

30-015 41199

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## **COG Operating, LLC**

Eddy County, NM (NAD 27)

Sec 3, T26-S, R28-E

SRO State Com #39H

**Wellbore #1**

**Design: Wellbore #1**

## **Survey Report - Geographic**

**21 April, 2015**





HP  
Survey Report - Geographic



|           |                          |                              |                                      |
|-----------|--------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC       | Local Co-ordinate Reference: | Well SRO State Com #39H              |
| Project:  | Eddy County, NM (NAD 27) | TVD Reference:               | Well @ 2980.0usft (Scandril Freedom) |
| Site:     | Sec 3, T26-S, R28-E      | MD Reference:                | Well @ 2980.0usft (Scandril Freedom) |
| Well:     | SRO State Com #39H       | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1              | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1              | Database:                    | Compass                              |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAD 27)             |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |                     |                   |                  |
|-----------------------|---------------------|-------------------|------------------|
| Site                  | Sec 3, T26-S, R28-E |                   |                  |
| Site Position:        |                     | Northing:         | 392,295.70 usft  |
| From:                 | Map                 | Easting:          | 579,141.10 usft  |
| Position Uncertainty: | 0.0 usft            | Slot Radius:      | 13-3/16 "        |
|                       |                     | Latitude:         | 32° 4' 41.804 N  |
|                       |                     | Longitude:        | 104° 4' 40.145 W |
|                       |                     | Grid Convergence: | 0.14 °           |

|                      |                    |                     |                  |
|----------------------|--------------------|---------------------|------------------|
| Well                 | SRO State Com #39H |                     |                  |
| Well Position        | +N/-S              | 0.0 usft            | Northing:        |
|                      | +E/-W              | 0.0 usft            | Easting:         |
| Position Uncertainty | 0.0 usft           | Wellhead Elevation: | 0.0 usft         |
|                      |                    | Latitude:           | 32° 4' 41.807 N  |
|                      |                    | Longitude:          | 104° 4' 39.569 W |
|                      |                    | Ground Level:       | 2,954.0 usft     |

|           |             |             |                |
|-----------|-------------|-------------|----------------|
| Wellbore  | Wellbore #1 |             |                |
| Magnetics | Model Name  | Sample Date | Declination    |
|           | IGRF2010    | 4/2/2015    | (°)            |
|           |             |             | 7.34           |
|           |             |             | Dip Angle      |
|           |             |             | (°)            |
|           |             |             | 59.87          |
|           |             |             | Field Strength |
|           |             |             | (nT)           |
|           |             |             | 48,098         |

|                   |                  |               |           |
|-------------------|------------------|---------------|-----------|
| Design            | Wellbore #1      |               |           |
| Audit Notes:      |                  |               |           |
| Version:          | 1.0              | Phase:        | ACTUAL    |
|                   |                  | Tie On Depth: | 0.0       |
| Vertical Section: | Depth From (TVD) | +N/-S         | +E/-W     |
|                   | (usft)           | (usft)        | (usft)    |
|                   | 0.0              | 0.0           | 0.0       |
|                   |                  |               | Direction |
|                   |                  |               | (°)       |
|                   |                  |               | 3.46      |

|                |                |                   |                |
|----------------|----------------|-------------------|----------------|
| Survey Program | Date 4/21/2015 |                   |                |
| From           | To             | Survey (Wellbore) | Tool Name      |
| (usft)         | (usft)         |                   |                |
| 184.0          | 13,029.0       | MWD (Wellbore #1) | MWD default    |
|                |                |                   | Description    |
|                |                |                   | MWD - Standard |

|                                       |             |         |          |        |        |            |            |                 |                  |
|---------------------------------------|-------------|---------|----------|--------|--------|------------|------------|-----------------|------------------|
| Survey                                |             |         |          |        |        |            |            |                 |                  |
| Measured                              | Inclination | Azimuth | Vertical | +N/-S  | +E/-W  | Map        | Map        | Latitude        | Longitude        |
| Depth                                 | (°)         | (°)     | Depth    | (usft) | (usft) | Northing   | Easting    |                 |                  |
| (usft)                                |             |         | (usft)   |        |        | (usft)     | (usft)     |                 |                  |
| 0.0                                   | 0.00        | 0.00    | 0.0      | 0.0    | 0.0    | 392,296.10 | 579,190.70 | 32° 4' 41.807 N | 104° 4' 39.569 W |
| 184.0                                 | 1.40        | 323.30  | 184.0    | 1.8    | -1.3   | 392,297.90 | 579,189.36 | 32° 4' 41.825 N | 104° 4' 39.584 W |
| First MWD Survey @ 184' MD / 184' TVD |             |         |          |        |        |            |            |                 |                  |
| 275.0                                 | 1.40        | 303.80  | 275.0    | 3.3    | -2.9   | 392,299.41 | 579,187.77 | 32° 4' 41.840 N | 104° 4' 39.603 W |
| 368.0                                 | 1.60        | 303.60  | 367.9    | 4.7    | -5.0   | 392,300.76 | 579,185.75 | 32° 4' 41.853 N | 104° 4' 39.626 W |
| 455.0                                 | 1.10        | 310.60  | 454.9    | 5.9    | -6.6   | 392,301.98 | 579,184.10 | 32° 4' 41.865 N | 104° 4' 39.645 W |
| 546.0                                 | 0.30        | 275.80  | 545.9    | 6.5    | -7.5   | 392,302.57 | 579,183.20 | 32° 4' 41.871 N | 104° 4' 39.656 W |
| 571.0                                 | 0.30        | 327.50  | 570.9    | 6.5    | -7.6   | 392,302.63 | 579,183.10 | 32° 4' 41.872 N | 104° 4' 39.657 W |
| 699.0                                 | 0.30        | 269.30  | 698.9    | 6.8    | -8.1   | 392,302.91 | 579,182.58 | 32° 4' 41.874 N | 104° 4' 39.663 W |
| 791.0                                 | 1.10        | 131.80  | 790.9    | 6.2    | -7.7   | 392,302.32 | 579,183.00 | 32° 4' 41.868 N | 104° 4' 39.658 W |
| 975.0                                 | 2.20        | 128.30  | 974.8    | 2.9    | -3.6   | 392,298.95 | 579,187.09 | 32° 4' 41.835 N | 104° 4' 39.611 W |
| 1,159.0                               | 1.00        | 139.80  | 1,158.7  | -0.6   | 0.2    | 392,295.54 | 579,190.90 | 32° 4' 41.801 N | 104° 4' 39.567 W |



HP  
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|           |                          |                              |                                      |
|-----------|--------------------------|------------------------------|--------------------------------------|
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| Project:  | Eddy County, NM (NAD 27) | TVD Reference:               | Well @ 2980.0usft (Scandril Freedom) |
| Site:     | Sec 3, T26-S, R28-E      | MD Reference:                | Well @ 2980.0usft (Scandril Freedom) |
| Well:     | SRO State Com #39H       | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1              | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1              | Database:                    | Compass                              |

| Survey                                    |                    |                |                             |                 |                 |                           |                          |                 |                  |
|-------------------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|---------------------------|--------------------------|-----------------|------------------|
| Measured<br>Depth<br>(usft)               | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Map<br>Northing<br>(usft) | Map<br>Easting<br>(usft) | Latitude        | Longitude        |
| 1,343.0                                   | 0.50               | 215.00         | 1,342.7                     | -2.4            | 0.8             | 392,293.65                | 579,191.47               | 32° 4' 41.783 N | 104° 4' 39.560 W |
| 1,527.0                                   | 0.70               | 216.60         | 1,526.7                     | -4.0            | -0.4            | 392,292.09                | 579,190.34               | 32° 4' 41.767 N | 104° 4' 39.573 W |
| 1,714.0                                   | 1.00               | 213.80         | 1,713.7                     | -6.3            | -1.9            | 392,289.82                | 579,188.75               | 32° 4' 41.745 N | 104° 4' 39.592 W |
| 1,902.0                                   | 1.90               | 126.00         | 1,901.6                     | -9.5            | -0.3            | 392,286.62                | 579,190.38               | 32° 4' 41.713 N | 104° 4' 39.573 W |
| 2,092.0                                   | 3.70               | 144.30         | 2,091.4                     | -16.3           | 5.8             | 392,279.79                | 579,196.49               | 32° 4' 41.645 N | 104° 4' 39.502 W |
| 2,280.0                                   | 3.90               | 176.30         | 2,279.0                     | -27.6           | 9.7             | 392,268.49                | 579,200.44               | 32° 4' 41.533 N | 104° 4' 39.456 W |
| 2,429.0                                   | 1.50               | 187.60         | 2,427.8                     | -34.6           | 9.8             | 392,261.50                | 579,200.51               | 32° 4' 41.464 N | 104° 4' 39.456 W |
| 2,563.0                                   | 0.90               | 300.20         | 2,561.8                     | -35.8           | 8.7             | 392,260.29                | 579,199.37               | 32° 4' 41.452 N | 104° 4' 39.469 W |
| 2,751.0                                   | 1.10               | 313.10         | 2,749.8                     | -33.8           | 6.1             | 392,262.26                | 579,196.78               | 32° 4' 41.472 N | 104° 4' 39.499 W |
| 2,940.0                                   | 1.00               | 306.70         | 2,938.8                     | -31.6           | 3.4             | 392,264.49                | 579,194.13               | 32° 4' 41.494 N | 104° 4' 39.530 W |
| 3,128.0                                   | 1.10               | 308.70         | 3,126.7                     | -29.5           | 0.7             | 392,266.60                | 579,191.41               | 32° 4' 41.515 N | 104° 4' 39.561 W |
| 3,317.0                                   | 1.10               | 326.30         | 3,315.7                     | -26.9           | -1.7            | 392,269.24                | 579,188.98               | 32° 4' 41.541 N | 104° 4' 39.590 W |
| 3,507.0                                   | 1.00               | 311.70         | 3,505.7                     | -24.2           | -4.0            | 392,271.86                | 579,186.73               | 32° 4' 41.567 N | 104° 4' 39.616 W |
| 3,696.0                                   | 1.20               | 320.50         | 3,694.6                     | -21.6           | -6.5            | 392,274.48                | 579,184.24               | 32° 4' 41.593 N | 104° 4' 39.644 W |
| 3,885.0                                   | 0.40               | 171.90         | 3,883.6                     | -20.7           | -7.6            | 392,275.36                | 579,183.08               | 32° 4' 41.602 N | 104° 4' 39.658 W |
| 4,075.0                                   | 0.80               | 161.20         | 4,073.6                     | -22.7           | -7.1            | 392,273.45                | 579,183.60               | 32° 4' 41.583 N | 104° 4' 39.652 W |
| 4,264.0                                   | 0.70               | 167.20         | 4,262.6                     | -25.0           | -6.4            | 392,271.07                | 579,184.28               | 32° 4' 41.559 N | 104° 4' 39.644 W |
| 4,454.0                                   | 1.00               | 166.60         | 4,452.6                     | -27.8           | -5.8            | 392,268.33                | 579,184.92               | 32° 4' 41.532 N | 104° 4' 39.637 W |
| 4,642.0                                   | 1.10               | 179.30         | 4,640.5                     | -31.2           | -5.4            | 392,264.93                | 579,185.32               | 32° 4' 41.498 N | 104° 4' 39.632 W |
| 4,831.0                                   | 1.10               | 81.20          | 4,829.5                     | -32.7           | -3.6            | 392,263.39                | 579,187.14               | 32° 4' 41.483 N | 104° 4' 39.611 W |
| 5,021.0                                   | 1.10               | 88.80          | 5,019.5                     | -32.4           | 0.1             | 392,263.71                | 579,190.76               | 32° 4' 41.486 N | 104° 4' 39.569 W |
| 5,210.0                                   | 1.10               | 79.60          | 5,208.5                     | -32.0           | 3.7             | 392,264.07                | 579,194.36               | 32° 4' 41.490 N | 104° 4' 39.527 W |
| 5,397.0                                   | 1.10               | 93.50          | 5,395.4                     | -31.8           | 7.2             | 392,264.29                | 579,197.92               | 32° 4' 41.492 N | 104° 4' 39.486 W |
| 5,586.0                                   | 1.40               | 110.80         | 5,584.4                     | -32.7           | 11.2            | 392,263.36                | 579,201.89               | 32° 4' 41.482 N | 104° 4' 39.440 W |
| 5,774.0                                   | 0.80               | 352.40         | 5,772.4                     | -32.3           | 13.2            | 392,263.84                | 579,203.86               | 32° 4' 41.487 N | 104° 4' 39.417 W |
| 5,964.0                                   | 0.70               | 313.30         | 5,962.3                     | -30.1           | 12.1            | 392,265.95                | 579,202.84               | 32° 4' 41.508 N | 104° 4' 39.429 W |
| 6,153.0                                   | 0.90               | 271.90         | 6,151.3                     | -29.3           | 9.8             | 392,266.79                | 579,200.52               | 32° 4' 41.517 N | 104° 4' 39.456 W |
| 6,343.0                                   | 1.10               | 132.40         | 6,341.3                     | -30.5           | 9.7             | 392,265.61                | 579,200.37               | 32° 4' 41.505 N | 104° 4' 39.457 W |
| 6,532.0                                   | 1.40               | 138.90         | 6,530.3                     | -33.4           | 12.5            | 392,262.65                | 579,203.23               | 32° 4' 41.475 N | 104° 4' 39.424 W |
| 6,721.0                                   | 0.80               | 282.30         | 6,719.2                     | -34.9           | 12.8            | 392,261.19                | 579,203.46               | 32° 4' 41.461 N | 104° 4' 39.421 W |
| 6,910.0                                   | 1.80               | 267.70         | 6,908.2                     | -34.7           | 8.5             | 392,261.35                | 579,199.20               | 32° 4' 41.463 N | 104° 4' 39.471 W |
| 7,099.0                                   | 1.90               | 315.40         | 7,097.1                     | -32.6           | 3.3             | 392,263.46                | 579,194.04               | 32° 4' 41.484 N | 104° 4' 39.531 W |
| 7,287.0                                   | 0.20               | 260.00         | 7,285.1                     | -30.5           | 0.8             | 392,265.63                | 579,191.53               | 32° 4' 41.505 N | 104° 4' 39.560 W |
| 7,475.0                                   | 0.80               | 248.40         | 7,473.1                     | -31.0           | -0.7            | 392,265.09                | 579,189.98               | 32° 4' 41.500 N | 104° 4' 39.578 W |
| 7,540.0                                   | 1.60               | 226.90         | 7,538.0                     | -31.8           | -1.8            | 392,264.30                | 579,188.90               | 32° 4' 41.492 N | 104° 4' 39.591 W |
| 7,571.0                                   | 1.70               | 318.00         | 7,569.0                     | -31.8           | -2.4            | 392,264.35                | 579,188.27               | 32° 4' 41.493 N | 104° 4' 39.598 W |
| 7,603.0                                   | 4.90               | 343.70         | 7,601.0                     | -30.1           | -3.1            | 392,266.01                | 579,187.57               | 32° 4' 41.509 N | 104° 4' 39.606 W |
| 7,634.0                                   | 9.90               | 0.00           | 7,631.7                     | -26.2           | -3.5            | 392,269.95                | 579,187.20               | 32° 4' 41.548 N | 104° 4' 39.610 W |
| 7,665.0                                   | 14.00              | 1.60           | 7,662.0                     | -19.7           | -3.4            | 392,276.36                | 579,187.31               | 32° 4' 41.612 N | 104° 4' 39.609 W |
| 7,697.0                                   | 17.50              | 1.80           | 7,692.8                     | -11.1           | -3.1            | 392,285.05                | 579,187.57               | 32° 4' 41.697 N | 104° 4' 39.606 W |
| 7,728.0                                   | 20.50              | 0.50           | 7,722.1                     | -1.0            | -2.9            | 392,295.13                | 579,187.76               | 32° 4' 41.797 N | 104° 4' 39.603 W |
| 7,759.0                                   | 23.60              | 0.00           | 7,750.9                     | 10.7            | -2.9            | 392,306.77                | 579,187.81               | 32° 4' 41.912 N | 104° 4' 39.602 W |
| 7,791.0                                   | 26.40              | 1.80           | 7,779.9                     | 24.2            | -2.7            | 392,320.29                | 579,188.03               | 32° 4' 42.046 N | 104° 4' 39.599 W |
| 7,822.0                                   | 29.90              | 5.60           | 7,807.2                     | 38.8            | -1.7            | 392,334.87                | 579,189.00               | 32° 4' 42.191 N | 104° 4' 39.588 W |
| 7,853.0                                   | 33.80              | 7.60           | 7,833.5                     | 55.0            | 0.2             | 392,351.12                | 579,190.90               | 32° 4' 42.351 N | 104° 4' 39.565 W |
| 7,885.0                                   | 37.20              | 7.00           | 7,859.6                     | 73.4            | 2.5             | 392,369.55                | 579,193.25               | 32° 4' 42.534 N | 104° 4' 39.537 W |
| 7,916.0                                   | 40.20              | 5.30           | 7,883.8                     | 92.7            | 4.6             | 392,388.81                | 579,195.32               | 32° 4' 42.724 N | 104° 4' 39.513 W |
| 7,948.0                                   | 43.40              | 4.80           | 7,907.6                     | 114.0           | 6.5             | 392,410.06                | 579,197.19               | 32° 4' 42.934 N | 104° 4' 39.490 W |
| 7,979.0                                   | 45.90              | 4.80           | 7,929.7                     | 135.7           | 8.3             | 392,431.77                | 579,199.02               | 32° 4' 43.149 N | 104° 4' 39.468 W |
| 8,010.0                                   | 49.50              | 5.60           | 7,950.5                     | 158.5           | 10.4            | 392,454.60                | 579,201.10               | 32° 4' 43.375 N | 104° 4' 39.444 W |
| 8,042.0                                   | 52.10              | 4.90           | 7,970.8                     | 183.2           | 12.7            | 392,479.29                | 579,203.37               | 32° 4' 43.619 N | 104° 4' 39.417 W |
| 8,050.6                                   | 52.85              | 4.87           | 7,976.0                     | 190.0           | 13.2            | 392,486.08                | 579,203.95               | 32° 4' 43.687 N | 104° 4' 39.410 W |
| Crossed Lease Line @ 8051' MD / 7976' TVD |                    |                |                             |                 |                 |                           |                          |                 |                  |
| 8,073.0                                   | 54.80              | 4.80           | 7,989.2                     | 208.0           | 14.8            | 392,504.10                | 579,205.47               | 32° 4' 43.865 N | 104° 4' 39.391 W |
| 8,104.0                                   | 57.90              | 4.10           | 8,006.4                     | 233.7           | 16.8            | 392,529.82                | 579,207.47               | 32° 4' 44.119 N | 104° 4' 39.367 W |



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|           |                          |                              |                                      |
|-----------|--------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC       | Local Co-ordinate Reference: | Well SRO State Com #39H              |
| Project:  | Eddy County, NM (NAD 27) | TVD Reference:               | Well @ 2980.0usft (Scandril Freedom) |
| Site:     | Sec 3, T26-S, R28-E      | MD Reference:                | Well @ 2980.0usft (Scandril Freedom) |
| Well:     | SRO State Com #39H       | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1              | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1              | Database:                    | Compass                              |

| Survey                                        |                    |                |                             |                 |                 |                           |                          |                 |                  |  |
|-----------------------------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|---------------------------|--------------------------|-----------------|------------------|--|
| Measured<br>Depth<br>(usft)                   | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Map<br>Northing<br>(usft) | Map<br>Easting<br>(usft) | Latitude        | Longitude        |  |
| 8,135.0                                       | 60.70              | 4.80           | 8,022.2                     | 260.3           | 18.8            | 392,556.40                | 579,209.54               | 32° 4' 44.382 N | 104° 4' 39.343 W |  |
| 8,167.0                                       | 62.20              | 4.90           | 8,037.5                     | 288.3           | 21.2            | 392,584.40                | 579,211.92               | 32° 4' 44.659 N | 104° 4' 39.314 W |  |
| 8,198.0                                       | 63.80              | 4.80           | 8,051.6                     | 315.8           | 23.5            | 392,611.93                | 579,214.25               | 32° 4' 44.932 N | 104° 4' 39.286 W |  |
| 8,229.0                                       | 66.60              | 3.90           | 8,064.6                     | 343.9           | 25.7            | 392,639.98                | 579,216.38               | 32° 4' 45.209 N | 104° 4' 39.261 W |  |
| 8,261.0                                       | 68.20              | 3.70           | 8,076.9                     | 373.4           | 27.6            | 392,669.46                | 579,218.34               | 32° 4' 45.501 N | 104° 4' 39.237 W |  |
| 8,292.0                                       | 70.10              | 3.70           | 8,087.9                     | 402.3           | 29.5            | 392,698.37                | 579,220.21               | 32° 4' 45.787 N | 104° 4' 39.215 W |  |
| 8,323.0                                       | 72.40              | 3.20           | 8,097.9                     | 431.6           | 31.3            | 392,727.67                | 579,221.98               | 32° 4' 46.077 N | 104° 4' 39.193 W |  |
| 8,354.0                                       | 74.40              | 2.30           | 8,106.7                     | 461.2           | 32.7            | 392,757.34                | 579,223.40               | 32° 4' 46.371 N | 104° 4' 39.176 W |  |
| 8,385.0                                       | 75.40              | 2.30           | 8,114.8                     | 491.1           | 33.9            | 392,787.24                | 579,224.60               | 32° 4' 46.667 N | 104° 4' 39.161 W |  |
| 8,414.9                                       | 75.79              | 2.78           | 8,122.3                     | 520.1           | 35.2            | 392,816.18                | 579,225.88               | 32° 4' 46.953 N | 104° 4' 39.146 W |  |
| Crossed 330' Hard Line @ 8415' MD / 8122' TVD |                    |                |                             |                 |                 |                           |                          |                 |                  |  |
| 8,416.0                                       | 75.80              | 2.80           | 8,122.5                     | 521.1           | 35.2            | 392,817.24                | 579,225.94               | 32° 4' 46.963 N | 104° 4' 39.145 W |  |
| 8,448.0                                       | 77.30              | 3.30           | 8,130.0                     | 552.2           | 36.9            | 392,848.32                | 579,227.59               | 32° 4' 47.271 N | 104° 4' 39.125 W |  |
| 8,479.0                                       | 79.30              | 4.40           | 8,136.3                     | 582.5           | 38.9            | 392,878.60                | 579,229.63               | 32° 4' 47.571 N | 104° 4' 39.100 W |  |
| 8,511.0                                       | 81.40              | 5.30           | 8,141.6                     | 613.9           | 41.6            | 392,910.04                | 579,232.30               | 32° 4' 47.882 N | 104° 4' 39.068 W |  |
| 8,542.0                                       | 83.60              | 6.00           | 8,145.7                     | 644.5           | 44.6            | 392,940.62                | 579,235.33               | 32° 4' 48.184 N | 104° 4' 39.032 W |  |
| 8,636.0                                       | 88.60              | 4.10           | 8,152.1                     | 737.9           | 52.9            | 393,034.00                | 579,243.57               | 32° 4' 49.108 N | 104° 4' 38.934 W |  |
| 8,730.0                                       | 90.50              | 3.20           | 8,152.8                     | 831.7           | 58.9            | 393,127.80                | 579,249.56               | 32° 4' 50.036 N | 104° 4' 38.862 W |  |
| 8,824.0                                       | 90.20              | 3.50           | 8,152.2                     | 925.5           | 64.3            | 393,221.64                | 579,255.05               | 32° 4' 50.965 N | 104° 4' 38.795 W |  |
| 8,918.0                                       | 88.60              | 3.00           | 8,153.2                     | 1,019.4         | 69.7            | 393,315.48                | 579,260.38               | 32° 4' 51.893 N | 104° 4' 38.731 W |  |
| 9,012.0                                       | 90.00              | 2.80           | 8,154.4                     | 1,113.3         | 74.4            | 393,409.35                | 579,265.13               | 32° 4' 52.822 N | 104° 4' 38.673 W |  |
| 9,107.0                                       | 89.80              | 1.90           | 8,154.5                     | 1,208.2         | 78.3            | 393,504.27                | 579,269.03               | 32° 4' 53.762 N | 104° 4' 38.625 W |  |
| 9,201.0                                       | 89.20              | 1.80           | 8,155.3                     | 1,302.1         | 81.4            | 393,598.22                | 579,272.06               | 32° 4' 54.691 N | 104° 4' 38.587 W |  |
| 9,295.0                                       | 90.40              | 2.30           | 8,155.7                     | 1,396.1         | 84.7            | 393,692.16                | 579,275.43               | 32° 4' 55.621 N | 104° 4' 38.546 W |  |
| 9,389.0                                       | 89.60              | 2.50           | 8,155.7                     | 1,490.0         | 88.7            | 393,786.07                | 579,279.36               | 32° 4' 56.550 N | 104° 4' 38.497 W |  |
| 9,483.0                                       | 90.00              | 4.80           | 8,156.0                     | 1,583.8         | 94.6            | 393,879.87                | 579,285.35               | 32° 4' 57.478 N | 104° 4' 38.425 W |  |
| 9,577.0                                       | 89.20              | 3.90           | 8,156.6                     | 1,677.5         | 101.8           | 393,973.60                | 579,292.48               | 32° 4' 58.406 N | 104° 4' 38.340 W |  |
| 9,672.0                                       | 89.30              | 3.30           | 8,157.9                     | 1,772.3         | 107.7           | 394,068.40                | 579,298.44               | 32° 4' 59.344 N | 104° 4' 38.268 W |  |
| 9,765.0                                       | 88.70              | 3.70           | 8,159.5                     | 1,865.1         | 113.4           | 394,161.22                | 579,304.12               | 32° 5' 0.262 N  | 104° 4' 38.199 W |  |
| 9,860.0                                       | 88.20              | 3.00           | 8,162.1                     | 1,959.9         | 119.0           | 394,256.02                | 579,309.67               | 32° 5' 1.200 N  | 104° 4' 38.132 W |  |
| 9,954.0                                       | 89.20              | 2.30           | 8,164.2                     | 2,053.8         | 123.3           | 394,349.89                | 579,314.01               | 32° 5' 2.129 N  | 104° 4' 38.079 W |  |
| 10,048.0                                      | 88.20              | 2.30           | 8,166.4                     | 2,147.7         | 127.1           | 394,443.79                | 579,317.78               | 32° 5' 3.058 N  | 104° 4' 38.033 W |  |
| 10,142.0                                      | 87.80              | 3.30           | 8,169.6                     | 2,241.5         | 131.7           | 394,537.62                | 579,322.37               | 32° 5' 3.987 N  | 104° 4' 37.977 W |  |
| 10,236.0                                      | 88.60              | 3.70           | 8,172.6                     | 2,335.3         | 137.4           | 394,631.40                | 579,328.11               | 32° 5' 4.915 N  | 104° 4' 37.907 W |  |
| 10,330.0                                      | 90.30              | 3.70           | 8,173.5                     | 2,429.1         | 143.5           | 394,725.19                | 579,334.17               | 32° 5' 5.843 N  | 104° 4' 37.834 W |  |
| 10,424.0                                      | 88.70              | 3.70           | 8,174.3                     | 2,522.9         | 149.5           | 394,818.99                | 579,340.24               | 32° 5' 6.771 N  | 104° 4' 37.761 W |  |
| 10,518.0                                      | 86.70              | 3.20           | 8,178.1                     | 2,616.6         | 155.2           | 394,912.74                | 579,345.89               | 32° 5' 7.699 N  | 104° 4' 37.693 W |  |
| 10,613.0                                      | 87.80              | 3.20           | 8,182.6                     | 2,711.4         | 160.5           | 395,007.48                | 579,351.19               | 32° 5' 8.636 N  | 104° 4' 37.629 W |  |
| 10,707.0                                      | 88.90              | 3.70           | 8,185.3                     | 2,805.2         | 166.1           | 395,101.27                | 579,356.84               | 32° 5' 9.564 N  | 104° 4' 37.560 W |  |
| 10,801.0                                      | 90.10              | 3.20           | 8,186.2                     | 2,899.0         | 171.8           | 395,195.09                | 579,362.50               | 32° 5' 10.493 N | 104° 4' 37.492 W |  |
| 10,895.0                                      | 89.50              | 3.90           | 8,186.5                     | 2,992.8         | 177.6           | 395,288.91                | 579,368.32               | 32° 5' 11.421 N | 104° 4' 37.422 W |  |
| 10,990.0                                      | 89.10              | 4.10           | 8,187.7                     | 3,087.6         | 184.2           | 395,383.67                | 579,374.94               | 32° 5' 12.359 N | 104° 4' 37.342 W |  |
| 11,084.0                                      | 87.90              | 3.70           | 8,190.1                     | 3,181.3         | 190.6           | 395,477.42                | 579,381.34               | 32° 5' 13.286 N | 104° 4' 37.265 W |  |
| 11,178.0                                      | 88.60              | 3.30           | 8,193.0                     | 3,275.1         | 196.4           | 395,571.20                | 579,387.07               | 32° 5' 14.214 N | 104° 4' 37.196 W |  |
| 11,272.0                                      | 90.00              | 3.50           | 8,194.1                     | 3,368.9         | 201.9           | 395,665.03                | 579,392.65               | 32° 5' 15.143 N | 104° 4' 37.129 W |  |
| 11,366.0                                      | 89.80              | 3.00           | 8,194.3                     | 3,462.8         | 207.3           | 395,758.87                | 579,397.97               | 32° 5' 16.071 N | 104° 4' 37.064 W |  |
| 11,460.0                                      | 88.50              | 3.70           | 8,195.7                     | 3,556.6         | 212.8           | 395,852.70                | 579,403.47               | 32° 5' 17.000 N | 104° 4' 36.998 W |  |
| 11,554.0                                      | 88.30              | 3.70           | 8,198.3                     | 3,650.4         | 218.8           | 395,946.47                | 579,409.53               | 32° 5' 17.928 N | 104° 4' 36.925 W |  |
| 11,648.0                                      | 88.00              | 3.70           | 8,201.3                     | 3,744.1         | 224.9           | 396,040.22                | 579,415.59               | 32° 5' 18.855 N | 104° 4' 36.851 W |  |
| 11,742.0                                      | 89.30              | 3.70           | 8,203.6                     | 3,837.9         | 231.0           | 396,134.00                | 579,421.66               | 32° 5' 19.783 N | 104° 4' 36.778 W |  |
| 11,836.0                                      | 88.40              | 3.30           | 8,205.5                     | 3,931.7         | 236.7           | 396,227.80                | 579,427.39               | 32° 5' 20.711 N | 104° 4' 36.709 W |  |
| 11,930.0                                      | 89.30              | 3.70           | 8,207.3                     | 4,025.5         | 242.4           | 396,321.61                | 579,433.13               | 32° 5' 21.640 N | 104° 4' 36.640 W |  |
| 12,024.0                                      | 87.30              | 3.30           | 8,210.1                     | 4,119.3         | 248.2           | 396,415.39                | 579,438.87               | 32° 5' 22.567 N | 104° 4' 36.571 W |  |
| 12,118.0                                      | 87.80              | 3.50           | 8,214.1                     | 4,213.0         | 253.7           | 396,509.14                | 579,444.44               | 32° 5' 23.495 N | 104° 4' 36.503 W |  |
| 12,212.0                                      | 88.30              | 3.00           | 8,217.3                     | 4,306.8         | 259.1           | 396,602.93                | 579,449.76               | 32° 5' 24.423 N | 104° 4' 36.439 W |  |



HP  
Survey Report - Geographic



|           |                          |                              |                                      |
|-----------|--------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC       | Local Co-ordinate Reference: | Well SRO State Com #39H              |
| Project:  | Eddy County, NM (NAD 27) | TVD Reference:               | Well @ 2980.0usft (Scandril Freedom) |
| Site:     | Sec 3, T26-S, R28-E      | MD Reference:                | Well @ 2980.0usft (Scandril Freedom) |
| Well:     | SRO State Com #39H       | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1              | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1              | Database:                    | Compass                              |

| Survey                     |                 |             |                       |              |              |                     |                    |                 |                  |
|----------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|------------------|
| Measured Depth (usft)      | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude        |
| 12,306.0                   | 89.70           | 4.10        | 8,219.0               | 4,400.6      | 264.9        | 396,696.73          | 579,455.58         | 32° 5' 25.351 N | 104° 4' 36.368 W |
| 12,400.0                   | 90.50           | 4.40        | 8,218.8               | 4,494.4      | 271.8        | 396,790.47          | 579,462.55         | 32° 5' 28.279 N | 104° 4' 36.285 W |
| 12,494.0                   | 88.80           | 4.10        | 8,219.4               | 4,588.1      | 278.8        | 396,884.21          | 579,469.52         | 32° 5' 27.206 N | 104° 4' 36.201 W |
| 12,588.0                   | 89.50           | 3.20        | 8,220.8               | 4,681.9      | 284.8        | 396,978.01          | 579,475.50         | 32° 5' 28.135 N | 104° 4' 36.129 W |
| 12,682.0                   | 89.30           | 3.00        | 8,221.8               | 4,775.8      | 289.9        | 397,071.86          | 579,480.58         | 32° 5' 29.063 N | 104° 4' 36.068 W |
| 12,776.0                   | 90.50           | 1.90        | 8,221.9               | 4,869.7      | 293.9        | 397,165.77          | 579,484.60         | 32° 5' 29.993 N | 104° 4' 36.018 W |
| 12,870.0                   | 89.30           | 2.10        | 8,222.1               | 4,963.6      | 297.2        | 397,259.71          | 579,487.88         | 32° 5' 30.922 N | 104° 4' 35.977 W |
| 12,976.0                   | 90.30           | 1.60        | 8,222.5               | 5,069.6      | 300.6        | 397,365.66          | 579,491.30         | 32° 5' 31.971 N | 104° 4' 35.935 W |
| 13,029.0                   | 90.30           | 1.60        | 8,222.2               | 5,122.5      | 302.1        | 397,418.64          | 579,492.78         | 32° 5' 32.495 N | 104° 4' 35.916 W |
| TD @ 13029' MD / 8222' TVD |                 |             |                       |              |              |                     |                    |                 |                  |

| Design Annotations    |                       |                   |              |                                               |
|-----------------------|-----------------------|-------------------|--------------|-----------------------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                       |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                               |
| 184.0                 | 184.0                 | 1.8               | -1.3         | First MWD Survey @ 184' MD / 184' TVD         |
| 8,050.6               | 7,976.0               | 190.0             | 13.2         | Crossed Lease Line @ 8051' MD / 7976' TVD     |
| 8,414.9               | 8,122.3               | 520.1             | 35.2         | Crossed 330' Hard Line @ 8415' MD / 8122' TVD |
| 13,029.0              | 8,222.2               | 5,122.5           | 302.1        | TD @ 13029' MD / 8222' TVD                    |

|                   |                    |             |
|-------------------|--------------------|-------------|
| Checked By: _____ | Approved By: _____ | Date: _____ |
|-------------------|--------------------|-------------|