	-1.35	13.64	0.902 Level 1		
5,800.00	5,799.19	5,799.19	5,799.19	1.65	12.06	177.91	8.99	-19.18	25.81	11.84	14.17	1.622		
5,850.00	5,842.71	5,842.83	5,843.03	2.01	12.17	178.12	9.34	-19.28	43.73	29.25	14.46	3.023		
5,900.00	5,887.25	5,888.48	5,887.65	2.22	12.27	178.16	9.66	-19.27	66.03	51.27	14.76	4.472		
5,950.00	5,932.44	5,933.75	5,932.92	2.58	12.35	178.16	9.91	-19.28	82.63	77.81	15.01	6.169		
6,000.00	5,977.99	5,977.16	5,977.16	2.89	12.43	178.16	10.20	-19.29	102.08	107.88	15.23	8.084		
6,050.00	6,023.14	6,023.26	6,023.27	3.52	12.58	178.16	13.95	-19.39	158.13	158.13	15.42	10.061		
6,100.00	6,067.96	6,068.02	6,068.05	4.13	12.76	177.83	30.79	-19.29	184.25	188.66	15.80	11.808		
6,150.00	6,087.02	6,087.96	6,087.96	4.80	12.94	177.84	84.29	-19.02	209.47	193.88	15.79	13.269		
6,200.00	6,092.08	6,093.13	6,093.77	6.94	13.25	177.94	109.09	-19.77	231.07	216.10	15.87	14.472		
6,250.00	6,112.42	6,113.53	6,113.77	8.53	13.59	177.82	153.78	-19.82	251.24	235.10	16.14	16.966		
6,300.00	6,129.14	6,130.29	6,130.40	7.16	13.94	177.32	202.73	-19.86	272.19	255.85	16.34	18.633		
6,350.00	6,143.85	6,145.24	6,145.84	8.02	14.59	176.77	273.55	-19.97	292.37	276.74	16.63	17.582		

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

Company:	COO Operating, LLC	Local Co-ordinate Reference:	(Well Puckett 12 Federal #7H)
Project:	Eddy County (NM27E)	TVD Reference:	(WELL @ 3679.000ft)
Reference Site:	Sec 12-T17S-R31E	MD Reference:	(WELL @ 3679.000ft)
Site Error:	0.00 u/s	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	(Minimum Curvature)
Well Error:	0.00 u/s	Output errors are at	2.00 sigma
Reference Wellbore:	Wellbore #2 (Dual Hz)	Database:	EDM 5000.1 (Single User, Db)
Reference Design:	Design #2	Offset TVD Reference:	(Reference Datum)

Offset Design: [Sec 12-T17S-R31E - Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1]														Offset Site Error:
Survey Program: (10-MWD) 1500-AFWO														Offset Well Error:
Measured Depth (feet)	Vertical Depth (feet)	Offset Vertical Depth (feet)	Vertical Depth (feet)	Reference Depth (feet)	Offset Reference Depth (feet)	Horizontal Distance (feet)	Offset Horizontal Distance (feet)	Offset Wellbore Centre (feet)	Offset Wellbore Centre (feet)	Distance Between Centres (feet)	Distance Between Ellipses (feet)	Minimum Separation (feet)	Separation Factor	Warning
8,400.00	8,147.85	8,591.87	8,434.88	8.91	16.90	175.92	368.92	-45.50	307.88	290.88	17.02	18.093		
8,450.00	8,150.03	8,571.19	8,440.10	8.90	16.94	174.71	448.18	-40.30	321.17	303.78	17.40	18.483		
8,457.29	8,150.00	8,586.18	8,440.38	8.93	16.70	174.28	458.77	-45.43	323.09	305.63	17.46	18.565		
8,500.00	8,148.25	8,768.19	8,477.31	10.70	17.66	170.04	530.41	-49.00	331.84	313.84	18.00	18.433		
8,600.00	8,147.51	8,900.51	8,487.10	12.51	19.88	85.01	680.16	-52.77	339.69	320.30	19.38	17.524		
8,700.00	8,145.76	9,012.07	8,488.52	14.33	21.50	70.72	762.69	-55.11	340.89	320.21	20.69	18.478		
8,800.00	8,144.02	9,111.74	8,485.87	16.15	23.94	74.38	882.94	-57.09	341.81	319.72	23.09	15.473		
8,900.00	8,142.27	9,209.58	8,485.12	17.99	24.48	96.15	980.15	-59.36	343.04	319.48	23.87	14.852		
9,000.00	8,140.53	9,306.49	8,484.48	19.81	25.85	81.43	1,078.03	-61.96	345.13	319.58	25.14	13.728		
9,100.00	8,138.78	9,418.48	8,484.35	21.64	27.08	47.84	1,188.93	-65.41	345.93	319.07	26.06	12.877		
9,200.00	8,137.04	9,527.60	8,479.32	23.47	29.80	32.81	1,297.91	-69.28	343.00	314.38	28.63	11.882		
9,300.00	8,135.29	9,630.58	8,474.88	25.31	31.58	48.15	1,390.73	-73.85	340.04	309.73	30.31	11.219		
9,400.00	8,133.55	9,731.74	8,472.33	27.19	33.29	53.88	1,488.84	-73.45	339.19	307.12	32.07	10.577		
9,500.00	8,131.80	9,821.18	8,469.10	28.98	35.25	49.35	1,581.20	-75.87	337.82	303.91	33.91	9.963		
9,578.71	8,130.48	9,882.05	8,487.00	30.39	36.53	67.77	1,682.03	-78.98	336.96	301.08	35.27	8.863		
9,600.00	8,130.06	9,912.83	8,468.59	30.82	36.90	78.13	1,682.90	-77.22	337.05	301.38	35.69	9.445		
9,700.00	8,128.31	10,014.90	8,465.58	32.66	38.74	72.20	1,784.87	-77.86	337.84	300.24	37.80	8.989		
9,800.00	8,126.57	10,118.10	8,463.21	34.50	40.79	67.39	1,888.04	-77.72	337.49	297.92	39.58	8.527		
9,856.10	8,125.80	10,170.59	8,461.94	35.51	41.75	74.60	1,940.51	-77.45	337.27	296.83	40.84	8.298		
9,900.00	8,124.82	10,212.00	8,461.23	36.34	42.51	82.94	1,981.82	-77.23	337.42	296.92	41.50	8.130		
10,000.00	8,123.05	10,305.18	8,460.66	38.18	44.14	91.08	2,078.09	-77.07	338.55	295.38	43.47	7.785		
10,100.00	8,121.33	10,406.33	8,461.02	40.02	45.86	94.08	2,176.35	-78.88	341.26	295.78	45.49	7.503		
10,200.00	8,119.58	10,501.20	8,462.56	41.86	47.58	101.90	2,271.15	-77.81	344.82	297.38	47.45	7.288		
10,300.00	8,117.84	10,606.02	8,464.59	43.70	49.54	94.19	2,375.95	-80.76	348.56	299.10	49.46	7.047		
10,400.00	8,116.10	10,718.22	8,463.58	45.54	51.77	72.90	2,488.98	-84.55	348.35	297.81	51.54	6.778		
10,500.00	8,114.35	10,816.15	8,460.26	47.58	53.71	74.40	2,587.78	-88.71	347.70	294.21	53.48	6.500		
10,519.38	8,114.03	10,834.23	8,459.94	47.72	54.02	78.07	2,603.83	-89.39	347.83	293.81	53.82	6.459		
10,600.00	8,112.80	10,911.07	8,458.84	49.22	56.50	65.92	2,680.59	-92.82	348.51	293.15	55.30	6.286		
10,700.00	8,110.88	11,010.11	8,459.30	51.06	57.41	87.55	2,778.53	-97.16	349.90	292.82	57.28	6.108		
10,800.00	8,109.11	11,111.42	8,459.38	52.90	58.36	85.08	2,880.75	-101.58	351.82	292.38	59.24	5.938		
10,900.00	8,107.37	11,213.83	8,458.42	54.74	61.41	78.24	2,984.15	-106.17	352.33	291.11	61.22	5.755		
11,000.00	8,105.82	11,323.25	8,459.81	56.59	63.60	83.24	3,092.35	-110.27	351.84	288.36	63.28	5.557		
11,100.00	8,103.88	11,417.12	8,452.89	58.43	65.45	74.19	3,186.12	-113.00	350.12	284.87	65.24	5.366		
11,200.00	8,102.13	11,525.00	8,448.57	60.27	67.68	60.30	3,293.87	-117.17	348.94	281.84	67.30	5.185		
11,300.00	8,100.39	11,618.87	8,445.94	62.11	69.43	70.08	3,388.66	-118.47	347.03	277.69	69.35	5.004		
11,400.00	8,098.64	11,719.59	8,443.03	63.95	71.27	73.96	3,487.34	-119.31	348.07	274.59	71.48	4.842		
11,454.81	8,097.88	11,770.96	8,441.83	64.96	72.25	78.11	3,539.67	-119.82	345.87	273.25	72.62	4.763		
11,500.00	8,096.90	11,814.82	8,441.13	65.80	73.08	80.59	3,583.34	-120.60	345.99	272.45	73.55	4.704		
11,600.00	8,095.15	11,918.94	8,439.24	67.64	75.10	77.33	3,685.62	-122.42	348.04	270.38	75.88	4.572		
11,700.00	8,093.41	12,017.47	8,436.78	69.48	77.10	77.39	3,786.12	-122.94	345.84	267.74	77.90	4.437		
11,800.00	8,091.66	12,118.07	8,434.27	71.32	79.04	76.29	3,887.88	-122.71	348.33	265.13	80.20	4.306		
11,900.00	8,089.82	12,223.90	8,430.12	73.19	81.05	71.41	3,992.45	-123.12	343.49	260.84	82.55	4.181		
12,000.00	8,088.17	12,323.84	8,425.93	75.01	82.98	72.38	4,092.08	-124.79	341.28	258.50	84.78	4.026		
12,100.00	8,086.43	12,423.85	8,421.74	76.85	84.91	73.13	4,191.98	-125.84	339.15	255.11	87.04	3.886		
12,200.00	8,084.68	12,524.27	8,417.45	78.68	86.87	73.03	4,292.50	-127.45	336.90	247.69	89.31	3.772		
12,300.00	8,082.94	12,620.09	8,413.52	80.53	88.73	78.08	4,388.23	-128.17	334.96	243.35	91.51	3.656		
12,373.24	8,081.68	12,689.70	8,411.64	81.88	90.04	82.18	4,457.82	-128.44	334.60	241.28	93.32	3.585		
12,400.00	8,081.18	12,715.37	8,411.15	83.37	90.82	83.30	4,483.48	-128.67	334.65	240.71	93.84	3.562		
12,500.00	8,079.45	12,809.24	8,410.20	84.22	92.30	89.81	4,577.34	-129.94	335.81	239.86	96.15	3.493		
12,600.00	8,077.70	12,907.72	8,410.95	86.06	94.17	91.05	4,678.80	-131.85	336.41	240.09	98.33	3.442		
12,700.00	8,075.95	13,008.68	8,411.71	87.90	96.16	90.31	4,778.48	-134.81	340.81	240.51	100.40	3.388		
12,800.00	8,074.21	13,108.86	8,412.24	89.74	98.15	89.91	4,876.84	-137.83	343.21	240.71	102.50	3.348		

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



Archer

Company:	COG Operating (LLC)	Local Co-ordinate Reference:	(Well Puckett #2 Federal #7H)
Project:	Eddy County (NM27E)	TVD Reference:	WELL # @ 3876.00m
Reference Sta:	Sec. 12 - T17S - R31E	WDB Reference:	WELL # @ 3876.00m
Sta Error:	0.00 (m)	North Reference:	Grid
Reference Well:	Puckett #2 (Federal #7H)	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 (m)	Output errors are at:	2.00 points
Reference Wellbore:	Wellbore #2 (Dual H2)	Database:	EDM 5000:1 Single User, Db
Reference Design:	Design #2L	Offset TVD Reference:	

Offset Design													Offset Error	
Sec.12-1175-R31E-J Puckett 12 Federal #7H - Wellbore #1 - Wellbore #1													Offset Error	
Survey Program: 100-MWD 5500-MWD													Offset Wct Error	
Reference		Offset		Semi Major Axis		Offset		Distance		Separation		Warning		
Measured Depth (feet)	Vertical Depth (feet)	Measured Depth (feet)	Vertical Depth (feet)	Reference (feet)	Offset (feet)	Asym from North (ft)	Offset Wellbore Centre (feet)	Between Centres (feet)	Between Ellipse (feet)	Minimum Separation (feet)	Separation Factor	Warning		
10 857.80	6 073.20	11 157.00	6 412.49	60.81	66.11	99.07	4 924.66	-139.34	344.64	241.05	103.59	3.937		



Archer
Anticollision Report

Archer

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3979.00uaf
Reference Site:	Sec 12, T17S, R31E	MD Reference:	WELL @ 3979.00uaf
Site Error:	0.00 uaf	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 uaf	Output errors are at:	2.00 Alpha
Reference Wellbore:	Wellbore #2 (Dual Ho)	Database:	EDM 5000.1 Single User.Db
Reference Design:	Design #21	Offset (TVD Reference):	(Reference Datum)

Reference Depths are relative to WELL @ 3979.00uaf

Offset Depths are relative to Offset Datum

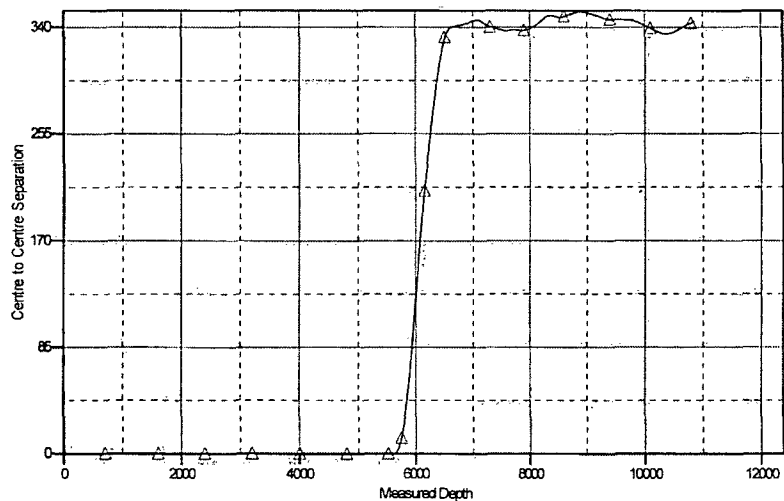
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to; Puckett 12 Federal #7H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Grid Convergence at Surface is: 0.28°

Ladder Plot



LEGEND

Puckett 12 Federal #7H, Wellbore #1, Wellbore #1 VO



Archer
Anticollision Report

Archer

Company:	COG Operating LLC	Local Coordinate Reference:	Well Puckett 12 Federal #7H
Project:	Eddy County NM27E	TVD Reference:	WELL @ 3979.00usft
Reference Blk:	Sec.12-T17S-R31E	MD Reference:	WELL @ 3979.00usft
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Puckett 12 Federal #7H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 Sigma
Reference Wellbore:	Wellbore #2 (Dual Hz)	Database:	EDM 5000:1 Single User Db
Reference Design:	Design #2	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3979.00usft

Offset Depths are relative to Offset Datum

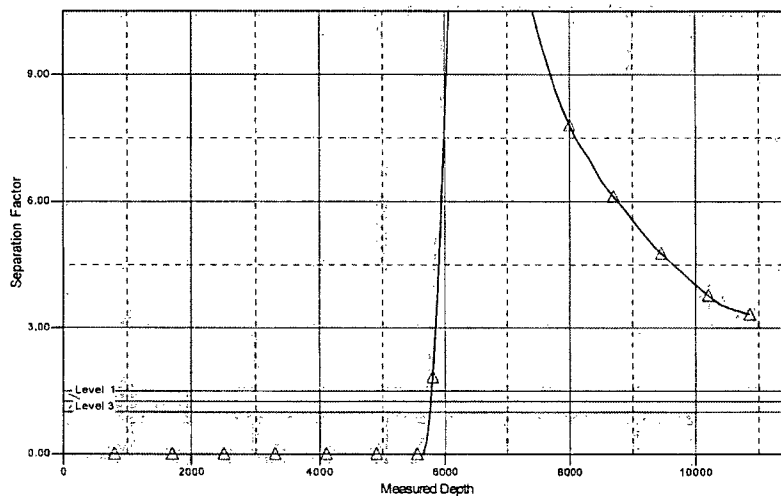
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Puckett 12 Federal #7H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

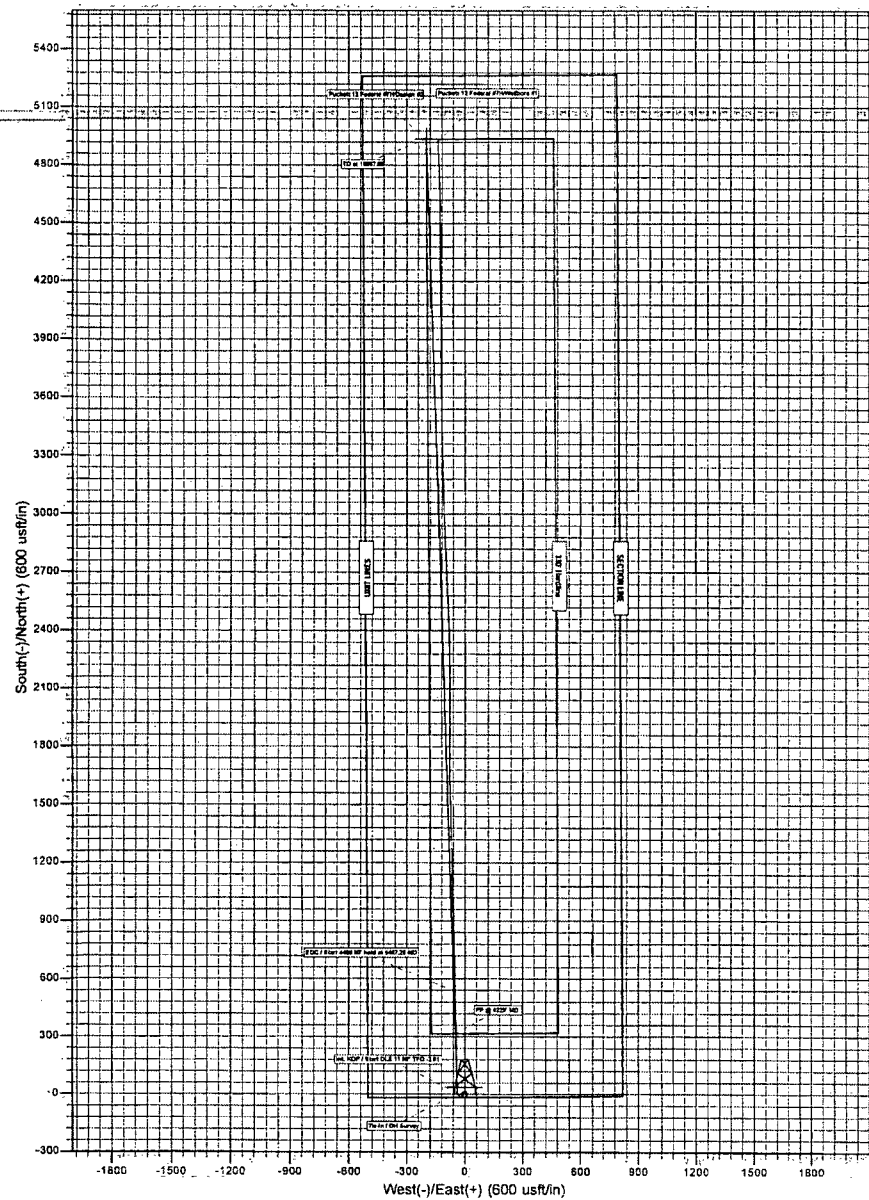
Grid Convergence at Surface is: 0.28"

Separation Factor Plot



LEGEND

Puckett 12 Federal #7H, Wellbore #1, Wellbore #1 V0





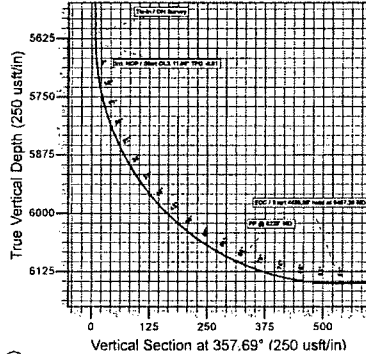
Project: Eddy County(NM27E)
Site: Sec.12-T17S-R31E
Well: Puckett 12 Federal #7H
Wellbore: Wellbore #2 (Dual Hz)
Design: Design #2
Lat: 32° 50' 30.711 N
Long: 103° 48' 59.997 W
GL: 3968.00
KB: WELL @ 3979.00ustf

Archer

SECTION DETAILS										
MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect	Annotation	
5615.00	0.75	12.66	5614.19	7.10	-39.33	0.00	0.00	8.88	Thin / OH Survey	
5635.12	0.58	0.75	5634.30	7.32	-39.30	0.84	-142.64	8.90	Int. KOP / Start DLS 11.00" TFO -2.61	
6457.29	91.00	358.14	6150.00	536.99	-48.27	11.00	-2.51	538.82	EOC / Start 4600.50' hold at 6457.29 MD	
10857.80	91.00	358.14	6073.20	4934.60	-199.10	0.00	0.00	4938.52	TD at 10857.80	

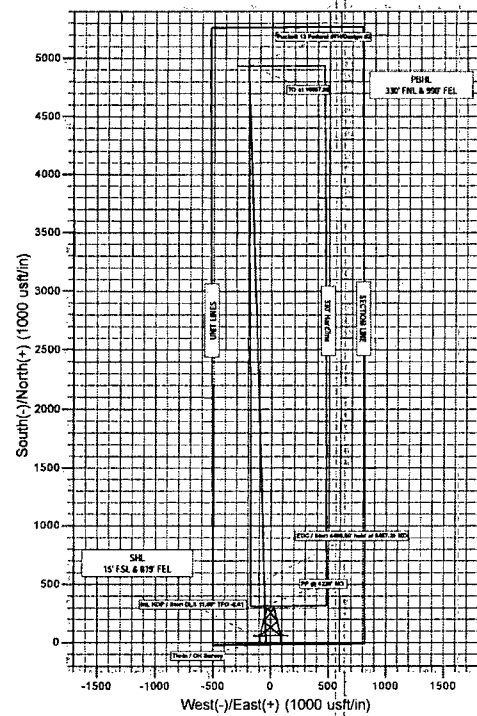
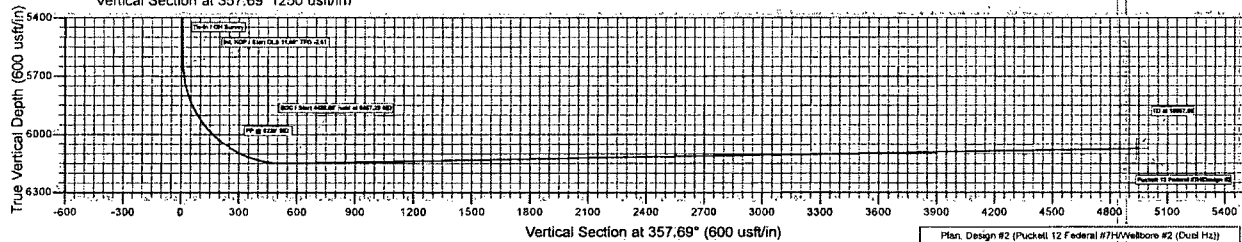
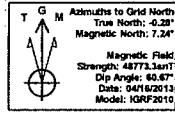
WELL DETAILS: Puckett 12 Federal #7H										
+N-S	+E-W	Northing	Ground Level:	3968.00						
0.00	0.00	670349.400	Easting	858084.800	Latitude	32° 50' 30.711 N	Longitude	103° 48' 59.997 W	Spot	

WELLBORE TARGET DETAILS (LAT/LONG)										
Name	TVD	+N-S	+E-W	Latitude	Longitude	Shape				
Puckett 12 Fed #7H PBHL	6073.20	4934.60	-199.10	32° 51' 18.547 N	103° 48' 2.948 W	Point				

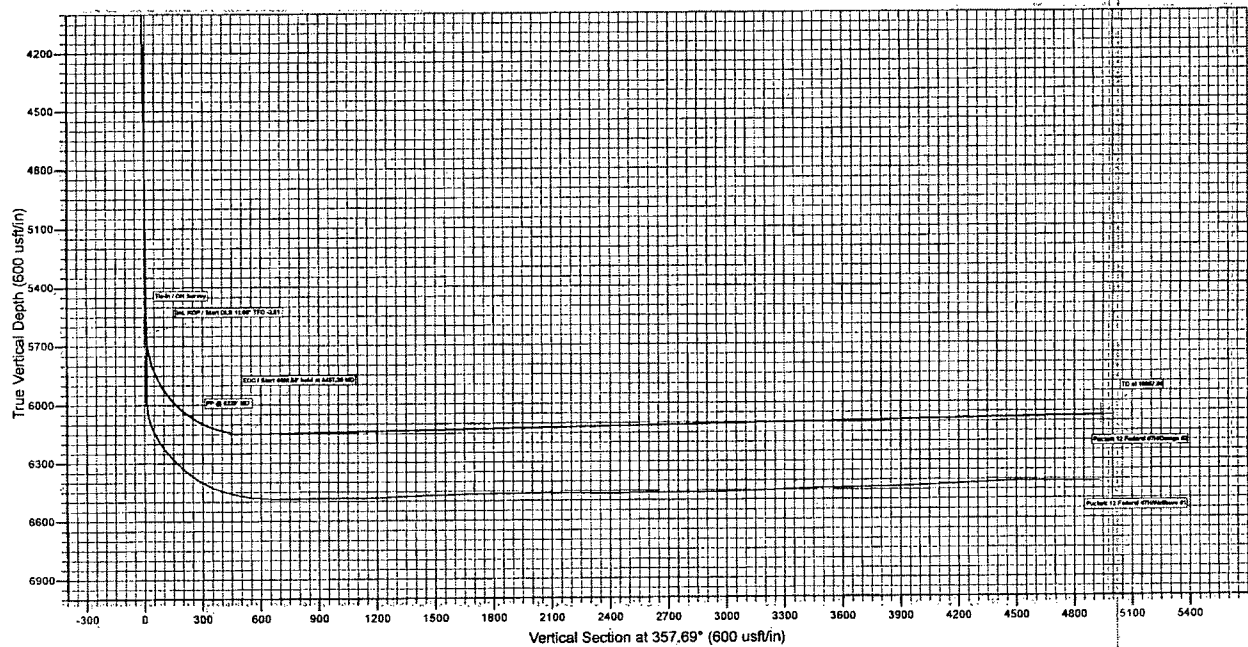


PROJECT DETAILS: Eddy County(NM27E)
Geodetic System: US State Plane 1957 (Exact solution)
Datum: NAD 1977 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

SITE DETAILS: Sec.12-T17S-R31E
Site Centre Latitude: 32° 50' 30.998 N
Longitude: 103° 48' 57.311 W
Positional Uncertainty: 0.09
Convergence: 0.28
Local North: Grid



Plan, Design #2 (Puckett 12 Federal #7H-Wellbore #2 (Dual Hz))
Created By Bret Wolford Date: 14 37, April 16 2013



CONDITIONS OF APPROVAL

Sundry dated 05/09/2013

COG Operating LLC

NMLC029415B

Puckett 12 Federal 7H

30-015-39476

Section 12, T. 17 S., R 31 E., NMPM

Eddy County, New Mexico

- 1. Surface disturbance beyond the existing pad must have prior approval.**
- 2. Closed loop system required.**
- 3. H2S monitoring equipment should be onsite for personnel protection from surrounding oil operations. Operator should not encounter H2S while deepening.**
- 4. Variance for liner top fluid entry and not testing seal also approved based on NMOCD classification of formations in this area as the Yeso group - Pool 26770.**
- 5. Variance of proposed liner tie back is approved in order to have access to bottom lateral.**
- 6. 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.**
- 7. 2000 (2M) BOP to be used. All blowout preventer (BOP) and related equipment (BOPE) shall comply with reasonable well control requirements. A two ram system with a blind ram and a pipe ram designed for the size of the work string shall be adequate. Tapered work strings will require an additional pipe ram. The manifold shall comply with Onshore Oil and Gas Order #2 Attachment I (2M Diagrams of Choke Manifold Equipment). The accumulator system shall have an immediately available power source to close the rams and retain 200 psi above pre-charge. The pre-charge test shall follow requirements in Onshore Order #2.**
- 8. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness BOP/BOPE testing.**
- 9. 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.**
- 10. Steel tanks to be used.**
- 11. Work to be completed in 90 days**
- 12. Subsequent sundry and completion report required when work is complete.**

EGF 052413