



HOBBS OCD

FEB 02 2017

RECEIVED

## **COG Operating LLC**

Lea County, NM (NAD-27 2015)

Sneed 9 Federal Com #11H

API #: 30-025-43284

SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D

PP: 353' FNL, 330' FWL, Sec 9, T17S, R32E, Unit D

BHL: 352' FNL, 965' FWL, Sec 10, T17S, R32E, Unit D

Design: BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D

## **Standard Survey Report**

07 November, 2016





TDS  
Survey Report



|                  |                                                     |                                     |                               |
|------------------|-----------------------------------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC                                   | <b>Local Co-ordinate Reference:</b> | Site Sneed 9 Federal Com #11H |
| <b>Project:</b>  | Lea County, NM (NAD-27 2015)                        | <b>TVD Reference:</b>               | KB @ 4107.00usft (Patriot 6)  |
| <b>Site:</b>     | Sneed 9 Federal Com #11H                            | <b>MD Reference:</b>                | KB @ 4107.00usft (Patriot 6)  |
| <b>Well:</b>     | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D  | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Database:</b>                    | EDM 5000.1 Single User Db     |

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Lea County, NM (NAD-27 2015)         |                      |                |
| <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 #11H |                          |                   |
| <b>Site Position:</b>        |                          | <b>Northing:</b>         | 675,208.10 usft   |
| <b>From:</b>                 | Map                      | <b>Easting:</b>          | 670,216.00 usft   |
| <b>Position Uncertainty:</b> | 0.00 usft                | <b>Slot Radius:</b>      | 13.20 in          |
|                              |                          | <b>Latitude:</b>         | 32° 51' 18.011 N  |
|                              |                          | <b>Longitude:</b>        | 103° 46' 44.539 W |
|                              |                          | <b>Grid Convergence:</b> | 0.30 °            |

|                             |                                                    |                            |                                  |
|-----------------------------|----------------------------------------------------|----------------------------|----------------------------------|
| <b>Well</b>                 | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D |                            |                                  |
| <b>Well Position</b>        | +N/-S                                              | 0.00 usft                  | <b>Northing:</b> 675,208.10 usft |
|                             | +E/-W                                              | 0.00 usft                  | <b>Easting:</b> 670,216.00 usft  |
| <b>Position Uncertainty</b> | 0.00 usft                                          | <b>Wellhead Elevation:</b> | 0.00 usft                        |
|                             |                                                    | <b>Latitude:</b>           | 32° 51' 18.011 N                 |
|                             |                                                    | <b>Longitude:</b>          | 103° 46' 44.539 W                |
|                             |                                                    | <b>Ground Level:</b>       | 4,089.00 usft                    |

|                  |                                                     |                    |                        |                      |                            |
|------------------|-----------------------------------------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b>                                   | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2015                                            | 10/4/2016          | 7.17                   | 60.62                | 48,358                     |

|                          |                                                     |                     |                     |                           |
|--------------------------|-----------------------------------------------------|---------------------|---------------------|---------------------------|
| <b>Design</b>            | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D |                     |                     |                           |
| <b>Audit Notes:</b>      |                                                     |                     |                     |                           |
| <b>Version:</b>          | 1.0                                                 | <b>Phase:</b>       | ACTUAL              | <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> | <b>Direction (°)</b>      |
|                          | 0.00                                                | 0.00                | 0.00                | 88.67                     |

|                       |                  |                                         |                   |                         |
|-----------------------|------------------|-----------------------------------------|-------------------|-------------------------|
| <b>Survey Program</b> | <b>Date</b>      | 11/7/2016                               |                   |                         |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>                | <b>Tool Name</b>  | <b>Description</b>      |
| 100.00                | 2,200.00         | VES Gyro #1 (BHL: 350' FNL, 968' FWL, S | VES-ISCWSA-GYRO-3 | Biaxial Semi-Cont. Gyro |
| 2,310.00              | 11,662.00        | TDS MWD #2 (BHL: 350' FNL, 968' FWL,    | MWD               | MWD - Standard          |

|                              |                        |                    |                              |                     |                     |                                |                                |                               |                              |
|------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|
| <b>Survey</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>Vertical Section (usft)</b> | <b>Dogleg Rate (°/100usft)</b> | <b>Build Rate (°/100usft)</b> | <b>Turn Rate (°/100usft)</b> |
| 0.00                         | 0.00                   | 0.00               | 0.00                         | 0.00                | 0.00                | 0.00                           | 0.00                           | 0.00                          | 0.00                         |
| 100.00                       | 0.25                   | 54.84              | 100.00                       | 0.13                | 0.18                | 0.18                           | 0.25                           | 0.25                          | 0.00                         |
| 200.00                       | 0.34                   | 12.36              | 200.00                       | 0.54                | 0.42                | 0.43                           | 0.23                           | 0.09                          | -42.48                       |
| 300.00                       | 0.49                   | 319.25             | 300.00                       | 1.15                | 0.20                | 0.23                           | 0.39                           | 0.15                          | -53.11                       |
| 400.00                       | 0.31                   | 286.74             | 399.99                       | 1.56                | -0.33               | -0.30                          | 0.28                           | -0.18                         | -32.51                       |
| 500.00                       | 0.50                   | 331.05             | 499.99                       | 2.02                | -0.80               | -0.76                          | 0.35                           | 0.19                          | 44.31                        |
| 600.00                       | 0.82                   | 287.64             | 599.99                       | 2.62                | -1.70               | -1.64                          | 0.57                           | 0.32                          | -43.41                       |



|                  |                                                     |                                     |                               |
|------------------|-----------------------------------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC                                   | <b>Local Co-ordinate Reference:</b> | Site Sneed 9 Federal Com #11H |
| <b>Project:</b>  | Lea County, NM (NAD-27 2015)                        | <b>TVD Reference:</b>               | KB @ 4107.00usft (Patriot 6)  |
| <b>Site:</b>     | Sneed 9 Federal Com #11H                            | <b>MD Reference:</b>                | KB @ 4107.00usft (Patriot 6)  |
| <b>Well:</b>     | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D  | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Database:</b>                    | EDM 5000.1 Single User Db     |

| 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) |  |
| 700.00                                         | 0.87            | 280.18      | 699.97                | 2.97         | -3.13        | -3.06                   | 0.12                    | 0.05                   | -7.46                 |  |
| 800.00                                         | 0.95            | 290.50      | 799.96                | 3.39         | -4.65        | -4.57                   | 0.18                    | 0.08                   | 10.32                 |  |
| 900.00                                         | 0.80            | 298.18      | 899.95                | 4.01         | -6.04        | -5.95                   | 0.19                    | -0.15                  | 7.68                  |  |
| 1,000.00                                       | 0.99            | 303.38      | 999.94                | 4.82         | -7.38        | -7.26                   | 0.21                    | 0.19                   | 5.20                  |  |
| 1,100.00                                       | 1.27            | 297.05      | 1,099.92              | 5.79         | -9.09        | -8.95                   | 0.31                    | 0.28                   | -6.33                 |  |
| 1,200.00                                       | 0.78            | 294.26      | 1,199.90              | 6.58         | -10.69       | -10.54                  | 0.49                    | -0.49                  | -2.79                 |  |
| 1,300.00                                       | 1.49            | 295.22      | 1,299.88              | 7.41         | -12.49       | -12.32                  | 0.71                    | 0.71                   | 0.96                  |  |
| 1,400.00                                       | 1.12            | 310.25      | 1,399.86              | 8.60         | -14.41       | -14.21                  | 0.50                    | -0.37                  | 15.03                 |  |
| 1,500.00                                       | 1.17            | 303.19      | 1,499.84              | 9.79         | -16.01       | -15.78                  | 0.15                    | 0.05                   | -7.06                 |  |
| 1,600.00                                       | 1.29            | 322.17      | 1,599.81              | 11.24        | -17.56       | -17.29                  | 0.42                    | 0.12                   | 18.98                 |  |
| 1,700.00                                       | 1.33            | 305.14      | 1,699.79              | 12.79        | -19.20       | -18.90                  | 0.39                    | 0.04                   | -17.03                |  |
| 1,800.00                                       | 1.31            | 317.66      | 1,799.76              | 14.31        | -20.92       | -20.58                  | 0.29                    | -0.02                  | 12.52                 |  |
| 1,900.00                                       | 1.30            | 301.82      | 1,899.74              | 15.75        | -22.65       | -22.28                  | 0.36                    | -0.01                  | -15.84                |  |
| 2,000.00                                       | 1.10            | 330.98      | 1,999.71              | 17.19        | -24.08       | -23.67                  | 0.63                    | -0.20                  | 29.16                 |  |
| 2,100.00                                       | 1.23            | 325.13      | 2,099.69              | 18.91        | -25.16       | -24.71                  | 0.18                    | 0.13                   | -5.85                 |  |
| 2,200.00                                       | 0.93            | 329.96      | 2,199.68              | 20.49        | -26.18       | -25.70                  | 0.31                    | -0.30                  | 4.83                  |  |
| Tie-In to VES Gyro - Tie-In to VES Gyro Survey |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 2,310.00                                       | 0.90            | 351.40      | 2,309.66              | 22.12        | -26.76       | -26.23                  | 0.31                    | -0.03                  | 19.49                 |  |
| First TDS MWD Survey                           |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 2,374.00                                       | 1.40            | 336.60      | 2,373.65              | 23.33        | -27.14       | -26.59                  | 0.90                    | 0.78                   | -23.13                |  |
| 2,468.00                                       | 3.00            | 324.60      | 2,467.58              | 26.39        | -29.02       | -28.40                  | 1.76                    | 1.70                   | -12.77                |  |
| 2,562.00                                       | 2.80            | 323.00      | 2,561.46              | 30.23        | -31.83       | -31.12                  | 0.23                    | -0.21                  | -1.70                 |  |
| 2,656.00                                       | 3.60            | 308.30      | 2,655.31              | 33.89        | -35.53       | -34.73                  | 1.21                    | 0.85                   | -15.64                |  |
| 2,751.00                                       | 3.30            | 307.10      | 2,750.14              | 37.39        | -40.05       | -39.17                  | 0.32                    | -0.32                  | -1.26                 |  |
| 2,845.00                                       | 2.90            | 302.30      | 2,844.00              | 40.29        | -44.22       | -43.27                  | 0.51                    | -0.43                  | -5.11                 |  |
| 2,939.00                                       | 3.30            | 312.40      | 2,937.86              | 43.39        | -48.22       | -47.20                  | 0.72                    | 0.43                   | 10.74                 |  |
| 3,033.00                                       | 3.10            | 313.60      | 3,031.72              | 46.96        | -52.06       | -50.96                  | 0.22                    | -0.21                  | 1.28                  |  |
| 3,128.00                                       | 3.10            | 315.10      | 3,126.58              | 50.56        | -55.74       | -54.55                  | 0.09                    | 0.00                   | 1.58                  |  |
| 3,221.00                                       | 3.90            | 313.60      | 3,219.40              | 54.52        | -59.80       | -58.52                  | 0.87                    | 0.86                   | -1.61                 |  |
| 3,315.00                                       | 3.50            | 309.80      | 3,313.21              | 58.56        | -64.32       | -62.94                  | 0.50                    | -0.43                  | -4.04                 |  |
| 3,410.00                                       | 3.40            | 307.20      | 3,408.04              | 62.12        | -68.79       | -67.33                  | 0.20                    | -0.11                  | -2.74                 |  |
| 3,503.00                                       | 4.00            | 311.10      | 3,500.84              | 65.92        | -73.43       | -71.88                  | 0.70                    | 0.65                   | 4.19                  |  |
| 3,598.00                                       | 3.60            | 310.00      | 3,595.63              | 70.01        | -78.21       | -76.57                  | 0.43                    | -0.42                  | -1.16                 |  |
| 3,693.00                                       | 3.90            | 306.80      | 3,690.43              | 73.87        | -83.09       | -81.35                  | 0.38                    | 0.32                   | -3.37                 |  |
| 3,787.00                                       | 4.00            | 308.50      | 3,784.21              | 77.82        | -88.21       | -86.38                  | 0.16                    | 0.11                   | 1.81                  |  |
| 3,881.00                                       | 3.80            | 305.70      | 3,877.99              | 81.68        | -93.31       | -91.39                  | 0.29                    | -0.21                  | -2.98                 |  |
| 3,976.00                                       | 3.70            | 305.30      | 3,972.79              | 85.29        | -98.37       | -96.36                  | 0.11                    | -0.11                  | -0.42                 |  |
| 4,071.00                                       | 3.60            | 306.90      | 4,067.59              | 88.85        | -103.25      | -101.16                 | 0.15                    | -0.11                  | 1.68                  |  |
| 4,165.00                                       | 3.30            | 304.30      | 4,161.42              | 92.15        | -107.85      | -105.68                 | 0.36                    | -0.32                  | -2.77                 |  |
| 4,259.00                                       | 3.20            | 306.00      | 4,255.27              | 95.21        | -112.21      | -109.96                 | 0.15                    | -0.11                  | 1.81                  |  |
| 4,355.00                                       | 3.10            | 309.30      | 4,351.13              | 98.43        | -116.38      | -114.07                 | 0.22                    | -0.10                  | 3.44                  |  |
| 4,449.00                                       | 3.10            | 308.30      | 4,444.99              | 101.62       | -120.34      | -117.95                 | 0.06                    | 0.00                   | -1.06                 |  |

|                  |                                                     |                                     |                               |
|------------------|-----------------------------------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC                                   | <b>Local Co-ordinate Reference:</b> | Site Sneed 9 Federal Com #11H |
| <b>Project:</b>  | Lea County, NM (NAD-27 2015)                        | <b>TVD Reference:</b>               | KB @ 4107.00usft (Patriot 6)  |
| <b>Site:</b>     | Sneed 9 Federal Com #11H                            | <b>MD Reference:</b>                | KB @ 4107.00usft (Patriot 6)  |
| <b>Well:</b>     | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D  | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Database:</b>                    | EDM 5000.1 Single User Db     |

| 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) |  |
| 4,544.00              | 3.20            | 310.30      | 4,539.85              | 104.93       | -124.38      | -121.91                 | 0.16                    | 0.11                   | 2.11                  |  |
| 4,639.00              | 3.00            | 309.70      | 4,634.71              | 108.23       | -128.32      | -125.77                 | 0.21                    | -0.21                  | -0.63                 |  |
| 4,734.00              | 2.60            | 308.20      | 4,729.59              | 111.15       | -131.92      | -129.31                 | 0.43                    | -0.42                  | -1.58                 |  |
| 4,829.00              | 0.70            | 279.60      | 4,824.55              | 112.58       | -134.19      | -131.54                 | 2.12                    | -2.00                  | -30.11                |  |
| 4,924.00              | 0.10            | 125.50      | 4,919.55              | 112.63       | -134.69      | -132.04                 | 0.83                    | -0.63                  | -162.21               |  |
| 5,019.00              | 0.20            | 132.40      | 5,014.55              | 112.47       | -134.50      | -131.86                 | 0.11                    | 0.11                   | 7.26                  |  |
| 5,050.00              | 1.40            | 91.10       | 5,045.54              | 112.42       | -134.08      | -131.44                 | 4.05                    | 3.87                   | -133.23               |  |
| 5,082.00              | 3.80            | 89.50       | 5,077.51              | 112.42       | -132.63      | -129.99                 | 7.50                    | 7.50                   | -5.00                 |  |
| 5,114.00              | 6.50            | 92.40       | 5,109.38              | 112.36       | -129.76      | -127.12                 | 8.47                    | 8.44                   | 9.06                  |  |
| 5,145.00              | 9.30            | 93.80       | 5,140.08              | 112.12       | -125.51      | -122.87                 | 9.05                    | 9.03                   | 4.52                  |  |
| 5,177.00              | 12.40           | 93.80       | 5,171.50              | 111.72       | -119.50      | -116.87                 | 9.69                    | 9.69                   | 0.00                  |  |
| 5,208.00              | 15.60           | 90.60       | 5,201.58              | 111.45       | -112.01      | -109.39                 | 10.62                   | 10.32                  | -10.32                |  |
| 5,240.00              | 18.50           | 89.80       | 5,232.17              | 111.43       | -102.63      | -100.01                 | 9.09                    | 9.06                   | -2.50                 |  |
| 5,272.00              | 21.80           | 89.90       | 5,262.21              | 111.46       | -91.60       | -88.99                  | 10.31                   | 10.31                  | 0.31                  |  |
| 5,303.00              | 25.10           | 90.20       | 5,290.64              | 111.44       | -79.27       | -76.66                  | 10.65                   | 10.65                  | 0.97                  |  |
| 5,335.00              | 28.20           | 90.70       | 5,319.24              | 111.33       | -64.92       | -62.32                  | 9.71                    | 9.69                   | 1.56                  |  |
| 5,365.00              | 30.90           | 91.30       | 5,345.34              | 111.07       | -50.13       | -47.54                  | 9.05                    | 9.00                   | 2.00                  |  |
| 5,397.00              | 33.60           | 90.70       | 5,372.40              | 110.77       | -33.06       | -30.48                  | 8.50                    | 8.44                   | -1.88                 |  |
| 5,428.00              | 36.80           | 89.80       | 5,397.72              | 110.70       | -15.19       | -12.62                  | 10.46                   | 10.32                  | -2.90                 |  |
| 5,459.00              | 40.00           | 88.80       | 5,422.02              | 110.94       | 4.06         | 6.64                    | 10.51                   | 10.32                  | -3.23                 |  |
| 5,491.00              | 42.90           | 88.10       | 5,446.00              | 111.52       | 25.23        | 27.82                   | 9.18                    | 9.06                   | -2.19                 |  |
| 5,522.00              | 43.40           | 87.40       | 5,468.62              | 112.35       | 46.42        | 49.01                   | 2.23                    | 1.61                   | -2.26                 |  |
| 5,554.00              | 42.60           | 87.20       | 5,492.02              | 113.38       | 68.22        | 70.83                   | 2.54                    | -2.50                  | -0.63                 |  |
| 5,585.00              | 42.10           | 87.20       | 5,514.93              | 114.40       | 89.08        | 91.71                   | 1.61                    | -1.61                  | 0.00                  |  |
| 5,617.00              | 41.80           | 87.60       | 5,538.73              | 115.37       | 110.45       | 113.09                  | 1.26                    | -0.94                  | 1.25                  |  |
| 5,648.00              | 41.30           | 87.50       | 5,561.93              | 116.25       | 130.99       | 133.65                  | 1.63                    | -1.61                  | -0.32                 |  |
| 5,680.00              | 41.50           | 88.20       | 5,585.93              | 117.04       | 152.13       | 154.81                  | 1.58                    | 0.63                   | 2.19                  |  |
| 5,712.00              | 44.40           | 90.30       | 5,609.35              | 117.31       | 173.93       | 176.61                  | 10.10                   | 9.06                   | 6.56                  |  |
| 5,720.52              | 45.53           | 90.65       | 5,615.38              | 117.26       | 179.95       | 182.63                  | 13.52                   | 13.21                  | 4.07                  |  |
| <b>As-Drilled PP</b>  |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 5,743.00              | 48.50           | 91.50       | 5,630.71              | 116.95       | 196.39       | 199.05                  | 13.52                   | 13.23                  | 3.80                  |  |
| 5,774.00              | 52.50           | 91.40       | 5,650.42              | 116.35       | 220.30       | 222.94                  | 12.91                   | 12.90                  | -0.32                 |  |
| 5,805.00              | 56.50           | 90.70       | 5,668.42              | 115.89       | 245.53       | 248.15                  | 13.03                   | 12.90                  | -2.26                 |  |
| 5,837.00              | 60.60           | 90.10       | 5,685.11              | 115.70       | 272.82       | 275.43                  | 12.91                   | 12.81                  | -1.88                 |  |
| 5,869.00              | 64.80           | 89.80       | 5,699.79              | 115.73       | 301.25       | 303.85                  | 13.15                   | 13.13                  | -0.94                 |  |
| 5,900.00              | 68.80           | 89.90       | 5,712.00              | 115.80       | 329.74       | 332.34                  | 12.91                   | 12.90                  | 0.32                  |  |
| 5,932.00              | 72.80           | 90.10       | 5,722.52              | 115.80       | 359.95       | 362.54                  | 12.51                   | 12.50                  | 0.63                  |  |
| 5,964.00              | 76.50           | 89.70       | 5,730.99              | 115.86       | 390.80       | 393.39                  | 11.63                   | 11.56                  | -1.25                 |  |
| 5,995.00              | 79.60           | 89.40       | 5,737.40              | 116.10       | 421.13       | 423.71                  | 10.04                   | 10.00                  | -0.97                 |  |
| 6,027.00              | 82.50           | 89.10       | 5,742.38              | 116.51       | 452.73       | 455.31                  | 9.11                    | 9.06                   | -0.94                 |  |
| 6,058.00              | 84.90           | 88.60       | 5,745.78              | 117.13       | 483.54       | 486.12                  | 7.91                    | 7.74                   | -1.61                 |  |
| 6,089.00              | 88.40           | 88.30       | 5,747.60              | 117.97       | 514.47       | 517.07                  | 11.33                   | 11.29                  | -0.97                 |  |



|                  |                                                     |                                     |                               |
|------------------|-----------------------------------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC                                   | <b>Local Co-ordinate Reference:</b> | Site Sneed 9 Federal Com #11H |
| <b>Project:</b>  | Lea County, NM (NAD-27 2015)                        | <b>TVD Reference:</b>               | KB @ 4107.00usft (Patriot 6)  |
| <b>Site:</b>     | Sneed 9 Federal Com #11H                            | <b>MD Reference:</b>                | KB @ 4107.00usft (Patriot 6)  |
| <b>Well:</b>     | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D  | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Database:</b>                    | EDM 5000.1 Single User Db     |

| 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) |  |
| 6,121.00              | 89.50           | 87.70       | 5,748.18              | 119.08       | 546.44       | 549.06                  | 3.92                    | 3.44                   | -1.88                 |  |
| 6,182.00              | 89.80           | 87.80       | 5,748.55              | 121.48       | 607.39       | 610.05                  | 0.52                    | 0.49                   | 0.16                  |  |
| 6,277.00              | 89.60           | 88.60       | 5,749.05              | 124.46       | 702.34       | 705.04                  | 0.87                    | -0.21                  | 0.84                  |  |
| 6,372.00              | 89.50           | 88.60       | 5,749.80              | 126.78       | 797.31       | 800.04                  | 0.11                    | -0.11                  | 0.00                  |  |
| 6,467.00              | 90.20           | 89.60       | 5,750.05              | 128.27       | 892.30       | 895.04                  | 1.28                    | 0.74                   | 1.05                  |  |
| 6,561.00              | 89.60           | 88.70       | 5,750.21              | 129.67       | 986.29       | 989.03                  | 1.15                    | -0.64                  | -0.96                 |  |
| 6,654.00              | 89.50           | 90.50       | 5,750.94              | 130.32       | 1,079.28     | 1,082.01                | 1.94                    | -0.11                  | 1.94                  |  |
| 6,749.00              | 89.70           | 91.90       | 5,751.60              | 128.33       | 1,174.25     | 1,176.91                | 1.49                    | 0.21                   | 1.47                  |  |
| 6,844.00              | 89.20           | 91.40       | 5,752.52              | 125.59       | 1,269.21     | 1,271.78                | 0.74                    | -0.53                  | -0.53                 |  |
| 6,938.00              | 89.50           | 91.20       | 5,753.58              | 123.46       | 1,363.18     | 1,365.68                | 0.38                    | 0.32                   | -0.21                 |  |
| 7,032.00              | 90.50           | 90.60       | 5,753.58              | 121.98       | 1,457.16     | 1,459.60                | 1.24                    | 1.06                   | -0.64                 |  |
| 7,127.00              | 90.10           | 90.70       | 5,753.09              | 120.91       | 1,552.16     | 1,554.54                | 0.43                    | -0.42                  | 0.11                  |  |
| 7,221.00              | 91.00           | 90.30       | 5,752.18              | 120.09       | 1,646.15     | 1,648.49                | 1.05                    | 0.96                   | -0.43                 |  |
| 7,315.00              | 90.70           | 90.70       | 5,750.79              | 119.27       | 1,740.13     | 1,742.43                | 0.53                    | -0.32                  | 0.43                  |  |
| 7,410.00              | 90.50           | 89.10       | 5,749.79              | 119.43       | 1,835.12     | 1,837.40                | 1.70                    | -0.21                  | -1.68                 |  |
| 7,504.00              | 90.30           | 89.00       | 5,749.14              | 120.99       | 1,929.11     | 1,931.40                | 0.24                    | -0.21                  | -0.11                 |  |
| 7,599.00              | 90.10           | 89.00       | 5,748.81              | 122.65       | 2,024.09     | 2,026.40                | 0.21                    | -0.21                  | 0.00                  |  |
| 7,693.00              | 89.80           | 89.40       | 5,748.89              | 123.96       | 2,118.08     | 2,120.39                | 0.53                    | -0.32                  | 0.43                  |  |
| 7,788.00              | 89.50           | 89.10       | 5,749.47              | 125.20       | 2,213.07     | 2,215.38                | 0.45                    | -0.32                  | -0.32                 |  |
| 7,883.00              | 88.90           | 89.10       | 5,750.79              | 126.70       | 2,308.05     | 2,310.37                | 0.63                    | -0.63                  | 0.00                  |  |
| 7,977.00              | 89.90           | 89.50       | 5,751.78              | 127.84       | 2,402.04     | 2,404.36                | 1.15                    | 1.06                   | 0.43                  |  |
| 8,072.00              | 91.00           | 89.50       | 5,751.03              | 128.67       | 2,497.03     | 2,499.35                | 1.16                    | 1.16                   | 0.00                  |  |
| 8,166.00              | 90.60           | 89.30       | 5,749.72              | 129.66       | 2,591.02     | 2,593.33                | 0.48                    | -0.43                  | -0.21                 |  |
| 8,261.00              | 90.10           | 88.50       | 5,749.14              | 131.48       | 2,686.00     | 2,688.32                | 0.99                    | -0.53                  | -0.84                 |  |
| 8,356.00              | 90.00           | 89.90       | 5,749.06              | 132.81       | 2,780.98     | 2,783.32                | 1.48                    | -0.11                  | 1.47                  |  |
| 8,451.00              | 90.60           | 90.30       | 5,748.56              | 132.64       | 2,875.98     | 2,878.29                | 0.76                    | 0.63                   | 0.42                  |  |
| 8,545.00              | 90.30           | 90.30       | 5,747.82              | 132.15       | 2,969.98     | 2,972.25                | 0.32                    | -0.32                  | 0.00                  |  |
| 8,639.00              | 89.80           | 90.10       | 5,747.74              | 131.82       | 3,063.98     | 3,066.21                | 0.57                    | -0.53                  | -0.21                 |  |
| 8,734.00              | 89.50           | 90.80       | 5,748.32              | 131.08       | 3,158.97     | 3,161.16                | 0.80                    | -0.32                  | 0.74                  |  |
| 8,827.00              | 89.50           | 90.80       | 5,749.13              | 129.78       | 3,251.96     | 3,254.10                | 0.00                    | 0.00                   | 0.00                  |  |
| 8,922.00              | 90.80           | 91.00       | 5,748.88              | 128.29       | 3,346.95     | 3,349.02                | 1.38                    | 1.37                   | 0.21                  |  |
| 9,016.00              | 90.60           | 90.00       | 5,747.73              | 127.47       | 3,440.93     | 3,442.97                | 1.08                    | -0.21                  | -1.06                 |  |
| 9,110.00              | 90.50           | 89.40       | 5,746.83              | 127.96       | 3,534.93     | 3,536.95                | 0.65                    | -0.11                  | -0.64                 |  |
| 9,205.00              | 90.10           | 89.40       | 5,746.33              | 128.95       | 3,629.92     | 3,631.94                | 0.42                    | -0.42                  | 0.00                  |  |
| 9,300.00              | 89.50           | 89.40       | 5,746.67              | 129.95       | 3,724.91     | 3,726.93                | 0.63                    | -0.63                  | 0.00                  |  |
| 9,394.00              | 89.10           | 89.40       | 5,747.81              | 130.93       | 3,818.90     | 3,820.91                | 0.43                    | -0.43                  | 0.00                  |  |
| 9,489.00              | 90.30           | 89.70       | 5,748.31              | 131.68       | 3,913.90     | 3,915.90                | 1.30                    | 1.26                   | 0.32                  |  |
| 9,582.00              | 90.10           | 89.90       | 5,747.99              | 132.00       | 4,006.89     | 4,008.88                | 0.30                    | -0.22                  | 0.22                  |  |
| 9,676.00              | 89.60           | 89.50       | 5,748.23              | 132.49       | 4,100.89     | 4,102.86                | 0.68                    | -0.53                  | -0.43                 |  |
| 9,771.00              | 89.70           | 90.50       | 5,748.81              | 132.49       | 4,195.89     | 4,197.83                | 1.06                    | 0.11                   | 1.05                  |  |
| 9,866.00              | 89.30           | 90.80       | 5,749.64              | 131.42       | 4,290.88     | 4,292.77                | 0.53                    | -0.42                  | 0.32                  |  |
| 9,960.00              | 90.10           | 90.00       | 5,750.13              | 130.76       | 4,384.87     | 4,386.73                | 1.20                    | 0.85                   | -0.85                 |  |

|                  |                                                     |                                     |                               |
|------------------|-----------------------------------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC                                   | <b>Local Co-ordinate Reference:</b> | Site Sneed 9 Federal Com #11H |
| <b>Project:</b>  | Lea County, NM (NAD-27 2015)                        | <b>TVD Reference:</b>               | KB @ 4107.00usft (Patriot 6)  |
| <b>Site:</b>     | Sneed 9 Federal Com #11H                            | <b>MD Reference:</b>                | KB @ 4107.00usft (Patriot 6)  |
| <b>Well:</b>     | SHL: 470' FNL, 150' FWL, Sec 9, T17S, R32E, Unit D  | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | BHL: 350' FNL, 968' FWL, Sec 10, T17S, R32E, Unit D | <b>Database:</b>                    | EDM 5000.1 Single User Db     |

| 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) |
| 10,054.00             | 89.80           | 89.80       | 5,750.22              | 130.92       | 4,478.87     | 4,480.71                | 0.38                    | -0.32                  | -0.21                 |
| 10,148.00             | 89.60           | 89.50       | 5,750.71              | 131.50       | 4,572.87     | 4,574.69                | 0.38                    | -0.21                  | -0.32                 |
| 10,243.00             | 90.00           | 89.50       | 5,751.04              | 132.33       | 4,667.87     | 4,669.68                | 0.42                    | 0.42                   | 0.00                  |
| 10,337.00             | 89.60           | 89.20       | 5,751.37              | 133.39       | 4,761.86     | 4,763.67                | 0.53                    | -0.43                  | -0.32                 |
| 10,431.00             | 90.20           | 89.00       | 5,751.53              | 134.87       | 4,855.85     | 4,857.67                | 0.67                    | 0.64                   | -0.21                 |
| 10,525.00             | 90.10           | 90.50       | 5,751.29              | 135.28       | 4,949.84     | 4,951.65                | 1.60                    | -0.11                  | 1.60                  |
| 10,620.00             | 89.60           | 90.50       | 5,751.54              | 134.45       | 5,044.84     | 5,046.60                | 0.53                    | -0.53                  | 0.00                  |
| 10,715.00             | 90.20           | 89.80       | 5,751.70              | 134.20       | 5,139.84     | 5,141.57                | 0.97                    | 0.63                   | -0.74                 |
| 10,810.00             | 89.80           | 89.70       | 5,751.70              | 134.62       | 5,234.84     | 5,236.55                | 0.43                    | -0.42                  | -0.11                 |
| 10,904.00             | 90.90           | 90.10       | 5,751.13              | 134.78       | 5,328.83     | 5,330.53                | 1.25                    | 1.17                   | 0.43                  |
| 10,999.00             | 91.00           | 90.20       | 5,749.55              | 134.53       | 5,423.82     | 5,425.48                | 0.15                    | 0.11                   | 0.11                  |
| 11,093.00             | 90.30           | 90.40       | 5,748.49              | 134.04       | 5,517.81     | 5,519.44                | 0.77                    | -0.74                  | 0.21                  |
| 11,187.00             | 90.90           | 89.40       | 5,747.50              | 134.20       | 5,611.81     | 5,613.41                | 1.24                    | 0.64                   | -1.06                 |
| 11,281.00             | 90.80           | 89.70       | 5,746.11              | 134.94       | 5,705.79     | 5,707.39                | 0.34                    | -0.11                  | 0.32                  |
| 11,376.00             | 91.00           | 89.80       | 5,744.61              | 135.36       | 5,800.78     | 5,802.36                | 0.24                    | 0.21                   | 0.11                  |
| 11,470.00             | 89.30           | 89.30       | 5,744.37              | 136.10       | 5,894.77     | 5,896.34                | 1.89                    | -1.81                  | -0.53                 |
| 11,565.00             | 88.70           | 89.00       | 5,746.03              | 137.50       | 5,989.75     | 5,991.32                | 0.71                    | -0.63                  | -0.32                 |
| Last TDS MWD Survey   |                 |             |                       |              |              |                         |                         |                        |                       |
| 11,662.00             | 88.70           | 89.00       | 5,748.23              | 139.20       | 6,086.71     | 6,088.30                | 0.00                    | 0.00                   | 0.00                  |
| Projection to Bit/TD  |                 |             |                       |              |              |                         |                         |                        |                       |

| Design Annotations    |                       |                   |              |                           |
|-----------------------|-----------------------|-------------------|--------------|---------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                   |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                           |
| 2,200.00              | 2,199.68              | 20.49             | -26.18       | Tie-In to VES Gyro        |
| 2,200.00              | 2,199.68              | 20.49             | -26.18       | Tie-In to VES Gyro Survey |
| 2,310.00              | 2,309.66              | 22.12             | -26.76       | First TDS MWD Survey      |
| 5,720.52              | 5,615.38              | 117.26            | 179.95       | As-Drilled PP             |
| 11,565.00             | 5,746.03              | 137.50            | 5,989.75     | Last TDS MWD Survey       |
| 11,662.00             | 5,748.23              | 139.20            | 6,086.71     | Projection to Bit/TD      |

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_





October 27, 2016

Concho Resources, Inc.  
One Concho Center  
600 W. Illinois Avenue  
Midland, Texas 79701

Attn: Kanicia Castillo

RE: **Sneed 9 Federal Com No. 011H**

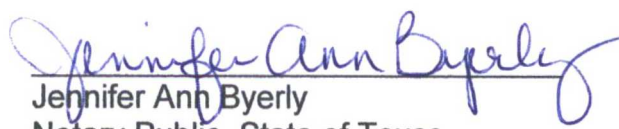
Please find enclosed a copy of the survey from 0' to 2200' ran on the above referenced well.

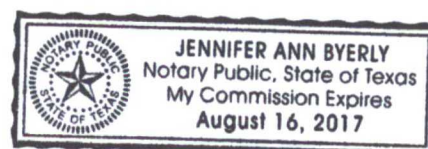
Sincerely,

  
Keith Havelka  
Operations

STATE OF TEXAS     §  
                                  §  
COUNTY OF NUECES §

This instrument was acknowledged before me on the 27th day of October,  
A.D., 2016, by Keith Havelka.

  
Jennifer Ann Byerly  
Notary Public, State of Texas



Company: COG OPERATING  
Lease/Well: SNEED 9 FEDERAL COM NO./011H



Rig Name: PATRIOT 6  
State/County: NEW MEXICO/LEA  
VS-Azi: 0.00 Degrees  
Latitude: 32.85500, Longitude: -103.77904  
Grid North = True North -0.30 degs (NAD 27)  
Grid Correction Applied = -0.30 degs



Depth Reference : RKB=18 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: e-line gyro-de\_01.ut

Minimum Curvature Method

Report Date/Time: 10/27/2016 / 13:57

VES Survey International

Midland, Texas

432-563-5444

Surveyor: Michael Cook

Sneed 9 Federal Com No. 011H / API 30-025-43284

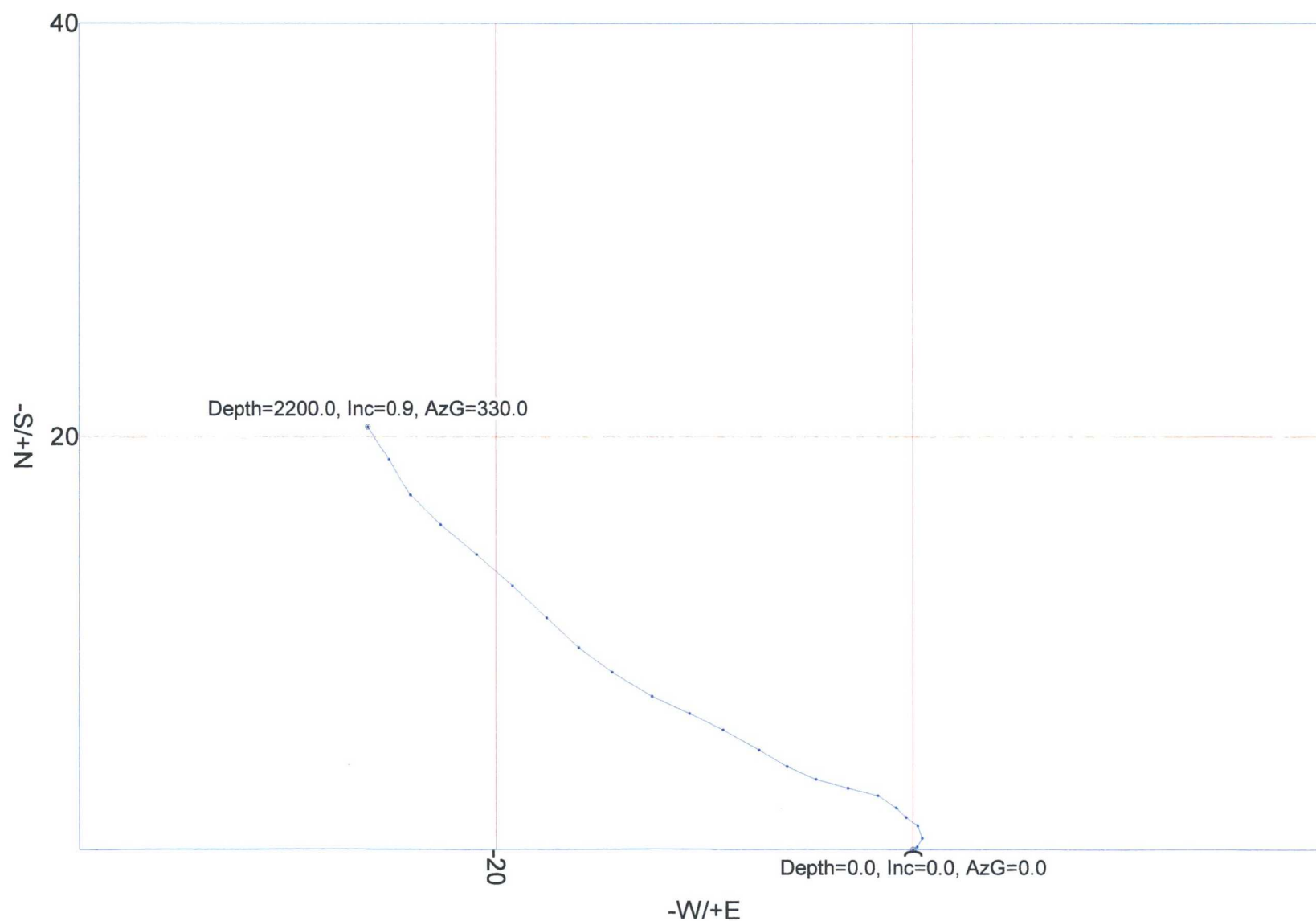
| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.00                    | 0.00                 | 0.00                      | 0.00      | 0.00        | 0.00        | 0.00                      | 0.00                      | 0.00                        | ****                          |
| 100.00                  | 0.25                 | 54.84                     | 100.00    | 0.13        | 0.18        | 0.13                      | 0.22                      | 54.84                       | 0.25                          |
| 200.00                  | 0.34                 | 12.36                     | 200.00    | 0.55        | 0.43        | 0.55                      | 0.69                      | 37.99                       | 0.23                          |
| 300.00                  | 0.49                 | 319.25                    | 300.00    | 1.16        | 0.21        | 1.16                      | 1.18                      | 10.24                       | 0.40                          |
| 400.00                  | 0.31                 | 286.74                    | 399.99    | 1.56        | -0.33       | 1.56                      | 1.60                      | 347.98                      | 0.28                          |
| 500.00                  | 0.50                 | 331.05                    | 499.99    | 2.02        | -0.81       | 2.02                      | 2.18                      | 338.29                      | 0.35                          |
| 600.00                  | 0.82                 | 287.64                    | 599.99    | 2.62        | -1.70       | 2.62                      | 3.12                      | 327.03                      | 0.57                          |
| 700.00                  | 0.87                 | 280.18                    | 699.97    | 2.97        | -3.13       | 2.97                      | 4.31                      | 313.49                      | 0.12                          |
| 800.00                  | 0.95                 | 290.50                    | 799.96    | 3.39        | -4.65       | 3.39                      | 5.76                      | 306.11                      | 0.18                          |
| 900.00                  | 0.80                 | 298.18                    | 899.95    | 4.01        | -6.04       | 4.01                      | 7.25                      | 303.59                      | 0.19                          |
| 1000.00                 | 0.99                 | 303.38                    | 999.94    | 4.82        | -7.38       | 4.82                      | 8.81                      | 303.14                      | 0.21                          |
| 1100.00                 | 1.27                 | 297.05                    | 1099.92   | 5.80        | -9.09       | 5.80                      | 10.79                     | 302.53                      | 0.31                          |
| 1200.00                 | 0.78                 | 294.26                    | 1199.90   | 6.58        | -10.70      | 6.58                      | 12.57                     | 301.60                      | 0.50                          |
| 1300.00                 | 1.49                 | 295.22                    | 1299.88   | 7.42        | -12.50      | 7.42                      | 14.53                     | 300.69                      | 0.71                          |
| 1400.00                 | 1.12                 | 310.25                    | 1399.86   | 8.60        | -14.42      | 8.60                      | 16.79                     | 300.82                      | 0.50                          |
| 1500.00                 | 1.17                 | 303.19                    | 1499.84   | 9.79        | -16.02      | 9.79                      | 18.77                     | 301.44                      | 0.15                          |
| 1600.00                 | 1.29                 | 322.17                    | 1599.81   | 11.23       | -17.56      | 11.23                     | 20.84                     | 302.62                      | 0.42                          |



| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 1700.00                 | 1.33                 | 305.14                    | 1699.79   | 12.79       | -19.19      | 12.79                     | 23.07                     | 303.68                      | 0.39                          |
| 1800.00                 | 1.31                 | 317.66                    | 1799.76   | 14.30       | -20.91      | 14.30                     | 25.34                     | 304.37                      | 0.29                          |
| 1900.00                 | 1.30                 | 301.82                    | 1899.74   | 15.75       | -22.65      | 15.75                     | 27.59                     | 304.81                      | 0.36                          |
| 2000.00                 | 1.10                 | 330.98                    | 1999.71   | 17.18       | -24.08      | 17.18                     | 29.58                     | 305.51                      | 0.64                          |
| 2100.00                 | 1.23                 | 325.13                    | 2099.69   | 18.90       | -25.15      | 18.90                     | 31.46                     | 306.92                      | 0.18                          |
| 2200.00                 | 0.93                 | 329.96                    | 2199.68   | 20.48       | -26.17      | 20.48                     | 33.23                     | 308.04                      | 0.31                          |



VES Survey International  
Midland, Texas  
432-563-5444  
Surveyor: Michael Cook  
Sneed 9 Federal Com No. 011H / API 30-025-43284







I Michael Cook certify that I am employed by VES Survey International. That I did on the day(s) of 10/21/16 through 10/21/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 2,200.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating for the Sneed 9 Federal Com Well # 11H API # 30-025-43284 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in blue ink, appearing to read "M COOK", is written over a horizontal line.

Michael Cook  
Service Technician  
VES Survey International



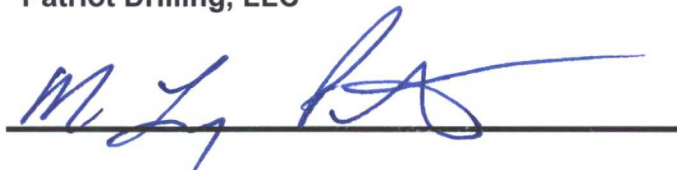
**PATRIOT DRILLING, LLC**

OPERATOR: COG Operating, LLC  
WELL/LEASE: Sneed 9 Fed Com #11H  
COUNTY: Lea Co., New Mexico  
Sec. 9, T 17S, R 32E

**STATE OF NEW MEXICO  
DEVIATION REPORT**

| <u>Depth</u> | <u>Deviation</u> | <u>Depth</u> | <u>Deviation</u> |
|--------------|------------------|--------------|------------------|
| 506          | 1/4              | 1,570        | 1                |
| 900          | 1                | 1,889        | 1                |
| 1,221        | 3/4              |              |                  |

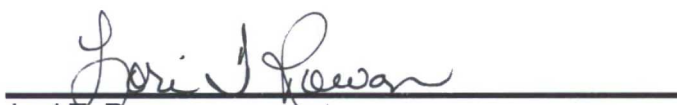
**Patriot Drilling, LLC**



M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 7th day of November 2016 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019



Lori T. Rowan  
Notary Public for Ector Co., Texas