

30-025-41489

# COG OPERATING, LLC

Lea County, NM

Sneed 9 Federal Com 21H

21H

Lateral

Plan: Plan #1a

## Standard Planning Report

03 February, 2015

### Section Distances

Sec9,T17S,R32E  
SHL - Unit D  
330'FNL, 150'FWL  
PP - Unit D  
330'FNL, 330'FWL  
Sec10,T17S,R32E  
PBHL - Unit D  
330'FNL, 988'FWL

*Revised Proposed DD*

# COG OPERATING, LLC

Field: Lea County, NM  
 Site: Sneed 9 Federal Com 21H  
 Well: 21H  
 Wellbore: Lateral  
 Plan: Plan #1a

## TARGET DETAILS

| Name                          | TVD     | +N/-S | +E/-W   | Northing  | Easting   | Latitude        | Longitude        |
|-------------------------------|---------|-------|---------|-----------|-----------|-----------------|------------------|
| Sneed 9 Federal Com #21H SHL  | 0.00    | 0.00  | 0.00    | 675348.20 | 670215.80 | 32° 51' 19.40 N | 103° 46' 44.53 W |
| Sneed 9 Federal Com #21H PP   | 6273.00 | 0.62  | 180.03  | 675348.82 | 670395.83 | 32° 51' 19.39 N | 103° 46' 42.42 W |
| Sneed 9 Federal Com #21H PBHL | 6400.00 | 21.00 | 6111.60 | 675369.20 | 676327.40 | 32° 51' 19.28 N | 103° 45' 32.89 W |



Azimuths to Grid North  
 True North -0.30°  
 Magnetic North: 7.13°

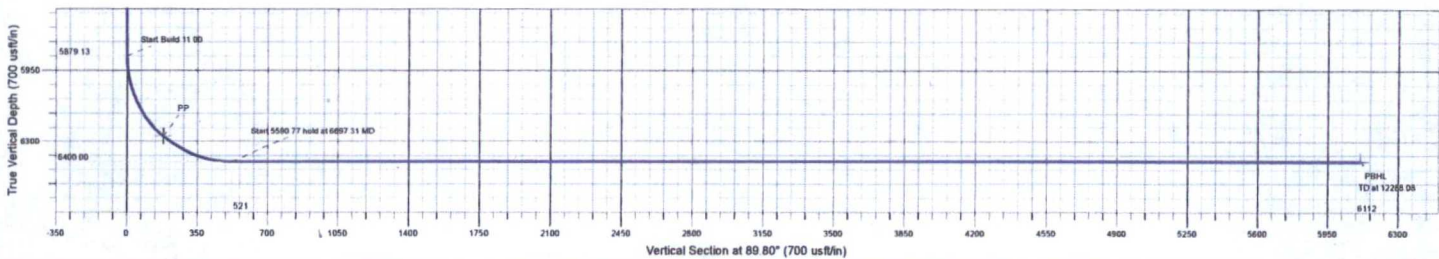
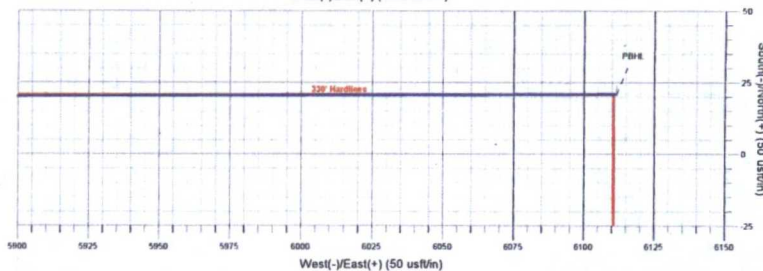
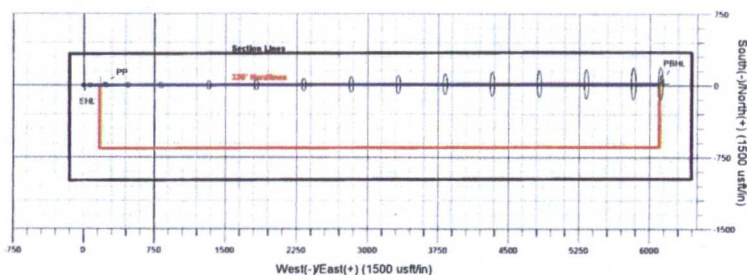
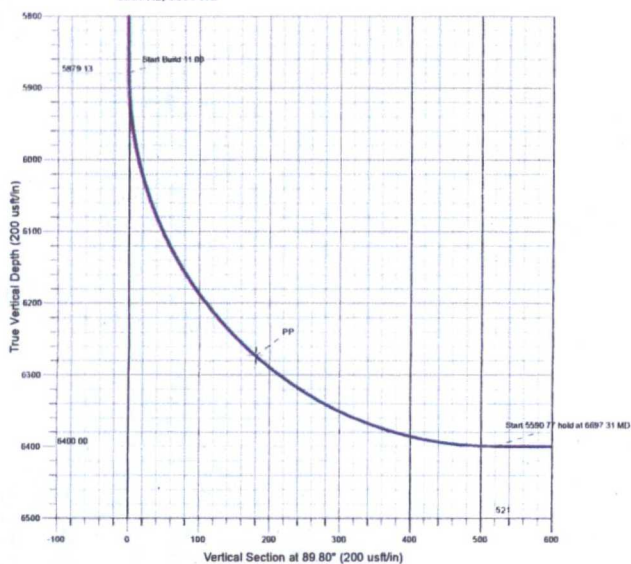
Magnetic Field  
 Strength: 48658.5nT  
 Dip Angle: 60.90°  
 Date: 1/23/2015  
 Model: HDGM

## Section Distances

Sec9.T17S.R32E  
 SHL - Unit D  
 330FNL, 150FWL  
 PP - Unit D  
 330FNL, 330FWL  
 Sec10.T17S.R32E  
 PBHL - Unit D  
 330FNL, 988FWL

## SECTION DETAILS

| Sec | MD       | Inc   | Azi   | TVD     | +N/-S | +E/-W   | Dleg  | TFace | VSec    | Target                        |
|-----|----------|-------|-------|---------|-------|---------|-------|-------|---------|-------------------------------|
| 1   | 0.00     | 0.00  | 0.00  | 0.00    | 0.00  | 0.00    | 0.00  | 0.00  | 0.00    |                               |
| 2   | 5879.13  | 0.00  | 0.00  | 5879.13 | 0.00  | 0.00    | 0.00  | 0.00  | 0.00    |                               |
| 3   | 6697.31  | 90.00 | 89.80 | 6400.00 | 1.79  | 520.87  | 11.00 | 89.80 | 520.87  | Sneed 9 Federal Com #21H PBHL |
| 4   | 12288.08 | 90.00 | 89.80 | 6400.00 | 21.00 | 6111.60 | 0.00  | 0.00  | 6111.64 |                               |



**Archer**

ARCHER DIRECTIONAL DRILLING SERVICES  
 12101 Cutten Rd. Houston, Texas 77066  
 Phone: 281-301-2600 Fax: 281-301-2795

Design: Plan #1a (21H/Lateral)  
 Created By: Keith Noack  
 Date: 7.32, February 03 2015



# Archer Planning Report

|                  |                         |                                     |                                           |
|------------------|-------------------------|-------------------------------------|-------------------------------------------|
| <b>Database:</b> | EDM R5000.1 MULTI       | <b>Local Co-ordinate Reference:</b> | Well 21H                                  |
| <b>Company:</b>  | COG OPERATING, LLC      | <b>TVD Reference:</b>               | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| <b>Project:</b>  | Lea County, NM          | <b>MD Reference:</b>                | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| <b>Site:</b>     | Sneed 9 Federal Com 21H | <b>North Reference:</b>             | Grid                                      |
| <b>Well:</b>     | 21H                     | <b>Survey Calculation Method:</b>   | Minimum Curvature                         |
| <b>Wellbore:</b> | Lateral                 |                                     |                                           |
| <b>Design:</b>   | Plan #1a                |                                     |                                           |

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Lea County, NM                       |                      |                |
| <b>Map System:</b> | US State Plane 1927 (Exact solution) | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | NAD 1927 (NADCON CONUS)              |                      |                |
| <b>Map Zone:</b>   | New Mexico East 3001                 |                      |                |

|                              |                         |                          |                  |
|------------------------------|-------------------------|--------------------------|------------------|
| <b>Site</b>                  | Sneed 9 Federal Com 21H |                          |                  |
| <b>Site Position:</b>        |                         | <b>Northing:</b>         | 675,348.20 usft  |
| <b>From:</b>                 | Map                     | <b>Easting:</b>          | 670,215.80 usft  |
| <b>Position Uncertainty:</b> | 0.00 usft               | <b>Slot Radius:</b>      | 13.200 in        |
|                              |                         | <b>Latitude:</b>         | 32° 51' 19.40 N  |
|                              |                         | <b>Longitude:</b>        | 103° 46' 44.53 W |
|                              |                         | <b>Grid Convergence:</b> | 0.30 °           |

|                             |              |                            |                                  |
|-----------------------------|--------------|----------------------------|----------------------------------|
| <b>Well</b>                 | 21H          |                            |                                  |
| <b>Well Position</b>        | <b>+N/-S</b> | 0.00 usft                  | <b>Northing:</b> 675,348.20 usft |
|                             | <b>+E/-W</b> | 0.00 usft                  | <b>Easting:</b> 670,215.80 usft  |
| <b>Position Uncertainty</b> | 0.00 usft    | <b>Wellhead Elevation:</b> | 0.00 usft                        |
|                             |              | <b>Latitude:</b>           | 32° 51' 19.40 N                  |
|                             |              | <b>Longitude:</b>          | 103° 46' 44.53 W                 |
|                             |              | <b>Ground Level:</b>       | 4,089.00 usft                    |

|                  |                   |                    |                            |
|------------------|-------------------|--------------------|----------------------------|
| <b>Wellbore</b>  | Lateral           |                    |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b>     |
|                  | HDGM              | 1/23/2015          | 7.43                       |
|                  |                   |                    | <b>Dip Angle (°)</b>       |
|                  |                   |                    | 60.90                      |
|                  |                   |                    | <b>Field Strength (nT)</b> |
|                  |                   |                    | 48,659                     |

|                          |                                |                     |                           |
|--------------------------|--------------------------------|---------------------|---------------------------|
| <b>Design</b>            | Plan #1a                       |                     |                           |
| <b>Audit Notes:</b>      |                                |                     |                           |
| <b>Version:</b>          | <b>Phase:</b>                  | PROTOTYPE           | <b>Tie On Depth:</b> 0.00 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b>       |
|                          | 0.00                           | 0.00                | 0.00                      |
|                          |                                |                     | <b>Direction (°)</b>      |
|                          |                                |                     | 89.80                     |

|                              |                        |                    |                              |                     |                     |                                |                               |                              |                |                      |
|------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|-------------------------------|------------------------------|----------------|----------------------|
| <b>Plan Sections</b>         |                        |                    |                              |                     |                     |                                |                               |                              |                |                      |
| <b>Measured Depth (usft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Dogleg Rate (°/100usft)</b> | <b>Build Rate (°/100usft)</b> | <b>Turn Rate (°/100usft)</b> | <b>TFO (°)</b> | <b>Target</b>        |
| 0.00                         | 0.00                   | 0.00               | 0.00                         | 0.00                | 0.00                | 0.00                           | 0.00                          | 0.00                         | 0.00           |                      |
| 5,879.13                     | 0.00                   | 0.00               | 5,879.13                     | 0.00                | 0.00                | 0.00                           | 0.00                          | 0.00                         | 0.00           |                      |
| 6,697.31                     | 90.00                  | 89.80              | 6,400.00                     | 1.79                | 520.87              | 11.00                          | 11.00                         | 0.00                         | 89.80          |                      |
| 12,288.08                    | 90.00                  | 89.80              | 6,400.00                     | 21.00               | 6,111.60            | 0.00                           | 0.00                          | 0.00                         | 0.00           | Sneed 9 Federal Corr |



# Archer Planning Report

|           |                         |                              |                                           |
|-----------|-------------------------|------------------------------|-------------------------------------------|
| Database: | EDM R5000.1 MULTI       | Local Co-ordinate Reference: | Well 21H                                  |
| Company:  | COG OPERATING, LLC      | TVD Reference:               | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| Project:  | Lea County, NM          | MD Reference:                | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| Site:     | Sneed 9 Federal Com 21H | North Reference:             | Grid                                      |
| Well:     | 21H                     | Survey Calculation Method:   | Minimum Curvature                         |
| Wellbore: | Lateral                 |                              |                                           |
| Design:   | Plan #1a                |                              |                                           |

## 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                        |



# Archer Planning Report

|           |                         |                              |                                           |
|-----------|-------------------------|------------------------------|-------------------------------------------|
| Database: | EDM R5000.1 MULTI       | Local Co-ordinate Reference: | Well 21H                                  |
| Company:  | COG OPERATING, LLC      | TVD Reference:               | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| Project:  | Lea County, NM          | MD Reference:                | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| Site:     | Sneed 9 Federal Com 21H | North Reference:             | Grid                                      |
| Well:     | 21H                     | Survey Calculation Method:   | Minimum Curvature                         |
| Wellbore: | Lateral                 |                              |                                           |
| Design:   | Plan #1a                |                              |                                           |

## 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                  |
| 5,879.13                         | 0.00            | 0.00        | 5,879.13              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |
| Start Build 11.00                |                 |             |                       |              |              |                         |                         |                        |                       |
| 5,900.00                         | 2.30            | 89.80       | 5,899.99              | 0.00         | 0.42         | 0.42                    | 11.00                   | 11.00                  | 0.00                  |
| 5,950.00                         | 7.80            | 89.80       | 5,949.78              | 0.02         | 4.81         | 4.81                    | 11.00                   | 11.00                  | 0.00                  |
| 6,000.00                         | 13.30           | 89.80       | 5,998.92              | 0.05         | 13.96        | 13.96                   | 11.00                   | 11.00                  | 0.00                  |
| 6,050.00                         | 18.80           | 89.80       | 6,046.95              | 0.10         | 27.78        | 27.78                   | 11.00                   | 11.00                  | 0.00                  |
| 6,100.00                         | 24.30           | 89.80       | 6,093.44              | 0.16         | 46.13        | 46.13                   | 11.00                   | 11.00                  | 0.00                  |
| 6,150.00                         | 29.80           | 89.80       | 6,137.96              | 0.24         | 68.86        | 68.86                   | 11.00                   | 11.00                  | 0.00                  |
| 6,200.00                         | 35.30           | 89.80       | 6,180.09              | 0.33         | 95.75        | 95.75                   | 11.00                   | 11.00                  | 0.00                  |
| 6,250.00                         | 40.80           | 89.80       | 6,219.45              | 0.43         | 126.55       | 126.55                  | 11.00                   | 11.00                  | 0.00                  |
| 6,300.00                         | 46.30           | 89.80       | 6,255.68              | 0.55         | 160.98       | 160.98                  | 11.00                   | 11.00                  | 0.00                  |
| 6,350.00                         | 51.80           | 89.80       | 6,288.44              | 0.68         | 198.73       | 198.73                  | 11.00                   | 11.00                  | 0.00                  |
| 6,400.00                         | 57.30           | 89.80       | 6,317.43              | 0.82         | 239.44       | 239.44                  | 11.00                   | 11.00                  | 0.00                  |
| 6,450.00                         | 62.80           | 89.80       | 6,342.38              | 0.97         | 282.75       | 282.75                  | 11.00                   | 11.00                  | 0.00                  |
| 6,500.00                         | 68.30           | 89.80       | 6,363.07              | 1.13         | 328.24       | 328.24                  | 11.00                   | 11.00                  | 0.00                  |
| 6,550.00                         | 73.80           | 89.80       | 6,379.31              | 1.29         | 375.51       | 375.52                  | 11.00                   | 11.00                  | 0.00                  |
| 6,600.00                         | 79.30           | 89.80       | 6,390.94              | 1.46         | 424.12       | 424.12                  | 11.00                   | 11.00                  | 0.00                  |
| 6,650.00                         | 84.80           | 89.80       | 6,397.85              | 1.63         | 473.62       | 473.62                  | 11.00                   | 11.00                  | 0.00                  |
| 6,697.31                         | 90.00           | 89.80       | 6,400.00              | 1.79         | 520.87       | 520.87                  | 11.00                   | 11.00                  | 0.00                  |
| Start 5590.77 hold at 6697.31 MD |                 |             |                       |              |              |                         |                         |                        |                       |
| 6,700.00                         | 90.00           | 89.80       | 6,400.00              | 1.80         | 523.56       | 523.56                  | 0.00                    | 0.00                   | 0.00                  |
| 6,800.00                         | 90.00           | 89.80       | 6,400.00              | 2.14         | 623.56       | 623.56                  | 0.00                    | 0.00                   | 0.00                  |
| 6,900.00                         | 90.00           | 89.80       | 6,400.00              | 2.49         | 723.56       | 723.56                  | 0.00                    | 0.00                   | 0.00                  |
| 7,000.00                         | 90.00           | 89.80       | 6,400.00              | 2.83         | 823.55       | 823.56                  | 0.00                    | 0.00                   | 0.00                  |
| 7,100.00                         | 90.00           | 89.80       | 6,400.00              | 3.17         | 923.55       | 923.56                  | 0.00                    | 0.00                   | 0.00                  |
| 7,200.00                         | 90.00           | 89.80       | 6,400.00              | 3.52         | 1,023.55     | 1,023.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,300.00                         | 90.00           | 89.80       | 6,400.00              | 3.86         | 1,123.55     | 1,123.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,400.00                         | 90.00           | 89.80       | 6,400.00              | 4.20         | 1,223.55     | 1,223.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,500.00                         | 90.00           | 89.80       | 6,400.00              | 4.55         | 1,323.55     | 1,323.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,600.00                         | 90.00           | 89.80       | 6,400.00              | 4.89         | 1,423.55     | 1,423.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,700.00                         | 90.00           | 89.80       | 6,400.00              | 5.24         | 1,523.55     | 1,523.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,800.00                         | 90.00           | 89.80       | 6,400.00              | 5.58         | 1,623.55     | 1,623.56                | 0.00                    | 0.00                   | 0.00                  |
| 7,900.00                         | 90.00           | 89.80       | 6,400.00              | 5.92         | 1,723.55     | 1,723.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,000.00                         | 90.00           | 89.80       | 6,400.00              | 6.27         | 1,823.55     | 1,823.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,100.00                         | 90.00           | 89.80       | 6,400.00              | 6.61         | 1,923.55     | 1,923.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,200.00                         | 90.00           | 89.80       | 6,400.00              | 6.95         | 2,023.55     | 2,023.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,300.00                         | 90.00           | 89.80       | 6,400.00              | 7.30         | 2,123.55     | 2,123.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,400.00                         | 90.00           | 89.80       | 6,400.00              | 7.64         | 2,223.55     | 2,223.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,500.00                         | 90.00           | 89.80       | 6,400.00              | 7.98         | 2,323.55     | 2,323.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,600.00                         | 90.00           | 89.80       | 6,400.00              | 8.33         | 2,423.55     | 2,423.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,700.00                         | 90.00           | 89.80       | 6,400.00              | 8.67         | 2,523.54     | 2,523.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,800.00                         | 90.00           | 89.80       | 6,400.00              | 9.01         | 2,623.54     | 2,623.56                | 0.00                    | 0.00                   | 0.00                  |
| 8,900.00                         | 90.00           | 89.80       | 6,400.00              | 9.36         | 2,723.54     | 2,723.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,000.00                         | 90.00           | 89.80       | 6,400.00              | 9.70         | 2,823.54     | 2,823.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,100.00                         | 90.00           | 89.80       | 6,400.00              | 10.05        | 2,923.54     | 2,923.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,200.00                         | 90.00           | 89.80       | 6,400.00              | 10.39        | 3,023.54     | 3,023.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,300.00                         | 90.00           | 89.80       | 6,400.00              | 10.73        | 3,123.54     | 3,123.56                | 0.00                    | 0.00                   | 0.00                  |
| 9,400.00                         | 90.00           | 89.80       | 6,400.00              | 11.08        | 3,223.54     | 3,223.56                | 0.00                    | 0.00                   | 0.00                  |



# Archer Planning Report

|                  |                         |                                     |                                           |
|------------------|-------------------------|-------------------------------------|-------------------------------------------|
| <b>Database:</b> | EDM R5000.1 MULTI       | <b>Local Co-ordinate Reference:</b> | Well 21H                                  |
| <b>Company:</b>  | COG OPERATING, LLC      | <b>TVD Reference:</b>               | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| <b>Project:</b>  | Lea County, NM          | <b>MD Reference:</b>                | 4089' GL + 19 RKB @ 4108.00usft (McVay 6) |
| <b>Site:</b>     | Sneed 9 Federal Com 21H | <b>North Reference:</b>             | Grid                                      |
| <b>Well:</b>     | 21H                     | <b>Survey Calculation Method:</b>   | Minimum Curvature                         |
| <b>Wellbore:</b> | Lateral                 |                                     |                                           |
| <b>Design:</b>   | Plan #1a                |                                     |                                           |

| 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) |  |
| 9,500.00              | 90.00           | 89.80       | 6,400.00              | 11.42        | 3,323.54     | 3,323.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 9,600.00              | 90.00           | 89.80       | 6,400.00              | 11.76        | 3,423.54     | 3,423.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 9,700.00              | 90.00           | 89.80       | 6,400.00              | 12.11        | 3,523.54     | 3,523.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 9,800.00              | 90.00           | 89.80       | 6,400.00              | 12.45        | 3,623.54     | 3,623.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 9,900.00              | 90.00           | 89.80       | 6,400.00              | 12.79        | 3,723.54     | 3,723.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,000.00             | 90.00           | 89.80       | 6,400.00              | 13.14        | 3,823.54     | 3,823.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,100.00             | 90.00           | 89.80       | 6,400.00              | 13.48        | 3,923.54     | 3,923.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,200.00             | 90.00           | 89.80       | 6,400.00              | 13.83        | 4,023.54     | 4,023.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,300.00             | 90.00           | 89.80       | 6,400.00              | 14.17        | 4,123.54     | 4,123.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,400.00             | 90.00           | 89.80       | 6,400.00              | 14.51        | 4,223.53     | 4,223.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,500.00             | 90.00           | 89.80       | 6,400.00              | 14.86        | 4,323.53     | 4,323.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,600.00             | 90.00           | 89.80       | 6,400.00              | 15.20        | 4,423.53     | 4,423.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,700.00             | 90.00           | 89.80       | 6,400.00              | 15.54        | 4,523.53     | 4,523.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,800.00             | 90.00           | 89.80       | 6,400.00              | 15.89        | 4,623.53     | 4,623.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 10,900.00             | 90.00           | 89.80       | 6,400.00              | 16.23        | 4,723.53     | 4,723.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,000.00             | 90.00           | 89.80       | 6,400.00              | 16.57        | 4,823.53     | 4,823.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,100.00             | 90.00           | 89.80       | 6,400.00              | 16.92        | 4,923.53     | 4,923.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,200.00             | 90.00           | 89.80       | 6,400.00              | 17.26        | 5,023.53     | 5,023.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,300.00             | 90.00           | 89.80       | 6,400.00              | 17.60        | 5,123.53     | 5,123.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,400.00             | 90.00           | 89.80       | 6,400.00              | 17.95        | 5,223.53     | 5,223.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,500.00             | 90.00           | 89.80       | 6,400.00              | 18.29        | 5,323.53     | 5,323.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,600.00             | 90.00           | 89.80       | 6,400.00              | 18.64        | 5,423.53     | 5,423.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,700.00             | 90.00           | 89.80       | 6,400.00              | 18.98        | 5,523.53     | 5,523.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,800.00             | 90.00           | 89.80       | 6,400.00              | 19.32        | 5,623.53     | 5,623.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 11,900.00             | 90.00           | 89.80       | 6,400.00              | 19.67        | 5,723.53     | 5,723.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 12,000.00             | 90.00           | 89.80       | 6,400.00              | 20.01        | 5,823.53     | 5,823.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 12,100.00             | 90.00           | 89.80       | 6,400.00              | 20.35        | 5,923.52     | 5,923.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 12,200.00             | 90.00           | 89.80       | 6,400.00              | 20.70        | 6,023.52     | 6,023.56                | 0.00                    | 0.00                   | 0.00                  |  |
| 12,288.08             | 90.00           | 89.80       | 6,400.00              | 21.00        | 6,111.60     | 6,111.64                | 0.00                    | 0.00                   | 0.00                  |  |
| TD at 12288.08        |                 |             |                       |              |              |                         |                         |                        |                       |  |

| 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                                                        |               |              |            |              |              |                 |                |                 |                  |
| Sneed 9 Federal Com #:<br>- plan hits target center<br>- Point | 0.00          | 0.00         | 0.00       | 0.00         | 0.00         | 675,348.20      | 670,215.80     | 32° 51' 19.40 N | 103° 46' 44.53 W |
| Sneed 9 Federal Com #:<br>- plan hits target center<br>- Point | 0.00          | 0.00         | 6,273.00   | 0.62         | 180.03       | 675,348.81      | 670,395.83     | 32° 51' 19.39 N | 103° 46' 42.42 W |
| Sneed 9 Federal Com #:<br>- plan hits target center<br>- Point | 0.00          | 0.00         | 6,400.00   | 21.00        | 6,111.60     | 675,369.20      | 676,327.40     | 32° 51' 19.28 N | 103° 45' 32.89 W |

# Archer Planning Report

Database: EDM R5000.1 MULTI  
Company: COG OPERATING, LLC  
Project: Lea County, NM  
Site: Sneed 9 Federal Com 21H  
Well: 21H  
Wellbore: Lateral  
Design: Plan #1a

Local Co-ordinate Reference: Well 21H  
TVD Reference: 4089' GL + 19 RKB @ 4108.00usft (McVay 6)  
MD Reference: 4089' GL + 19 RKB @ 4108.00usft (McVay 6)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

## Plan Annotations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                          |
|-----------------------------|-----------------------------|-------------------|-----------------|----------------------------------|
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                  |
| 5,879.13                    | 5,879.13                    | 0.00              | 0.00            | Start Build 11.00                |
| 6,697.31                    | 6,400.00                    | 1.79              | 520.87          | Start 5590.77 hold at 6697.31 MD |
| 12,288.08                   | 6,400.00                    | 21.00             | 6,111.60        | TD at 12288.08                   |