



## **COG Operating LLC**

**Lea County, NM (NAD27 NME)  
Square Bill Federal Com  
22H**

**OH / Job# 61977**

**Design: Surveys (McVay 8)**

## **Standard Survey Report**

**29 January, 2018**

**HOBBS OCD  
OCT 29 2018  
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# Phoenix Technology Services LP

## Survey Report



|           |                            |                              |                               |
|-----------|----------------------------|------------------------------|-------------------------------|
| Company:  | COG Operating, LLC         | Local Co-ordinate Reference: | Well 22H                      |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
| Site:     | Square Bill Federal Com    | MD Reference:                | GL+KB @ 3299.60usft (McVay 8) |
| Well:     | 22H                        | North Reference:             | Grid                          |
| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
| Design:   | Surveys (McVay 8)          | Database:                    | Compass 5000 GCR              |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Lea County, NM (NAD27 NME)           |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |                         |                   |                    |
|-----------------------|-------------------------|-------------------|--------------------|
| Site                  | Square Bill Federal Com |                   |                    |
| Site Position:        |                         | Northing:         | 394,104.50 usft    |
| From:                 | Map                     | Easting:          | 788,808.10 usft    |
| Position Uncertainty: | 0.00 usft               | Slot Radius:      | 13-3/16 "          |
|                       |                         | Latitude:         | 32° 4' 48.27950 N  |
|                       |                         | Longitude:        | 103° 24' 3.18637 W |
|                       |                         | Grid Convergence: | 0.50 °             |

|                      |           |                     |                    |
|----------------------|-----------|---------------------|--------------------|
| Well                 | 22H       |                     |                    |
| Well Position        | +N/-S     | 0.00 usft           | Northing:          |
|                      | +E/-W     | 0.00 usft           | Easting:           |
| Position Uncertainty | 0.00 usft | Wellhead Elevation: | 0.00 usft          |
|                      |           | Latitude:           | 32° 4' 48.27963 N  |
|                      |           | Longitude:          | 103° 24' 2.80166 W |
|                      |           | Ground Level:       | 3,273.60 usft      |

|           |                 |             |                 |               |                     |
|-----------|-----------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | OH / Job# 61977 |             |                 |               |                     |
| Magnetics | Model Name      | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | User Defined    | 12/15/2017  | 6.72            | 59.80         | 47,894              |

|                   |                         |              |              |               |      |
|-------------------|-------------------------|--------------|--------------|---------------|------|
| Design            | Surveys (McVay 8)       |              |              |               |      |
| Audit Notes:      |                         |              |              |               |      |
| Version:          | 1.0                     | Phase:       | ACTUAL       | Tie On Depth: | 0.00 |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |      |
|                   | 0.00                    | 0.00         | 0.00         | 359.56        |      |

|                |                |                                           |                   |                                                    |  |
|----------------|----------------|-------------------------------------------|-------------------|----------------------------------------------------|--|
| Survey Program | Date 1/29/2018 |                                           |                   |                                                    |  |
| From (usft)    | To (usft)      | Survey (Wellbore)                         | Tool Name         | Description                                        |  |
| 100.00         | 11,669.09      | Scientific Gyro Surveys (OH / Job# 61977) | Scientific Keeper | Scientific Drilling Intl. Standard Wireline Keeper |  |
| 11,856.00      | 20,115.00      | Phoenix MWD Surveys (OH / Job# 61977)     | MWD+HDGM          | OWSG Rev.2 MWD + HDGM                              |  |

|                       |                 |             |                       |              |              |                         |                         |                        |                       |  |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|--|
| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |  |
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |  |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |  |
| 100.00                | 0.95            | 353.62      | 100.00                | 0.82         | -0.09        | 0.82                    | 0.95                    | 0.95                   | 0.00                  |  |
| 125.00                | 0.93            | 0.24        | 124.99                | 1.23         | -0.11        | 1.23                    | 0.44                    | -0.08                  | 26.48                 |  |
| 150.00                | 1.03            | 357.10      | 149.99                | 1.66         | -0.12        | 1.66                    | 0.45                    | 0.40                   | -12.56                |  |
| 175.00                | 1.16            | 357.19      | 174.98                | 2.14         | -0.15        | 2.14                    | 0.52                    | 0.52                   | 0.36                  |  |
| 200.00                | 1.09            | 0.55        | 199.98                | 2.63         | -0.16        | 2.63                    | 0.38                    | -0.28                  | 13.44                 |  |
| 225.00                | 1.15            | 0.58        | 224.97                | 3.12         | -0.15        | 3.12                    | 0.24                    | 0.24                   | 0.12                  |  |
| 250.00                | 1.24            | 357.46      | 249.97                | 3.64         | -0.16        | 3.64                    | 0.44                    | 0.36                   | -12.48                |  |
| 275.00                | 1.22            | 357.30      | 274.96                | 4.17         | -0.19        | 4.17                    | 0.08                    | -0.08                  | -0.64                 |  |
| 300.00                | 1.20            | 5.29        | 299.96                | 4.70         | -0.18        | 4.70                    | 0.68                    | -0.08                  | 31.96                 |  |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
| 325.00                | 1.13            | 11.76       | 324.95                | 5.20         | -0.10        | 5.20                    | 0.60                    | -0.28                  | 25.88                 |
| 350.00                | 1.30            | 0.08        | 349.95                | 5.73         | -0.05        | 5.73                    | 1.20                    | 0.68                   | -46.72                |
| 375.00                | 1.23            | 8.48        | 374.94                | 6.28         | -0.01        | 6.28                    | 0.79                    | -0.28                  | 33.60                 |
| 400.00                | 1.20            | 11.56       | 399.94                | 6.80         | 0.08         | 6.80                    | 0.29                    | -0.12                  | 12.32                 |
| 425.00                | 1.11            | 8.46        | 424.93                | 7.29         | 0.17         | 7.29                    | 0.44                    | -0.36                  | -12.40                |
| 450.00                | 1.07            | 9.25        | 449.93                | 7.76         | 0.24         | 7.76                    | 0.17                    | -0.16                  | 3.16                  |
| 475.00                | 0.96            | 15.26       | 474.92                | 8.20         | 0.33         | 8.19                    | 0.61                    | -0.44                  | 24.04                 |
| 500.00                | 0.95            | 19.96       | 499.92                | 8.59         | 0.46         | 8.59                    | 0.32                    | -0.04                  | 18.80                 |
| 525.00                | 0.92            | 19.91       | 524.91                | 8.98         | 0.60         | 8.97                    | 0.12                    | -0.12                  | -0.20                 |
| 550.00                | 0.89            | 19.97       | 549.91                | 9.35         | 0.73         | 9.34                    | 0.12                    | -0.12                  | 0.24                  |
| 575.00                | 0.76            | 23.86       | 574.91                | 9.68         | 0.87         | 9.67                    | 0.57                    | -0.52                  | 15.56                 |
| 600.00                | 0.70            | 21.86       | 599.91                | 9.98         | 0.99         | 9.97                    | 0.26                    | -0.24                  | -8.00                 |
| 625.00                | 0.64            | 29.38       | 624.91                | 10.24        | 1.12         | 10.23                   | 0.43                    | -0.24                  | 30.08                 |
| 650.00                | 0.61            | 36.21       | 649.90                | 10.47        | 1.26         | 10.46                   | 0.32                    | -0.12                  | 27.32                 |
| 675.00                | 0.70            | 42.86       | 674.90                | 10.69        | 1.45         | 10.68                   | 0.47                    | 0.36                   | 26.60                 |
| 700.00                | 0.73            | 44.80       | 699.90                | 10.91        | 1.66         | 10.90                   | 0.15                    | 0.12                   | 7.76                  |
| 725.00                | 0.80            | 45.67       | 724.90                | 11.15        | 1.90         | 11.13                   | 0.28                    | 0.28                   | 3.48                  |
| 750.00                | 0.72            | 37.34       | 749.90                | 11.39        | 2.12         | 11.38                   | 0.54                    | -0.32                  | -33.32                |
| 775.00                | 0.67            | 43.28       | 774.89                | 11.62        | 2.32         | 11.61                   | 0.35                    | -0.20                  | 23.76                 |
| 800.00                | 0.59            | 42.58       | 799.89                | 11.83        | 2.50         | 11.81                   | 0.32                    | -0.32                  | -2.80                 |
| 825.00                | 0.63            | 50.91       | 824.89                | 12.01        | 2.70         | 11.99                   | 0.39                    | 0.16                   | 33.32                 |
| 850.00                | 0.70            | 50.86       | 849.89                | 12.19        | 2.92         | 12.17                   | 0.28                    | 0.28                   | -0.20                 |
| 875.00                | 0.65            | 47.66       | 874.89                | 12.38        | 3.14         | 12.36                   | 0.25                    | -0.20                  | -12.80                |
| 900.00                | 0.54            | 47.66       | 899.89                | 12.56        | 3.34         | 12.53                   | 0.44                    | -0.44                  | 0.00                  |
| 925.00                | 0.45            | 59.57       | 924.89                | 12.69        | 3.51         | 12.66                   | 0.54                    | -0.36                  | 47.64                 |
| 950.00                | 0.30            | 62.06       | 949.88                | 12.77        | 3.65         | 12.74                   | 0.60                    | -0.60                  | 9.96                  |
| 975.00                | 0.28            | 72.76       | 974.88                | 12.82        | 3.77         | 12.79                   | 0.23                    | -0.08                  | 42.80                 |
| 1,000.00              | 0.31            | 80.44       | 999.88                | 12.84        | 3.89         | 12.81                   | 0.20                    | 0.12                   | 30.72                 |
| 1,025.00              | 0.31            | 87.88       | 1,024.88              | 12.86        | 4.03         | 12.83                   | 0.16                    | 0.00                   | 29.76                 |
| 1,050.00              | 0.27            | 92.23       | 1,049.88              | 12.86        | 4.15         | 12.83                   | 0.18                    | -0.16                  | 17.40                 |
| 1,075.00              | 0.23            | 81.18       | 1,074.88              | 12.86        | 4.26         | 12.83                   | 0.25                    | -0.16                  | -44.20                |
| 1,100.00              | 0.16            | 110.89      | 1,099.88              | 12.86        | 4.34         | 12.83                   | 0.48                    | -0.28                  | 118.84                |
| 1,125.00              | 0.11            | 129.87      | 1,124.88              | 12.83        | 4.39         | 12.80                   | 0.27                    | -0.20                  | 75.92                 |
| 1,150.00              | 0.23            | 129.51      | 1,149.88              | 12.78        | 4.45         | 12.75                   | 0.48                    | 0.48                   | -1.44                 |
| 1,175.00              | 0.30            | 127.20      | 1,174.88              | 12.71        | 4.54         | 12.68                   | 0.28                    | 0.28                   | -9.24                 |
| 1,200.00              | 0.27            | 112.55      | 1,199.88              | 12.65        | 4.65         | 12.61                   | 0.31                    | -0.12                  | -58.60                |
| 1,225.00              | 0.22            | 109.15      | 1,224.88              | 12.61        | 4.75         | 12.58                   | 0.21                    | -0.20                  | -13.60                |
| 1,250.00              | 0.14            | 117.84      | 1,249.88              | 12.58        | 4.82         | 12.55                   | 0.34                    | -0.32                  | 34.76                 |
| 1,275.00              | 0.20            | 145.36      | 1,274.88              | 12.53        | 4.87         | 12.49                   | 0.40                    | 0.24                   | 110.08                |
| 1,300.00              | 0.17            | 146.19      | 1,299.88              | 12.47        | 4.92         | 12.43                   | 0.12                    | -0.12                  | 3.32                  |
| 1,325.00              | 0.29            | 129.54      | 1,324.88              | 12.39        | 4.99         | 12.36                   | 0.54                    | 0.48                   | -66.60                |
| 1,350.00              | 0.25            | 120.94      | 1,349.88              | 12.33        | 5.08         | 12.29                   | 0.23                    | -0.16                  | -34.40                |
| 1,375.00              | 0.25            | 136.06      | 1,374.88              | 12.26        | 5.17         | 12.22                   | 0.26                    | 0.00                   | 60.48                 |



Phoenix Technology Services LP  
Survey Report



|           |                            |                              |                               |
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| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
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| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
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| 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 1,400.00              | 0.12            | 134.25      | 1,399.88              | 12.20        | 5.22         | 12.16                   | 0.52                    | -0.52                  | -7.24                 |
| 1,425.00              | 0.17            | 175.96      | 1,424.88              | 12.15        | 5.25         | 12.11                   | 0.45                    | 0.20                   | 166.84                |
| 1,450.00              | 0.23            | 146.01      | 1,449.88              | 12.07        | 5.28         | 12.03                   | 0.47                    | 0.24                   | -119.80               |
| 1,475.00              | 0.23            | 130.09      | 1,474.88              | 11.99        | 5.34         | 11.95                   | 0.25                    | 0.00                   | -63.68                |
| 1,500.00              | 0.10            | 149.54      | 1,499.88              | 11.94        | 5.39         | 11.90                   | 0.56                    | -0.52                  | 77.80                 |
| 1,525.00              | 0.17            | 134.26      | 1,524.88              | 11.90        | 5.43         | 11.86                   | 0.31                    | 0.28                   | -61.12                |
| 1,550.00              | 0.18            | 160.52      | 1,549.88              | 11.83        | 5.47         | 11.79                   | 0.32                    | 0.04                   | 105.04                |
| 1,575.00              | 0.25            | 155.93      | 1,574.88              | 11.75        | 5.51         | 11.71                   | 0.29                    | 0.28                   | -18.36                |
| 1,600.00              | 0.17            | 152.69      | 1,599.88              | 11.67        | 5.54         | 11.62                   | 0.32                    | -0.32                  | -12.96                |
| 1,625.00              | 0.25            | 133.73      | 1,624.88              | 11.59        | 5.60         | 11.55                   | 0.42                    | 0.32                   | -75.84                |
| 1,650.00              | 0.11            | 161.44      | 1,649.88              | 11.53        | 5.65         | 11.49                   | 0.64                    | -0.56                  | 110.84                |
| 1,675.00              | 0.12            | 135.17      | 1,674.88              | 11.49        | 5.67         | 11.45                   | 0.21                    | 0.04                   | -105.08               |
| 1,700.00              | 0.10            | 199.13      | 1,699.88              | 11.45        | 5.69         | 11.41                   | 0.47                    | -0.08                  | 255.84                |
| 1,725.00              | 0.10            | 167.60      | 1,724.88              | 11.41        | 5.68         | 11.37                   | 0.22                    | 0.00                   | -126.12               |
| 1,750.00              | 0.17            | 149.69      | 1,749.88              | 11.36        | 5.71         | 11.31                   | 0.32                    | 0.28                   | -71.64                |
| 1,775.00              | 0.12            | 145.43      | 1,774.88              | 11.30        | 5.74         | 11.26                   | 0.20                    | -0.20                  | -17.04                |
| 1,800.00              | 0.10            | 143.64      | 1,799.88              | 11.27        | 5.77         | 11.22                   | 0.08                    | -0.08                  | -7.16                 |
| 1,825.00              | 0.18            | 131.31      | 1,824.88              | 11.22        | 5.81         | 11.18                   | 0.34                    | 0.32                   | -49.32                |
| 1,850.00              | 0.14            | 165.75      | 1,849.88              | 11.17        | 5.85         | 11.12                   | 0.41                    | -0.16                  | 137.76                |
| 1,875.00              | 0.13            | 151.39      | 1,874.88              | 11.11        | 5.87         | 11.07                   | 0.14                    | -0.04                  | -57.44                |
| 1,900.00              | 0.23            | 151.86      | 1,899.88              | 11.04        | 5.91         | 11.00                   | 0.40                    | 0.40                   | 1.88                  |
| 1,925.00              | 0.21            | 132.85      | 1,924.88              | 10.97        | 5.96         | 10.92                   | 0.30                    | -0.08                  | -76.04                |
| 1,950.00              | 0.19            | 111.95      | 1,949.88              | 10.92        | 6.03         | 10.87                   | 0.30                    | -0.08                  | -83.60                |
| 1,975.00              | 0.19            | 95.38       | 1,974.88              | 10.90        | 6.11         | 10.85                   | 0.22                    | 0.00                   | -66.28                |
| 2,000.00              | 0.19            | 107.88      | 1,999.88              | 10.88        | 6.19         | 10.84                   | 0.17                    | 0.00                   | 50.00                 |
| 2,025.00              | 0.26            | 130.29      | 2,024.88              | 10.84        | 6.28         | 10.79                   | 0.44                    | 0.28                   | 89.64                 |
| 2,050.00              | 0.19            | 128.97      | 2,049.88              | 10.77        | 6.35         | 10.72                   | 0.28                    | -0.28                  | -5.28                 |
| 2,075.00              | 0.26            | 115.86      | 2,074.88              | 10.72        | 6.44         | 10.67                   | 0.35                    | 0.28                   | -52.44                |
| 2,100.00              | 0.42            | 109.13      | 2,099.88              | 10.67        | 6.57         | 10.62                   | 0.66                    | 0.64                   | -26.92                |
| 2,125.00              | 0.29            | 101.66      | 2,124.88              | 10.62        | 6.72         | 10.57                   | 0.55                    | -0.52                  | -29.88                |
| 2,150.00              | 0.30            | 96.20       | 2,149.88              | 10.60        | 6.85         | 10.55                   | 0.12                    | 0.04                   | -21.84                |
| 2,175.00              | 0.30            | 107.72      | 2,174.88              | 10.58        | 6.98         | 10.52                   | 0.24                    | 0.00                   | 46.08                 |
| 2,200.00              | 0.36            | 112.38      | 2,199.88              | 10.53        | 7.11         | 10.47                   | 0.26                    | 0.24                   | 18.64                 |
| 2,225.00              | 0.41            | 112.76      | 2,224.88              | 10.46        | 7.27         | 10.41                   | 0.20                    | 0.20                   | 1.52                  |
| 2,250.00              | 0.41            | 103.26      | 2,249.87              | 10.41        | 7.44         | 10.35                   | 0.27                    | 0.00                   | -38.00                |
| 2,275.00              | 0.33            | 104.91      | 2,274.87              | 10.37        | 7.59         | 10.31                   | 0.32                    | -0.32                  | 6.60                  |
| 2,300.00              | 0.36            | 111.90      | 2,299.87              | 10.32        | 7.74         | 10.26                   | 0.21                    | 0.12                   | 27.96                 |
| 2,325.00              | 0.40            | 100.31      | 2,324.87              | 10.28        | 7.89         | 10.22                   | 0.35                    | 0.16                   | -46.36                |
| 2,350.00              | 0.42            | 100.40      | 2,349.87              | 10.24        | 8.07         | 10.18                   | 0.08                    | 0.08                   | 0.36                  |
| 2,375.00              | 0.36            | 104.51      | 2,374.87              | 10.21        | 8.24         | 10.14                   | 0.26                    | -0.24                  | 16.44                 |
| 2,400.00              | 0.42            | 112.02      | 2,399.87              | 10.15        | 8.40         | 10.09                   | 0.31                    | 0.24                   | 30.04                 |
| 2,425.00              | 0.41            | 109.90      | 2,424.87              | 10.09        | 8.57         | 10.02                   | 0.07                    | -0.04                  | -8.48                 |
| 2,450.00              | 0.41            | 204.79      | 2,449.87              | 9.98         | 8.61         | 9.91                    | 2.42                    | 0.00                   | 379.56                |



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| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
| Site:     | Square Bill Federal Com    | MD Reference:                | GL+KB @ 3299.60usft (McVay 8) |
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| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
| Design:   | Surveys (McVay 8)          | Database:                    | Compass 5000 GCR              |

| 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 2,475.00              | 0.70            | 222.11      | 2,474.87              | 9.78         | 8.47         | 9.72                    | 1.33                    | 1.16                   | 69.28                 |
| 2,500.00              | 0.74            | 214.33      | 2,499.87              | 9.54         | 8.28         | 9.47                    | 0.42                    | 0.16                   | -31.12                |
| 2,525.00              | 0.76            | 211.97      | 2,524.86              | 9.26         | 8.10         | 9.20                    | 0.15                    | 0.08                   | -9.44                 |
| 2,550.00              | 0.76            | 213.23      | 2,549.86              | 8.98         | 7.92         | 8.92                    | 0.07                    | 0.00                   | 5.04                  |
| 2,575.00              | 0.75            | 217.66      | 2,574.86              | 8.71         | 7.73         | 8.66                    | 0.24                    | -0.04                  | 17.72                 |
| 2,600.00              | 0.81            | 215.62      | 2,599.86              | 8.44         | 7.53         | 8.38                    | 0.26                    | 0.24                   | -8.16                 |
| 2,625.00              | 0.81            | 207.50      | 2,624.86              | 8.14         | 7.34         | 8.08                    | 0.46                    | 0.00                   | -32.48                |
| 2,650.00              | 0.75            | 206.07      | 2,649.85              | 7.84         | 7.19         | 7.78                    | 0.25                    | -0.24                  | -5.72                 |
| 2,675.00              | 0.68            | 203.88      | 2,674.85              | 7.55         | 7.06         | 7.50                    | 0.30                    | -0.28                  | -8.76                 |
| 2,700.00              | 0.78            | 193.50      | 2,699.85              | 7.25         | 6.96         | 7.20                    | 0.66                    | 0.40                   | -41.52                |
| 2,725.00              | 0.70            | 195.60      | 2,724.85              | 6.94         | 6.88         | 6.89                    | 0.34                    | -0.32                  | 8.40                  |
| 2,750.00              | 0.59            | 182.77      | 2,749.85              | 6.67         | 6.83         | 6.61                    | 0.72                    | -0.44                  | -51.32                |
| 2,775.00              | 0.63            | 167.36      | 2,774.84              | 6.40         | 6.85         | 6.35                    | 0.67                    | 0.16                   | -61.64                |
| 2,800.00              | 0.55            | 163.64      | 2,799.84              | 6.15         | 6.92         | 6.10                    | 0.35                    | -0.32                  | -14.88                |
| 2,825.00              | 0.52            | 172.52      | 2,824.84              | 5.93         | 6.97         | 5.87                    | 0.35                    | -0.12                  | 35.52                 |
| 2,850.00              | 0.61            | 170.07      | 2,849.84              | 5.68         | 7.00         | 5.63                    | 0.37                    | 0.36                   | -9.80                 |
| 2,875.00              | 0.67            | 162.46      | 2,874.84              | 5.41         | 7.07         | 5.36                    | 0.42                    | 0.24                   | -30.44                |
| 2,900.00              | 0.63            | 150.90      | 2,899.84              | 5.15         | 7.18         | 5.10                    | 0.55                    | -0.16                  | -46.24                |
| 2,925.00              | 0.67            | 152.71      | 2,924.84              | 4.90         | 7.32         | 4.85                    | 0.18                    | 0.16                   | 7.24                  |
| 2,950.00              | 0.62            | 148.63      | 2,949.83              | 4.66         | 7.45         | 4.60                    | 0.27                    | -0.20                  | -16.32                |
| 2,975.00              | 0.68            | 152.05      | 2,974.83              | 4.41         | 7.59         | 4.35                    | 0.29                    | 0.24                   | 13.68                 |
| 3,000.00              | 0.69            | 151.63      | 2,999.83              | 4.15         | 7.74         | 4.09                    | 0.04                    | 0.04                   | -1.68                 |
| 3,025.00              | 0.74            | 145.32      | 3,024.83              | 3.88         | 7.90         | 3.82                    | 0.37                    | 0.20                   | -25.24                |
| 3,050.00              | 0.70            | 141.01      | 3,049.83              | 3.63         | 8.09         | 3.57                    | 0.27                    | -0.16                  | -17.24                |
| 3,075.00              | 0.68            | 142.39      | 3,074.83              | 3.39         | 8.27         | 3.33                    | 0.10                    | -0.08                  | 5.52                  |
| 3,100.00              | 0.80            | 158.55      | 3,099.82              | 3.11         | 8.43         | 3.05                    | 0.96                    | 0.48                   | 64.64                 |
| 3,125.00              | 0.96            | 186.18      | 3,124.82              | 2.74         | 8.47         | 2.68                    | 1.79                    | 0.64                   | 110.52                |
| 3,150.00              | 0.97            | 180.97      | 3,149.82              | 2.32         | 8.44         | 2.26                    | 0.35                    | 0.04                   | -20.84                |
| 3,175.00              | 0.93            | 189.85      | 3,174.81              | 1.91         | 8.40         | 1.85                    | 0.61                    | -0.16                  | 35.52                 |
| 3,200.00              | 1.06            | 186.02      | 3,199.81              | 1.48         | 8.35         | 1.42                    | 0.58                    | 0.52                   | -15.32                |
| 3,225.00              | 1.02            | 184.75      | 3,224.81              | 1.03         | 8.30         | 0.97                    | 0.18                    | -0.16                  | -5.08                 |
| 3,250.00              | 1.01            | 181.96      | 3,249.80              | 0.59         | 8.28         | 0.53                    | 0.20                    | -0.04                  | -11.16                |
| 3,275.00              | 0.93            | 174.71      | 3,274.80              | 0.17         | 8.29         | 0.10                    | 0.59                    | -0.32                  | -29.00                |
| 3,300.00              | 0.92            | 172.48      | 3,299.79              | -0.23        | 8.33         | -0.30                   | 0.15                    | -0.04                  | -8.92                 |
| 3,325.00              | 0.91            | 167.77      | 3,324.79              | -0.63        | 8.40         | -0.69                   | 0.30                    | -0.04                  | -18.84                |
| 3,350.00              | 0.92            | 164.52      | 3,349.79              | -1.01        | 8.50         | -1.08                   | 0.21                    | 0.04                   | -13.00                |
| 3,375.00              | 0.97            | 158.27      | 3,374.78              | -1.40        | 8.63         | -1.47                   | 0.46                    | 0.20                   | -25.00                |
| 3,400.00              | 1.06            | 139.31      | 3,399.78              | -1.78        | 8.86         | -1.84                   | 1.38                    | 0.36                   | -75.84                |
| 3,425.00              | 1.12            | 129.98      | 3,424.78              | -2.11        | 9.20         | -2.18                   | 0.75                    | 0.24                   | -37.32                |
| 3,450.00              | 1.23            | 129.81      | 3,449.77              | -2.44        | 9.59         | -2.51                   | 0.44                    | 0.44                   | -0.68                 |
| 3,475.00              | 1.27            | 128.24      | 3,474.77              | -2.78        | 10.01        | -2.86                   | 0.21                    | 0.16                   | -6.28                 |
| 3,500.00              | 1.30            | 123.63      | 3,499.76              | -3.11        | 10.47        | -3.19                   | 0.43                    | 0.12                   | -18.44                |
| 3,525.00              | 1.30            | 127.40      | 3,524.75              | -3.44        | 10.93        | -3.52                   | 0.34                    | 0.00                   | 15.08                 |
| 3,550.00              | 1.17            | 124.93      | 3,549.75              | -3.76        | 11.36        | -3.84                   | 0.56                    | -0.52                  | -9.88                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
| 3,575.00              | 0.80            | 118.25      | 3,574.74              | -3.99        | 11.73        | -4.08                   | 1.55                    | -1.48                  | -26.72                |
| 3,600.00              | 0.21            | 106.21      | 3,599.74              | -4.08        | 11.92        | -4.17                   | 2.38                    | -2.36                  | -48.16                |
| 3,625.00              | 0.15            | 341.13      | 3,624.74              | -4.06        | 11.96        | -4.15                   | 1.28                    | -0.24                  | -500.32               |
| 3,650.00              | 0.36            | 307.40      | 3,649.74              | -3.98        | 11.88        | -4.08                   | 1.00                    | 0.84                   | -134.92               |
| 3,675.00              | 0.40            | 296.68      | 3,674.74              | -3.90        | 11.74        | -3.99                   | 0.33                    | 0.16                   | -42.88                |
| 3,700.00              | 0.33            | 320.68      | 3,699.74              | -3.80        | 11.62        | -3.89                   | 0.67                    | -0.28                  | 96.00                 |
| 3,725.00              | 0.46            | 321.73      | 3,724.74              | -3.67        | 11.51        | -3.76                   | 0.52                    | 0.52                   | 4.20                  |
| 3,750.00              | 0.41            | 314.29      | 3,749.74              | -3.53        | 11.39        | -3.61                   | 0.30                    | -0.20                  | -29.76                |
| 3,775.00              | 0.34            | 323.29      | 3,774.74              | -3.41        | 11.28        | -3.49                   | 0.37                    | -0.28                  | 36.00                 |
| 3,800.00              | 0.41            | 335.20      | 3,799.74              | -3.26        | 11.20        | -3.35                   | 0.42                    | 0.28                   | 47.64                 |
| 3,825.00              | 0.44            | 333.41      | 3,824.74              | -3.10        | 11.11        | -3.18                   | 0.13                    | 0.12                   | -7.16                 |
| 3,850.00              | 0.46            | 324.36      | 3,849.74              | -2.93        | 11.01        | -3.01                   | 0.30                    | 0.08                   | -36.20                |
| 3,875.00              | 0.48            | 322.29      | 3,874.74              | -2.77        | 10.89        | -2.85                   | 0.10                    | 0.08                   | -8.28                 |
| 3,900.00              | 0.48            | 320.05      | 3,899.74              | -2.60        | 10.76        | -2.69                   | 0.08                    | 0.00                   | -8.96                 |
| 3,925.00              | 0.45            | 323.62      | 3,924.73              | -2.44        | 10.63        | -2.52                   | 0.17                    | -0.12                  | 14.28                 |
| 3,950.00              | 0.48            | 335.00      | 3,949.73              | -2.27        | 10.53        | -2.35                   | 0.39                    | 0.12                   | 45.52                 |
| 3,975.00              | 0.61            | 322.94      | 3,974.73              | -2.07        | 10.41        | -2.15                   | 0.69                    | 0.52                   | -48.24                |
| 4,000.00              | 0.55            | 326.78      | 3,999.73              | -1.86        | 10.26        | -1.94                   | 0.29                    | -0.24                  | 15.36                 |
| 4,025.00              | 0.53            | 329.11      | 4,024.73              | -1.66        | 10.14        | -1.74                   | 0.12                    | -0.08                  | 9.32                  |
| 4,050.00              | 0.64            | 330.55      | 4,049.73              | -1.44        | 10.01        | -1.52                   | 0.44                    | 0.44                   | 5.76                  |
| 4,075.00              | 0.63            | 324.16      | 4,074.73              | -1.21        | 9.86         | -1.28                   | 0.29                    | -0.04                  | -25.56                |
| 4,100.00              | 0.55            | 321.46      | 4,099.73              | -1.00        | 9.70         | -1.08                   | 0.34                    | -0.32                  | -10.80                |
| 4,125.00              | 0.60            | 324.80      | 4,124.72              | -0.80        | 9.55         | -0.88                   | 0.24                    | 0.20                   | 13.36                 |
| 4,150.00              | 0.65            | 330.34      | 4,149.72              | -0.57        | 9.41         | -0.64                   | 0.31                    | 0.20                   | 22.16                 |
| 4,175.00              | 0.67            | 326.63      | 4,174.72              | -0.33        | 9.26         | -0.40                   | 0.19                    | 0.08                   | -14.84                |
| 4,200.00              | 0.62            | 321.08      | 4,199.72              | -0.10        | 9.09         | -0.17                   | 0.32                    | -0.20                  | -22.20                |
| 4,225.00              | 0.56            | 329.53      | 4,224.72              | 0.11         | 8.95         | 0.04                    | 0.42                    | -0.24                  | 33.80                 |
| 4,250.00              | 0.59            | 334.28      | 4,249.72              | 0.33         | 8.83         | 0.26                    | 0.23                    | 0.12                   | 19.00                 |
| 4,275.00              | 0.65            | 333.34      | 4,274.72              | 0.58         | 8.71         | 0.51                    | 0.24                    | 0.24                   | -3.76                 |
| 4,300.00              | 0.67            | 328.43      | 4,299.71              | 0.83         | 8.57         | 0.76                    | 0.24                    | 0.08                   | -19.64                |
| 4,325.00              | 0.61            | 325.33      | 4,324.71              | 1.06         | 8.42         | 1.00                    | 0.28                    | -0.24                  | -12.40                |
| 4,350.00              | 0.55            | 329.32      | 4,349.71              | 1.27         | 8.28         | 1.21                    | 0.29                    | -0.24                  | 15.96                 |
| 4,375.00              | 0.64            | 343.18      | 4,374.71              | 1.51         | 8.18         | 1.45                    | 0.68                    | 0.36                   | 55.44                 |
| 4,400.00              | 0.60            | 335.68      | 4,399.71              | 1.76         | 8.08         | 1.70                    | 0.36                    | -0.16                  | -30.00                |
| 4,425.00              | 0.58            | 326.47      | 4,424.71              | 1.99         | 7.96         | 1.93                    | 0.39                    | -0.08                  | -36.84                |
| 4,450.00              | 0.60            | 335.81      | 4,449.71              | 2.21         | 7.84         | 2.15                    | 0.39                    | 0.08                   | 37.36                 |
| 4,475.00              | 0.39            | 4.19        | 4,474.70              | 2.42         | 7.79         | 2.36                    | 1.27                    | -0.84                  | 113.52                |
| 4,500.00              | 0.47            | 25.40       | 4,499.70              | 2.59         | 7.84         | 2.53                    | 0.71                    | 0.32                   | 84.84                 |
| 4,525.00              | 0.48            | 23.10       | 4,524.70              | 2.78         | 7.92         | 2.72                    | 0.09                    | 0.04                   | -9.20                 |
| 4,550.00              | 0.45            | 43.37       | 4,549.70              | 2.95         | 8.03         | 2.89                    | 0.67                    | -0.12                  | 81.08                 |
| 4,575.00              | 0.49            | 52.17       | 4,574.70              | 3.09         | 8.18         | 3.02                    | 0.33                    | 0.16                   | 35.20                 |
| 4,600.00              | 0.66            | 63.84       | 4,599.70              | 3.22         | 8.40         | 3.15                    | 0.82                    | 0.68                   | 46.68                 |
| 4,625.00              | 0.58            | 73.27       | 4,624.70              | 3.32         | 8.65         | 3.25                    | 0.52                    | -0.32                  | 37.72                 |



Phoenix Technology Services LP  
Survey Report



|           |                            |                              |                               |
|-----------|----------------------------|------------------------------|-------------------------------|
| Company:  | COG Operating LLC          | Local Co-ordinate Reference: | Well 22H                      |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
| Site:     | Square Bill Federal Com    | MD Reference:                | GL+KB @ 3299.60usft (McVay 8) |
| Well:     | 22H                        | North Reference:             | Grid                          |
| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
| Design:   | Surveys (McVay 8)          | Database:                    | Compass 5000 GCR              |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Buid Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|-----------------------|-----------------------|
| 4,650.00              | 0.65            | 73.60       | 4,649.70              | 3.39         | 8.90         | 3.32                    | 0.28                    | 0.28                  | 1.32                  |
| 4,675.00              | 0.87            | 71.63       | 4,674.70              | 3.49         | 9.22         | 3.42                    | 0.89                    | 0.88                  | -7.88                 |
| 4,700.00              | 0.92            | 74.90       | 4,699.69              | 3.61         | 9.59         | 3.53                    | 0.29                    | 0.20                  | 13.08                 |
| 4,725.00              | 0.86            | 85.90       | 4,724.69              | 3.67         | 9.98         | 3.59                    | 0.72                    | -0.24                 | 44.00                 |
| 4,750.00              | 1.04            | 80.93       | 4,749.69              | 3.72         | 10.39        | 3.64                    | 0.79                    | 0.72                  | -19.88                |
| 4,775.00              | 1.13            | 83.37       | 4,774.68              | 3.78         | 10.86        | 3.70                    | 0.40                    | 0.36                  | 9.76                  |
| 4,800.00              | 1.11            | 86.13       | 4,799.68              | 3.83         | 11.34        | 3.74                    | 0.23                    | -0.08                 | 11.04                 |
| 4,825.00              | 1.21            | 109.19      | 4,824.67              | 3.76         | 11.83        | 3.67                    | 1.90                    | 0.40                  | 92.24                 |
| 4,850.00              | 1.97            | 134.95      | 4,849.66              | 3.37         | 12.39        | 3.27                    | 4.10                    | 3.04                  | 103.04                |
| 4,875.00              | 2.49            | 135.95      | 4,874.64              | 2.67         | 13.07        | 2.57                    | 2.09                    | 2.08                  | 4.00                  |
| 4,900.00              | 2.61            | 136.34      | 4,899.62              | 1.87         | 13.84        | 1.77                    | 0.48                    | 0.48                  | 1.56                  |
| 4,925.00              | 2.54            | 138.43      | 4,924.59              | 1.05         | 14.60        | 0.93                    | 0.47                    | -0.28                 | 8.36                  |
| 4,950.00              | 2.73            | 136.65      | 4,949.57              | 0.20         | 15.38        | 0.08                    | 0.83                    | 0.76                  | -7.12                 |
| 4,975.00              | 2.68            | 136.12      | 4,974.54              | -0.66        | 16.19        | -0.78                   | 0.22                    | -0.20                 | -2.12                 |
| 5,000.00              | 2.87            | 134.95      | 4,999.51              | -1.52        | 17.04        | -1.65                   | 0.79                    | 0.76                  | -4.68                 |
| 5,025.00              | 2.98            | 134.31      | 5,024.48              | -2.42        | 17.95        | -2.55                   | 0.46                    | 0.44                  | -2.56                 |
| 5,050.00              | 3.00            | 133.67      | 5,049.44              | -3.32        | 18.88        | -3.47                   | 0.16                    | 0.08                  | -2.56                 |
| 5,075.00              | 2.87            | 134.92      | 5,074.41              | -4.21        | 19.80        | -4.37                   | 0.58                    | -0.52                 | 5.00                  |
| 5,100.00              | 2.70            | 133.25      | 5,099.38              | -5.06        | 20.67        | -5.22                   | 0.75                    | -0.68                 | -6.68                 |
| 5,125.00              | 2.54            | 130.33      | 5,124.35              | -5.82        | 21.52        | -5.99                   | 0.83                    | -0.64                 | -11.68                |
| 5,150.00              | 2.45            | 131.74      | 5,149.33              | -6.54        | 22.34        | -6.71                   | 0.44                    | -0.36                 | 5.64                  |
| 5,175.00              | 2.43            | 131.46      | 5,174.31              | -7.24        | 23.14        | -7.42                   | 0.09                    | -0.08                 | -1.12                 |
| 5,200.00              | 2.32            | 140.44      | 5,199.29              | -7.98        | 23.86        | -8.17                   | 1.55                    | -0.44                 | 35.92                 |
| 5,225.00              | 2.25            | 150.62      | 5,224.27              | -8.80        | 24.42        | -8.99                   | 1.65                    | -0.28                 | 40.72                 |
| 5,250.00              | 2.15            | 158.10      | 5,249.25              | -9.66        | 24.84        | -9.85                   | 1.22                    | -0.40                 | 29.92                 |
| 5,275.00              | 2.12            | 158.27      | 5,274.23              | -10.53       | 25.18        | -10.72                  | 0.12                    | -0.12                 | 0.68                  |
| 5,300.00              | 2.02            | 158.28      | 5,299.21              | -11.37       | 25.52        | -11.56                  | 0.40                    | -0.40                 | 0.04                  |
| 5,325.00              | 2.02            | 161.51      | 5,324.20              | -12.19       | 25.82        | -12.39                  | 0.46                    | 0.00                  | 12.92                 |
| 5,350.00              | 2.04            | 160.11      | 5,349.18              | -13.03       | 26.11        | -13.23                  | 0.21                    | 0.08                  | -5.60                 |
| 5,375.00              | 1.86            | 160.13      | 5,374.17              | -13.83       | 26.40        | -14.03                  | 0.72                    | -0.72                 | 0.08                  |
| 5,400.00              | 1.51            | 152.45      | 5,399.16              | -14.50       | 26.69        | -14.71                  | 1.66                    | -1.40                 | -30.72                |
| 5,425.00              | 1.41            | 157.93      | 5,424.15              | -15.08       | 26.96        | -15.29                  | 0.69                    | -0.40                 | 21.92                 |
| 5,450.00              | 1.45            | 154.79      | 5,449.14              | -15.65       | 27.21        | -15.86                  | 0.35                    | 0.16                  | -12.56                |
| 5,475.00              | 1.52            | 160.04      | 5,474.13              | -16.25       | 27.46        | -16.46                  | 0.61                    | 0.28                  | 21.00                 |
| 5,500.00              | 1.57            | 173.24      | 5,499.13              | -16.90       | 27.61        | -17.11                  | 1.43                    | 0.20                  | 52.80                 |
| 5,525.00              | 1.82            | 184.99      | 5,524.11              | -17.64       | 27.62        | -17.85                  | 1.71                    | 1.00                  | 47.00                 |
| 5,550.00              | 1.87            | 185.96      | 5,549.10              | -18.44       | 27.54        | -18.65                  | 0.24                    | 0.20                  | 3.88                  |
| 5,575.00              | 1.88            | 187.86      | 5,574.09              | -19.25       | 27.44        | -19.46                  | 0.25                    | 0.04                  | 7.60                  |
| 5,600.00              | 1.96            | 187.93      | 5,599.07              | -20.08       | 27.33        | -20.29                  | 0.32                    | 0.32                  | 0.28                  |
| 5,625.00              | 1.88            | 188.28      | 5,624.06              | -20.91       | 27.21        | -21.12                  | 0.32                    | -0.32                 | 1.40                  |
| 5,650.00              | 1.93            | 189.35      | 5,649.05              | -21.73       | 27.08        | -21.94                  | 0.25                    | 0.20                  | 4.28                  |
| 5,675.00              | 1.96            | 187.16      | 5,674.03              | -22.57       | 26.96        | -22.78                  | 0.32                    | 0.12                  | -8.76                 |
| 5,700.00              | 1.90            | 189.99      | 5,699.02              | -23.40       | 26.83        | -23.61                  | 0.45                    | -0.24                 | 11.32                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
| 5,725.00              | 1.93            | 190.90      | 5,724.00              | -24.23       | 26.68        | -24.43                  | 0.17                    | 0.12                   | 3.64                  |
| 5,750.00              | 1.90            | 187.92      | 5,748.99              | -25.05       | 26.55        | -25.25                  | 0.42                    | -0.12                  | -11.92                |
| 5,775.00              | 1.90            | 189.57      | 5,773.98              | -25.87       | 26.42        | -26.07                  | 0.22                    | 0.00                   | 6.60                  |
| 5,800.00              | 1.81            | 188.09      | 5,798.96              | -26.67       | 26.30        | -26.87                  | 0.41                    | -0.36                  | -5.92                 |
| 5,825.00              | 1.80            | 190.66      | 5,823.95              | -27.44       | 26.17        | -27.64                  | 0.33                    | -0.04                  | 10.28                 |
| 5,850.00              | 1.78            | 185.77      | 5,848.94              | -28.22       | 26.06        | -28.42                  | 0.62                    | -0.08                  | -19.56                |
| 5,875.00              | 1.63            | 187.33      | 5,873.93              | -28.96       | 25.97        | -29.15                  | 0.63                    | -0.60                  | 6.24                  |
| 5,900.00              | 1.59            | 182.95      | 5,898.92              | -29.65       | 25.91        | -29.85                  | 0.52                    | -0.16                  | -17.52                |
| 5,925.00              | 1.57            | 183.64      | 5,923.91              | -30.34       | 25.87        | -30.54                  | 0.11                    | -0.08                  | 2.76                  |
| 5,950.00              | 1.58            | 182.71      | 5,948.90              | -31.03       | 25.83        | -31.23                  | 0.11                    | 0.04                   | -3.72                 |
| 5,975.00              | 1.52            | 182.77      | 5,973.89              | -31.70       | 25.80        | -31.90                  | 0.24                    | -0.24                  | 0.24                  |
| 6,000.00              | 1.38            | 186.73      | 5,998.88              | -32.33       | 25.75        | -32.53                  | 0.69                    | -0.56                  | 15.84                 |
| 6,025.00              | 1.36            | 184.50      | 6,023.87              | -32.93       | 25.69        | -33.13                  | 0.23                    | -0.08                  | -8.92                 |
| 6,050.00              | 1.32            | 182.35      | 6,048.87              | -33.51       | 25.65        | -33.71                  | 0.26                    | -0.16                  | -8.60                 |
| 6,075.00              | 1.30            | 186.40      | 6,073.86              | -34.08       | 25.61        | -34.28                  | 0.38                    | -0.08                  | 16.20                 |
| 6,100.00              | 1.30            | 180.71      | 6,098.85              | -34.65       | 25.58        | -34.84                  | 0.52                    | 0.00                   | -22.76                |
| 6,125.00              | 1.18            | 182.64      | 6,123.85              | -35.19       | 25.56        | -35.38                  | 0.51                    | -0.48                  | 7.72                  |
| 6,150.00              | 1.05            | 183.57      | 6,148.84              | -35.67       | 25.53        | -35.87                  | 0.52                    | -0.52                  | 3.72                  |
| 6,175.00              | 1.06            | 181.14      | 6,173.84              | -36.13       | 25.52        | -36.33                  | 0.18                    | 0.04                   | -9.72                 |
| 6,200.00              | 0.99            | 179.34      | 6,198.84              | -36.58       | 25.51        | -36.78                  | 0.31                    | -0.28                  | -7.20                 |
| 6,225.00              | 1.04            | 180.60      | 6,223.83              | -37.02       | 25.51        | -37.22                  | 0.22                    | 0.20                   | 5.04                  |
| 6,250.00              | 1.03            | 174.85      | 6,248.83              | -37.47       | 25.53        | -37.67                  | 0.42                    | -0.04                  | -23.00                |
| 6,275.00              | 1.00            | 177.97      | 6,273.82              | -37.92       | 25.56        | -38.11                  | 0.25                    | -0.12                  | 12.48                 |
| 6,300.00              | 1.08            | 177.10      | 6,298.82              | -38.37       | 25.58        | -38.56                  | 0.33                    | 0.32                   | -3.48                 |
| 6,325.00              | 0.99            | 178.77      | 6,323.82              | -38.82       | 25.59        | -39.02                  | 0.38                    | -0.36                  | 6.68                  |
| 6,350.00              | 0.89            | 184.03      | 6,348.81              | -39.23       | 25.59        | -39.43                  | 0.53                    | -0.40                  | 21.04                 |
| 6,375.00              | 0.89            | 184.65      | 6,373.81              | -39.62       | 25.56        | -39.81                  | 0.04                    | 0.00                   | 2.48                  |
| 6,400.00              | 0.96            | 183.47      | 6,398.81              | -40.02       | 25.53        | -40.22                  | 0.29                    | 0.28                   | -4.72                 |
| 6,425.00              | 0.92            | 182.52      | 6,423.80              | -40.43       | 25.51        | -40.62                  | 0.17                    | -0.16                  | -3.80                 |
| 6,450.00              | 0.96            | 185.95      | 6,448.80              | -40.84       | 25.48        | -41.03                  | 0.28                    | 0.16                   | 13.72                 |
| 6,475.00              | 0.96            | 182.54      | 6,473.80              | -41.26       | 25.45        | -41.45                  | 0.23                    | 0.00                   | -13.64                |
| 6,500.00              | 0.89            | 187.02      | 6,498.79              | -41.66       | 25.41        | -41.85                  | 0.40                    | -0.28                  | 17.92                 |
| 6,525.00              | 0.91            | 184.47      | 6,523.79              | -42.05       | 25.37        | -42.24                  | 0.18                    | 0.08                   | -10.20                |
| 6,550.00              | 0.97            | 188.10      | 6,548.79              | -42.46       | 25.33        | -42.65                  | 0.34                    | 0.24                   | 14.52                 |
| 6,575.00              | 0.84            | 180.95      | 6,573.78              | -42.85       | 25.29        | -43.04                  | 0.69                    | -0.52                  | -28.60                |
| 6,600.00              | 0.77            | 177.10      | 6,598.78              | -43.20       | 25.30        | -43.39                  | 0.35                    | -0.28                  | -15.40                |
| 6,625.00              | 0.71            | 174.91      | 6,623.78              | -43.52       | 25.32        | -43.71                  | 0.27                    | -0.24                  | -8.76                 |
| 6,650.00              | 0.73            | 179.89      | 6,648.78              | -43.84       | 25.34        | -44.03                  | 0.26                    | 0.08                   | 19.92                 |
| 6,675.00              | 0.60            | 162.37      | 6,673.77              | -44.12       | 25.38        | -44.31                  | 0.96                    | -0.52                  | -70.08                |
| 6,700.00              | 0.52            | 175.32      | 6,698.77              | -44.36       | 25.43        | -44.55                  | 0.60                    | -0.32                  | 51.80                 |
| 6,725.00              | 0.65            | 167.33      | 6,723.77              | -44.61       | 25.47        | -44.80                  | 0.61                    | 0.52                   | -31.96                |
| 6,750.00              | 0.54            | 169.25      | 6,748.77              | -44.86       | 25.52        | -45.06                  | 0.45                    | -0.44                  | 7.68                  |
| 6,775.00              | 0.62            | 170.78      | 6,773.77              | -45.11       | 25.56        | -45.31                  | 0.33                    | 0.32                   | 6.12                  |
| 6,800.00              | 0.63            | 166.65      | 6,798.77              | -45.38       | 25.62        | -45.57                  | 0.18                    | 0.04                   | -16.52                |



## Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
| 6,825.00              | 0.52            | 163.43      | 6,823.77              | -45.62       | 25.68        | -45.82                  | 0.46                    | -0.44                  | -12.88                |
| 6,850.00              | 0.51            | 164.22      | 6,848.77              | -45.84       | 25.74        | -46.03                  | 0.05                    | -0.04                  | 3.16                  |
| 6,875.00              | 0.53            | 173.16      | 6,873.76              | -46.06       | 25.79        | -46.26                  | 0.33                    | 0.08                   | 35.76                 |
| 6,900.00              | 0.51            | 167.45      | 6,898.76              | -46.28       | 25.82        | -46.48                  | 0.22                    | -0.08                  | -22.84                |
| 6,925.00              | 0.47            | 160.88      | 6,923.76              | -46.49       | 25.88        | -46.69                  | 0.28                    | -0.16                  | -26.28                |
| 6,950.00              | 0.48            | 154.43      | 6,948.76              | -46.68       | 25.96        | -46.88                  | 0.22                    | 0.04                   | -25.80                |
| 6,975.00              | 0.41            | 164.14      | 6,973.76              | -46.86       | 26.03        | -47.06                  | 0.41                    | -0.28                  | 38.84                 |
| 7,000.00              | 0.45            | 160.79      | 6,998.76              | -47.04       | 26.09        | -47.24                  | 0.19                    | 0.16                   | -13.40                |
| 7,025.00              | 0.36            | 160.02      | 7,023.76              | -47.21       | 26.15        | -47.40                  | 0.36                    | -0.36                  | -3.08                 |
| 7,050.00              | 0.35            | 169.98      | 7,048.76              | -47.35       | 26.19        | -47.55                  | 0.25                    | -0.04                  | 39.84                 |
| 7,075.00              | 0.33            | 157.40      | 7,073.76              | -47.50       | 26.23        | -47.70                  | 0.31                    | -0.08                  | -50.32                |
| 7,100.00              | 0.24            | 156.09      | 7,098.76              | -47.61       | 26.28        | -47.81                  | 0.36                    | -0.36                  | -5.24                 |
| 7,125.00              | 0.30            | 169.10      | 7,123.76              | -47.72       | 26.31        | -47.92                  | 0.34                    | 0.24                   | 52.04                 |
| 7,150.00              | 0.23            | 155.44      | 7,148.76              | -47.83       | 26.34        | -48.03                  | 0.38                    | -0.28                  | -54.64                |
| 7,175.00              | 0.17            | 177.54      | 7,173.76              | -47.92       | 26.37        | -48.12                  | 0.39                    | -0.24                  | 88.40                 |
| 7,200.00              | 0.16            | 206.65      | 7,198.76              | -47.98       | 26.35        | -48.18                  | 0.33                    | -0.04                  | 116.44                |
| 7,225.00              | 0.13            | 177.07      | 7,223.76              | -48.04       | 26.34        | -48.24                  | 0.32                    | -0.12                  | -118.32               |
| 7,250.00              | 0.05            | 186.96      | 7,248.76              | -48.08       | 26.34        | -48.28                  | 0.32                    | -0.32                  | 39.56                 |
| 7,275.00              | 0.13            | 230.38      | 7,273.76              | -48.11       | 26.31        | -48.31                  | 0.40                    | 0.32                   | 173.68                |
| 7,300.00              | 0.13            | 176.63      | 7,298.76              | -48.16       | 26.29        | -48.36                  | 0.47                    | 0.00                   | -215.00               |
| 7,325.00              | 0.09            | 229.87      | 7,323.76              | -48.20       | 26.28        | -48.40                  | 0.42                    | -0.16                  | 212.96                |
| 7,350.00              | 0.13            | 239.50      | 7,348.76              | -48.23       | 26.24        | -48.43                  | 0.18                    | 0.16                   | 38.52                 |
| 7,375.00              | 0.08            | 204.72      | 7,373.76              | -48.26       | 26.21        | -48.46                  | 0.32                    | -0.20                  | -139.12               |
| 7,400.00              | 0.14            | 229.14      | 7,398.76              | -48.29       | 26.18        | -48.49                  | 0.30                    | 0.24                   | 97.68                 |
| 7,425.00              | 0.11            | 215.31      | 7,423.76              | -48.33       | 26.14        | -48.53                  | 0.17                    | -0.12                  | -55.32                |
| 7,450.00              | 0.11            | 208.89      | 7,448.76              | -48.37       | 26.12        | -48.57                  | 0.05                    | 0.00                   | -25.68                |
| 7,475.00              | 0.07            | 246.77      | 7,473.76              | -48.40       | 26.09        | -48.60                  | 0.28                    | -0.16                  | 151.52                |
| 7,500.00              | 0.15            | 255.75      | 7,498.76              | -48.41       | 26.05        | -48.61                  | 0.33                    | 0.32                   | 35.92                 |
| 7,525.00              | 0.10            | 189.77      | 7,523.76              | -48.44       | 26.01        | -48.64                  | 0.57                    | -0.20                  | -263.92               |
| 7,550.00              | 0.07            | 232.80      | 7,548.76              | -48.47       | 25.99        | -48.67                  | 0.27                    | -0.12                  | 172.12                |
| 7,575.00              | 0.16            | 217.17      | 7,573.76              | -48.51       | 25.96        | -48.71                  | 0.38                    | 0.36                   | -62.52                |
| 7,600.00              | 0.08            | 211.35      | 7,598.76              | -48.55       | 25.93        | -48.75                  | 0.32                    | -0.32                  | -23.28                |
| 7,625.00              | 0.13            | 239.34      | 7,623.76              | -48.58       | 25.90        | -48.78                  | 0.28                    | 0.20                   | 111.96                |
| 7,650.00              | 0.21            | 236.48      | 7,648.76              | -48.62       | 25.83        | -48.82                  | 0.32                    | 0.32                   | -11.44                |
| 7,675.00              | 0.15            | 248.99      | 7,673.76              | -48.66       | 25.77        | -48.86                  | 0.29                    | -0.24                  | 50.04                 |
| 7,700.00              | 0.16            | 258.49      | 7,698.76              | -48.68       | 25.70        | -48.87                  | 0.11                    | 0.04                   | 38.00                 |
| 7,725.00              | 0.20            | 250.25      | 7,723.76              | -48.70       | 25.63        | -48.89                  | 0.19                    | 0.16                   | -32.96                |
| 7,750.00              | 0.21            | 223.90      | 7,748.76              | -48.75       | 25.55        | -48.94                  | 0.38                    | 0.04                   | -105.40               |
| 7,775.00              | 0.15            | 221.25      | 7,773.76              | -48.80       | 25.50        | -49.00                  | 0.24                    | -0.24                  | -10.60                |
| 7,800.00              | 0.24            | 245.19      | 7,798.76              | -48.85       | 25.43        | -49.05                  | 0.48                    | 0.36                   | 95.76                 |
| 7,825.00              | 0.21            | 232.70      | 7,823.76              | -48.90       | 25.35        | -49.09                  | 0.23                    | -0.12                  | -49.96                |
| 7,850.00              | 0.23            | 262.17      | 7,848.76              | -48.94       | 25.26        | -49.13                  | 0.45                    | 0.08                   | 117.88                |
| 7,875.00              | 0.25            | 255.37      | 7,873.76              | -48.96       | 25.16        | -49.15                  | 0.14                    | 0.08                   | -27.20                |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 7,900.00              | 0.22            | 225.86      | 7,898.76              | -49.00       | 25.07        | -49.19                  | 0.49                    | -0.12                  | -118.04               |
| 7,925.00              | 0.18            | 233.21      | 7,923.75              | -49.06       | 25.01        | -49.25                  | 0.19                    | -0.16                  | 29.40                 |
| 7,950.00              | 0.17            | 243.44      | 7,948.75              | -49.10       | 24.94        | -49.29                  | 0.13                    | -0.04                  | 40.92                 |
| 7,975.00              | 0.23            | 215.25      | 7,973.75              | -49.16       | 24.88        | -49.35                  | 0.45                    | 0.24                   | -112.76               |
| 8,000.00              | 0.12            | 211.53      | 7,998.75              | -49.22       | 24.84        | -49.41                  | 0.44                    | -0.44                  | -14.88                |
| 8,025.00              | 0.14            | 215.29      | 8,023.75              | -49.27       | 24.80        | -49.46                  | 0.09                    | 0.08                   | 15.04                 |
| 8,050.00              | 0.31            | 169.27      | 8,048.75              | -49.36       | 24.80        | -49.55                  | 0.94                    | 0.68                   | -184.08               |
| 8,075.00              | 0.52            | 150.05      | 8,073.75              | -49.52       | 24.87        | -49.71                  | 1.00                    | 0.84                   | -76.88                |
| 8,100.00              | 0.58            | 159.92      | 8,098.75              | -49.74       | 24.97        | -49.93                  | 0.45                    | 0.24                   | 39.48                 |
| 8,125.00              | 0.62            | 145.18      | 8,123.75              | -49.97       | 25.09        | -50.16                  | 0.64                    | 0.16                   | -58.96                |
| 8,150.00              | 0.58            | 148.28      | 8,148.75              | -50.19       | 25.23        | -50.38                  | 0.21                    | -0.16                  | 12.40                 |
| 8,175.00              | 0.55            | 156.00      | 8,173.75              | -50.41       | 25.35        | -50.60                  | 0.33                    | -0.12                  | 30.88                 |
| 8,200.00              | 0.65            | 151.50      | 8,198.75              | -50.64       | 25.46        | -50.84                  | 0.44                    | 0.40                   | -18.00                |
| 8,225.00              | 0.69            | 144.54      | 8,223.75              | -50.89       | 25.62        | -51.08                  | 0.36                    | 0.16                   | -27.84                |
| 8,250.00              | 0.61            | 143.08      | 8,248.74              | -51.12       | 25.79        | -51.31                  | 0.33                    | -0.32                  | -5.84                 |
| 8,275.00              | 0.62            | 156.19      | 8,273.74              | -51.35       | 25.92        | -51.55                  | 0.56                    | 0.04                   | 52.44                 |
| 8,300.00              | 0.72            | 144.01      | 8,298.74              | -51.60       | 26.07        | -51.80                  | 0.69                    | 0.40                   | -48.72                |
| 8,325.00              | 0.65            | 145.57      | 8,323.74              | -51.84       | 26.24        | -52.04                  | 0.29                    | -0.28                  | 6.24                  |
| 8,350.00              | 0.63            | 149.15      | 8,348.74              | -52.08       | 26.39        | -52.28                  | 0.18                    | -0.08                  | 14.32                 |
| 8,375.00              | 0.64            | 148.58      | 8,373.74              | -52.32       | 26.53        | -52.52                  | 0.05                    | 0.04                   | -2.28                 |
| 8,400.00              | 0.60            | 142.61      | 8,398.73              | -52.54       | 26.69        | -52.74                  | 0.30                    | -0.16                  | -23.88                |
| 8,425.00              | 0.62            | 156.70      | 8,423.73              | -52.77       | 26.82        | -52.97                  | 0.60                    | 0.08                   | 56.36                 |
| 8,450.00              | 1.02            | 175.24      | 8,448.73              | -53.11       | 26.89        | -53.32                  | 1.90                    | 1.60                   | 74.16                 |
| 8,475.00              | 1.12            | 171.24      | 8,473.73              | -53.58       | 26.95        | -53.78                  | 0.50                    | 0.40                   | -16.00                |
| 8,500.00              | 1.10            | 172.39      | 8,498.72              | -54.06       | 27.02        | -54.26                  | 0.12                    | -0.08                  | 4.60                  |
| 8,525.00              | 1.24            | 173.38      | 8,523.72              | -54.56       | 27.08        | -54.77                  | 0.57                    | 0.56                   | 3.96                  |
| 8,550.00              | 1.12            | 177.72      | 8,548.71              | -55.07       | 27.12        | -55.28                  | 0.60                    | -0.48                  | 17.36                 |
| 8,575.00              | 1.14            | 181.31      | 8,573.71              | -55.57       | 27.12        | -55.77                  | 0.29                    | 0.08                   | 14.36                 |
| 8,600.00              | 1.06            | 178.04      | 8,598.70              | -56.05       | 27.13        | -56.25                  | 0.41                    | -0.32                  | -13.08                |
| 8,625.00              | 0.98            | 200.33      | 8,623.70              | -56.48       | 27.06        | -56.68                  | 1.61                    | -0.32                  | 89.16                 |
| 8,650.00              | 1.19            | 207.73      | 8,648.69              | -56.91       | 26.87        | -57.11                  | 1.01                    | 0.84                   | 29.60                 |
| 8,675.00              | 1.23            | 206.47      | 8,673.69              | -57.38       | 26.63        | -57.58                  | 0.19                    | 0.16                   | -5.04                 |
| 8,700.00              | 1.20            | 207.71      | 8,698.68              | -57.85       | 26.38        | -58.05                  | 0.16                    | -0.12                  | 4.96                  |
| 8,725.00              | 1.13            | 214.36      | 8,723.68              | -58.29       | 26.12        | -58.48                  | 0.61                    | -0.28                  | 26.60                 |
| 8,750.00              | 1.22            | 214.90      | 8,748.67              | -58.71       | 25.83        | -58.90                  | 0.36                    | 0.36                   | 2.16                  |
| 8,775.00              | 1.21            | 214.74      | 8,773.67              | -59.14       | 25.53        | -59.34                  | 0.04                    | -0.04                  | -0.64                 |
| 8,800.00              | 1.12            | 215.12      | 8,798.66              | -59.56       | 25.24        | -59.75                  | 0.36                    | -0.36                  | 1.52                  |
| 8,825.00              | 1.11            | 221.42      | 8,823.66              | -59.94       | 24.94        | -60.13                  | 0.49                    | -0.04                  | 25.20                 |
| 8,850.00              | 1.09            | 219.37      | 8,848.65              | -60.31       | 24.63        | -60.49                  | 0.18                    | -0.08                  | -8.20                 |
| 8,875.00              | 1.04            | 218.81      | 8,873.65              | -60.67       | 24.33        | -60.85                  | 0.20                    | -0.20                  | -2.24                 |
| 8,900.00              | 1.04            | 220.51      | 8,898.64              | -61.02       | 24.04        | -61.20                  | 0.12                    | 0.00                   | 6.80                  |
| 8,925.00              | 1.09            | 224.34      | 8,923.64              | -61.36       | 23.73        | -61.54                  | 0.35                    | 0.20                   | 15.32                 |
| 8,950.00              | 1.12            | 221.99      | 8,948.63              | -61.71       | 23.40        | -61.89                  | 0.22                    | 0.12                   | -9.40                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
| 8,975.00              | 1.00            | 225.82      | 8,973.63              | -62.04       | 23.08        | -62.22                  | 0.56                    | -0.48                  | 15.32                 |
| 9,000.00              | 1.01            | 223.29      | 8,998.63              | -62.36       | 22.77        | -62.53                  | 0.18                    | 0.04                   | -10.12                |
| 9,025.00              | 1.03            | 227.30      | 9,023.62              | -62.67       | 22.46        | -62.84                  | 0.30                    | 0.08                   | 16.04                 |
| 9,050.00              | 1.04            | 223.00      | 9,048.62              | -62.99       | 22.14        | -63.16                  | 0.31                    | 0.04                   | -17.20                |
| 9,075.00              | 1.02            | 221.39      | 9,073.61              | -63.32       | 21.83        | -63.49                  | 0.14                    | -0.08                  | -6.44                 |
| 9,100.00              | 0.99            | 226.86      | 9,098.61              | -63.64       | 21.53        | -63.80                  | 0.40                    | -0.12                  | 21.88                 |
| 9,125.00              | 1.05            | 222.99      | 9,123.61              | -63.95       | 21.22        | -64.11                  | 0.37                    | 0.24                   | -15.48                |
| 9,150.00              | 1.05            | 224.68      | 9,148.60              | -64.28       | 20.90        | -64.44                  | 0.12                    | 0.00                   | 6.76                  |
| 9,175.00              | 1.14            | 227.26      | 9,173.60              | -64.61       | 20.56        | -64.77                  | 0.41                    | 0.36                   | 10.32                 |
| 9,200.00              | 1.49            | 205.63      | 9,198.59              | -65.07       | 20.23        | -65.23                  | 2.41                    | 1.40                   | -86.52                |
| 9,225.00              | 1.63            | 209.10      | 9,223.58              | -65.68       | 19.92        | -65.83                  | 0.68                    | 0.56                   | 13.88                 |
| 9,250.00              | 1.70            | 209.64      | 9,248.57              | -66.31       | 19.56        | -66.46                  | 0.29                    | 0.28                   | 2.16                  |
| 9,275.00              | 1.72            | 207.30      | 9,273.56              | -66.97       | 19.21        | -67.11                  | 0.29                    | 0.08                   | -9.36                 |
| 9,300.00              | 1.64            | 205.81      | 9,298.55              | -67.62       | 18.88        | -67.77                  | 0.36                    | -0.32                  | -5.96                 |
| 9,325.00              | 1.42            | 207.62      | 9,323.54              | -68.22       | 18.58        | -68.36                  | 0.90                    | -0.88                  | 7.24                  |
| 9,350.00              | 1.33            | 208.05      | 9,348.53              | -68.75       | 18.30        | -68.89                  | 0.36                    | -0.36                  | 1.72                  |
| 9,375.00              | 1.30            | 209.00      | 9,373.53              | -69.25       | 18.03        | -69.39                  | 0.15                    | -0.12                  | 3.80                  |
| 9,400.00              | 1.22            | 210.95      | 9,398.52              | -69.73       | 17.75        | -69.86                  | 0.36                    | -0.32                  | 7.80                  |
| 9,425.00              | 1.09            | 215.24      | 9,423.52              | -70.15       | 17.48        | -70.28                  | 0.62                    | -0.52                  | 17.16                 |
| 9,450.00              | 0.97            | 216.73      | 9,448.51              | -70.52       | 17.21        | -70.65                  | 0.49                    | -0.48                  | 5.96                  |
| 9,475.00              | 0.83            | 221.76      | 9,473.51              | -70.82       | 16.97        | -70.95                  | 0.64                    | -0.56                  | 20.12                 |
| 9,500.00              | 0.82            | 233.95      | 9,498.51              | -71.06       | 16.70        | -71.19                  | 0.70                    | -0.04                  | 48.76                 |
| 9,525.00              | 0.78            | 230.58      | 9,523.50              | -71.27       | 16.42        | -71.40                  | 0.25                    | -0.16                  | -13.48                |
| 9,550.00              | 0.84            | 230.05      | 9,548.50              | -71.50       | 16.15        | -71.62                  | 0.24                    | 0.24                   | -2.12                 |
| 9,575.00              | 0.96            | 229.70      | 9,573.50              | -71.75       | 15.85        | -71.87                  | 0.48                    | 0.48                   | -1.40                 |
| 9,600.00              | 1.13            | 230.89      | 9,598.49              | -72.04       | 15.50        | -72.16                  | 0.69                    | 0.68                   | 4.76                  |
| 9,625.00              | 1.27            | 230.07      | 9,623.49              | -72.38       | 15.10        | -72.49                  | 0.56                    | 0.56                   | -3.28                 |
| 9,650.00              | 1.34            | 227.80      | 9,648.48              | -72.75       | 14.67        | -72.86                  | 0.35                    | 0.28                   | -9.08                 |
| 9,675.00              | 1.78            | 219.72      | 9,673.47              | -73.25       | 14.20        | -73.35                  | 1.96                    | 1.76                   | -32.32                |
| 9,700.00              | 1.92            | 220.34      | 9,698.46              | -73.86       | 13.69        | -73.97                  | 0.57                    | 0.56                   | 2.48                  |
| 9,725.00              | 1.96            | 219.29      | 9,723.44              | -74.51       | 13.14        | -74.61                  | 0.21                    | 0.16                   | -4.20                 |
| 9,750.00              | 2.05            | 218.63      | 9,748.43              | -75.19       | 12.59        | -75.29                  | 0.37                    | 0.36                   | -2.64                 |
| 9,775.00              | 2.02            | 216.91      | 9,773.41              | -75.90       | 12.05        | -75.99                  | 0.27                    | -0.12                  | -6.88                 |
| 9,800.00              | 2.02            | 220.20      | 9,798.40              | -76.59       | 11.50        | -76.67                  | 0.46                    | 0.00                   | 13.16                 |
| 9,825.00              | 2.07            | 220.65      | 9,823.38              | -77.26       | 10.92        | -77.35                  | 0.21                    | 0.20                   | 1.80                  |
| 9,850.00              | 2.06            | 224.92      | 9,848.37              | -77.93       | 10.31        | -78.00                  | 0.62                    | -0.04                  | 17.08                 |
| 9,875.00              | 2.07            | 224.64      | 9,873.35              | -78.56       | 9.68         | -78.64                  | 0.06                    | 0.04                   | -1.12                 |
| 9,900.00              | 2.08            | 226.12      | 9,898.33              | -79.20       | 9.03         | -79.27                  | 0.22                    | 0.04                   | 5.92                  |
| 9,925.00              | 2.07            | 227.50      | 9,923.32              | -79.82       | 8.37         | -79.88                  | 0.20                    | -0.04                  | 5.52                  |
| 9,950.00              | 2.18            | 227.30      | 9,948.30              | -80.45       | 7.69         | -80.50                  | 0.44                    | 0.44                   | -0.80                 |
| 9,975.00              | 2.09            | 225.75      | 9,973.28              | -81.09       | 7.01         | -81.14                  | 0.43                    | -0.36                  | -6.20                 |
| 10,000.00             | 2.09            | 227.06      | 9,998.27              | -81.72       | 6.35         | -81.76                  | 0.19                    | 0.00                   | 5.24                  |
| 10,025.00             | 2.13            | 227.36      | 10,023.25             | -82.34       | 5.68         | -82.38                  | 0.17                    | 0.16                   | 1.20                  |
| 10,050.00             | 2.18            | 226.21      | 10,048.23             | -82.99       | 4.99         | -83.02                  | 0.26                    | 0.20                   | -4.60                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 10,075.00             | 2.18            | 227.29      | 10,073.21             | -83.64       | 4.30         | -83.67                  | 0.16                    | 0.00                   | 4.32                  |
| 10,100.00             | 2.12            | 229.72      | 10,098.20             | -84.26       | 3.60         | -84.28                  | 0.44                    | -0.24                  | 9.72                  |
| 10,125.00             | 2.26            | 229.64      | 10,123.18             | -84.88       | 2.87         | -84.90                  | 0.56                    | 0.56                   | -0.32                 |
| 10,150.00             | 2.26            | 229.16      | 10,148.16             | -85.52       | 2.12         | -85.53                  | 0.08                    | 0.00                   | -1.92                 |
| 10,175.00             | 2.19            | 229.60      | 10,173.14             | -86.15       | 1.38         | -86.16                  | 0.29                    | -0.28                  | 1.76                  |
| 10,200.00             | 2.22            | 230.55      | 10,198.12             | -86.77       | 0.65         | -86.77                  | 0.19                    | 0.12                   | 3.80                  |
| 10,225.00             | 2.07            | 229.78      | 10,223.10             | -87.37       | -0.07        | -87.36                  | 0.61                    | -0.60                  | -3.08                 |
| 10,250.00             | 1.93            | 229.50      | 10,248.09             | -87.93       | -0.74        | -87.92                  | 0.56                    | -0.56                  | -1.12                 |
| 10,275.00             | 1.82            | 227.50      | 10,273.07             | -88.47       | -1.35        | -88.46                  | 0.51                    | -0.44                  | -8.00                 |
| 10,300.00             | 1.77            | 221.21      | 10,298.06             | -89.03       | -1.90        | -89.01                  | 0.81                    | -0.20                  | -25.16                |
| 10,325.00             | 1.78            | 226.70      | 10,323.05             | -89.59       | -2.43        | -89.57                  | 0.68                    | 0.04                   | 21.96                 |
| 10,350.00             | 1.76            | 228.51      | 10,348.04             | -90.11       | -3.00        | -90.08                  | 0.24                    | -0.08                  | 7.24                  |
| 10,375.00             | 1.73            | 228.48      | 10,373.03             | -90.61       | -3.57        | -90.58                  | 0.12                    | -0.12                  | -0.12                 |
| 10,400.00             | 1.74            | 231.60      | 10,398.01             | -91.10       | -4.15        | -91.07                  | 0.38                    | 0.04                   | 12.48                 |
| 10,425.00             | 1.68            | 232.84      | 10,423.00             | -91.56       | -4.74        | -91.52                  | 0.28                    | -0.24                  | 4.96                  |
| 10,450.00             | 1.63            | 233.90      | 10,447.99             | -91.99       | -5.32        | -91.94                  | 0.23                    | -0.20                  | 4.24                  |
| 10,475.00             | 1.63            | 233.42      | 10,472.98             | -92.41       | -5.90        | -92.36                  | 0.05                    | 0.00                   | -1.92                 |
| 10,500.00             | 1.68            | 232.46      | 10,497.97             | -92.84       | -6.47        | -92.79                  | 0.23                    | 0.20                   | -3.84                 |
| 10,525.00             | 1.67            | 234.87      | 10,522.96             | -93.28       | -7.06        | -93.22                  | 0.28                    | -0.04                  | 9.64                  |
| 10,550.00             | 1.71            | 238.10      | 10,547.95             | -93.68       | -7.67        | -93.62                  | 0.41                    | 0.16                   | 12.92                 |
| 10,575.00             | 1.64            | 239.47      | 10,572.94             | -94.06       | -8.30        | -94.00                  | 0.32                    | -0.28                  | 5.48                  |
| 10,600.00             | 1.57            | 239.53      | 10,597.93             | -94.42       | -8.90        | -94.35                  | 0.28                    | -0.28                  | 0.24                  |
| 10,625.00             | 1.41            | 237.19      | 10,622.92             | -94.76       | -9.46        | -94.68                  | 0.68                    | -0.64                  | -9.36                 |
| 10,650.00             | 1.26            | 240.19      | 10,647.92             | -95.06       | -9.95        | -94.98                  | 0.66                    | -0.60                  | 12.00                 |
| 10,675.00             | 1.26            | 241.89      | 10,672.91             | -95.33       | -10.43       | -95.24                  | 0.15                    | 0.00                   | 6.80                  |
| 10,700.00             | 1.18            | 240.68      | 10,697.90             | -95.58       | -10.90       | -95.50                  | 0.34                    | -0.32                  | -4.84                 |
| 10,725.00             | 1.19            | 239.41      | 10,722.90             | -95.84       | -11.35       | -95.75                  | 0.11                    | 0.04                   | -5.08                 |
| 10,750.00             | 1.21            | 243.28      | 10,747.89             | -96.09       | -11.81       | -96.00                  | 0.33                    | 0.08                   | 15.48                 |
| 10,775.00             | 1.16            | 245.26      | 10,772.89             | -96.32       | -12.27       | -96.22                  | 0.26                    | -0.20                  | 7.92                  |
| 10,800.00             | 1.12            | 245.11      | 10,797.88             | -96.53       | -12.73       | -96.43                  | 0.16                    | -0.16                  | -0.60                 |
| 10,825.00             | 1.15            | 245.06      | 10,822.88             | -96.73       | -13.17       | -96.63                  | 0.12                    | 0.12                   | -0.20                 |
| 10,850.00             | 1.09            | 241.53      | 10,847.87             | -96.95       | -13.61       | -96.85                  | 0.37                    | -0.24                  | -14.12                |
| 10,875.00             | 1.07            | 246.36      | 10,872.87             | -97.16       | -14.03       | -97.05                  | 0.37                    | -0.08                  | 19.32                 |
| 10,900.00             | 1.02            | 240.25      | 10,897.86             | -97.36       | -14.44       | -97.25                  | 0.49                    | -0.20                  | -24.44                |
| 10,925.00             | 1.06            | 245.06      | 10,922.86             | -97.57       | -14.84       | -97.46                  | 0.38                    | 0.16                   | 19.24                 |
| 10,950.00             | 0.97            | 239.54      | 10,947.86             | -97.78       | -15.24       | -97.66                  | 0.53                    | -0.36                  | -22.08                |
| 10,975.00             | 0.95            | 241.91      | 10,972.85             | -97.98       | -15.60       | -97.86                  | 0.18                    | -0.08                  | 9.48                  |
| 11,000.00             | 0.76            | 242.17      | 10,997.85             | -98.16       | -15.93       | -98.03                  | 0.76                    | -0.76                  | 1.04                  |
| 11,025.00             | 0.65            | 248.23      | 11,022.85             | -98.29       | -16.21       | -98.16                  | 0.53                    | -0.44                  | 24.24                 |
| 11,050.00             | 0.52            | 239.43      | 11,047.85             | -98.40       | -16.44       | -98.27                  | 0.63                    | -0.52                  | -35.20                |
| 11,075.00             | 0.41            | 243.04      | 11,072.85             | -98.50       | -16.62       | -98.37                  | 0.46                    | -0.44                  | 14.44                 |
| 11,100.00             | 0.34            | 237.79      | 11,097.85             | -98.58       | -16.76       | -98.44                  | 0.31                    | -0.28                  | -21.00                |
| 11,125.00             | 0.30            | 255.66      | 11,122.85             | -98.63       | -16.88       | -98.50                  | 0.43                    | -0.16                  | 71.48                 |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County; NM (NAD27 NME) | <b>TVD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |
|---------------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 11,150.00                       | 0.36            | 232.25      | 11,147.84             | -98.70       | -17.01       | -98.56                  | 0.58                    | 0.24                   | -93.64                |
| 11,175.00                       | 0.24            | 249.01      | 11,172.84             | -98.76       | -17.12       | -98.63                  | 0.59                    | -0.48                  | 67.04                 |
| 11,200.00                       | 0.37            | 232.27      | 11,197.84             | -98.83       | -17.23       | -98.70                  | 0.63                    | 0.52                   | -66.96                |
| 11,225.00                       | 0.38            | 198.76      | 11,222.84             | -98.96       | -17.32       | -98.82                  | 0.87                    | 0.04                   | -134.04               |
| 11,250.00                       | 0.36            | 202.39      | 11,247.84             | -99.11       | -17.38       | -98.97                  | 0.12                    | -0.08                  | 14.52                 |
| 11,275.00                       | 0.31            | 189.42      | 11,272.84             | -99.25       | -17.42       | -99.11                  | 0.36                    | -0.20                  | -51.88                |
| 11,300.00                       | 0.36            | 212.33      | 11,297.84             | -99.38       | -17.47       | -99.25                  | 0.57                    | 0.20                   | 91.64                 |
| 11,325.00                       | 0.44            | 192.97      | 11,322.84             | -99.54       | -17.54       | -99.40                  | 0.62                    | 0.32                   | -77.44                |
| 11,350.00                       | 0.40            | 184.98      | 11,347.84             | -99.72       | -17.57       | -99.58                  | 0.28                    | -0.16                  | -31.96                |
| 11,375.00                       | 0.36            | 195.77      | 11,372.84             | -99.89       | -17.60       | -99.75                  | 0.33                    | -0.16                  | 43.16                 |
| 11,400.00                       | 0.21            | 200.10      | 11,397.84             | -100.00      | -17.63       | -99.87                  | 0.61                    | -0.60                  | 17.32                 |
| 11,425.00                       | 0.09            | 210.20      | 11,422.84             | -100.06      | -17.66       | -99.93                  | 0.49                    | -0.48                  | 40.40                 |
| 11,450.00                       | 0.09            | 318.87      | 11,447.84             | -100.07      | -17.68       | -99.93                  | 0.58                    | 0.00                   | 434.68                |
| 11,475.00                       | 0.20            | 353.04      | 11,472.84             | -100.01      | -17.70       | -99.87                  | 0.54                    | 0.44                   | 136.68                |
| 11,500.00                       | 0.17            | 32.01       | 11,497.84             | -99.93       | -17.69       | -99.79                  | 0.51                    | -0.12                  | 155.88                |
| 11,525.00                       | 0.23            | 95.17       | 11,522.84             | -99.91       | -17.62       | -99.77                  | 0.86                    | 0.24                   | 252.64                |
| 11,550.00                       | 0.31            | 97.41       | 11,547.84             | -99.92       | -17.50       | -99.78                  | 0.32                    | 0.32                   | 8.96                  |
| 11,575.00                       | 0.41            | 95.57       | 11,572.84             | -99.94       | -17.34       | -99.80                  | 0.40                    | 0.40                   | -7.36                 |
| 11,600.00                       | 0.50            | 90.49       | 11,597.84             | -99.95       | -17.14       | -99.81                  | 0.39                    | 0.36                   | -20.32                |
| 11,625.00                       | 0.83            | 112.01      | 11,622.84             | -100.02      | -16.87       | -99.88                  | 1.63                    | 1.32                   | 86.08                 |
| 11,650.00                       | 1.14            | 117.77      | 11,647.83             | -100.20      | -16.48       | -100.07                 | 1.30                    | 1.24                   | 23.04                 |
| 11,669.09                       | 1.48            | 122.94      | 11,666.92             | -100.42      | -16.10       | -100.29                 | 1.88                    | 1.78                   | 27.08                 |
| 11,856.00                       | 2.59            | 134.27      | 11,853.71             | -104.68      | -11.06       | -104.59                 | 0.63                    | 0.59                   | 6.06                  |
| <b>First Phoenix MWD Survey</b> |                 |             |                       |              |              |                         |                         |                        |                       |
| 11,950.00                       | 2.52            | 132.24      | 11,947.61             | -107.55      | -8.00        | -107.49                 | 0.12                    | -0.07                  | -2.16                 |
| 12,044.00                       | 3.20            | 132.43      | 12,041.50             | -110.71      | -4.54        | -110.67                 | 0.72                    | 0.72                   | 0.20                  |
| 12,139.00                       | 3.41            | 132.36      | 12,136.34             | -114.41      | -0.49        | -114.40                 | 0.22                    | 0.22                   | -0.07                 |
| 12,170.00                       | 3.46            | 124.23      | 12,167.28             | -115.55      | 0.96         | -115.56                 | 1.58                    | 0.16                   | -26.23                |
| 12,202.00                       | 3.26            | 105.95      | 12,199.23             | -116.35      | 2.63         | -116.36                 | 3.39                    | -0.63                  | -57.13                |
| 12,233.00                       | 3.01            | 88.32       | 12,230.18             | -116.56      | 4.30         | -116.59                 | 3.20                    | -0.81                  | -56.87                |
| 12,264.00                       | 3.22            | 53.01       | 12,261.14             | -116.02      | 5.81         | -116.06                 | 6.13                    | 0.68                   | -113.90               |
| 12,308.00                       | 5.38            | 16.07       | 12,305.02             | -113.29      | 7.36         | -113.34                 | 7.74                    | 4.91                   | -83.95                |
| 12,340.00                       | 8.29            | 9.18        | 12,336.79             | -109.57      | 8.15         | -109.63                 | 9.43                    | 9.09                   | -21.53                |
| 12,371.00                       | 14.53           | 10.05       | 12,367.16             | -103.53      | 9.18         | -103.60                 | 20.14                   | 20.13                  | 2.81                  |
| 12,403.00                       | 19.71           | 15.19       | 12,397.74             | -94.36       | 11.30        | -94.45                  | 16.85                   | 16.19                  | 16.06                 |
| 12,434.00                       | 25.46           | 15.40       | 12,426.35             | -82.88       | 14.44        | -82.99                  | 18.55                   | 18.55                  | 0.68                  |
| 12,465.00                       | 30.41           | 12.68       | 12,453.73             | -68.80       | 17.93        | -68.93                  | 16.48                   | 15.97                  | -8.77                 |
| 12,497.00                       | 34.30           | 5.99        | 12,480.76             | -51.92       | 20.66        | -52.07                  | 16.51                   | 12.16                  | -20.91                |
| 12,528.00                       | 38.88           | 1.28        | 12,505.65             | -33.49       | 21.79        | -33.65                  | 17.32                   | 14.77                  | -15.19                |
| 12,560.00                       | 41.23           | 1.46        | 12,530.14             | -12.90       | 22.28        | -13.07                  | 7.35                    | 7.34                   | 0.56                  |
| 12,591.00                       | 45.60           | 358.24      | 12,552.66             | 8.39         | 22.20        | 8.22                    | 15.80                   | 14.10                  | -10.39                |
| 12,623.00                       | 49.94           | 357.87      | 12,574.16             | 32.07        | 21.39        | 31.90                   | 13.59                   | 13.56                  | -1.16                 |
| 12,654.00                       | 55.33           | 354.86      | 12,592.97             | 56.64        | 19.81        | 56.49                   | 19.02                   | 17.39                  | -9.71                 |



Phoenix Technology Services LP  
Survey Report



|           |                            |                              |                               |
|-----------|----------------------------|------------------------------|-------------------------------|
| Company:  | COG Operating LLC          | Local Co-ordinate Reference: | Well 22H                      |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
| Site:     | Square Bill Federal Com    | MD Reference:                | GL+KB @ 3299.60usft (McVay 8) |
| Well:     | 22H                        | North Reference:             | Grid                          |
| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
| Design:   | Surveys (McVay 8)          | Database:                    | Compass 5000 GCR              |

| 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) |
| 12,686.00                               | 61.12           | 355.28      | 12,609.82             | 83.73        | 17.47        | 83.60                   | 18.13                   | 18.09                  | 1.31                  |
| 12,717.00                               | 67.18           | 356.61      | 12,623.33             | 111.55       | 15.51        | 111.42                  | 19.93                   | 19.55                  | 4.29                  |
| 12,725.00                               | 68.92           | 357.37      | 12,626.32             | 118.96       | 15.12        | 118.84                  | 23.45                   | 21.72                  | 9.52                  |
| FTP: 12725' MD, 68.92° Inc, 357.37° Azi |                 |             |                       |              |              |                         |                         |                        |                       |
| 12,748.00                               | 73.93           | 359.47      | 12,633.64             | 140.74       | 14.53        | 140.63                  | 23.45                   | 21.79                  | 9.12                  |
| 12,780.00                               | 80.47           | 1.42        | 12,640.73             | 171.93       | 14.78        | 171.81                  | 21.28                   | 20.44                  | 6.09                  |
| 12,811.00                               | 87.31           | 0.82        | 12,644.03             | 202.73       | 15.38        | 202.60                  | 22.15                   | 22.06                  | -1.94                 |
| 12,842.00                               | 92.99           | 2.06        | 12,643.94             | 233.70       | 16.16        | 233.57                  | 18.75                   | 18.32                  | 4.00                  |
| 12,905.00                               | 92.47           | 1.52        | 12,640.94             | 296.60       | 18.12        | 296.45                  | 1.19                    | -0.83                  | -0.86                 |
| 12,999.00                               | 92.19           | 1.19        | 12,637.12             | 390.50       | 20.34        | 390.33                  | 0.46                    | -0.30                  | -0.35                 |
| 13,094.00                               | 92.47           | 1.47        | 12,633.26             | 485.39       | 22.54        | 485.20                  | 0.42                    | 0.29                   | 0.29                  |
| 13,188.00                               | 92.07           | 1.67        | 12,629.54             | 579.28       | 25.12        | 579.07                  | 0.48                    | -0.43                  | 0.21                  |
| 13,283.00                               | 91.71           | 0.27        | 12,626.40             | 674.21       | 26.73        | 673.99                  | 1.52                    | -0.38                  | -1.47                 |
| 13,377.00                               | 90.22           | 359.62      | 12,624.82             | 768.20       | 26.64        | 767.97                  | 1.73                    | -1.59                  | -0.69                 |
| 13,473.00                               | 90.03           | 359.65      | 12,624.61             | 864.20       | 26.02        | 863.97                  | 0.20                    | -0.20                  | 0.03                  |
| 13,569.00                               | 89.91           | 359.41      | 12,624.66             | 960.19       | 25.24        | 959.97                  | 0.28                    | -0.13                  | -0.25                 |
| 13,663.00                               | 89.66           | 359.37      | 12,625.01             | 1,054.19     | 24.24        | 1,053.97                | 0.27                    | -0.27                  | -0.04                 |
| 13,757.00                               | 89.61           | 359.59      | 12,625.61             | 1,148.18     | 23.38        | 1,147.97                | 0.24                    | -0.05                  | 0.23                  |
| 13,853.00                               | 90.14           | 359.98      | 12,625.82             | 1,244.18     | 23.02        | 1,243.97                | 0.69                    | 0.55                   | 0.41                  |
| 13,947.00                               | 90.31           | 359.22      | 12,625.45             | 1,338.18     | 22.37        | 1,337.96                | 0.83                    | 0.18                   | -0.81                 |
| 14,043.00                               | 89.64           | 358.89      | 12,625.50             | 1,434.16     | 20.78        | 1,433.96                | 0.78                    | -0.70                  | -0.34                 |
| 14,139.00                               | 89.50           | 359.26      | 12,626.22             | 1,530.15     | 19.23        | 1,529.95                | 0.41                    | -0.15                  | 0.39                  |
| 14,235.00                               | 90.11           | 359.31      | 12,626.54             | 1,626.14     | 18.03        | 1,625.95                | 0.64                    | 0.64                   | 0.05                  |
| 14,330.00                               | 90.11           | 359.72      | 12,626.36             | 1,721.13     | 17.23        | 1,720.95                | 0.43                    | 0.00                   | 0.43                  |
| 14,426.00                               | 90.92           | 359.45      | 12,625.50             | 1,817.13     | 16.54        | 1,816.95                | 0.89                    | 0.84                   | -0.28                 |
| 14,521.00                               | 91.23           | 0.03        | 12,623.71             | 1,912.11     | 16.10        | 1,911.93                | 0.69                    | 0.33                   | 0.61                  |
| 14,617.00                               | 90.67           | 357.93      | 12,622.12             | 2,008.07     | 14.40        | 2,007.90                | 2.26                    | -0.58                  | -2.19                 |
| 14,713.00                               | 90.45           | 357.90      | 12,621.18             | 2,104.01     | 10.90        | 2,103.86                | 0.23                    | -0.23                  | -0.03                 |
| 14,809.00                               | 90.50           | 358.52      | 12,620.39             | 2,199.96     | 7.90         | 2,199.83                | 0.65                    | 0.05                   | 0.65                  |
| 14,905.00                               | 90.50           | 358.79      | 12,619.55             | 2,295.93     | 5.65         | 2,295.81                | 0.28                    | 0.00                   | 0.28                  |
| 15,000.00                               | 90.39           | 359.15      | 12,618.81             | 2,390.91     | 3.94         | 2,390.81                | 0.40                    | -0.12                  | -0.38                 |
| 15,096.00                               | 90.79           | 359.40      | 12,617.82             | 2,486.89     | 2.73         | 2,486.80                | 0.49                    | 0.42                   | 0.26                  |
| 15,192.00                               | 90.76           | 359.51      | 12,616.53             | 2,582.88     | 1.82         | 2,582.79                | 0.12                    | -0.03                  | 0.11                  |
| 15,287.00                               | 90.73           | 359.44      | 12,615.29             | 2,677.87     | 0.95         | 2,677.78                | 0.08                    | -0.03                  | -0.07                 |
| 15,383.00                               | 90.67           | 359.71      | 12,614.12             | 2,773.86     | 0.23         | 2,773.78                | 0.29                    | -0.06                  | 0.28                  |
| 15,479.00                               | 90.84           | 0.05        | 12,612.85             | 2,869.85     | 0.03         | 2,869.77                | 0.40                    | 0.18                   | 0.35                  |
| 15,575.00                               | 89.91           | 358.96      | 12,612.22             | 2,965.84     | -0.80        | 2,965.76                | 1.49                    | -0.97                  | -1.14                 |
| 15,671.00                               | 91.79           | 0.00        | 12,610.80             | 3,061.82     | -1.67        | 3,061.74                | 2.24                    | 1.96                   | 1.08                  |
| 15,766.00                               | 90.00           | 358.87      | 12,609.32             | 3,156.80     | -2.61        | 3,156.73                | 2.23                    | -1.88                  | -1.19                 |
| 15,862.00                               | 89.89           | 358.93      | 12,609.41             | 3,252.78     | -4.45        | 3,252.72                | 0.13                    | -0.11                  | 0.06                  |
| 15,958.00                               | 89.81           | 358.84      | 12,609.66             | 3,348.76     | -6.32        | 3,348.71                | 0.13                    | -0.08                  | -0.09                 |
| 16,053.00                               | 89.91           | 359.53      | 12,609.89             | 3,443.75     | -7.67        | 3,443.71                | 0.73                    | 0.11                   | 0.73                  |
| 16,149.00                               | 89.86           | 359.98      | 12,610.09             | 3,539.75     | -8.08        | 3,539.71                | 0.47                    | -0.05                  | 0.47                  |
| 16,245.00                               | 89.94           | 0.42        | 12,610.25             | 3,635.75     | -7.74        | 3,635.70                | 0.47                    | 0.08                   | 0.46                  |



# Phoenix Technology Services LP

## Survey Report



|                  |                            |                                     |                               |
|------------------|----------------------------|-------------------------------------|-------------------------------|
| <b>Company:</b>  | COG Operating LLC          | <b>Local Co-ordinate Reference:</b> | Well 22H                      |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TYD Reference:</b>               | GL+KB @ 3299.60usft (McVay 8) |
| <b>Site:</b>     | Square Bill Federal Com    | <b>MD Reference:</b>                | GL+KB @ 3299.60usft (McVay 8) |
| <b>Well:</b>     | 22H                        | <b>North Reference:</b>             | Grid                          |
| <b>Wellbore:</b> | OH / Job# 61977            | <b>Survey Calculation Method:</b>   | Minimum Curvature             |
| <b>Design:</b>   | Surveys (McVay 8)          | <b>Database:</b>                    | Compass 5000 GCR              |

| 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) |  |
| 16,340.00                             | 89.27           | 358.29      | 12,610.91             | 3,730.74     | -8.81        | 3,730.69                | 2.35                    | -0.71                  | -2.24                 |  |
| 16,456.00                             | 92.10           | 356.59      | 12,609.52             | 3,846.60     | -13.99       | 3,846.59                | 2.85                    | 2.44                   | -1.47                 |  |
| 16,552.00                             | 92.04           | 355.62      | 12,606.05             | 3,942.31     | -20.51       | 3,942.35                | 1.01                    | -0.06                  | -1.01                 |  |
| 16,648.00                             | 91.46           | 354.97      | 12,603.12             | 4,037.94     | -28.38       | 4,038.04                | 0.91                    | -0.60                  | -0.68                 |  |
| 16,743.00                             | 91.04           | 356.79      | 12,601.05             | 4,132.67     | -35.20       | 4,132.82                | 1.97                    | -0.44                  | 1.92                  |  |
| 16,839.00                             | 93.47           | 359.29      | 12,597.27             | 4,228.53     | -38.48       | 4,228.70                | 3.63                    | 2.53                   | 2.60                  |  |
| 16,935.00                             | 90.95           | 359.96      | 12,593.57             | 4,324.44     | -39.11       | 4,324.62                | 2.72                    | -2.63                  | 0.70                  |  |
| 17,031.00                             | 89.50           | 358.84      | 12,593.19             | 4,420.43     | -40.12       | 4,420.61                | 1.91                    | -1.51                  | -1.17                 |  |
| 17,126.00                             | 89.89           | 0.84        | 12,593.70             | 4,515.43     | -40.38       | 4,515.60                | 2.14                    | 0.41                   | 2.11                  |  |
| 17,222.00                             | 90.70           | 1.95        | 12,593.20             | 4,611.39     | -38.05       | 4,611.55                | 1.43                    | 0.84                   | 1.16                  |  |
| 17,318.00                             | 89.61           | 0.05        | 12,592.94             | 4,707.37     | -36.37       | 4,707.51                | 2.28                    | -1.14                  | -1.98                 |  |
| 17,413.00                             | 91.85           | 0.62        | 12,591.73             | 4,802.36     | -35.81       | 4,802.49                | 2.43                    | 2.36                   | 0.60                  |  |
| 17,509.00                             | 89.41           | 358.33      | 12,590.68             | 4,898.33     | -36.69       | 4,898.47                | 3.49                    | -2.54                  | -2.39                 |  |
| 17,605.00                             | 89.44           | 357.28      | 12,591.64             | 4,994.26     | -40.37       | 4,994.42                | 1.09                    | 0.03                   | -1.09                 |  |
| 17,701.00                             | 89.69           | 359.42      | 12,592.37             | 5,090.21     | -43.14       | 5,090.39                | 2.24                    | 0.26                   | 2.23                  |  |
| 17,797.00                             | 91.15           | 359.87      | 12,591.67             | 5,186.20     | -43.73       | 5,186.39                | 1.59                    | 1.52                   | 0.47                  |  |
| 17,893.00                             | 89.75           | 2.63        | 12,590.91             | 5,282.16     | -41.64       | 5,282.33                | 3.22                    | -1.46                  | 2.88                  |  |
| 17,988.00                             | 88.41           | 1.13        | 12,592.44             | 5,377.10     | -38.52       | 5,377.23                | 2.12                    | -1.41                  | -1.58                 |  |
| 18,084.00                             | 89.13           | 1.98        | 12,594.50             | 5,473.04     | -35.92       | 5,473.15                | 1.16                    | 0.75                   | 0.89                  |  |
| 18,179.00                             | 87.62           | 355.70      | 12,597.20             | 5,567.93     | -37.83       | 5,568.06                | 6.80                    | -1.59                  | -6.61                 |  |
| 18,275.00                             | 88.21           | 359.58      | 12,600.69             | 5,663.77     | -41.78       | 5,663.92                | 4.09                    | 0.61                   | 4.04                  |  |
| 18,371.00                             | 91.54           | 359.43      | 12,600.90             | 5,759.75     | -42.61       | 5,759.91                | 3.47                    | 3.47                   | -0.16                 |  |
| 18,467.00                             | 91.07           | 358.71      | 12,598.71             | 5,855.71     | -44.17       | 5,855.88                | 0.90                    | -0.49                  | -0.75                 |  |
| 18,563.00                             | 91.57           | 358.32      | 12,596.50             | 5,951.65     | -46.66       | 5,951.83                | 0.66                    | 0.52                   | -0.41                 |  |
| 18,658.00                             | 89.41           | 358.07      | 12,595.69             | 6,046.60     | -49.65       | 6,046.80                | 2.29                    | -2.27                  | -0.26                 |  |
| 18,754.00                             | 89.08           | 356.53      | 12,596.95             | 6,142.48     | -54.17       | 6,142.71                | 1.64                    | -0.34                  | -1.60                 |  |
| 18,850.00                             | 89.55           | 358.60      | 12,598.10             | 6,238.38     | -58.25       | 6,238.64                | 2.21                    | 0.49                   | 2.16                  |  |
| 18,946.00                             | 88.96           | 357.91      | 12,599.35             | 6,334.33     | -61.17       | 6,334.61                | 0.95                    | -0.61                  | -0.72                 |  |
| 19,041.00                             | 87.79           | 355.70      | 12,602.04             | 6,429.13     | -66.46       | 6,429.45                | 2.63                    | -1.23                  | -2.33                 |  |
| 19,137.00                             | 91.04           | 1.24        | 12,603.03             | 6,525.04     | -69.02       | 6,525.38                | 6.69                    | 3.39                   | 5.77                  |  |
| 19,233.00                             | 90.56           | 357.12      | 12,601.68             | 6,621.00     | -70.40       | 6,621.35                | 4.32                    | -0.50                  | -4.29                 |  |
| 19,328.00                             | 90.45           | 359.38      | 12,600.85             | 6,715.95     | -73.30       | 6,716.31                | 2.38                    | -0.12                  | 2.38                  |  |
| 19,424.00                             | 93.05           | 3.64        | 12,597.91             | 6,811.84     | -70.77       | 6,812.18                | 5.20                    | 2.71                   | 4.44                  |  |
| 19,519.00                             | 93.42           | 3.06        | 12,592.55             | 6,906.53     | -65.23       | 6,906.82                | 0.72                    | 0.39                   | -0.61                 |  |
| 19,615.00                             | 93.39           | 2.56        | 12,586.85             | 7,002.24     | -60.53       | 7,002.50                | 0.52                    | -0.03                  | -0.52                 |  |
| 19,711.00                             | 93.81           | 1.56        | 12,580.82             | 7,097.99     | -57.09       | 7,098.22                | 1.13                    | 0.44                   | -1.04                 |  |
| 19,807.00                             | 94.09           | 1.45        | 12,574.21             | 7,193.73     | -54.57       | 7,193.93                | 0.31                    | 0.29                   | -0.11                 |  |
| 19,903.00                             | 94.04           | 1.56        | 12,567.40             | 7,289.45     | -52.06       | 7,289.64                | 0.13                    | -0.05                  | 0.11                  |  |
| 19,987.00                             | 95.29           | 1.07        | 12,560.57             | 7,373.15     | -50.14       | 7,373.32                | 1.60                    | 1.49                   | -0.58                 |  |
| LTP: 19987° MD, 95.29° Inc, 1.07° Azi |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 19,999.00                             | 95.47           | 1.00        | 12,559.45             | 7,385.09     | -49.92       | 7,385.26                | 1.60                    | 1.49                   | -0.58                 |  |
| 20,061.00                             | 95.67           | 1.49        | 12,553.43             | 7,446.79     | -48.58       | 7,446.94                | 0.85                    | 0.32                   | 0.79                  |  |
| Final Phoenix MWD Survey              |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 20,115.00                             | 95.67           | 1.49        | 12,548.09             | 7,500.51     | -47.18       | 7,500.65                | 0.00                    | 0.00                   | 0.00                  |  |



Phoenix Technology Services LP  
Survey Report



|           |                            |                              |                               |
|-----------|----------------------------|------------------------------|-------------------------------|
| Company:  | COG Operating LLC          | Local Co-ordinate Reference: | Well 22H                      |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | GL+KB @ 3299.60usft (McVay 8) |
| Site:     | Square Bill Federal Com    | MD Reference:                | GL+KB @ 3299.60usft (McVay 8) |
| Well:     | 22H                        | North Reference:             | Grid                          |
| Wellbore: | OH / Job# 61977            | Survey Calculation Method:   | Minimum Curvature             |
| Design:   | Surveys (McVay 8)          | Database:                    | Compass 5000 GCR              |

| 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) |
| Projection to TD      |                 |             |                       |              |              |                         |                         |                        |                       |

| Design Annotations    |                       |                   |              |                                         |  |
|-----------------------|-----------------------|-------------------|--------------|-----------------------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              |                                         |  |
|                       |                       | +N/-S (usft)      | +E/-W (usft) | Comment                                 |  |
| 11,856.00             | 11,853.71             | -104.68           | -11.06       | First Phoenix MWD Survey                |  |
| 12,725.00             | 12,626.32             | 118.96            | 15.12        | FTP: 12725' MD, 68.92° Inc, 357.37° Azi |  |
| 19,987.00             | 12,560.57             | 7,373.15          | -50.14       | LTP: 19987' MD, 95.29° Inc, 1.07° Azi   |  |
| 20,061.00             | 12,553.43             | 7,446.79          | -48.58       | Final Phoenix MWD Survey                |  |
| 20,115.00             | 12,548.09             | 7,500.51          | -47.18       | Projection to TD                        |  |