

30-025-40887

# Plan Proposal

FOR

COG Operating, LLC  
Pan Head Fee #3H  
Lea Co., NM

Design #1

Presented By:

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Aaron Boger  
Account Manager

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Dusty Moyer  
Well Planner

SHL  
330' FNL & 1765' FWL  
Penetration Point  
330' FNL 1765' FWL  
PBHL  
2302' FNL & 1649' FWL

# Attacher

DEC 20 7 2012

# Archer

## COG Operating, LLC

Lea County(NM27E)

Sec.11-T17S-R32E

Pan Head Fee #3H

Wellbore #1

Plan: Design #1

## Standard Planning Report

28 November, 2012

HOBBS OCD

DEC 17 2012

RECEIVED



|           |                    |                              |                                         |
|-----------|--------------------|------------------------------|-----------------------------------------|
| Database: | EDMDBBW            | Local Co-ordinate Reference: | Well Pan Head Fee #3H                   |
| Company:  | COG Operating, LLC | TVD Reference:               | WELL @ 4172.00usft (Original Well Elev) |
| Project:  | Lea County(NM27E)  | MD Reference:                | WELL @ 4172.00usft (Original Well Elev) |
| Site:     | Sec.11-T17S-R32E   | North Reference:             | Grid                                    |
| Well:     | Pan Head Fee #3H   | Survey Calculation Method:   | Minimum Curvature                       |
| Wellbore: | Wellbore #1        |                              |                                         |
| Design:   | Design #1          |                              |                                         |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project:    | Lea 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.11-T17S-R32E |                   |                   |
| Site Position:        |                  | Northing:         | 675,378.000 usft  |
| From:                 | Map              | Easting:          | 680,940.300 usft  |
| Position Uncertainty: | 0.00 usft        | Slot Radius:      | 13-3/16"          |
|                       |                  | Latitude:         | 32° 51' 19.118 N  |
|                       |                  | Longitude:        | 103° 44' 38.811 W |
|                       |                  | Grid Convergence: | 0.32 °            |

|                      |                  |               |                     |                  |               |                   |
|----------------------|------------------|---------------|---------------------|------------------|---------------|-------------------|
| Well                 | Pan Head Fee #3H |               |                     |                  |               |                   |
| Well Position        | +N/-S            | 6.20 usft     | Northing:           | 675,384.200 usft | Latitude:     | 32° 51' 19.100 N  |
|                      | +E/-W            | 1,434.60 usft | Easting:            | 682,374.900 usft | Longitude:    | 103° 44' 21.994 W |
| Position Uncertainty |                  | 0.00 usft     | Wellhead Elevation: | usft             | Ground Level: | 4,155.00 usft     |

|           |             |             |                    |                  |                        |
|-----------|-------------|-------------|--------------------|------------------|------------------------|
| Wellbore  | Wellbore #1 |             |                    |                  |                        |
| Magnetics | Model Name  | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|           | IGRF2010    | 11/28/12    | 7.53               | 60.70            | 48,827                 |

|                   |                            |                 |                 |                  |
|-------------------|----------------------------|-----------------|-----------------|------------------|
| Design            | Design #1                  |                 |                 |                  |
| Audit Notes:      |                            |                 |                 |                  |
| Version:          | Phase:                     | PROTOTYPE       | Tie On Depth:   | 0.00             |
| Vertical Section: | Depth From (TVD)<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Direction<br>(°) |
|                   | 0.00                       | 0.00            | 0.00            | 180.58           |

| 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    |                    |
| 6,322.61              | 0.00            | 0.00        | 6,322.61              | 0.00         | 0.00         | 0.00                    | 0.00                   | 0.00                  | 0.00    |                    |
| 7,080.94              | 91.00           | 180.58      | 6,800.00              | -485.77      | -4.92        | 12.00                   | 12.00                  | 0.00                  | 180.58  | Pan Head Fee #3H P |
| 13,850.55             | 91.00           | 180.58      | 6,681.86              | -7,254.00    | -73.50       | 0.00                    | 0.00                   | 0.00                  | 0.00    | Pan Head Fee #3H P |

|           |                    |                              |                                         |
|-----------|--------------------|------------------------------|-----------------------------------------|
| Database: | EDMDBBW            | Local Co-ordinate Reference: | Well Pan Head Fee #3H                   |
| Company:  | COG Operating, LLC | TVD Reference:               | WELL @ 4172.00usft (Original Well Elev) |
| Project:  | Lea County(NM27E)  | MD Reference:                | WELL @ 4172.00usft (Original Well Elev) |
| Site:     | Sec.11-T17S-R32E   | North Reference:             | Grid                                    |
| Well:     | Pan Head Fee #3H   | Survey Calculation Method:   | Minimum Curvature                       |
| Wellbore: | Wellbore #1        |                              |                                         |
| Design:   | Design #1          |                              |                                         |

## Planned Survey

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| 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: | EDMDBBW            | Local Co-ordinate Reference: | Well Pan Head Fee #3H                   |
| Company:  | COG Operating, LLC | TVD Reference:               | WELL @ 4172.00usft (Original Well Elev) |
| Project:  | Lea County(NM27E)  | MD Reference:                | WELL @ 4172.00usft (Original Well Elev) |
| Site:     | Sec.11-T17S-R32E   | North Reference:             | Grid                                    |
| Well:     | Pan Head Fee #3H   | Survey Calculation Method:   | Minimum Curvature                       |
| Wellbore: | Wellbore #1        |                              |                                         |
| Design:   | Design #1          |                              |                                         |

| 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                  |
| KOP 12°/100'          |                 |             |                       |              |              |                         |                         |                        |                       |
| 6,322.61              | 0.00            | 0.00        | 6,322.61              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |
| 6,325.00              | 0.29            | 180.58      | 6,325.00              | -0.01        | 0.00         | 0.01                    | 12.00                   | 12.00                  | 0.00                  |
| 6,350.00              | 3.29            | 180.58      | 6,349.98              | -0.79        | -0.01        | 0.79                    | 12.00                   | 12.00                  | 0.00                  |
| 6,375.00              | 6.29            | 180.58      | 6,374.89              | -2.87        | -0.03        | 2.87                    | 12.00                   | 12.00                  | 0.00                  |
| 6,400.00              | 9.29            | 180.58      | 6,399.66              | -6.26        | -0.06        | 6.26                    | 12.00                   | 12.00                  | 0.00                  |
| 6,425.00              | 12.29           | 180.58      | 6,424.22              | -10.94       | -0.11        | 10.94                   | 12.00                   | 12.00                  | 0.00                  |
| 6,450.00              | 15.29           | 180.58      | 6,448.49              | -16.89       | -0.17        | 16.89                   | 12.00                   | 12.00                  | 0.00                  |
| 6,475.00              | 18.29           | 180.58      | 6,472.43              | -24.11       | -0.24        | 24.11                   | 12.00                   | 12.00                  | 0.00                  |
| 6,500.00              | 21.29           | 180.58      | 6,495.95              | -32.57       | -0.33        | 32.58                   | 12.00                   | 12.00                  | 0.00                  |
| 6,525.00              | 24.29           | 180.58      | 6,518.99              | -42.25       | -0.43        | 42.26                   | 12.00                   | 12.00                  | 0.00                  |
| 6,550.00              | 27.29           | 180.58      | 6,541.50              | -53.13       | -0.54        | 53.13                   | 12.00                   | 12.00                  | 0.00                  |
| 6,575.00              | 30.29           | 180.58      | 6,563.41              | -65.16       | -0.66        | 65.17                   | 12.00                   | 12.00                  | 0.00                  |
| 6,600.00              | 33.29           | 180.58      | 6,584.66              | -78.33       | -0.79        | 78.34                   | 12.00                   | 12.00                  | 0.00                  |
| 6,625.00              | 36.29           | 180.58      | 6,605.19              | -92.59       | -0.94        | 92.60                   | 12.00                   | 12.00                  | 0.00                  |
| 6,650.00              | 39.29           | 180.58      | 6,624.94              | -107.91      | -1.09        | 107.91                  | 12.00                   | 12.00                  | 0.00                  |
| 6,675.00              | 42.29           | 180.58      | 6,643.87              | -124.24      | -1.26        | 124.24                  | 12.00                   | 12.00                  | 0.00                  |
| 6,700.00              | 45.29           | 180.58      | 6,661.91              | -141.53      | -1.43        | 141.54                  | 12.00                   | 12.00                  | 0.00                  |
| 6,725.00              | 48.29           | 180.58      | 6,679.03              | -159.75      | -1.62        | 159.76                  | 12.00                   | 12.00                  | 0.00                  |
| 6,750.00              | 51.29           | 180.58      | 6,695.17              | -178.84      | -1.81        | 178.85                  | 12.00                   | 12.00                  | 0.00                  |
| 6,775.00              | 54.29           | 180.58      | 6,710.29              | -198.74      | -2.01        | 198.76                  | 12.00                   | 12.00                  | 0.00                  |
| 6,800.00              | 57.29           | 180.58      | 6,724.34              | -219.42      | -2.22        | 219.43                  | 12.00                   | 12.00                  | 0.00                  |
| 6,825.00              | 60.29           | 180.58      | 6,737.30              | -240.79      | -2.44        | 240.81                  | 12.00                   | 12.00                  | 0.00                  |
| 6,850.00              | 63.29           | 180.58      | 6,749.11              | -262.82      | -2.66        | 262.83                  | 12.00                   | 12.00                  | 0.00                  |
| 6,875.00              | 66.29           | 180.58      | 6,759.76              | -285.43      | -2.89        | 285.45                  | 12.00                   | 12.00                  | 0.00                  |
| 6,900.00              | 69.29           | 180.58      | 6,769.21              | -308.57      | -3.13        | 308.59                  | 12.00                   | 12.00                  | 0.00                  |
| 6,925.00              | 72.29           | 180.58      | 6,777.44              | -332.18      | -3.37        | 332.19                  | 12.00                   | 12.00                  | 0.00                  |
| 6,950.00              | 75.29           | 180.58      | 6,784.42              | -356.18      | -3.61        | 356.20                  | 12.00                   | 12.00                  | 0.00                  |
| 6,975.00              | 78.29           | 180.58      | 6,790.13              | -380.51      | -3.86        | 380.53                  | 12.00                   | 12.00                  | 0.00                  |
| 7,000.00              | 81.29           | 180.58      | 6,794.56              | -405.11      | -4.10        | 405.13                  | 12.00                   | 12.00                  | 0.00                  |
| 7,025.00              | 84.29           | 180.58      | 6,797.70              | -429.91      | -4.36        | 429.93                  | 12.00                   | 12.00                  | 0.00                  |
| 7,050.00              | 87.29           | 180.58      | 6,799.54              | -454.84      | -4.61        | 454.86                  | 12.00                   | 12.00                  | 0.00                  |
| 7,075.00              | 90.29           | 180.58      | 6,800.07              | -479.83      | -4.86        | 479.85                  | 12.00                   | 12.00                  | 0.00                  |
| EOC / Hold to TD      |                 |             |                       |              |              |                         |                         |                        |                       |
| 7,080.94              | 91.00           | 180.58      | 6,800.00              | -485.77      | -4.92        | 485.80                  | 12.00                   | 12.00                  | 0.00                  |
| 7,100.00              | 91.00           | 180.58      | 6,799.67              | -504.83      | -5.12        | 504.85                  | 0.00                    | 0.00                   | 0.00                  |
| 7,200.00              | 91.00           | 180.58      | 6,797.92              | -604.81      | -6.13        | 604.84                  | 0.00                    | 0.00                   | 0.00                  |
| 7,300.00              | 91.00           | 180.58      | 6,796.18              | -704.78      | -7.14        | 704.82                  | 0.00                    | 0.00                   | 0.00                  |
| 7,400.00              | 91.00           | 180.58      | 6,794.43              | -804.76      | -8.15        | 804.81                  | 0.00                    | 0.00                   | 0.00                  |
| 7,500.00              | 91.00           | 180.58      | 6,792.69              | -904.74      | -9.17        | 904.79                  | 0.00                    | 0.00                   | 0.00                  |
| 7,600.00              | 91.00           | 180.58      | 6,790.94              | -1,004.72    | -10.18       | 1,004.78                | 0.00                    | 0.00                   | 0.00                  |
| 7,700.00              | 91.00           | 180.58      | 6,789.20              | -1,104.70    | -11.19       | 1,104.76                | 0.00                    | 0.00                   | 0.00                  |
| 7,800.00              | 91.00           | 180.58      | 6,787.45              | -1,204.68    | -12.21       | 1,204.74                | 0.00                    | 0.00                   | 0.00                  |

|           |                    |                              |                                         |
|-----------|--------------------|------------------------------|-----------------------------------------|
| Database: | EDMDBBW            | Local Co-ordinate Reference: | Well Pan Head Fee #3H                   |
| Company:  | COG Operating, LLC | TVD Reference:               | WELL @ 4172.00usft (Original Well Elev) |
| Project:  | Lea County(NM27E)  | MD Reference:                | WELL @ 4172.00usft (Original Well Elev) |
| Site:     | Sec.11-T17S-R32E   | North Reference:             | Grid                                    |
| Well:     | Pan Head Fee #3H   | Survey Calculation Method:   | Minimum Curvature                       |
| Wellbore: | Wellbore #1        |                              |                                         |
| Design:   | Design #1          |                              |                                         |

| 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) |
| 7,900.00              | 91.00           | 180.58      | 6,785.71              | -1,304.66    | -13.22       | 1,304.73                | 0.00                    | 0.00                   | 0.00                  |
| 8,000.00              | 91.00           | 180.58      | 6,783.96              | -1,404.64    | -14.23       | 1,404.71                | 0.00                    | 0.00                   | 0.00                  |
| 8,100.00              | 91.00           | 180.58      | 6,782.22              | -1,504.62    | -15.25       | 1,504.70                | 0.00                    | 0.00                   | 0.00                  |
| 8,200.00              | 91.00           | 180.58      | 6,780.47              | -1,604.60    | -16.26       | 1,604.68                | 0.00                    | 0.00                   | 0.00                  |
| 8,300.00              | 91.00           | 180.58      | 6,778.73              | -1,704.58    | -17.27       | 1,704.67                | 0.00                    | 0.00                   | 0.00                  |
| 8,400.00              | 91.00           | 180.58      | 6,776.98              | -1,804.56    | -18.28       | 1,804.65                | 0.00                    | 0.00                   | 0.00                  |
| 8,500.00              | 91.00           | 180.58      | 6,775.24              | -1,904.54    | -19.30       | 1,904.64                | 0.00                    | 0.00                   | 0.00                  |
| 8,600.00              | 91.00           | 180.58      | 6,773.49              | -2,004.52    | -20.31       | 2,004.62                | 0.00                    | 0.00                   | 0.00                  |
| 8,700.00              | 91.00           | 180.58      | 6,771.75              | -2,104.50    | -21.32       | 2,104.61                | 0.00                    | 0.00                   | 0.00                  |
| 8,800.00              | 91.00           | 180.58      | 6,770.00              | -2,204.48    | -22.34       | 2,204.59                | 0.00                    | 0.00                   | 0.00                  |
| 8,900.00              | 91.00           | 180.58      | 6,768.26              | -2,304.46    | -23.35       | 2,304.58                | 0.00                    | 0.00                   | 0.00                  |
| 9,000.00              | 91.00           | 180.58      | 6,766.51              | -2,404.44    | -24.36       | 2,404.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,100.00              | 91.00           | 180.58      | 6,764.76              | -2,504.42    | -25.38       | 2,504.55                | 0.00                    | 0.00                   | 0.00                  |
| 9,200.00              | 91.00           | 180.58      | 6,763.02              | -2,604.40    | -26.39       | 2,604.53                | 0.00                    | 0.00                   | 0.00                  |
| 9,300.00              | 91.00           | 180.58      | 6,761.27              | -2,704.38    | -27.40       | 2,704.52                | 0.00                    | 0.00                   | 0.00                  |
| 9,400.00              | 91.00           | 180.58      | 6,759.53              | -2,804.36    | -28.41       | 2,804.50                | 0.00                    | 0.00                   | 0.00                  |
| 9,500.00              | 91.00           | 180.58      | 6,757.78              | -2,904.34    | -29.43       | 2,904.49                | 0.00                    | 0.00                   | 0.00                  |
| 9,600.00              | 91.00           | 180.58      | 6,756.04              | -3,004.32    | -30.44       | 3,004.47                | 0.00                    | 0.00                   | 0.00                  |
| 9,700.00              | 91.00           | 180.58      | 6,754.29              | -3,104.30    | -31.45       | 3,104.46                | 0.00                    | 0.00                   | 0.00                  |
| 9,800.00              | 91.00           | 180.58      | 6,752.55              | -3,204.28    | -32.47       | 3,204.44                | 0.00                    | 0.00                   | 0.00                  |
| 9,900.00              | 91.00           | 180.58      | 6,750.80              | -3,304.26    | -33.48       | 3,304.43                | 0.00                    | 0.00                   | 0.00                  |
| 10,000.00             | 91.00           | 180.58      | 6,749.06              | -3,404.24    | -34.49       | 3,404.41                | 0.00                    | 0.00                   | 0.00                  |
| 10,100.00             | 91.00           | 180.58      | 6,747.31              | -3,504.21    | -35.51       | 3,504.39                | 0.00                    | 0.00                   | 0.00                  |
| 10,200.00             | 91.00           | 180.58      | 6,745.57              | -3,604.19    | -36.52       | 3,604.38                | 0.00                    | 0.00                   | 0.00                  |
| 10,300.00             | 91.00           | 180.58      | 6,743.82              | -3,704.17    | -37.53       | 3,704.36                | 0.00                    | 0.00                   | 0.00                  |
| 10,400.00             | 91.00           | 180.58      | 6,742.08              | -3,804.15    | -38.54       | 3,804.35                | 0.00                    | 0.00                   | 0.00                  |
| 10,500.00             | 91.00           | 180.58      | 6,740.33              | -3,904.13    | -39.56       | 3,904.33                | 0.00                    | 0.00                   | 0.00                  |
| 10,600.00             | 91.00           | 180.58      | 6,738.59              | -4,004.11    | -40.57       | 4,004.32                | 0.00                    | 0.00                   | 0.00                  |
| 10,700.00             | 91.00           | 180.58      | 6,736.84              | -4,104.09    | -41.58       | 4,104.30                | 0.00                    | 0.00                   | 0.00                  |
| 10,800.00             | 91.00           | 180.58      | 6,735.10              | -4,204.07    | -42.60       | 4,204.29                | 0.00                    | 0.00                   | 0.00                  |
| 10,900.00             | 91.00           | 180.58      | 6,733.35              | -4,304.05    | -43.61       | 4,304.27                | 0.00                    | 0.00                   | 0.00                  |
| 11,000.00             | 91.00           | 180.58      | 6,731.61              | -4,404.03    | -44.62       | 4,404.26                | 0.00                    | 0.00                   | 0.00                  |
| 11,100.00             | 91.00           | 180.58      | 6,729.86              | -4,504.01    | -45.64       | 4,504.24                | 0.00                    | 0.00                   | 0.00                  |
| 11,200.00             | 91.00           | 180.58      | 6,728.11              | -4,603.99    | -46.65       | 4,604.23                | 0.00                    | 0.00                   | 0.00                  |
| 11,300.00             | 91.00           | 180.58      | 6,726.37              | -4,703.97    | -47.66       | 4,704.21                | 0.00                    | 0.00                   | 0.00                  |
| 11,400.00             | 91.00           | 180.58      | 6,724.62              | -4,803.95    | -48.68       | 4,804.20                | 0.00                    | 0.00                   | 0.00                  |
| 11,500.00             | 91.00           | 180.58      | 6,722.88              | -4,903.93    | -49.69       | 4,904.18                | 0.00                    | 0.00                   | 0.00                  |
| 11,600.00             | 91.00           | 180.58      | 6,721.13              | -5,003.91    | -50.70       | 5,004.17                | 0.00                    | 0.00                   | 0.00                  |
| 11,700.00             | 91.00           | 180.58      | 6,719.39              | -5,103.89    | -51.71       | 5,104.15                | 0.00                    | 0.00                   | 0.00                  |
| 11,800.00             | 91.00           | 180.58      | 6,717.64              | -5,203.87    | -52.73       | 5,204.14                | 0.00                    | 0.00                   | 0.00                  |
| 11,900.00             | 91.00           | 180.58      | 6,715.90              | -5,303.85    | -53.74       | 5,304.12                | 0.00                    | 0.00                   | 0.00                  |
| 12,000.00             | 91.00           | 180.58      | 6,714.15              | -5,403.83    | -54.75       | 5,404.11                | 0.00                    | 0.00                   | 0.00                  |
| 12,100.00             | 91.00           | 180.58      | 6,712.41              | -5,503.81    | -55.77       | 5,504.09                | 0.00                    | 0.00                   | 0.00                  |
| 12,200.00             | 91.00           | 180.58      | 6,710.66              | -5,603.79    | -56.78       | 5,604.07                | 0.00                    | 0.00                   | 0.00                  |
| 12,300.00             | 91.00           | 180.58      | 6,708.92              | -5,703.77    | -57.79       | 5,704.06                | 0.00                    | 0.00                   | 0.00                  |
| 12,400.00             | 91.00           | 180.58      | 6,707.17              | -5,803.75    | -58.81       | 5,804.04                | 0.00                    | 0.00                   | 0.00                  |
| 12,500.00             | 91.00           | 180.58      | 6,705.43              | -5,903.73    | -59.82       | 5,904.03                | 0.00                    | 0.00                   | 0.00                  |
| 12,600.00             | 91.00           | 180.58      | 6,703.68              | -6,003.71    | -60.83       | 6,004.01                | 0.00                    | 0.00                   | 0.00                  |
| 12,700.00             | 91.00           | 180.58      | 6,701.94              | -6,103.69    | -61.84       | 6,104.00                | 0.00                    | 0.00                   | 0.00                  |
| 12,800.00             | 91.00           | 180.58      | 6,700.19              | -6,203.66    | -62.86       | 6,203.98                | 0.00                    | 0.00                   | 0.00                  |
| 12,900.00             | 91.00           | 180.58      | 6,698.45              | -6,303.64    | -63.87       | 6,303.97                | 0.00                    | 0.00                   | 0.00                  |
| 13,000.00             | 91.00           | 180.58      | 6,696.70              | -6,403.62    | -64.88       | 6,403.95                | 0.00                    | 0.00                   | 0.00                  |
| 13,100.00             | 91.00           | 180.58      | 6,694.96              | -6,503.60    | -65.90       | 6,503.94                | 0.00                    | 0.00                   | 0.00                  |
| 13,200.00             | 91.00           | 180.58      | 6,693.21              | -6,603.58    | -66.91       | 6,603.92                | 0.00                    | 0.00                   | 0.00                  |

|           |                    |                              |                                         |
|-----------|--------------------|------------------------------|-----------------------------------------|
| Database: | EDMDBBW            | Local Co-ordinate Reference: | Well Pan Head Fee #3H                   |
| Company:  | COG Operating, LLC | TVD Reference:               | WELL @ 4172.00usft (Original Well Elev) |
| Project:  | Lea County(NM27E)  | MD Reference:                | WELL @ 4172.00usft (Original Well Elev) |
| Site:     | Sec.11-T17S-R32E   | North Reference:             | Grid                                    |
| Well:     | Pan Head Fee #3H   | Survey Calculation Method:   | Minimum Curvature                       |
| Wellbore: | Wellbore #1        |                              |                                         |
| Design:   | Design #1          |                              |                                         |

| 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) |
| 13,300.00             | 91.00           | 180.58      | 6,691.46              | -6,703.56    | -67.92       | 6,703.91                | 0.00                    | 0.00                   | 0.00                  |
| 13,400.00             | 91.00           | 180.58      | 6,689.72              | -6,803.54    | -68.94       | 6,803.89                | 0.00                    | 0.00                   | 0.00                  |
| 13,500.00             | 91.00           | 180.58      | 6,687.97              | -6,903.52    | -69.95       | 6,903.88                | 0.00                    | 0.00                   | 0.00                  |
| 13,600.00             | 91.00           | 180.58      | 6,686.23              | -7,003.50    | -70.96       | 7,003.86                | 0.00                    | 0.00                   | 0.00                  |
| 13,700.00             | 91.00           | 180.58      | 6,684.48              | -7,103.48    | -71.97       | 7,103.85                | 0.00                    | 0.00                   | 0.00                  |
| 13,800.00             | 91.00           | 180.58      | 6,682.74              | -7,203.46    | -72.99       | 7,203.83                | 0.00                    | 0.00                   | 0.00                  |
| TD at 13850.55        |                 |             |                       |              |              |                         |                         |                        |                       |
| 13,850.55             | 91.00           | 180.58      | 6,681.86              | -7,254.00    | -73.50       | 7,254.37                | 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         |
| - hit/miss target         |               |              |            |              |              |                 |                |                 |                   |
| - Shape                   |               |              |            |              |              |                 |                |                 |                   |
| Pan Head Fee #3H PBH      | 0.00          | 0.00         | 6,681.86   | -7,254.00    | -73.50       | 668,130.200     | 682,301.400    | 32° 50' 7.327 N | 103° 44' 23.333 W |
| - plan hits target center |               |              |            |              |              |                 |                |                 |                   |
| - Point                   |               |              |            |              |              |                 |                |                 |                   |

| Plan Annotations      |                       |                   |              |                  |
|-----------------------|-----------------------|-------------------|--------------|------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment          |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                  |
| 6,322.61              | 6,322.61              | 0.00              | 0.00         | KOP 12°/100'     |
| 7,080.94              | 6,800.00              | -485.77           | -4.92        | EOC / Hold to TD |
| 13,850.55             | 6,681.86              | -7,254.00         | -73.50       | TD at 13850.55   |



Project: Lea County(NM27E)  
Site: Sec.11,-117S,-R32E  
Well: Pan Head Fee #3H  
Wellbore: Wellbore #1  
Design: Design #1  
Lat: 32.51 19.100 N  
Long: 103.44 21.994 W  
GL: 4155.00

| SECTION DETAILS |          |       |        |         |          |        |        |       |         |                 |
|-----------------|----------|-------|--------|---------|----------|--------|--------|-------|---------|-----------------|
|                 | MD       | Inc   | Azi    | TVD     | +N/S     | +E/W   | Dieg   | TFace | Vsect   | Annotation      |
|                 | 0.00     | 0.00  | 0.00   | 0.00    | 0.00     | 0.00   | 0.00   | 0.00  | 0.00    |                 |
|                 | 6322.61  | 0.00  | 0.00   | 6322.61 | 0.00     | 0.00   | 0.00   | 0.00  | 0.00    | KOP 1297.00'    |
|                 | 7080.94  | 0.00  | 0.00   | 6800.00 | -485.77  | -5.32  | 180.58 | 0.00  | 485.80  | EOC / 164 ft TD |
|                 | 73850.35 | 91.00 | 180.58 | 6881.86 | -7234.00 | -73.50 | 0.00   | 0.00  | 7234.37 | TD at 13850.55  |

| WELL DETAILS: Pan Head Fee #3H |               |            |          |                   |
|--------------------------------|---------------|------------|----------|-------------------|
|                                | Ground Level: | 4155.00    |          |                   |
|                                | Easting       | 682374.900 | Latitude | 103° 44' 21.994 W |
|                                | Northing      | 675384.200 |          |                   |
| +E-W                           |               | 0.00       |          |                   |
| +N-S                           |               | 0.00       |          | Slot              |

| WELLBORE TARGET DETAILS (LAT/LONG) |         |          |        |                 |                   |
|------------------------------------|---------|----------|--------|-----------------|-------------------|
| Name                               | TVD     | +N/-S    | +E/-W  | Latitude        | Longitude         |
| Pan Head Fee #3H PBHL              | 6681.86 | -7254.00 | -73.50 | 32° 50' 7.327 N | 103° 44' 23.333 W |
|                                    |         |          |        |                 | Shape Point       |

