Form 3160-5
(August 2007)

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.***

5. Lease Serial No.
NMNM96848

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
ADMIRAL FEDERAL COM 2H

2. Name of Operator
COG OPERATING LLC
Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

9. API Well No.
30-015-42820

3a. Address
2208 WEST MAIN STREET
ARTESIA, NM 88210

3b. Phone No. (include area code)
Ph: 575-748-6945

10. Field and Pool, or Exploratory
WILLOW LAKE; ~~BS~~, SE
Wolfcamp

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 28 T25S R29E SWSE 190FSL 1980FEL

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 to Original APD |
| | ☐ Change Plans | ☐ Plug and Abandon | ☐ Temporarily Abandon | |
| | ☐ 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 recomplete 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, respectfully requests approval for the following drilling changes to the original approved APD.

Attachments:
Drilling program
Directional plan
3M BOP and choke schematics
5M BOP and choke schematics
Flex Hose Variance

NM OIL CONSERVATION
ARTESIA DISTRICT
JAN 25 2016
RECEIVED

SEE ATTACHED FOR CONDITIONS OF APPROVAL

1/26/16
Accepted for record
NMOCD

14. I hereby certify that the foregoing is true and correct.
**Electronic Submission #328547 verified by the BLM Well Information System**
**For COG OPERATING LLC, sent to the Carlsbad**
**Committed to AFMSS for processing by KENNETH RENNICK on 01/15/2016 ()**

Name *(Printed/Typed)* MAYTE X REYES — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 01/14/2016

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

Approved By _____ Title _____ Date _____

APPROVED
Kenneth Rennick
JAN 20 2016
PETROLEUM ENGINEER
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

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 ****

**Admiral Federal Com 2H**
**API 30-015-42820**
**COG Production LLC**
**Conditions of Approval**

**Original COA still applies except for the replacement of the cement filled behind the intermediate and production casings, and addition of the requirement to keep intermediate casing fluid filled. Also replacement of the Pressure Control Section, and the addition of the Drilling Mud Section. See the following:**

## A. CASING

**Intermediate casing shall be kept fluid filled while running into hole to meet BLM minimum collapse requirements.**

1. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

   ☒ Cement to surface. If cement does not circulate see VII.B.1.a, c-d of the original Conditions of Approval. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/ karst.**

2. The minimum required fill of cement behind the **5-1/2** inch production casing is:

   ☒ Cement to surface as proposed by operator. If cement does not circulate, contact the appropriate BLM office. **Additional cement may be required since excess was calculated to be 17%.**

## B. 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. Variance approved to use flex line from BOP to choke manifold. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. **Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **5000 (5M)** psi. **5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**

5. 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**.

    c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

    d. The results of the test shall be reported to the appropriate BLM office.

    e. 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.**

    f. 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. This test shall be performed prior to the test at full stack pressure.

    g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **3rd Bone Springs** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

## C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **3rd Bone Springs** and the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

Proposed mud weight may not be adequate for drilling through the **3rd Bone Springs** and the **Wolfcamp**.

**KGR 01202016**

## COG Operating LLC, Admiral Federal Com 2H

### 1. Geologic Formations

| | | | |
|---|---|---|---|
| TVD of target | 10,175' | Pilot hole depth | 11,300' |
| MD at TD: | 20,045' | Deepest expected fresh water: | 42' |

**Basin**

| Formation | Depth (TVD) from KB | Water/Mineral Bearing/ Target Zone? | Hazards* |
|---|---|---|---|
| Quaternary Fill | Surface | Water | |
| Rustler | 297 | Water | |
| Top of Salt | 655 | Salt | |
| Lamar | 2984 | | |
| Delaware Group | 2984 | Oil/Gas | |
| Bone Spring | 6769 | Oil/Gas | |
| Wolfcamp | 9931 | Oil/Gas | |
| Wolfcamp | 10,175 | Target Zone | |
| PHTD | 11,300 | | |
| Pennsylvanian | 11,900' | Will Not Penetrate | |

*H2S, water flows, loss of circulation, abnormal pressures, etc.

### 2. Casing Program

| Hole Size | Casing Interval From | Casing Interval To | Csg. Size | Weight (lbs) | Grade | Conn. | SF Collapse | SF Burst | SF Tension |
|---|---|---|---|---|---|---|---|---|---|
| 17.5" | 0 | 640 | 13.375" | 54.5 | J55 | STC | 4.042 | 0.610 | 14.763 |
| 12.25" | 0 | 9500 | 9.625" | 47 | P110 | BTC | 1.277 | 1.765 | 3.359 |
| 8.5" | 0 | 20,045 | 5.5" | 20 | P110 | BTC | 1.599 | 2.588 | 3.278 |
| | | | | BLM Minimum Safety Factor | | | 1.125 | 1.0 | 1.6 Dry<br>1.8 Wet |

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas where used on all SF calculations
  - Explanation for SF below BLM's minimum standards:
    - 13-3/8" Burst SF @ 0.61 – used BLM's frac gradient scenario to qualify. 2740 psi/640'=4.2>0.7

| | Y or N |
|---|---|
| Is casing new? If used, attach certification as required in Onshore Order #1 | Y |
| Is casing API approved? If no, attach casing specification sheet. | Y |
| Is premium or uncommon casing planned? If yes attach casing specification sheet. | N |
| Does the above casing design meet or exceed BLM's minimum standards? If not provide justification. | Y |
| SEE COA Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing? | Y |
| Is well located within Capitan Reef? | N |
| If yes, does production casing cement tie back a minimum of 50' above the Reef? | |
| Is well within the designated 4 string boundary. | |
| Is well located in SOPA but not in R-111-P? | N |
| If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing? | |
| Is well located in R-111-P and SOPA? | N |
| If yes, are the first three strings cemented to surface? | |
| Is 2nd string set 100' to 600' below the base of salt? | |
| Is well located in high Cave/Karst? | N |
| If yes, are there two strings cemented to surface? | |
| (For 2 string wells) If yes, is there a contingency casing if lost circulation occurs? | |
| Is well located in critical Cave/Karst? | N |
| If yes, are there three strings cemented to surface? | |

### 3. Cementing Program SEE COA

| Casing | # Sks | Wt. lb/ gal | Yld ft3/ sack | $H_20$ gal/sk | 500# Comp. Strength (hours) | Slurry Description |
|---|---|---|---|---|---|---|
| Surf. | 350 | 13.5 | 1.75 | 9.2 | 13 | Lead: Class C + 4% Gel + 1% CaCl2 |
| | 250 | 14.8 | 1.34 | 6.4 | 6 | Tail: Class C + 2% CaCl2 |
| Inter. | 1900 | 11.9 | 2.5 | 14.2 | 18 | Lead: 50:50:10 Class H (FR, Retarder, FL adds as necessary) |
| | 200 | 16.4 | 1.1 | 4.3 | 8 | Tail: Class H |
| Prod. SEE COA LOW CEMENT | 1000 | 11.9 | 2.5 | 14.2 | 18 | Lead: 50:50:10 Class H (FR, Retarder, FL adds as necessary) |
| | 2470 | 14.4 | 1.25 | 5.7 | 22 | Tail:50:50:2 H blend (FR, Retarder, FL adds as necessary) |

| Casing String | TOC | % Excess |
|---|---|---|
| Surface | 0' | 75% on OH volumes |
| Intermediate | 0' | 40% on OH volumes |
| Production | 0' | 40% on OH volumes EOC-EOL |

## 4. Pressure Control Equipment

| | |
|---|---|
| N | A variance is requested for the use of a diverter on the surface casing. See attached for schematic. |

| BOP installed and tested before drilling which hole? | Size? | System Rated WP | Type | ✓ | Tested to: |
|---|---|---|---|---|---|
| 12-1/4" | 13-5/8" | 3M | Annular | X | 50% of working pressure |
| | | | Blind Ram | X | WP |
| | | | Pipe Ram | X | |
| | | | Double Ram | | |
| | | | Other* | | |
| 8-3/4" | 11" | 5M | Annular | X | 50% working pressure |
| | | | Blind Ram | X | WP |
| | | | Pipe Ram | X | |
| | | | Double Ram | | |
| | | | Other* | | |

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

| | |
|---|---|
| Y | Formation integrity test will be performed per Onshore Order #2.<br>On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. |
| Y | A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart. |
| | Are anchors required by manufacturer? |
| N | A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.<br>See attached schematic & Description. |

See COA

## 5. Mud Program

| Depth | | Type | Weight (ppg) | Viscosity | Water Loss |
|---|---|---|---|---|---|
| From | To | | | | |
| 0 | Surf. shoe | FW Gel | 8.6-8.8 | 28-34 | N/C |
| Surf csg | Base of Salt | Saturated Brine | 10.0-10.2 | 28-34 | N/C |
| Base of Salt | Int shoe | WBM | 8.5-9.3 | 28-34 | 10-50 |
| Int shoe | PHTD | Cut Brine | 8.7-9.2 | 28-34 | N/C |
| KOP | EOL TD | OBM | 11.5 -12.5 | 28-34 | 1-10 |

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

Base of Salt to Intermediate TD – After drilling thru salt sections, water based mud system will used consisting of fresh water with pre-hydrated bentonite gel this will allow lower mud weights while drilling thru Delaware and Bone Spring formations while maintaining integrity of salt formations.

KOP to EOL TD – After plugging back PH to KOP, Oil based mud system will be used to control unstable shale formations in the lateral section. Mud weight will be used to assist in controlling unstable shale formations, not for over pressure in formation.

| | |
|---|---|
| What will be used to monitor the loss or gain of fluid? | Pason PVT |

## 6. Logging and Testing Procedures SEE COA (ORIGINAL)

| | Logging, Coring and Testing. |
|---|---|
| X | Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM. |
| | No Logs are planned based on well control or offset log information. |
| | Drill stem test? If yes, explain |
| | Coring? If yes, explain |

| Additional logs planned | | Interval |
|---|---|---|
| | Resistivity | |
| | Density | |
| | CBL | |
| | Mud log | |
| | PEX | |

## 7. Drilling Conditions SEE COA (ORIGINAL)

| Condition | Specify what type and where? |
|---|---|
| BH Pressure at deepest TVD | 5347 psi |
| Abnormal Temperature | No |

Mitigation measure for abnormal conditions. Describe:
No abnormal drilling conditions are expected to occur.

| Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM. | |
|---|---|
| N | H2S is present |
| X | H2S Contingency Plan Attached |

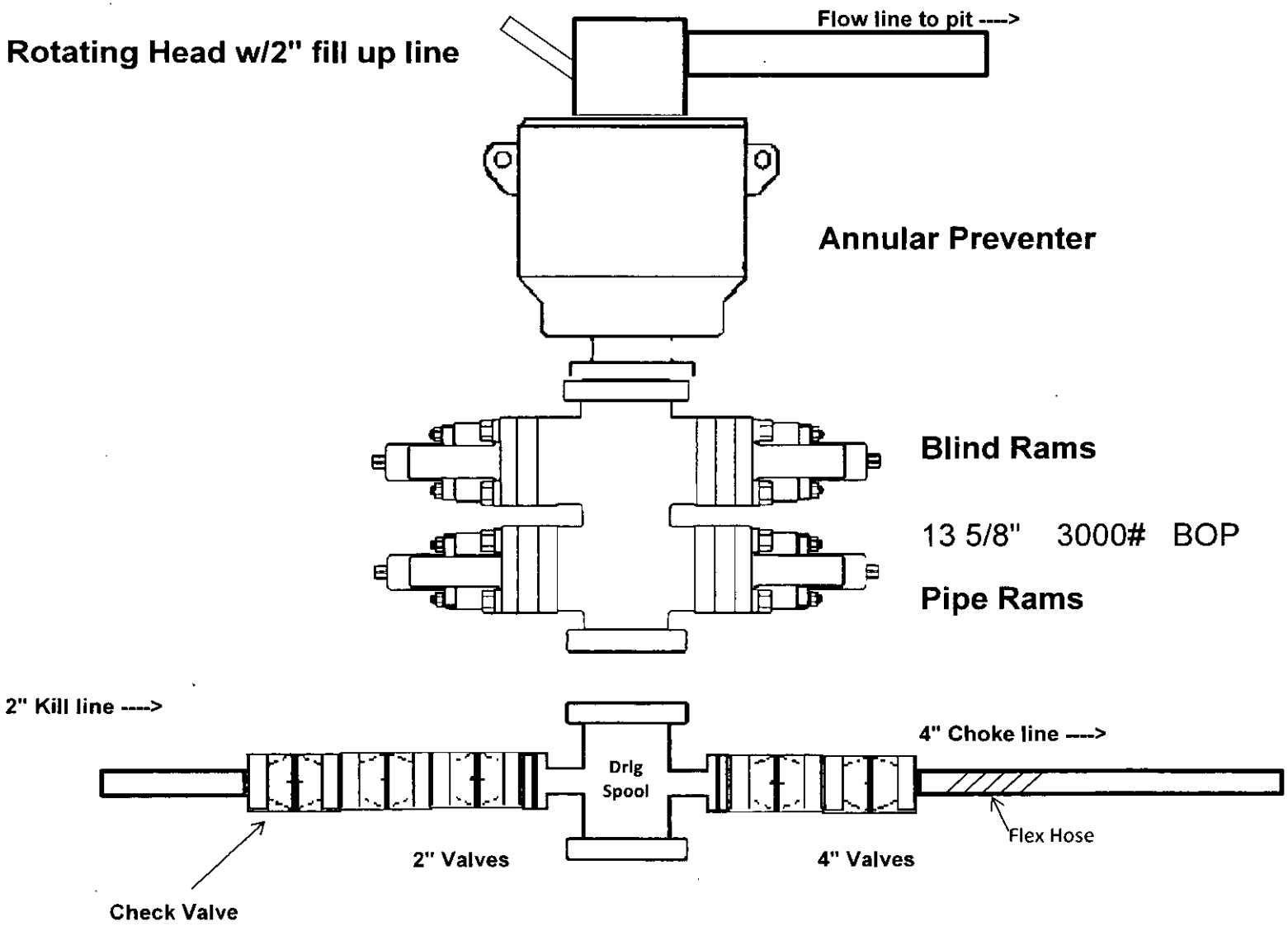
## 8. Other Facets of Operation

Is this a walking operation? No
Will be pre-setting casing? No

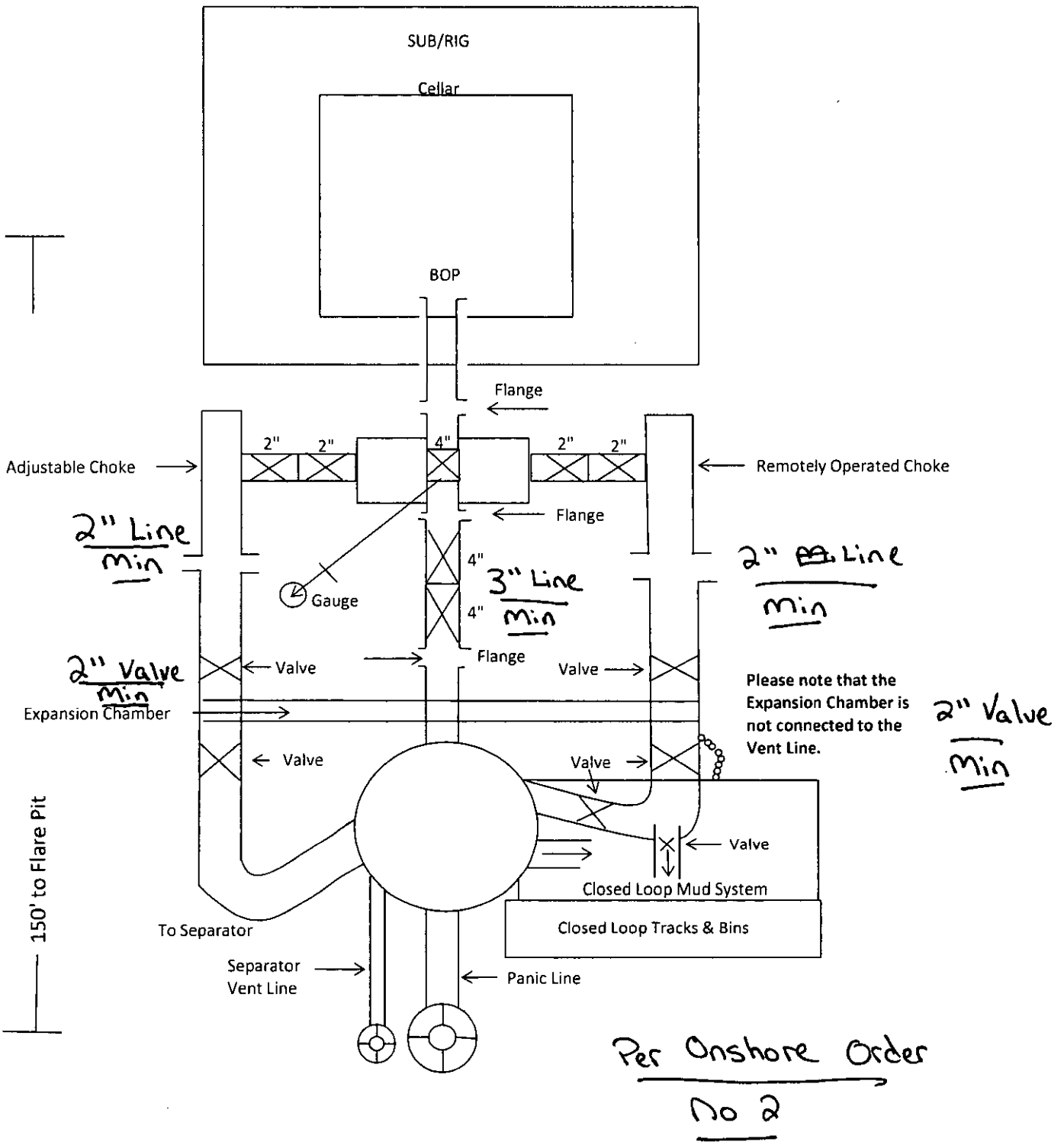
Attachments:

- BOP & Choke Schematics
- Directional Plan

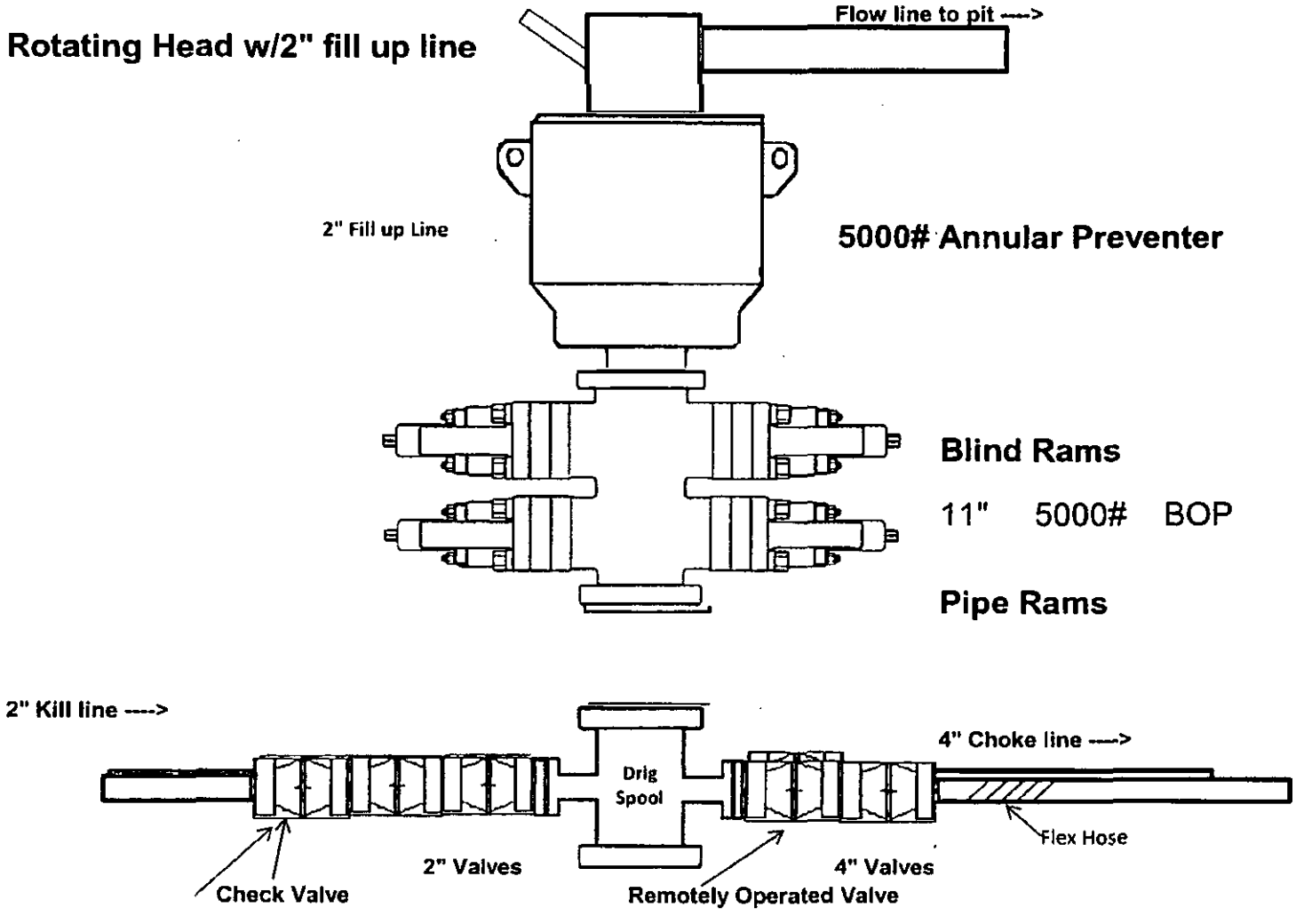
# 3,000 psi BOP Schematic



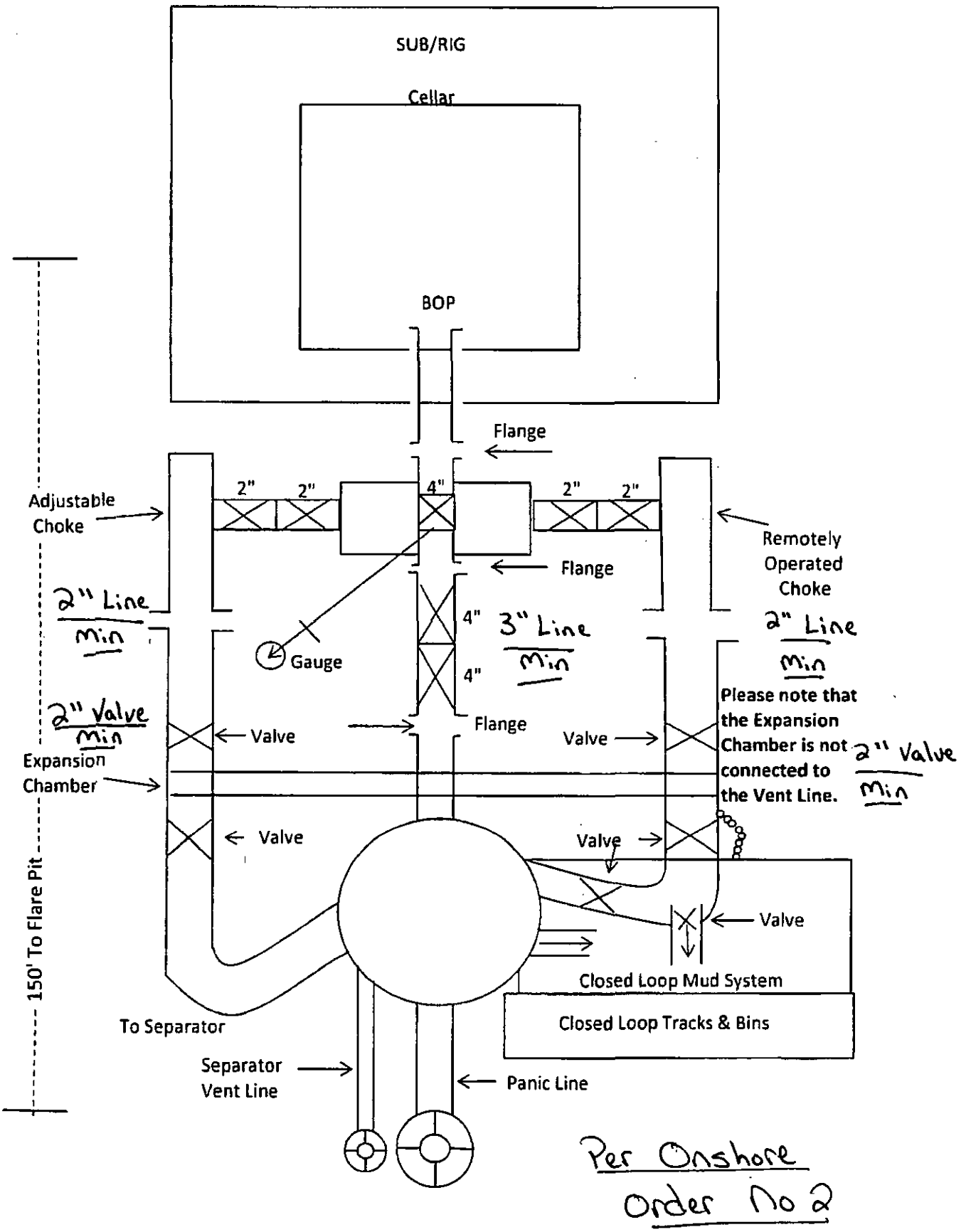
# 3M Choke Manifold Equipment



# 5,000 psi BOP Schematic



# 5M Choke Manifold Equipment



Midwest Hose
& Specialty, Inc.

# Certificate of Conformity

| | |
|---|---|
| *Customer:* LATSHAW DRILLING | *Customer P.O.#* RIG#44 |
| *Sales Order #* 242739 | *Date Assembled:* 2/9/2015 |

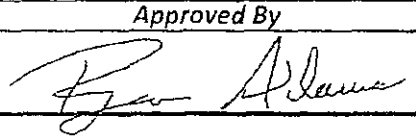
## Specifications

| | | | |
|---|---|---|---|
| *Hose Assembly Type:* | Choke & Kill | | |
| *Assembly Serial #* | 292614-1 | *Hose Lot # and Date Code* | 10900-08/13 |
| *Hose Working Pressure (psi)* | 10000 | *Test Pressure (psi)* | 15000 |

*We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.*

*Supplier:*
***Midwest Hose & Specialty, Inc.***
***3312 S I-35 Service Rd***
***Oklahoma City, OK 73129***

*Comments:*

| *Approved By* | *Date* |
|---|---|
|  | 2/10/2015 |

Midwest Hose
& Specialty, Inc.

## Certificate of Conformity

| | |
|---|---|
| *Customer:* LATSHAW DRILLING | *Customer P.O.#* RIG#44 |
| *Sales Order #* 242739 | *Date Assembled:* 2/9/2015 |

## Specifications

| | | | |
|---|---|---|---|
| *Hose Assembly Type:* | Choke & Kill | | |
| *Assembly Serial #* | 292614-2 | *Hose Lot # and Date Code* | 11794-10/14 |
| *Hose Working Pressure (psi)* | 10000 | *Test Pressure (psi)* | 15000 |

*We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.*

*Supplier:*
***Midwest Hose & Specialty, Inc.***
***3312 S I-35 Service Rd***
***Oklahoma City, OK 73129***

*Comments:*

| *Approved By* | *Date* |
|---|---|
| | 2/10/2015 |

CONCHO

COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Admiral Federal Com #2H
Well: Admiral Federal Com #2H
Wellbore: Lateral #1
Plan: Design #2 (Admiral Federal Com #2H/Lateral #1)

Admiral Federal Com #2H

Ground Elevation:: 2987.50
RKB Elevation: KB @ 3012.50usft (Latshaw 44)
Rig Name: Latshaw 44

| Northing | Easting | Latitude | Longitude |
|---|---|---|---|
| 398074.40 | 607380.50 | 32° 5' 38.212 N | 103° 59' 11.708 W |

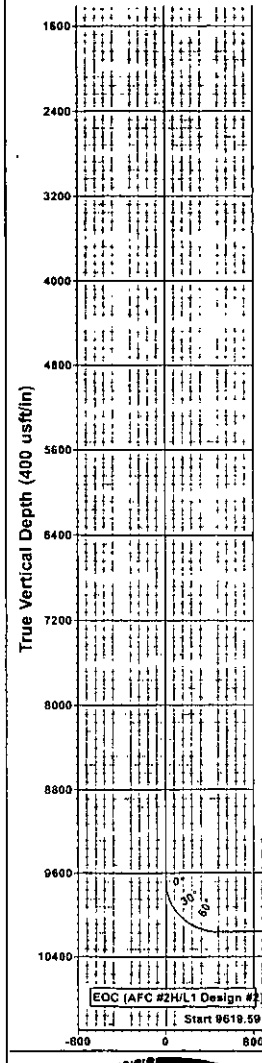
Section Details

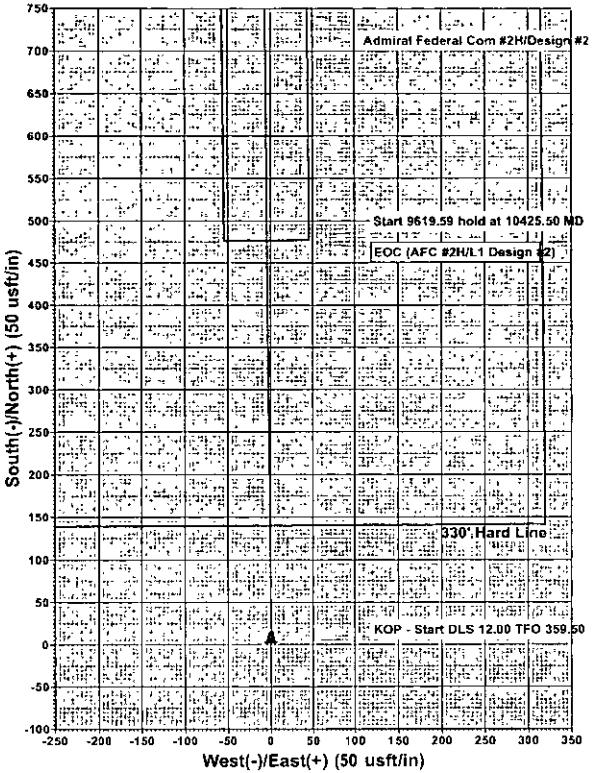
| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | VSect | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 9676.54 | 0.00 | 0.00 | 9676.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 10425.50 | 89.87 | 359.50 | 10154.00 | 476.40 | -4.17 | 12.00 | 359.50 | 476.42 | |
| 4 | 20045.09 | 89.87 | 359.50 | 10175.00 | 10095.60 | -88.40 | 0.00 | 0.00 | 10095.99 | PBHL (AFC #2H/L1) |

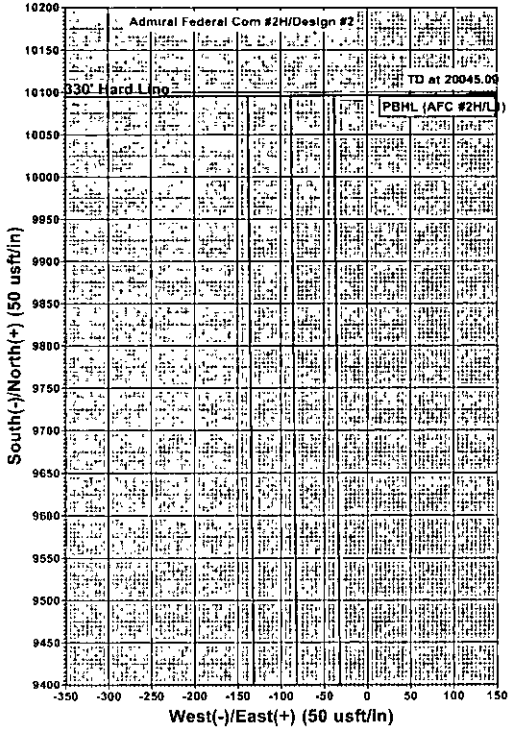
G
T M

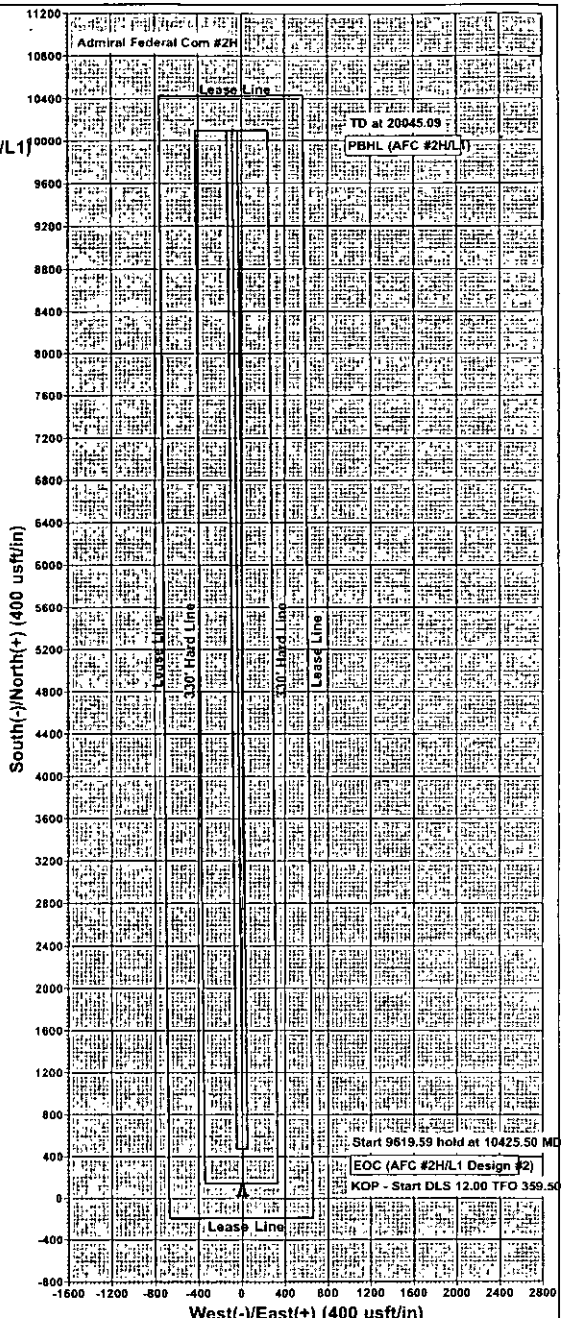
Azimuths to Grid North
True North: -0.18°
Magnetic North: 7.11°

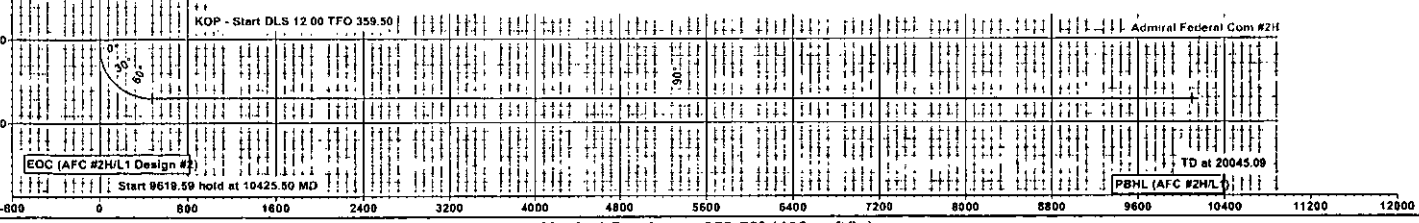
Magnetic Field
Strength: 47967.0snT
Dip Angle: 59.89°
Date: 1/7/2016
Model: IGRF2015





Terra Directional Services LLC
322 Spring Hill Drive, Suite A300. Spring, Tx 77386
Phone: 432-618-1210


PROJECT DETAILS: Eddy County, NM (NAD-27 2015)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

# COG Operating LLC

**Eddy County, NM (NAD-27 2015)**
**Admiral Federal Com #2H**
**Admiral Federal Com #2H**
**30-015-42820**
**Lateral #1**

**Plan: Design #2**

# Standard Planning Report

**11 January, 2016**

TERRA DIRECTIONAL SERVICES, L.L.C.

| | | | |
|---|---|---|---|
| **Database:** | EDM 5000.1 Single User Db | **Local Co-ordinate Reference:** | Well Admiral Federal Com #2H |
| **Company:** | COG Operating LLC | **TVD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Project:** | Eddy County, NM (NAD-27 2015) | **MD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Site:** | Admiral Federal Com #2H | **North Reference:** | Grid |
| **Well:** | Admiral Federal Com #2H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Lateral #1 | | |
| **Design:** | Design #2 | | |

**Project** Eddy County, NM (NAD-27 2015)

| | | | |
|---|---|---|---|
| **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** Admiral Federal Com #2H

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 398,074.40 usft | **Latitude:** | 32° 5' 38.212 N |
| **From:** | Map | **Easting:** | 607,380.50 usft | **Longitude:** | 103° 59' 11.708 W |
| **Position Uncertainty:** | 0.00 usft | **Slot Radius:** | 13.20 in | **Grid Convergence:** | 0.18 ° |

**Well** Admiral Federal Com #2H

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.00 usft | **Northing:** | 398,074.40 usft | **Latitude:** | 32° 5' 38.212 N |
| | **+E/-W** | 0.00 usft | **Easting:** | 607,380.50 usft | **Longitude:** | 103° 59' 11.708 W |
| **Position Uncertainty** | | 0.00 usft | **Wellhead Elevation:** | 0.00 usft | **Ground Level:** | 2,987.50 usft |

**Wellbore** Lateral #1

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2015 | 1/7/2016 | 7.29 | 59.89 | 47,967 |

**Design** Design #2

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | | **Phase:** | PLAN | **Tie On Depth:** | 0.00 |

| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
|---|---|---|---|---|
| | 0.00 | 0.00 | 0.00 | 359.50 |

**Plan Sections**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TFO (°) | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 9,676.54 | 0.00 | 0.00 | 9,676.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 10,425.50 | 89.87 | 359.50 | 10,154.00 | 476.40 | -4.17 | 12.00 | 12.00 | -0.07 | 359.50 | |
| 20,045.09 | 89.87 | 359.50 | 10,175.00 | 10,095.60 | -88.40 | 0.00 | 0.00 | 0.00 | 0.00 | PBHL (AFC #2H/L1) |

| | | | |
|---|---|---|---|
| Database: | EDM 5000.1 Single User Db | Local Co-ordinate Reference: | Well Admiral Federal Com #2H |
| Company: | COG Operating LLC | TVD Reference: | KB @ 3012.50usft (Latshaw 44) |
| Project: | Eddy County, NM (NAD-27 2015) | MD Reference: | KB @ 3012.50usft (Latshaw 44) |
| Site: | Admiral Federal Com #2H | North Reference: | Grid |
| Well: | Admiral Federal Com #2H | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Lateral #1 | | |
| 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 |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,400.00 | 0.00 | 0.00 | 1,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,500.00 | 0.00 | 0.00 | 1,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,600.00 | 0.00 | 0.00 | 1,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,700.00 | 0.00 | 0.00 | 1,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,800.00 | 0.00 | 0.00 | 1,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,900.00 | 0.00 | 0.00 | 1,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,000.00 | 0.00 | 0.00 | 2,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,100.00 | 0.00 | 0.00 | 2,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,200.00 | 0.00 | 0.00 | 2,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,300.00 | 0.00 | 0.00 | 2,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,400.00 | 0.00 | 0.00 | 2,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,500.00 | 0.00 | 0.00 | 2,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,600.00 | 0.00 | 0.00 | 2,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,700.00 | 0.00 | 0.00 | 2,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,800.00 | 0.00 | 0.00 | 2,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,900.00 | 0.00 | 0.00 | 2,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,000.00 | 0.00 | 0.00 | 3,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,100.00 | 0.00 | 0.00 | 3,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,200.00 | 0.00 | 0.00 | 3,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,300.00 | 0.00 | 0.00 | 3,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,400.00 | 0.00 | 0.00 | 3,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,500.00 | 0.00 | 0.00 | 3,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,600.00 | 0.00 | 0.00 | 3,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,700.00 | 0.00 | 0.00 | 3,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,800.00 | 0.00 | 0.00 | 3,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,900.00 | 0.00 | 0.00 | 3,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,000.00 | 0.00 | 0.00 | 4,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,100.00 | 0.00 | 0.00 | 4,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,200.00 | 0.00 | 0.00 | 4,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,300.00 | 0.00 | 0.00 | 4,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,400.00 | 0.00 | 0.00 | 4,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,500.00 | 0.00 | 0.00 | 4,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,600.00 | 0.00 | 0.00 | 4,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,700.00 | 0.00 | 0.00 | 4,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,800.00 | 0.00 | 0.00 | 4,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,900.00 | 0.00 | 0.00 | 4,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,000.00 | 0.00 | 0.00 | 5,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,100.00 | 0.00 | 0.00 | 5,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,200.00 | 0.00 | 0.00 | 5,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,300.00 | 0.00 | 0.00 | 5,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | EDM 5000.1 Single User Db | **Local Co-ordinate Reference:** | Well Admiral Federal Com #2H |
| **Company:** | COG Operating LLC | **TVD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Project:** | Eddy County, NM (NAD-27 2015) | **MD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Site:** | Admiral Federal Com #2H | **North Reference:** | Grid |
| **Well:** | Admiral Federal Com #2H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Lateral #1 | | |
| **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) |
|---|---|---|---|---|---|---|---|---|---|
| 5,400.00 | 0.00 | 0.00 | 5,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,500.00 | 0.00 | 0.00 | 5,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,600.00 | 0.00 | 0.00 | 5,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,700.00 | 0.00 | 0.00 | 5,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,800.00 | 0.00 | 0.00 | 5,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,900.00 | 0.00 | 0.00 | 5,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,000.00 | 0.00 | 0.00 | 6,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,100.00 | 0.00 | 0.00 | 6,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,200.00 | 0.00 | 0.00 | 6,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,300.00 | 0.00 | 0.00 | 6,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,400.00 | 0.00 | 0.00 | 6,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,500.00 | 0.00 | 0.00 | 6,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,600.00 | 0.00 | 0.00 | 6,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,700.00 | 0.00 | 0.00 | 6,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,800.00 | 0.00 | 0.00 | 6,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,900.00 | 0.00 | 0.00 | 6,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,000.00 | 0.00 | 0.00 | 7,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,100.00 | 0.00 | 0.00 | 7,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,200.00 | 0.00 | 0.00 | 7,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,300.00 | 0.00 | 0.00 | 7,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,400.00 | 0.00 | 0.00 | 7,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,500.00 | 0.00 | 0.00 | 7,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,600.00 | 0.00 | 0.00 | 7,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,700.00 | 0.00 | 0.00 | 7,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,800.00 | 0.00 | 0.00 | 7,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,900.00 | 0.00 | 0.00 | 7,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,000.00 | 0.00 | 0.00 | 8,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,100.00 | 0.00 | 0.00 | 8,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,200.00 | 0.00 | 0.00 | 8,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,300.00 | 0.00 | 0.00 | 8,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,400.00 | 0.00 | 0.00 | 8,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,500.00 | 0.00 | 0.00 | 8,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,600.00 | 0.00 | 0.00 | 8,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,700.00 | 0.00 | 0.00 | 8,700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,800.00 | 0.00 | 0.00 | 8,800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,900.00 | 0.00 | 0.00 | 8,900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,000.00 | 0.00 | 0.00 | 9,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,100.00 | 0.00 | 0.00 | 9,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,200.00 | 0.00 | 0.00 | 9,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,300.00 | 0.00 | 0.00 | 9,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,400.00 | 0.00 | 0.00 | 9,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,500.00 | 0.00 | 0.00 | 9,500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,600.00 | 0.00 | 0.00 | 9,600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,676.54 | 0.00 | 0.00 | 9,676.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **KOP - Start DLS 12.00 TFO 359.50** | | | | | | | | | |
| 9,700.00 | 2.82 | 359.50 | 9,699.99 | 0.58 | -0.01 | 0.58 | 12.00 | 12.00 | 0.00 |
| 9,725.00 | 5.82 | 359.50 | 9,724.92 | 2.46 | -0.02 | 2.46 | 12.00 | 12.00 | 0.00 |
| 9,750.00 | 8.82 | 359.50 | 9,749.71 | 5.64 | -0.05 | 5.64 | 12.00 | 12.00 | 0.00 |
| 9,775.00 | 11.82 | 359.50 | 9,774.30 | 10.12 | -0.09 | 10.12 | 12.00 | 12.00 | 0.00 |
| 9,800.00 | 14.82 | 359.50 | 9,798.63 | 15.87 | -0.14 | 15.87 | 12.00 | 12.00 | 0.00 |
| 9,825.00 | 17.82 | 359.50 | 9,822.62 | 22.89 | -0.20 | 22.90 | 12.00 | 12.00 | 0.00 |
| 9,850.00 | 20.82 | 359.50 | 9,846.21 | 31.16 | -0.27 | 31.16 | 12.00 | 12.00 | 0.00 |
| 9,875.00 | 23.82 | 359.50 | 9,869.33 | 40.65 | -0.36 | 40.65 | 12.00 | 12.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | EDM 5000.1 Single User Db | **Local Co-ordinate Reference:** | Well Admiral Federal Com #2H |
| **Company:** | COG Operating LLC | **TVD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Project:** | Eddy County, NM (NAD-27 2015) | **MD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Site:** | Admiral Federal Com #2H | **North Reference:** | Grid |
| **Well:** | Admiral Federal Com #2H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Lateral #1 | | |
| **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) |
|---|---|---|---|---|---|---|---|---|---|
| 9,900.00 | 26.82 | 359.50 | 9,891.93 | 51.34 | -0.45 | 51.34 | 12.00 | 12.00 | 0.00 |
| 9,925.00 | 29.82 | 359.50 | 9,913.94 | 63.20 | -0.55 | 63.20 | 12.00 | 12.00 | 0.00 |
| 9,950.00 | 32.82 | 359.50 | 9,935.29 | 76.19 | -0.67 | 76.19 | 12.00 | 12.00 | 0.00 |
| 9,975.00 | 35.82 | 359.50 | 9,955.94 | 90.28 | -0.79 | 90.28 | 12.00 | 12.00 | 0.00 |
| 10,000.00 | 38.82 | 359.50 | 9,975.82 | 105.43 | -0.92 | 105.44 | 12.00 | 12.00 | 0.00 |
| 10,025.00 | 41.82 | 359.50 | 9,994.88 | 121.61 | -1.06 | 121.61 | 12.00 | 12.00 | 0.00 |
| 10,050.00 | 44.82 | 359.50 | 10,013.07 | 138.75 | -1.21 | 138.76 | 12.00 | 12.00 | 0.00 |
| 10,075.00 | 47.82 | 359.50 | 10,030.33 | 156.83 | -1.37 | 156.84 | 12.00 | 12.00 | 0.00 |
| 10,100.00 | 50.82 | 359.50 | 10,046.63 | 175.78 | -1.54 | 175.79 | 12.00 | 12.00 | 0.00 |
| 10,125.00 | 53.82 | 359.50 | 10,061.91 | 195.57 | -1.71 | 195.57 | 12.00 | 12.00 | 0.00 |
| 10,150.00 | 56.82 | 359.50 | 10,076.14 | 216.12 | -1.89 | 216.13 | 12.00 | 12.00 | 0.00 |
| 10,175.00 | 59.82 | 359.50 | 10,089.26 | 237.39 | -2.08 | 237.40 | 12.00 | 12.00 | 0.00 |
| 10,200.00 | 62.82 | 359.50 | 10,101.26 | 259.32 | -2.27 | 259.33 | 12.00 | 12.00 | 0.00 |
| 10,225.00 | 65.82 | 359.50 | 10,112.10 | 281.85 | -2.47 | 281.86 | 12.00 | 12.00 | 0.00 |
| 10,250.00 | 68.82 | 359.50 | 10,121.74 | 304.91 | -2.67 | 304.92 | 12.00 | 12.00 | 0.00 |
| 10,275.00 | 71.82 | 359.50 | 10,130.16 | 328.44 | -2.88 | 328.46 | 12.00 | 12.00 | 0.00 |
| 10,300.00 | 74.82 | 359.50 | 10,137.33 | 352.39 | -3.09 | 352.40 | 12.00 | 12.00 | 0.00 |
| 10,325.00 | 77.82 | 359.50 | 10,143.25 | 376.67 | -3.30 | 376.69 | 12.00 | 12.00 | 0.00 |
| 10,350.00 | 80.82 | 359.50 | 10,147.88 | 401.24 | -3.51 | 401.25 | 12.00 | 12.00 | 0.00 |
| 10,375.00 | 83.82 | 359.50 | 10,151.23 | 426.01 | -3.73 | 426.02 | 12.00 | 12.00 | 0.00 |
| 10,400.00 | 86.82 | 359.50 | 10,153.27 | 450.92 | -3.95 | 450.94 | 12.00 | 12.00 | 0.00 |
| 10,425.50 | 89.87 | 359.50 | 10,154.00 | 476.40 | -4.17 | 476.42 | 12.00 | 12.00 | 0.00 |
| **EOC - Start 9619.59 hold at 10425.50 MD** | | | | | | | | | |
| 10,500.00 | 89.87 | 359.50 | 10,154.17 | 550.90 | -4.82 | 550.92 | 0.00 | 0.00 | 0.00 |
| 10,600.00 | 89.87 | 359.50 | 10,154.38 | 650.90 | -5.70 | 650.92 | 0.00 | 0.00 | 0.00 |
| 10,700.00 | 89.87 | 359.50 | 10,154.60 | 750.90 | -6.58 | 750.92 | 0.00 | 0.00 | 0.00 |
| 10,800.00 | 89.87 | 359.50 | 10,154.82 | 850.89 | -7.45 | 850.92 | 0.00 | 0.00 | 0.00 |
| 10,900.00 | 89.87 | 359.50 | 10,155.04 | 950.89 | -8.33 | 950.92 | 0.00 | 0.00 | 0.00 |
| 11,000.00 | 89.87 | 359.50 | 10,155.26 | 1,050.88 | -9.20 | 1,050.92 | 0.00 | 0.00 | 0.00 |
| 11,100.00 | 89.87 | 359.50 | 10,155.48 | 1,150.88 | -10.08 | 1,150.92 | 0.00 | 0.00 | 0.00 |
| 11,200.00 | 89.87 | 359.50 | 10,155.69 | 1,250.88 | -10.95 | 1,250.92 | 0.00 | 0.00 | 0.00 |
| 11,300.00 | 89.87 | 359.50 | 10,155.91 | 1,350.87 | -11.83 | 1,350.92 | 0.00 | 0.00 | 0.00 |
| 11,400.00 | 89.87 | 359.50 | 10,156.13 | 1,450.87 | -12.70 | 1,450.92 | 0.00 | 0.00 | 0.00 |
| 11,500.00 | 89.87 | 359.50 | 10,156.35 | 1,550.86 | -13.58 | 1,550.92 | 0.00 | 0.00 | 0.00 |
| 11,600.00 | 89.87 | 359.50 | 10,156.57 | 1,650.86 | -14.46 | 1,650.92 | 0.00 | 0.00 | 0.00 |
| 11,700.00 | 89.87 | 359.50 | 10,156.79 | 1,750.85 | -15.33 | 1,750.92 | 0.00 | 0.00 | 0.00 |
| 11,800.00 | 89.87 | 359.50 | 10,157.00 | 1,850.85 | -16.21 | 1,850.92 | 0.00 | 0.00 | 0.00 |
| 11,900.00 | 89.87 | 359.50 | 10,157.22 | 1,950.85 | -17.08 | 1,950.92 | 0.00 | 0.00 | 0.00 |
| 12,000.00 | 89.87 | 359.50 | 10,157.44 | 2,050.84 | -17.96 | 2,050.92 | 0.00 | 0.00 | 0.00 |
| 12,100.00 | 89.87 | 359.50 | 10,157.66 | 2,150.84 | -18.83 | 2,150.92 | 0.00 | 0.00 | 0.00 |
| 12,200.00 | 89.87 | 359.50 | 10,157.88 | 2,250.83 | -19.71 | 2,250.92 | 0.00 | 0.00 | 0.00 |
| 12,300.00 | 89.87 | 359.50 | 10,158.10 | 2,350.83 | -20.58 | 2,350.92 | 0.00 | 0.00 | 0.00 |
| 12,400.00 | 89.87 | 359.50 | 10,158.31 | 2,450.83 | -21.46 | 2,450.92 | 0.00 | 0.00 | 0.00 |
| 12,500.00 | 89.87 | 359.50 | 10,158.53 | 2,550.82 | -22.34 | 2,550.92 | 0.00 | 0.00 | 0.00 |
| 12,600.00 | 89.87 | 359.50 | 10,158.75 | 2,650.82 | -23.21 | 2,650.92 | 0.00 | 0.00 | 0.00 |
| 12,700.00 | 89.87 | 359.50 | 10,158.97 | 2,750.81 | -24.09 | 2,750.92 | 0.00 | 0.00 | 0.00 |
| 12,800.00 | 89.87 | 359.50 | 10,159.19 | 2,850.81 | -24.96 | 2,850.92 | 0.00 | 0.00 | 0.00 |
| 12,900.00 | 89.87 | 359.50 | 10,159.40 | 2,950.81 | -25.84 | 2,950.92 | 0.00 | 0.00 | 0.00 |
| 13,000.00 | 89.87 | 359.50 | 10,159.62 | 3,050.80 | -26.71 | 3,050.92 | 0.00 | 0.00 | 0.00 |
| 13,100.00 | 89.87 | 359.50 | 10,159.84 | 3,150.80 | -27.59 | 3,150.92 | 0.00 | 0.00 | 0.00 |
| 13,200.00 | 89.87 | 359.50 | 10,160.06 | 3,250.79 | -28.46 | 3,250.92 | 0.00 | 0.00 | 0.00 |
| 13,300.00 | 89.87 | 359.50 | 10,160.28 | 3,350.79 | -29.34 | 3,350.92 | 0.00 | 0.00 | 0.00 |
| 13,400.00 | 89.87 | 359.50 | 10,160.50 | 3,450.79 | -30.22 | 3,450.92 | 0.00 | 0.00 | 0.00 |
| 13,500.00 | 89.87 | 359.50 | 10,160.71 | 3,550.78 | -31.09 | 3,550.92 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | EDM 5000.1 Single User Db | **Local Co-ordinate Reference:** | Well Admiral Federal Com #2H |
| **Company:** | COG Operating LLC | **TVD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Project:** | Eddy County, NM (NAD-27 2015) | **MD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Site:** | Admiral Federal Com #2H | **North Reference:** | Grid |
| **Well:** | Admiral Federal Com #2H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Lateral #1 | | |
| **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) |
|---|---|---|---|---|---|---|---|---|---|
| 13,600.00 | 89.87 | 359.50 | 10,160.93 | 3,650.78 | -31.97 | 3,650.92 | 0.00 | 0.00 | 0.00 |
| 13,700.00 | 89.87 | 359.50 | 10,161.15 | 3,750.77 | -32.84 | 3,750.92 | 0.00 | 0.00 | 0.00 |
| 13,800.00 | 89.87 | 359.50 | 10,161.37 | 3,850.77 | -33.72 | 3,850.92 | 0.00 | 0.00 | 0.00 |
| 13,900.00 | 89.87 | 359.50 | 10,161.59 | 3,950.77 | -34.59 | 3,950.92 | 0.00 | 0.00 | 0.00 |
| 14,000.00 | 89.87 | 359.50 | 10,161.81 | 4,050.76 | -35.47 | 4,050.92 | 0.00 | 0.00 | 0.00 |
| 14,100.00 | 89.87 | 359.50 | 10,162.02 | 4,150.76 | -36.35 | 4,150.92 | 0.00 | 0.00 | 0.00 |
| 14,200.00 | 89.87 | 359.50 | 10,162.24 | 4,250.75 | -37.22 | 4,250.92 | 0.00 | 0.00 | 0.00 |
| 14,300.00 | 89.87 | 359.50 | 10,162.46 | 4,350.75 | -38.10 | 4,350.92 | 0.00 | 0.00 | 0.00 |
| 14,400.00 | 89.87 | 359.50 | 10,162.68 | 4,450.74 | -38.97 | 4,450.92 | 0.00 | 0.00 | 0.00 |
| 14,500.00 | 89.87 | 359.50 | 10,162.90 | 4,550.74 | -39.85 | 4,550.92 | 0.00 | 0.00 | 0.00 |
| 14,600.00 | 89.87 | 359.50 | 10,163.12 | 4,650.74 | -40.72 | 4,650.91 | 0.00 | 0.00 | 0.00 |
| 14,700.00 | 89.87 | 359.50 | 10,163.33 | 4,750.73 | -41.60 | 4,750.91 | 0.00 | 0.00 | 0.00 |
| 14,800.00 | 89.87 | 359.50 | 10,163.55 | 4,850.73 | -42.47 | 4,850.91 | 0.00 | 0.00 | 0.00 |
| 14,900.00 | 89.87 | 359.50 | 10,163.77 | 4,950.72 | -43.35 | 4,950.91 | 0.00 | 0.00 | 0.00 |
| 15,000.00 | 89.87 | 359.50 | 10,163.99 | 5,050.72 | -44.23 | 5,050.91 | 0.00 | 0.00 | 0.00 |
| 15,100.00 | 89.87 | 359.50 | 10,164.21 | 5,150.72 | -45.10 | 5,150.91 | 0.00 | 0.00 | 0.00 |
| 15,200.00 | 89.87 | 359.50 | 10,164.43 | 5,250.71 | -45.98 | 5,250.91 | 0.00 | 0.00 | 0.00 |
| 15,300.00 | 89.87 | 359.50 | 10,164.64 | 5,350.71 | -46.85 | 5,350.91 | 0.00 | 0.00 | 0.00 |
| 15,400.00 | 89.87 | 359.50 | 10,164.86 | 5,450.70 | -47.73 | 5,450.91 | 0.00 | 0.00 | 0.00 |
| 15,500.00 | 89.87 | 359.50 | 10,165.08 | 5,550.70 | -48.60 | 5,550.91 | 0.00 | 0.00 | 0.00 |
| 15,600.00 | 89.87 | 359.50 | 10,165.30 | 5,650.70 | -49.48 | 5,650.91 | 0.00 | 0.00 | 0.00 |
| 15,700.00 | 89.87 | 359.50 | 10,165.52 | 5,750.69 | -50.35 | 5,750.91 | 0.00 | 0.00 | 0.00 |
| 15,800.00 | 89.87 | 359.50 | 10,165.73 | 5,850.69 | -51.23 | 5,850.91 | 0.00 | 0.00 | 0.00 |
| 15,900.00 | 89.87 | 359.50 | 10,165.95 | 5,950.68 | -52.11 | 5,950.91 | 0.00 | 0.00 | 0.00 |
| 16,000.00 | 89.87 | 359.50 | 10,166.17 | 6,050.68 | -52.98 | 6,050.91 | 0.00 | 0.00 | 0.00 |
| 16,100.00 | 89.87 | 359.50 | 10,166.39 | 6,150.68 | -53.86 | 6,150.91 | 0.00 | 0.00 | 0.00 |
| 16,200.00 | 89.87 | 359.50 | 10,166.61 | 6,250.67 | -54.73 | 6,250.91 | 0.00 | 0.00 | 0.00 |
| 16,300.00 | 89.87 | 359.50 | 10,166.83 | 6,350.67 | -55.61 | 6,350.91 | 0.00 | 0.00 | 0.00 |
| 16,400.00 | 89.87 | 359.50 | 10,167.04 | 6,450.66 | -56.48 | 6,450.91 | 0.00 | 0.00 | 0.00 |
| 16,500.00 | 89.87 | 359.50 | 10,167.26 | 6,550.66 | -57.36 | 6,550.91 | 0.00 | 0.00 | 0.00 |
| 16,600.00 | 89.87 | 359.50 | 10,167.48 | 6,650.66 | -58.24 | 6,650.91 | 0.00 | 0.00 | 0.00 |
| 16,700.00 | 89.87 | 359.50 | 10,167.70 | 6,750.65 | -59.11 | 6,750.91 | 0.00 | 0.00 | 0.00 |
| 16,800.00 | 89.87 | 359.50 | 10,167.92 | 6,850.65 | -59.99 | 6,850.91 | 0.00 | 0.00 | 0.00 |
| 16,900.00 | 89.87 | 359.50 | 10,168.14 | 6,950.64 | -60.86 | 6,950.91 | 0.00 | 0.00 | 0.00 |
| 17,000.00 | 89.87 | 359.50 | 10,168.35 | 7,050.64 | -61.74 | 7,050.91 | 0.00 | 0.00 | 0.00 |
| 17,100.00 | 89.87 | 359.50 | 10,168.57 | 7,150.63 | -62.61 | 7,150.91 | 0.00 | 0.00 | 0.00 |
| 17,200.00 | 89.87 | 359.50 | 10,168.79 | 7,250.63 | -63.49 | 7,250.91 | 0.00 | 0.00 | 0.00 |
| 17,300.00 | 89.87 | 359.50 | 10,169.01 | 7,350.63 | -64.36 | 7,350.91 | 0.00 | 0.00 | 0.00 |
| 17,400.00 | 89.87 | 359.50 | 10,169.23 | 7,450.62 | -65.24 | 7,450.91 | 0.00 | 0.00 | 0.00 |
| 17,500.00 | 89.87 | 359.50 | 10,169.45 | 7,550.62 | -66.12 | 7,550.91 | 0.00 | 0.00 | 0.00 |
| 17,600.00 | 89.87 | 359.50 | 10,169.66 | 7,650.61 | -66.99 | 7,650.91 | 0.00 | 0.00 | 0.00 |
| 17,700.00 | 89.87 | 359.50 | 10,169.88 | 7,750.61 | -67.87 | 7,750.91 | 0.00 | 0.00 | 0.00 |
| 17,800.00 | 89.87 | 359.50 | 10,170.10 | 7,850.61 | -68.74 | 7,850.91 | 0.00 | 0.00 | 0.00 |
| 17,900.00 | 89.87 | 359.50 | 10,170.32 | 7,950.60 | -69.62 | 7,950.91 | 0.00 | 0.00 | 0.00 |
| 18,000.00 | 89.87 | 359.50 | 10,170.54 | 8,050.60 | -70.49 | 8,050.91 | 0.00 | 0.00 | 0.00 |
| 18,100.00 | 89.87 | 359.50 | 10,170.75 | 8,150.59 | -71.37 | 8,150.91 | 0.00 | 0.00 | 0.00 |
| 18,200.00 | 89.87 | 359.50 | 10,170.97 | 8,250.59 | -72.24 | 8,250.91 | 0.00 | 0.00 | 0.00 |
| 18,300.00 | 89.87 | 359.50 | 10,171.19 | 8,350.59 | -73.12 | 8,350.91 | 0.00 | 0.00 | 0.00 |
| 18,400.00 | 89.87 | 359.50 | 10,171.41 | 8,450.58 | -74.00 | 8,450.91 | 0.00 | 0.00 | 0.00 |
| 18,500.00 | 89.87 | 359.50 | 10,171.63 | 8,550.58 | -74.87 | 8,550.91 | 0.00 | 0.00 | 0.00 |
| 18,600.00 | 89.87 | 359.50 | 10,171.85 | 8,650.57 | -75.75 | 8,650.91 | 0.00 | 0.00 | 0.00 |
| 18,700.00 | 89.87 | 359.50 | 10,172.06 | 8,750.57 | -76.62 | 8,750.91 | 0.00 | 0.00 | 0.00 |
| 18,800.00 | 89.87 | 359.50 | 10,172.28 | 8,850.57 | -77.50 | 8,850.91 | 0.00 | 0.00 | 0.00 |
| 18,900.00 | 89.87 | 359.50 | 10,172.50 | 8,950.56 | -78.37 | 8,950.90 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | EDM 5000.1 Single User Db | **Local Co-ordinate Reference:** | Well Admiral Federal Com #2H |
| **Company:** | COG Operating LLC | **TVD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Project:** | Eddy County, NM (NAD-27 2015) | **MD Reference:** | KB @ 3012.50usft (Latshaw 44) |
| **Site:** | Admiral Federal Com #2H | **North Reference:** | Grid |
| **Well:** | Admiral Federal Com #2H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Lateral #1 | | |
| **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) |
|---|---|---|---|---|---|---|---|---|---|
| 19,000.00 | 89.87 | 359.50 | 10,172.72 | 9,050.56 | -79.25 | 9,050.90 | 0.00 | 0.00 | 0.00 |
| 19,100.00 | 89.87 | 359.50 | 10,172.94 | 9,150.55 | -80.12 | 9,150.90 | 0.00 | 0.00 | 0.00 |
| 19,200.00 | 89.87 | 359.50 | 10,173.16 | 9,250.55 | -81.00 | 9,250.90 | 0.00 | 0.00 | 0.00 |
| 19,300.00 | 89.87 | 359.50 | 10,173.37 | 9,350.55 | -81.88 | 9,350.90 | 0.00 | 0.00 | 0.00 |
| 19,400.00 | 89.87 | 359.50 | 10,173.59 | 9,450.54 | -82.75 | 9,450.90 | 0.00 | 0.00 | 0.00 |
| 19,500.00 | 89.87 | 359.50 | 10,173.81 | 9,550.54 | -83.63 | 9,550.90 | 0.00 | 0.00 | 0.00 |
| 19,600.00 | 89.87 | 359.50 | 10,174.03 | 9,650.53 | -84.50 | 9,650.90 | 0.00 | 0.00 | 0.00 |
| 19,700.00 | 89.87 | 359.50 | 10,174.25 | 9,750.53 | -85.38 | 9,750.90 | 0.00 | 0.00 | 0.00 |
| 19,800.00 | 89.87 | 359.50 | 10,174.47 | 9,850.53 | -86.25 | 9,850.90 | 0.00 | 0.00 | 0.00 |
| 19,900.00 | 89.87 | 359.50 | 10,174.68 | 9,950.52 | -87.13 | 9,950.90 | 0.00 | 0.00 | 0.00 |
| 20,000.00 | 89.87 | 359.50 | 10,174.90 | 10,050.52 | -88.01 | 10,050.90 | 0.00 | 0.00 | 0.00 |
| 20,045.09 | 89.87 | 359.50 | 10,175.00 | 10,095.60 | -88.40 | 10,095.99 | 0.00 | 0.00 | 0.00 |
| **TD at 20045.09** | | | | | | | | | |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| EOC (AFC #2H/L1 Desi<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 10,154.00 | 476.41 | -4.17 | 398,550.81 | 607,376.33 | 32° 5' 42.927 N | 103° 59' 11.739 W |
| PBHL (AFC #2H/L1)<br>- plan hits target center<br>- Rectangle (sides W100.00 H9,619.67 D0.00) | 0.14 | 359.50 | 10,175.00 | 10,095.60 | -88.40 | 408,170.00 | 607,292.10 | 32° 7' 18.125 N | 103° 59' 12.358 W |

**Plan Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 9,676.54 | 9,676.54 | 0.00 | 0.00 | KOP - Start DLS 12.00 TFO 359.50 |
| 10,425.50 | 10,154.00 | 476.40 | -4.17 | EOC - Start 9619.59 hold at 10425.50 MD |
| 20,045.09 | 10,175.00 | 10,095.60 | -88.40 | TD at 20045.09 |