

# The Directional Drilling Company

11390 FM 830  
Willis, TX 77318  
Phone: (936) 856-4332  
Fax: (936) 856-8678



30-015-39388

## Survey Certification Sheet

| Company            | Job Number | Date     |
|--------------------|------------|----------|
| COG Operating, LLC | WT-150460  | 8/5/2015 |

| Lease           | Well Name                   | County & State  |
|-----------------|-----------------------------|-----------------|
| Sec24,T26S,R25E | Cali Roll 24 Federal Com 2H | Lea, NM<br>Eddy |

| API No.      | Survey Depth Range       | Survey Type |
|--------------|--------------------------|-------------|
| 30-015-39388 | 154 feet to 6099 feet MD | MWD         |

| Sidetrack Information      | Directional Supervisor/Surveyor |
|----------------------------|---------------------------------|
| 5289 feet to 17738 feet MD | Joe Hargrove                    |

## Certification Statement

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by The Directional Drilling Company (DDC). This report represents a true and correct directional survey of this well based on the original data obtained at the well site.

Wellbore coordinates are calculated using minimum curvature.

# Christopher Hughes

Christopher Hughes  
MWD Compliance Manager  
The Directional Drilling Company

Digitally signed by Christopher Hughes  
DN: cn=Christopher Hughes, o=DDC, ou,  
email=Chrish@directionaldrillers.com,  
c=US  
Date: 2015.08.06 08:22:26 -05'00'

A handwritten signature in black ink, appearing to be "Christopher Hughes", is written over a horizontal line.



## **COG Operating, LLC**

Eddy County, NM (NAD 83)  
Sec 24, T26S, R25E  
Cali Roll 24 Federal Com #2H

Wellbore #1

Design: Wellbore #1

## **Survey Report - Geographic**

15 July, 2015

**NM OIL CONSERVATION**  
ARTESIA DISTRICT

**MAY 19 2016**

**RECEIVED**





HP  
Survey Report - Geographic



|           |                              |                              |                                      |
|-----------|------------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H    |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadrill Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadrill Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1                  | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1                  | Database:                    | Compass                              |

|             |                           |               |                |
|-------------|---------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAD 83)  |               |                |
| Map System: | US State Plane 1983       | System Datum: | Mean Sea Level |
| Geo Datum:  | North American Datum 1983 |               |                |
| Map Zone:   | New Mexico Eastern Zone   |               |                |

|                       |                    |                        |                              |
|-----------------------|--------------------|------------------------|------------------------------|
| Site                  | Sec 24, T26S, R25E |                        |                              |
| Site Position:        | Northing:          | 376,201.46 usft        | Latitude: 32° 2' 3.327 N     |
| From: Map             | Easting:           | 538,606.31 usft        | Longitude: 104° 20' 31.730 W |
| Position Uncertainty: | 0.0 usft           | Slot Radius: 13-3/16 " | Grid Convergence: 0.00 °     |

|                      |                              |                     |                           |
|----------------------|------------------------------|---------------------|---------------------------|
| Well                 | Cali Roll 24 Federal Com #2H |                     |                           |
| Well Position        | +N/-S                        | 0.0 usft            | Northing: 376,201.46 usft |
|                      | +E/-W                        | 0.0 usft            | Easting: 538,606.31 usft  |
| Position Uncertainty | 0.0 usft                     | Wellhead Elevation: | 0.0 usft                  |
|                      |                              | Ground Level:       | 3,547.0 usft              |

|           |             |             |                |
|-----------|-------------|-------------|----------------|
| Wellbore  | Wellbore #1 |             |                |
| Magnetics | Model Name  | Sample Date | Declination    |
|           |             |             | (°)            |
|           | IGRF2015    | 6/29/2015   | 7.50           |
|           |             |             | Dip Angle      |
|           |             |             | (°)            |
|           |             |             | 59.78          |
|           |             |             | Field Strength |
|           |             |             | (nT)           |
|           |             |             | 47,941         |

|                   |                  |               |           |
|-------------------|------------------|---------------|-----------|
| 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 |
|                   |                  |               | (°)       |
|                   |                  |               | 179.68    |

|                |                |                   |                |
|----------------|----------------|-------------------|----------------|
| Survey Program | Date 7/15/2015 |                   |                |
| From           | To             | Survey (Wellbore) | Tool Name      |
| (usft)         | (usft)         |                   | Description    |
| 154.0          | 6,099.0        | MWD (Wellbore #1) | MWD default    |
|                |                |                   | 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    | 376,201.46 | 538,606.31 | 32° 2' 3.327 N | 104° 20' 31.730 W |
| 154.0                                 | 0.70        | 258.70  | 154.0    | -0.2   | -0.9   | 376,201.27 | 538,605.39 | 32° 2' 3.325 N | 104° 20' 31.741 W |
| First MWD Survey @ 154' MD / 154' TVD |             |         |          |        |        |            |            |                |                   |
| 240.0                                 | 1.00        | 234.30  | 240.0    | -0.7   | -2.0   | 376,200.73 | 538,604.26 | 32° 2' 3.320 N | 104° 20' 31.754 W |
| 342.0                                 | 1.10        | 236.40  | 342.0    | -1.8   | -3.6   | 376,199.67 | 538,602.73 | 32° 2' 3.309 N | 104° 20' 31.772 W |
| 423.0                                 | 1.10        | 254.10  | 423.0    | -2.4   | -5.0   | 376,199.03 | 538,601.33 | 32° 2' 3.303 N | 104° 20' 31.788 W |
| 542.0                                 | 1.60        | 265.20  | 541.9    | -2.9   | -7.7   | 376,198.58 | 538,598.58 | 32° 2' 3.298 N | 104° 20' 31.820 W |
| 632.0                                 | 0.90        | 294.00  | 631.9    | -2.7   | -9.6   | 376,198.76 | 538,596.68 | 32° 2' 3.300 N | 104° 20' 31.842 W |
| 786.0                                 | 1.00        | 284.40  | 785.9    | -1.9   | -12.0  | 376,199.59 | 538,594.27 | 32° 2' 3.308 N | 104° 20' 31.870 W |
| 878.0                                 | 1.10        | 280.50  | 877.9    | -1.5   | -13.7  | 376,199.95 | 538,592.63 | 32° 2' 3.312 N | 104° 20' 31.889 W |
| 970.0                                 | 1.20        | 284.50  | 969.8    | -1.1   | -15.5  | 376,200.35 | 538,590.83 | 32° 2' 3.316 N | 104° 20' 31.910 W |
| 1,062.0                               | 1.30        | 287.40  | 1,061.8  | -0.6   | -17.4  | 376,200.90 | 538,588.90 | 32° 2' 3.321 N | 104° 20' 31.932 W |



HP  
Survey Report - Geographic



|           |                              |                              |                                      |
|-----------|------------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H    |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadriil Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadriil Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                 |
| Wellbore: | Wellbore #1                  | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | Wellbore #1                  | Database:                    | Compass                              |

| Measured Depth (usft)                                | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude       | Longitude         |
|------------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|----------------|-------------------|
| 1,123.5                                              | 1.43            | 288.91      | 1,123.3               | -0.1         | -18.8        | 376,201.36          | 538,587.51         | 32° 2' 3.326 N | 104° 20' 31.949 W |
| <b>Crossed 330' Hard Line @ 1124' MD / 1123' TVD</b> |                 |             |                       |              |              |                     |                    |                |                   |
| 1,156.0                                              | 1.50            | 289.60      | 1,155.8               | 0.2          | -19.6        | 376,201.63          | 538,586.72         | 32° 2' 3.329 N | 104° 20' 31.958 W |
| 1,248.0                                              | 1.40            | 294.00      | 1,247.8               | 1.0          | -21.8        | 376,202.49          | 538,584.56         | 32° 2' 3.337 N | 104° 20' 31.983 W |
| 1,340.0                                              | 1.50            | 300.70      | 1,339.7               | 2.1          | -23.8        | 376,203.57          | 538,582.50         | 32° 2' 3.348 N | 104° 20' 32.007 W |
| 1,432.0                                              | 1.80            | 305.30      | 1,431.7               | 3.6          | -26.0        | 376,205.02          | 538,580.28         | 32° 2' 3.362 N | 104° 20' 32.032 W |
| 1,507.0                                              | 1.90            | 303.40      | 1,506.7               | 4.9          | -28.0        | 376,206.38          | 538,578.28         | 32° 2' 3.376 N | 104° 20' 32.056 W |
| 1,601.0                                              | 1.90            | 307.60      | 1,600.6               | 6.7          | -30.6        | 376,208.19          | 538,575.75         | 32° 2' 3.394 N | 104° 20' 32.085 W |
| 1,696.0                                              | 0.60            | 172.00      | 1,695.6               | 7.2          | -31.7        | 376,208.66          | 538,574.57         | 32° 2' 3.398 N | 104° 20' 32.099 W |
| 1,791.0                                              | 0.30            | 171.70      | 1,790.6               | 6.5          | -31.6        | 376,207.92          | 538,574.67         | 32° 2' 3.391 N | 104° 20' 32.098 W |
| 1,886.0                                              | 1.10            | 173.30      | 1,885.6               | 5.3          | -31.5        | 376,206.77          | 538,574.82         | 32° 2' 3.380 N | 104° 20' 32.096 W |
| 2,075.0                                              | 1.00            | 181.70      | 2,074.6               | 1.9          | -31.3        | 376,203.32          | 538,574.98         | 32° 2' 3.345 N | 104° 20' 32.094 W |
| 2,177.0                                              | 1.21            | 186.90      | 2,176.5               | -0.1         | -31.5        | 376,201.36          | 538,574.82         | 32° 2' 3.326 N | 104° 20' 32.096 W |
| <b>Crossed 330' Hard Line @ 2177' MD / 2177' TVD</b> |                 |             |                       |              |              |                     |                    |                |                   |
| 2,265.0                                              | 1.40            | 190.10      | 2,264.5               | -2.1         | -31.8        | 376,199.37          | 538,574.52         | 32° 2' 3.306 N | 104° 20' 32.099 W |
| 2,454.0                                              | 1.30            | 206.90      | 2,453.5               | -6.3         | -33.2        | 376,195.19          | 538,573.15         | 32° 2' 3.265 N | 104° 20' 32.115 W |
| 2,644.0                                              | 1.50            | 207.90      | 2,643.4               | -10.4        | -35.3        | 376,191.07          | 538,571.01         | 32° 2' 3.224 N | 104° 20' 32.140 W |
| 2,833.0                                              | 0.70            | 139.90      | 2,832.4               | -13.5        | -35.7        | 376,188.00          | 538,570.60         | 32° 2' 3.194 N | 104° 20' 32.145 W |
| 3,022.0                                              | 1.00            | 156.80      | 3,021.3               | -15.9        | -34.3        | 376,185.60          | 538,571.99         | 32° 2' 3.170 N | 104° 20' 32.129 W |
| 3,211.0                                              | 0.70            | 182.60      | 3,210.3               | -18.5        | -33.7        | 376,182.93          | 538,572.59         | 32° 2' 3.144 N | 104° 20' 32.122 W |
| 3,398.0                                              | 1.00            | 189.40      | 3,397.3               | -21.3        | -34.0        | 376,180.18          | 538,572.27         | 32° 2' 3.116 N | 104° 20' 32.126 W |
| 3,588.0                                              | 1.70            | 175.00      | 3,587.3               | -25.7        | -34.1        | 376,175.74          | 538,572.24         | 32° 2' 3.072 N | 104° 20' 32.126 W |
| 3,778.0                                              | 0.90            | 26.30       | 3,777.2               | -27.2        | -33.2        | 376,174.27          | 538,573.15         | 32° 2' 3.058 N | 104° 20' 32.115 W |
| 3,966.0                                              | 0.60            | 33.20       | 3,965.2               | -25.0        | -32.0        | 376,176.41          | 538,574.34         | 32° 2' 3.079 N | 104° 20' 32.101 W |
| 4,154.0                                              | 0.50            | 68.90       | 4,153.2               | -23.9        | -30.7        | 376,177.53          | 538,575.65         | 32° 2' 3.090 N | 104° 20' 32.086 W |
| 4,343.0                                              | 0.30            | 91.40       | 4,342.2               | -23.6        | -29.4        | 376,177.82          | 538,576.91         | 32° 2' 3.093 N | 104° 20' 32.072 W |
| 4,532.0                                              | 0.30            | 202.30      | 4,531.2               | -24.1        | -29.1        | 376,177.35          | 538,577.22         | 32° 2' 3.088 N | 104° 20' 32.068 W |
| 4,721.0                                              | 0.60            | 219.50      | 4,720.2               | -25.3        | -29.9        | 376,176.13          | 538,576.40         | 32° 2' 3.076 N | 104° 20' 32.078 W |
| 4,910.0                                              | 0.80            | 209.00      | 4,909.2               | -27.2        | -31.2        | 376,174.21          | 538,575.13         | 32° 2' 3.057 N | 104° 20' 32.092 W |
| 5,101.0                                              | 1.10            | 216.50      | 5,100.2               | -29.9        | -32.9        | 376,171.57          | 538,573.40         | 32° 2' 3.031 N | 104° 20' 32.112 W |
| 5,289.0                                              | 1.20            | 227.90      | 5,288.1               | -32.7        | -35.5        | 376,168.80          | 538,570.86         | 32° 2' 3.004 N | 104° 20' 32.142 W |
| 5,480.0                                              | 1.10            | 260.50      | 5,479.1               | -34.3        | -38.7        | 376,167.16          | 538,567.57         | 32° 2' 2.987 N | 104° 20' 32.180 W |
| 5,670.0                                              | 2.40            | 246.90      | 5,669.0               | -36.2        | -44.2        | 376,165.29          | 538,562.11         | 32° 2' 2.969 N | 104° 20' 32.244 W |
| 5,765.0                                              | 2.50            | 238.50      | 5,763.9               | -38.0        | -47.8        | 376,163.43          | 538,558.51         | 32° 2' 2.951 N | 104° 20' 32.285 W |
| 5,857.0                                              | 2.60            | 211.40      | 5,855.8               | -40.9        | -50.6        | 376,160.60          | 538,555.72         | 32° 2' 2.923 N | 104° 20' 32.318 W |
| 5,951.0                                              | 3.00            | 163.10      | 5,949.7               | -45.0        | -51.0        | 376,156.43          | 538,555.32         | 32° 2' 2.881 N | 104° 20' 32.322 W |
| 6,046.0                                              | 5.80            | 126.70      | 6,044.4               | -50.3        | -46.4        | 376,151.18          | 538,559.89         | 32° 2' 2.829 N | 104° 20' 32.269 W |
| 6,099.0                                              | 5.80            | 126.70      | 6,097.2               | -53.5        | -42.1        | 376,147.98          | 538,564.19         | 32° 2' 2.798 N | 104° 20' 32.219 W |
| <b>TD OH @ 6099' MD / 6097' TVD</b>                  |                 |             |                       |              |              |                     |                    |                |                   |

| Design Annotations    |                       |                   |              |                                               |  |
|-----------------------|-----------------------|-------------------|--------------|-----------------------------------------------|--|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              |                                               |  |
|                       |                       | +N/-S (usft)      | +E/-W (usft) | Comment                                       |  |
| 154.0                 | 154.0                 | -0.2              | -0.9         | First MWD Survey @ 154' MD / 154' TVD         |  |
| 1,123.5               | 1,123.3               | -0.1              | -18.8        | Crossed 330' Hard Line @ 1124' MD / 1123' TVD |  |
| 2,177.0               | 2,176.5               | -0.1              | -31.5        | Crossed 330' Hard Line @ 2177' MD / 2177' TVD |  |
| 6,099.0               | 6,097.2               | -53.5             | -42.1        | TD OH @ 6099' MD / 6097' TVD                  |  |

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

Company Name: COG Operating, LLC  
 Cali Roll 24 Federal Com #2H  
 Eddy County, NM (NAD 83)  
 Rig: Scardill Freedom  
 Created By: Kelsey Sheffield  
 Date: 06/04/2015

Cali Roll 24 Federal Com #2H  
 Eddy County, NM (NAD 83)  
 Q- 150535 & WT-150460  
 Sidetrack #1 - TC#1



Azimuths to Grid North

Correction: 7.50°

Magnetic Field

Strength: 47936.8nT

Dip Angle: 59.78°

Date: 7/15/2015

Model: IGRF2015

PROJECT DETAILS: Eddy County, NM (NAD 83)

Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: New Mexico Eastern Zone  
 System Datum: Mean Sea Level

WELL DETAILS: Cali Roll 24 Federal Com #2H

Ground Level: 3547.8  
 +N-S +E-W Northing Easting  
 316201.46 618608.11  
 32° 2' 5.327" N 104° 20' 31.736" W

DESIGN TARGET DETAILS

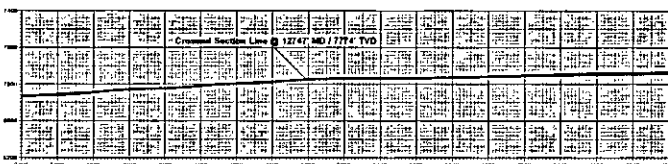
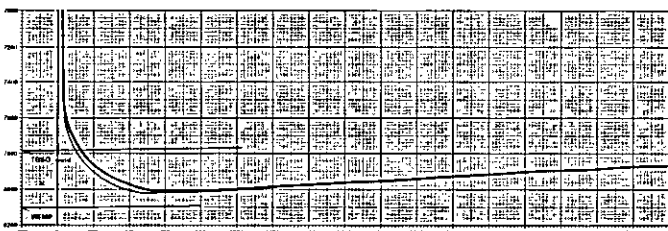
| Name                                                | TVD    | +N-S    | +E-W | Northing  | Eastng    | Latitude         | Longitude          |
|-----------------------------------------------------|--------|---------|------|-----------|-----------|------------------|--------------------|
| PdRt, Cali Roll 24 Federal Com #2H DQ2              | 7706.0 | -8964.9 | 56.8 | 360267.43 | 536951.94 | 32° 0' 24.422" N | 104° 20' 31.875" W |
| - plan into target center                           |        |         |      |           |           |                  |                    |
| Intermediate Target, Cali Roll 24 Federal Com 2H TC | 7775.0 | -8990.9 | 27.8 | 371291.54 | 538854.34 | 32° 1' 13.840" N | 104° 20' 31.401" W |
| - plan into target center                           |        |         |      |           |           |                  |                    |

ANNOTATIONS - STB1

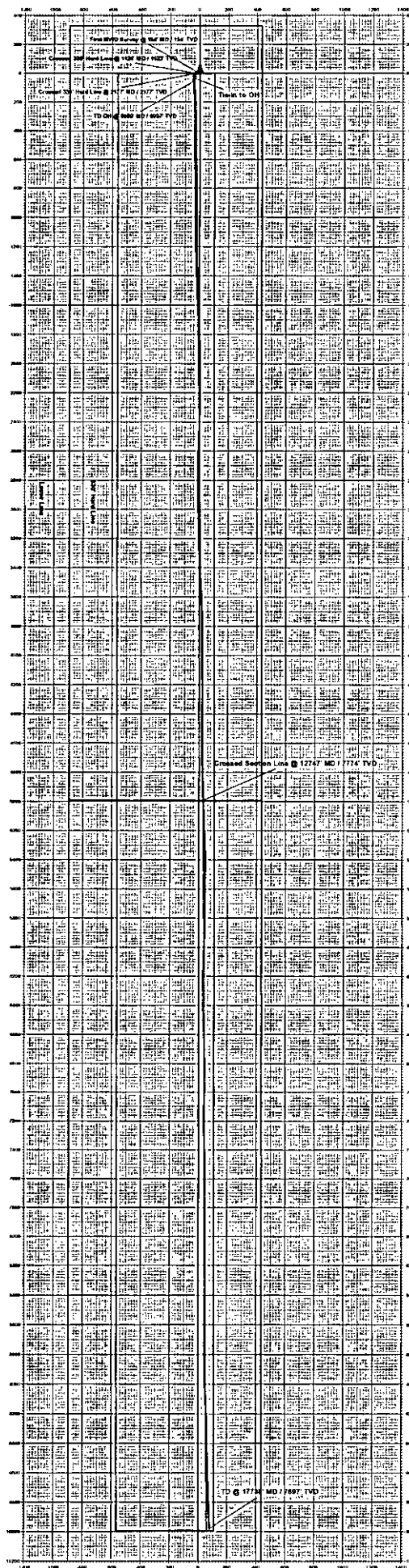
| MD     | Inc  | Asi    | TVD    | +N-S  | +E-W  | V-Set | Departure | Annotation                                    |
|--------|------|--------|--------|-------|-------|-------|-----------|-----------------------------------------------|
| 154.6  | 179  | 258.70 | 154.0  | -0.2  | -0.9  | 0.2   | 0.0       | First MWD Survey @ 154' MD / 154' TVD         |
| 1173.8 | 1.03 | 285.81 | 1123.3 | -0.1  | -18.8 | 8.0   | 20.8      | Crossed 336' Hard Line @ 1124' MD / 1123' TVD |
| 2177.0 | 1.21 | 186.90 | 2178.8 | -0.1  | -31.5 | -0.1  | 43.2      | Crossed 336' Hard Line @ 2177' MD / 2177' TVD |
| 6898.0 | 1.30 | 126.70 | 6897.2 | -53.5 | -42.1 | 93.2  | 127.9     | TD @ 6898' MD / 6897' TVD                     |

ANNOTATIONS - STB1

| MD      | Inc   | Asi    | TVD    | +N-S    | +E-W  | V-Set  | Departure | Annotation                                   |
|---------|-------|--------|--------|---------|-------|--------|-----------|----------------------------------------------|
| 5298.8  | 1.30  | 227.96 | 5298.1 | -12.7   | -35.3 | 37.5   | 92.1      | Turn to CH                                   |
| 12747.1 | 81.80 | 173.21 | 7773.7 | -4900.9 | 78.4  | 4090.8 | 5090.8    | Crossed Section Line @ 12747' MD / 7774' TVD |
| 17738.0 | 91.60 | 177.80 | 7896.7 | -9676.0 | 77.8  | 9676.2 | 16183.3   | TD @ 17738' MD / 7897' TVD                   |



Vertical Section at 179.68° (200 ual/in)





## **COG Operating, LLC**

Eddy County, NM (NAD 83)

Sec 24, T26S, R25E

Cali Roll 24 Federal Com #2H

SideTrack #1

Design: SideTrack #1

## **Survey Report - Geographic**

04 August, 2015





HP  
Survey Report - Geographic



|           |                              |                              |                                      |
|-----------|------------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H    |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadrill Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadrill Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                 |
| Wellbore: | SideTrack #1                 | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | SideTrack #1                 | Database:                    | Compass                              |

|             |                           |               |                |
|-------------|---------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAD 83)  |               |                |
| Map System: | US State Plane 1983       | System Datum: | Mean Sea Level |
| Geo Datum:  | North American Datum 1983 |               |                |
| Map Zone:   | New Mexico Eastern Zone   |               |                |

|                       |                    |                   |                   |
|-----------------------|--------------------|-------------------|-------------------|
| Site                  | Sec 24, T26S, R25E |                   |                   |
| Site Position:        | Map                | Northing:         | 376,201.46 usft   |
| From:                 |                    | Easting:          | 538,606.31 usft   |
| Position Uncertainty: | 0.0 usft           | Slot Radius:      | 13-3/16 "         |
|                       |                    | Latitude:         | 32° 2' 3.327 N    |
|                       |                    | Longitude:        | 104° 20' 31.730 W |
|                       |                    | Grid Convergence: | 0.00 °            |

|                      |                              |                     |                   |
|----------------------|------------------------------|---------------------|-------------------|
| Well                 | Cali Roll 24 Federal Com #2H |                     |                   |
| 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° 2' 3.327 N    |
|                      |                              | Longitude:          | 104° 20' 31.730 W |
|                      |                              | Ground Level:       | 3,547.0 usft      |

|           |              |             |                |
|-----------|--------------|-------------|----------------|
| Wellbore  | SideTrack #1 |             |                |
| Magnetics | Model Name   | Sample Date | Declination    |
|           | IGRF2015     | 7/15/2015   | (°)            |
|           |              |             | 7.50           |
|           |              |             | Dip Angle      |
|           |              |             | (°)            |
|           |              |             | 59.78          |
|           |              |             | Field Strength |
|           |              |             | (nT)           |
|           |              |             | 47,937         |

|                   |                  |               |           |
|-------------------|------------------|---------------|-----------|
| Design            | SideTrack #1     |               |           |
| Audit Notes:      |                  |               |           |
| Version:          | 1.0              | Phase:        | ACTUAL    |
|                   |                  | Tie On Depth: | 5,289.0   |
| Vertical Section: | Depth From (TVD) | +N/-S         | +E/-W     |
|                   | (usft)           | (usft)        | (usft)    |
|                   | 0.0              | 0.0           | 0.0       |
|                   |                  |               | Direction |
|                   |                  |               | (°)       |
|                   |                  |               | 179.68    |

|                |               |                          |                |
|----------------|---------------|--------------------------|----------------|
| Survey Program | Date 8/4/2015 |                          |                |
| From           | To            | Survey (Wellbore)        | Tool Name      |
| (usft)         | (usft)        |                          | Description    |
| 154.0          | 5,289.0       | MWD (Wellbore #1)        | MWD default    |
| 5,388.0        | 17,738.0      | MWD ST #1 (SideTrack #1) | MWD default    |
|                |               |                          | MWD - Standard |
|                |               |                          | 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    | 376,201.46 | 538,606.31 | 32° 2' 3.327 N | 104° 20' 31.730 W |
| 154.0    | 0.70        | 258.70  | 154.0    | -0.2   | -0.9   | 376,201.27 | 538,605.39 | 32° 2' 3.325 N | 104° 20' 31.741 W |
| 240.0    | 1.00        | 234.30  | 240.0    | -0.7   | -2.0   | 376,200.73 | 538,604.26 | 32° 2' 3.320 N | 104° 20' 31.754 W |
| 342.0    | 1.10        | 236.40  | 342.0    | -1.8   | -3.6   | 376,199.67 | 538,602.73 | 32° 2' 3.309 N | 104° 20' 31.772 W |
| 423.0    | 1.10        | 254.10  | 423.0    | -2.4   | -5.0   | 376,199.03 | 538,601.33 | 32° 2' 3.303 N | 104° 20' 31.788 W |
| 542.0    | 1.60        | 265.20  | 541.9    | -2.9   | -7.7   | 376,198.58 | 538,598.58 | 32° 2' 3.298 N | 104° 20' 31.820 W |
| 632.0    | 0.90        | 294.00  | 631.9    | -2.7   | -9.6   | 376,198.76 | 538,596.68 | 32° 2' 3.300 N | 104° 20' 31.842 W |
| 786.0    | 1.00        | 284.40  | 785.9    | -1.9   | -12.0  | 376,199.59 | 538,594.27 | 32° 2' 3.308 N | 104° 20' 31.870 W |
| 878.0    | 1.10        | 280.50  | 877.9    | -1.5   | -13.7  | 376,199.95 | 538,592.63 | 32° 2' 3.312 N | 104° 20' 31.889 W |
| 970.0    | 1.20        | 284.50  | 969.8    | -1.1   | -15.5  | 376,200.35 | 538,590.83 | 32° 2' 3.316 N | 104° 20' 31.910 W |
| 1,062.0  | 1.30        | 287.40  | 1,061.8  | -0.6   | -17.4  | 376,200.90 | 538,588.90 | 32° 2' 3.321 N | 104° 20' 31.932 W |



HP  
Survey Report - Geographic



|           |                              |                              |                                      |
|-----------|------------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H    |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadriil Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadriil Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                 |
| Wellbore: | SideTrack #1                 | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | SideTrack #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         |
| 1,156.0                     | 1.50               | 289.60         | 1,155.8                     | 0.2             | -19.6           | 376,201.63                | 538,586.72               | 32° 2' 3.329 N | 104° 20' 31.958 W |
| 1,248.0                     | 1.40               | 294.00         | 1,247.8                     | 1.0             | -21.8           | 376,202.49                | 538,584.56               | 32° 2' 3.337 N | 104° 20' 31.983 W |
| 1,340.0                     | 1.50               | 300.70         | 1,339.7                     | 2.1             | -23.8           | 376,203.57                | 538,582.50               | 32° 2' 3.348 N | 104° 20' 32.007 W |
| 1,432.0                     | 1.80               | 305.30         | 1,431.7                     | 3.6             | -26.0           | 376,205.02                | 538,580.28               | 32° 2' 3.362 N | 104° 20' 32.032 W |
| 1,507.0                     | 1.90               | 303.40         | 1,506.7                     | 4.9             | -28.0           | 376,206.38                | 538,578.28               | 32° 2' 3.376 N | 104° 20' 32.056 W |
| 1,601.0                     | 1.90               | 307.60         | 1,600.6                     | 6.7             | -30.6           | 376,208.19                | 538,575.75               | 32° 2' 3.394 N | 104° 20' 32.085 W |
| 1,696.0                     | 0.60               | 172.00         | 1,695.6                     | 7.2             | -31.7           | 376,208.66                | 538,574.57               | 32° 2' 3.398 N | 104° 20' 32.099 W |
| 1,791.0                     | 0.30               | 171.70         | 1,790.6                     | 6.5             | -31.6           | 376,207.92                | 538,574.67               | 32° 2' 3.391 N | 104° 20' 32.098 W |
| 1,886.0                     | 1.10               | 173.30         | 1,885.6                     | 5.3             | -31.5           | 376,206.77                | 538,574.82               | 32° 2' 3.380 N | 104° 20' 32.096 W |
| 2,075.0                     | 1.00               | 181.70         | 2,074.6                     | 1.9             | -31.3           | 376,203.32                | 538,574.98               | 32° 2' 3.345 N | 104° 20' 32.094 W |
| 2,265.0                     | 1.40               | 190.10         | 2,264.5                     | -2.1            | -31.8           | 376,199.37                | 538,574.52               | 32° 2' 3.306 N | 104° 20' 32.099 W |
| 2,454.0                     | 1.30               | 206.90         | 2,453.5                     | -6.3            | -33.2           | 376,195.19                | 538,573.15               | 32° 2' 3.265 N | 104° 20' 32.115 W |
| 2,644.0                     | 1.50               | 207.90         | 2,643.4                     | -10.4           | -35.3           | 376,191.07                | 538,571.01               | 32° 2' 3.224 N | 104° 20' 32.140 W |
| 2,833.0                     | 0.70               | 139.90         | 2,832.4                     | -13.5           | -35.7           | 376,188.00                | 538,570.60               | 32° 2' 3.194 N | 104° 20' 32.145 W |
| 3,022.0                     | 1.00               | 156.80         | 3,021.3                     | -15.9           | -34.3           | 376,185.60                | 538,571.99               | 32° 2' 3.170 N | 104° 20' 32.129 W |
| 3,211.0                     | 0.70               | 182.60         | 3,210.3                     | -18.5           | -33.7           | 376,182.93                | 538,572.59               | 32° 2' 3.144 N | 104° 20' 32.122 W |
| 3,398.0                     | 1.00               | 189.40         | 3,397.3                     | -21.3           | -34.0           | 376,180.18                | 538,572.27               | 32° 2' 3.116 N | 104° 20' 32.126 W |
| 3,588.0                     | 1.70               | 175.00         | 3,587.3                     | -25.7           | -34.1           | 376,175.74                | 538,572.24               | 32° 2' 3.072 N | 104° 20' 32.126 W |
| 3,778.0                     | 0.90               | 26.30          | 3,777.2                     | -27.2           | -33.2           | 376,174.27                | 538,573.15               | 32° 2' 3.058 N | 104° 20' 32.115 W |
| 3,966.0                     | 0.60               | 33.20          | 3,965.2                     | -25.0           | -32.0           | 376,176.41                | 538,574.34               | 32° 2' 3.079 N | 104° 20' 32.101 W |
| 4,154.0                     | 0.50               | 68.90          | 4,153.2                     | -23.9           | -30.7           | 376,177.53                | 538,575.65               | 32° 2' 3.090 N | 104° 20' 32.086 W |
| 4,343.0                     | 0.30               | 91.40          | 4,342.2                     | -23.6           | -29.4           | 376,177.82                | 538,576.91               | 32° 2' 3.093 N | 104° 20' 32.072 W |
| 4,532.0                     | 0.30               | 202.30         | 4,531.2                     | -24.1           | -29.1           | 376,177.35                | 538,577.22               | 32° 2' 3.088 N | 104° 20' 32.068 W |
| 4,721.0                     | 0.60               | 219.50         | 4,720.2                     | -25.3           | -29.9           | 376,176.13                | 538,576.40               | 32° 2' 3.076 N | 104° 20' 32.078 W |
| 4,910.0                     | 0.80               | 209.00         | 4,909.2                     | -27.2           | -31.2           | 376,174.21                | 538,575.13               | 32° 2' 3.057 N | 104° 20' 32.092 W |
| 5,101.0                     | 1.10               | 216.50         | 5,100.2                     | -29.9           | -32.9           | 376,171.57                | 538,573.40               | 32° 2' 3.031 N | 104° 20' 32.112 W |
| 5,289.0                     | 1.20               | 227.90         | 5,288.1                     | -32.7           | -35.5           | 376,168.80                | 538,570.86               | 32° 2' 3.004 N | 104° 20' 32.142 W |
| Tie-in to OH                |                    |                |                             |                 |                 |                           |                          |                |                   |
| 5,388.0                     | 2.40               | 36.70          | 5,387.1                     | -31.7           | -35.0           | 376,169.77                | 538,571.33               | 32° 2' 3.013 N | 104° 20' 32.136 W |
| 5,452.0                     | 2.20               | 33.70          | 5,451.0                     | -29.6           | -33.5           | 376,171.86                | 538,572.81               | 32° 2' 3.034 N | 104° 20' 32.119 W |
| 5,484.0                     | 2.00               | 31.80          | 5,483.0                     | -28.6           | -32.9           | 376,172.85                | 538,573.45               | 32° 2' 3.044 N | 104° 20' 32.112 W |
| 5,547.0                     | 1.60               | 22.80          | 5,546.0                     | -26.9           | -31.9           | 376,174.59                | 538,574.37               | 32° 2' 3.061 N | 104° 20' 32.101 W |
| 5,578.0                     | 1.40               | 16.30          | 5,577.0                     | -26.1           | -31.7           | 376,175.36                | 538,574.64               | 32° 2' 3.069 N | 104° 20' 32.098 W |
| 5,673.0                     | 1.10               | 334.80         | 5,672.0                     | -24.2           | -31.7           | 376,177.30                | 538,574.58               | 32° 2' 3.088 N | 104° 20' 32.099 W |
| 5,768.0                     | 1.20               | 291.00         | 5,766.9                     | -23.0           | -33.0           | 376,178.48                | 538,573.26               | 32° 2' 3.100 N | 104° 20' 32.114 W |
| 5,860.0                     | 1.90               | 273.50         | 5,858.9                     | -22.5           | -35.5           | 376,178.92                | 538,570.84               | 32° 2' 3.104 N | 104° 20' 32.142 W |
| 5,955.0                     | 0.90               | 9.80           | 5,953.9                     | -21.7           | -36.9           | 376,179.75                | 538,569.40               | 32° 2' 3.112 N | 104° 20' 32.159 W |
| 6,050.0                     | 0.90               | 335.50         | 6,048.9                     | -20.3           | -37.1           | 376,181.16                | 538,569.21               | 32° 2' 3.126 N | 104° 20' 32.161 W |
| 6,144.0                     | 1.20               | 306.00         | 6,142.9                     | -19.0           | -38.2           | 376,182.41                | 538,568.11               | 32° 2' 3.138 N | 104° 20' 32.174 W |
| 6,236.0                     | 1.80               | 296.00         | 6,234.8                     | -17.8           | -40.3           | 376,183.61                | 538,566.03               | 32° 2' 3.150 N | 104° 20' 32.198 W |
| 6,331.0                     | 1.10               | 192.80         | 6,329.8                     | -18.1           | -41.8           | 376,183.38                | 538,564.49               | 32° 2' 3.148 N | 104° 20' 32.216 W |
| 6,426.0                     | 1.00               | 214.40         | 6,424.8                     | -19.7           | -42.5           | 376,181.80                | 538,563.82               | 32° 2' 3.132 N | 104° 20' 32.224 W |
| 6,520.0                     | 0.30               | 303.50         | 6,518.8                     | -20.2           | -43.2           | 376,181.26                | 538,563.15               | 32° 2' 3.127 N | 104° 20' 32.231 W |
| 6,615.0                     | 0.90               | 221.80         | 6,613.8                     | -20.6           | -43.9           | 376,180.84                | 538,562.45               | 32° 2' 3.123 N | 104° 20' 32.240 W |
| 6,709.0                     | 0.40               | 145.00         | 6,707.8                     | -21.4           | -44.2           | 376,180.02                | 538,562.14               | 32° 2' 3.115 N | 104° 20' 32.243 W |
| 6,804.0                     | 1.70               | 183.30         | 6,802.8                     | -23.1           | -44.1           | 376,178.34                | 538,562.25               | 32° 2' 3.098 N | 104° 20' 32.242 W |
| 6,899.0                     | 0.60               | 79.20          | 6,897.7                     | -24.4           | -43.7           | 376,177.03                | 538,562.66               | 32° 2' 3.085 N | 104° 20' 32.237 W |
| 6,994.0                     | 0.90               | 156.10         | 6,992.7                     | -25.0           | -42.9           | 376,176.44                | 538,563.45               | 32° 2' 3.079 N | 104° 20' 32.228 W |
| 7,089.0                     | 1.90               | 147.80         | 7,087.7                     | -27.0           | -41.7           | 376,174.43                | 538,564.59               | 32° 2' 3.059 N | 104° 20' 32.215 W |
| 7,184.0                     | 0.60               | 67.60          | 7,182.7                     | -28.2           | -40.4           | 376,173.28                | 538,565.89               | 32° 2' 3.048 N | 104° 20' 32.200 W |
| 7,278.0                     | 0.60               | 127.00         | 7,276.7                     | -28.3           | -39.6           | 376,173.18                | 538,566.74               | 32° 2' 3.047 N | 104° 20' 32.190 W |
| 7,371.0                     | 1.10               | 159.40         | 7,369.7                     | -29.4           | -38.9           | 376,172.05                | 538,567.44               | 32° 2' 3.036 N | 104° 20' 32.182 W |
| 7,450.0                     | 1.70               | 150.40         | 7,448.7                     | -31.1           | -38.0           | 376,170.32                | 538,568.29               | 32° 2' 3.019 N | 104° 20' 32.172 W |
| 7,488.0                     | 1.50               | 151.50         | 7,486.6                     | -32.1           | -37.5           | 376,169.39                | 538,568.80               | 32° 2' 3.010 N | 104° 20' 32.166 W |
| 7,520.0                     | 4.30               | 167.30         | 7,518.6                     | -33.6           | -37.0           | 376,167.85                | 538,569.27               | 32° 2' 2.994 N | 104° 20' 32.160 W |



HP  
Survey Report - Geographic



|           |                              |                              |                                     |
|-----------|------------------------------|------------------------------|-------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H   |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadrit Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadrit Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                |
| Wellbore: | SideTrack #1                 | Survey Calculation Method:   | Minimum Curvature                   |
| Design:   | SideTrack #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         |
| 7,551.0               | 8.00            | 173.60      | 7,549.4               | -36.9        | -36.5        | 376,164.57          | 538,569.76         | 32° 2' 2.962 N  | 104° 20' 32.155 W |
| 7,582.0               | 11.40           | 177.70      | 7,580.0               | -42.1        | -36.2        | 376,159.37          | 538,570.13         | 32° 2' 2.910 N  | 104° 20' 32.150 W |
| 7,614.0               | 15.20           | 183.30      | 7,611.1               | -49.4        | -36.3        | 376,152.02          | 538,570.01         | 32° 2' 2.838 N  | 104° 20' 32.152 W |
| 7,645.0               | 18.60           | 184.90      | 7,640.8               | -58.4        | -37.0        | 376,143.03          | 538,569.36         | 32° 2' 2.749 N  | 104° 20' 32.159 W |
| 7,677.0               | 21.60           | 183.30      | 7,670.8               | -69.4        | -37.7        | 376,132.06          | 538,568.58         | 32° 2' 2.640 N  | 104° 20' 32.168 W |
| 7,709.0               | 24.10           | 181.20      | 7,700.3               | -81.8        | -38.2        | 376,119.65          | 538,568.10         | 32° 2' 2.517 N  | 104° 20' 32.174 W |
| 7,740.0               | 27.40           | 180.80      | 7,728.2               | -95.3        | -38.4        | 376,106.18          | 538,567.87         | 32° 2' 2.384 N  | 104° 20' 32.177 W |
| 7,771.0               | 30.40           | 178.60      | 7,755.3               | -110.3       | -38.3        | 376,091.21          | 538,567.96         | 32° 2' 2.236 N  | 104° 20' 32.175 W |
| 7,802.0               | 34.60           | 176.10      | 7,781.5               | -126.9       | -37.6        | 376,074.58          | 538,568.75         | 32° 2' 2.071 N  | 104° 20' 32.166 W |
| 7,833.0               | 38.20           | 175.40      | 7,806.4               | -145.2       | -36.2        | 376,056.23          | 538,570.12         | 32° 2' 1.890 N  | 104° 20' 32.150 W |
| 7,865.0               | 41.70           | 176.30      | 7,831.0               | -165.7       | -34.7        | 376,035.74          | 538,571.60         | 32° 2' 1.687 N  | 104° 20' 32.133 W |
| 7,896.0               | 45.50           | 178.40      | 7,853.4               | -187.1       | -33.7        | 376,014.39          | 538,572.58         | 32° 2' 1.476 N  | 104° 20' 32.122 W |
| 7,928.0               | 50.20           | 178.70      | 7,874.9               | -210.8       | -33.1        | 375,990.68          | 538,573.18         | 32° 2' 1.241 N  | 104° 20' 32.115 W |
| 7,960.0               | 54.50           | 179.40      | 7,894.4               | -236.1       | -32.7        | 375,965.36          | 538,573.59         | 32° 2' 0.990 N  | 104° 20' 32.110 W |
| 7,991.0               | 58.10           | 179.10      | 7,911.6               | -261.9       | -32.4        | 375,939.57          | 538,573.93         | 32° 2' 0.735 N  | 104° 20' 32.106 W |
| 8,022.0               | 61.30           | 178.40      | 7,927.3               | -288.6       | -31.8        | 375,912.82          | 538,574.52         | 32° 2' 0.470 N  | 104° 20' 32.099 W |
| 8,054.0               | 64.50           | 178.90      | 7,941.8               | -317.1       | -31.1        | 375,884.34          | 538,575.19         | 32° 2' 0.189 N  | 104° 20' 32.091 W |
| 8,082.0               | 67.10           | 180.50      | 7,953.3               | -342.7       | -31.0        | 375,858.81          | 538,575.32         | 32° 1' 59.936 N | 104° 20' 32.090 W |
| 8,113.0               | 69.40           | 182.10      | 7,964.8               | -371.4       | -31.7        | 375,830.03          | 538,574.66         | 32° 1' 59.651 N | 104° 20' 32.097 W |
| 8,145.0               | 71.90           | 182.10      | 7,975.4               | -401.6       | -32.8        | 375,799.86          | 538,573.55         | 32° 1' 59.353 N | 104° 20' 32.110 W |
| 8,176.0               | 73.60           | 181.00      | 7,984.6               | -431.2       | -33.6        | 375,770.26          | 538,572.75         | 32° 1' 59.060 N | 104° 20' 32.120 W |
| 8,208.0               | 75.70           | 180.30      | 7,993.1               | -462.1       | -33.9        | 375,739.41          | 538,572.40         | 32° 1' 58.754 N | 104° 20' 32.124 W |
| 8,239.0               | 78.20           | 179.40      | 8,000.1               | -492.2       | -33.8        | 375,709.21          | 538,572.49         | 32° 1' 58.456 N | 104° 20' 32.123 W |
| 8,271.0               | 81.10           | 179.10      | 8,005.8               | -523.7       | -33.4        | 375,677.74          | 538,572.90         | 32° 1' 58.144 N | 104° 20' 32.118 W |
| 8,302.0               | 84.30           | 178.60      | 8,009.7               | -554.5       | -32.8        | 375,647.00          | 538,573.52         | 32° 1' 57.840 N | 104° 20' 32.111 W |
| 8,334.0               | 87.10           | 178.40      | 8,012.1               | -586.4       | -32.0        | 375,615.10          | 538,574.35         | 32° 1' 57.524 N | 104° 20' 32.101 W |
| 8,365.0               | 89.30           | 178.70      | 8,013.1               | -617.3       | -31.2        | 375,584.13          | 538,575.13         | 32° 1' 57.218 N | 104° 20' 32.092 W |
| 8,397.0               | 90.00           | 178.70      | 8,013.3               | -649.3       | -30.5        | 375,552.14          | 538,575.86         | 32° 1' 56.901 N | 104° 20' 32.083 W |
| 8,460.0               | 91.00           | 179.30      | 8,012.8               | -712.3       | -29.4        | 375,489.15          | 538,576.96         | 32° 1' 56.278 N | 104° 20' 32.070 W |
| 8,554.0               | 91.90           | 179.30      | 8,010.4               | -806.3       | -28.2        | 375,395.19          | 538,578.11         | 32° 1' 55.348 N | 104° 20' 32.057 W |
| 8,650.0               | 92.80           | 179.40      | 8,006.5               | -902.2       | -27.1        | 375,299.28          | 538,579.20         | 32° 1' 54.399 N | 104° 20' 32.044 W |
| 8,743.0               | 93.80           | 179.40      | 8,001.1               | -995.0       | -26.1        | 375,206.44          | 538,580.17         | 32° 1' 53.480 N | 104° 20' 32.033 W |
| 8,837.0               | 94.90           | 179.80      | 7,994.0               | -1,088.7     | -25.5        | 375,112.71          | 538,580.82         | 32° 1' 52.552 N | 104° 20' 32.025 W |
| 8,932.0               | 94.20           | 178.60      | 7,986.4               | -1,183.4     | -24.2        | 375,018.03          | 538,582.15         | 32° 1' 51.615 N | 104° 20' 32.010 W |
| 9,026.0               | 92.70           | 178.20      | 7,980.8               | -1,277.2     | -21.5        | 374,924.23          | 538,584.77         | 32° 1' 50.687 N | 104° 20' 31.979 W |
| 9,121.0               | 92.90           | 178.40      | 7,976.1               | -1,372.1     | -18.7        | 374,829.39          | 538,587.58         | 32° 1' 49.748 N | 104° 20' 31.946 W |
| 9,216.0               | 93.30           | 178.20      | 7,971.0               | -1,466.9     | -15.9        | 374,734.57          | 538,590.39         | 32° 1' 48.810 N | 104° 20' 31.914 W |
| 9,311.0               | 92.90           | 177.10      | 7,965.9               | -1,561.7     | -12.0        | 374,639.79          | 538,594.28         | 32° 1' 47.872 N | 104° 20' 31.868 W |
| 9,406.0               | 94.30           | 177.00      | 7,959.9               | -1,656.4     | -7.1         | 374,545.11          | 538,599.16         | 32° 1' 46.935 N | 104° 20' 31.812 W |
| 9,501.0               | 91.10           | 176.30      | 7,955.4               | -1,751.1     | -1.6         | 374,450.39          | 538,604.71         | 32° 1' 45.998 N | 104° 20' 31.747 W |
| 9,596.0               | 92.30           | 178.00      | 7,952.6               | -1,845.9     | 3.1          | 374,355.55          | 538,609.43         | 32° 1' 45.059 N | 104° 20' 31.692 W |
| 9,691.0               | 93.80           | 179.80      | 7,947.5               | -1,940.7     | 4.9          | 374,260.71          | 538,611.25         | 32° 1' 44.121 N | 104° 20' 31.671 W |
| 9,786.0               | 95.10           | 179.90      | 7,940.2               | -2,035.5     | 5.2          | 374,166.00          | 538,611.50         | 32° 1' 43.183 N | 104° 20' 31.668 W |
| 9,880.0               | 92.60           | 179.90      | 7,933.9               | -2,129.2     | 5.4          | 374,072.22          | 538,611.66         | 32° 1' 42.255 N | 104° 20' 31.666 W |
| 9,974.0               | 93.80           | 180.30      | 7,928.6               | -2,223.1     | 5.2          | 373,978.37          | 538,611.50         | 32° 1' 41.326 N | 104° 20' 31.668 W |
| 10,069.0              | 92.90           | 181.20      | 7,923.1               | -2,317.9     | 3.9          | 373,883.54          | 538,610.26         | 32° 1' 40.388 N | 104° 20' 31.682 W |
| 10,164.0              | 94.40           | 181.90      | 7,917.0               | -2,412.7     | 1.4          | 373,788.77          | 538,607.69         | 32° 1' 39.450 N | 104° 20' 31.712 W |
| 10,259.0              | 92.80           | 181.50      | 7,911.1               | -2,507.5     | -1.4         | 373,694.00          | 538,604.88         | 32° 1' 38.512 N | 104° 20' 31.744 W |
| 10,353.0              | 94.50           | 181.90      | 7,905.1               | -2,601.2     | -4.2         | 373,600.24          | 538,602.10         | 32° 1' 37.584 N | 104° 20' 31.777 W |
| 10,448.0              | 92.10           | 180.80      | 7,899.6               | -2,696.0     | -6.4         | 373,505.43          | 538,599.87         | 32° 1' 36.646 N | 104° 20' 31.802 W |
| 10,543.0              | 92.70           | 180.60      | 7,895.6               | -2,790.9     | -7.6         | 373,410.52          | 538,598.71         | 32° 1' 35.707 N | 104° 20' 31.816 W |
| 10,637.0              | 91.30           | 179.30      | 7,892.3               | -2,884.9     | -7.5         | 373,316.58          | 538,598.79         | 32° 1' 34.777 N | 104° 20' 31.815 W |
| 10,730.0              | 93.60           | 179.30      | 7,888.4               | -2,977.8     | -6.4         | 373,223.68          | 538,599.92         | 32° 1' 33.858 N | 104° 20' 31.801 W |
| 10,824.0              | 94.80           | 179.10      | 7,881.5               | -3,071.5     | -5.1         | 373,129.95          | 538,601.23         | 32° 1' 32.930 N | 104° 20' 31.786 W |
| 10,918.0              | 92.90           | 178.40      | 7,875.2               | -3,165.3     | -3.0         | 373,036.18          | 538,603.28         | 32° 1' 32.002 N | 104° 20' 31.762 W |



HP  
Survey Report - Geographic



|           |                              |                              |                                      |
|-----------|------------------------------|------------------------------|--------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H    |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadriil Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadriil Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                 |
| Wellbore: | SideTrack #1                 | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | SideTrack #1                 | Database:                    | Compass                              |

| Measured Depth (usft)                               | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude         |
|-----------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| 11,013.0                                            | 91.40           | 176.60      | 7,871.6               | -3,260.1     | 1.1          | 372,941.35          | 538,607.42         | 32° 1' 31.064 N | 104° 20' 31.714 W |
| 11,107.0                                            | 91.70           | 178.00      | 7,869.1               | -3,354.0     | 5.5          | 372,847.49          | 538,611.85         | 32° 1' 30.135 N | 104° 20' 31.663 W |
| 11,202.0                                            | 92.40           | 178.70      | 7,865.7               | -3,448.9     | 8.3          | 372,752.59          | 538,614.58         | 32° 1' 29.196 N | 104° 20' 31.631 W |
| 11,296.0                                            | 91.40           | 176.80      | 7,862.6               | -3,542.7     | 12.0         | 372,658.72          | 538,618.27         | 32° 1' 28.267 N | 104° 20' 31.588 W |
| 11,328.0                                            | 91.00           | 176.10      | 7,861.9               | -3,574.7     | 13.9         | 372,626.79          | 538,620.25         | 32° 1' 27.951 N | 104° 20' 31.565 W |
| 11,359.0                                            | 92.50           | 176.30      | 7,860.9               | -3,605.6     | 16.0         | 372,595.87          | 538,622.30         | 32° 1' 27.645 N | 104° 20' 31.541 W |
| 11,391.0                                            | 94.10           | 177.10      | 7,859.1               | -3,637.5     | 17.8         | 372,563.98          | 538,624.14         | 32° 1' 27.329 N | 104° 20' 31.519 W |
| 11,422.0                                            | 94.50           | 178.20      | 7,856.8               | -3,668.4     | 19.1         | 372,533.09          | 538,625.41         | 32° 1' 27.024 N | 104° 20' 31.505 W |
| 11,485.0                                            | 94.70           | 179.60      | 7,851.7               | -3,731.1     | 20.3         | 372,470.31          | 538,626.62         | 32° 1' 26.402 N | 104° 20' 31.491 W |
| 11,580.0                                            | 96.10           | 179.80      | 7,842.8               | -3,825.7     | 20.8         | 372,375.74          | 538,627.11         | 32° 1' 25.466 N | 104° 20' 31.485 W |
| 11,675.0                                            | 94.20           | 180.10      | 7,834.2               | -3,920.3     | 20.9         | 372,281.12          | 538,627.19         | 32° 1' 24.530 N | 104° 20' 31.484 W |
| 11,770.0                                            | 92.30           | 179.90      | 7,828.9               | -4,015.2     | 20.9         | 372,186.28          | 538,627.19         | 32° 1' 23.591 N | 104° 20' 31.484 W |
| 11,865.0                                            | 91.50           | 179.80      | 7,825.7               | -4,110.1     | 21.1         | 372,091.33          | 538,627.44         | 32° 1' 22.652 N | 104° 20' 31.481 W |
| 11,960.0                                            | 91.70           | 179.80      | 7,823.1               | -4,205.1     | 21.5         | 371,996.37          | 538,627.77         | 32° 1' 21.712 N | 104° 20' 31.477 W |
| 12,056.0                                            | 94.30           | 179.80      | 7,818.0               | -4,300.9     | 21.8         | 371,900.51          | 538,628.11         | 32° 1' 20.763 N | 104° 20' 31.473 W |
| 12,150.0                                            | 95.60           | 179.60      | 7,809.9               | -4,394.6     | 22.3         | 371,806.87          | 538,628.60         | 32° 1' 19.836 N | 104° 20' 31.467 W |
| 12,245.0                                            | 93.60           | 179.90      | 7,802.3               | -4,489.3     | 22.7         | 371,712.18          | 538,629.01         | 32° 1' 18.899 N | 104° 20' 31.462 W |
| 12,340.0                                            | 92.50           | 179.90      | 7,797.3               | -4,584.1     | 22.9         | 371,617.31          | 538,629.18         | 32° 1' 17.961 N | 104° 20' 31.460 W |
| 12,436.0                                            | 93.10           | 179.80      | 7,792.6               | -4,680.0     | 23.1         | 371,521.43          | 538,629.43         | 32° 1' 17.012 N | 104° 20' 31.457 W |
| 12,531.0                                            | 93.40           | 179.30      | 7,787.2               | -4,774.9     | 23.9         | 371,426.59          | 538,630.17         | 32° 1' 16.073 N | 104° 20' 31.448 W |
| 12,626.0                                            | 93.70           | 178.90      | 7,781.3               | -4,869.7     | 25.4         | 371,331.78          | 538,631.66         | 32° 1' 15.135 N | 104° 20' 31.431 W |
| 12,721.0                                            | 93.60           | 178.40      | 7,775.2               | -4,964.5     | 27.6         | 371,237.00          | 538,633.90         | 32° 1' 14.197 N | 104° 20' 31.405 W |
| 12,747.1                                            | 93.00           | 178.21      | 7,773.7               | -4,990.5     | 28.4         | 371,210.95          | 538,634.67         | 32° 1' 13.939 N | 104° 20' 31.396 W |
| <b>Crossed Section Line @ 12747' MD / 7774' TVD</b> |                 |             |                       |              |              |                     |                    |                 |                   |
| 12,816.0                                            | 91.40           | 177.70      | 7,771.1               | -5,059.3     | 30.8         | 371,142.15          | 538,637.13         | 32° 1' 13.258 N | 104° 20' 31.367 W |
| 12,911.0                                            | 90.20           | 177.30      | 7,769.8               | -5,154.2     | 35.0         | 371,047.25          | 538,641.27         | 32° 1' 12.319 N | 104° 20' 31.319 W |
| 13,007.0                                            | 91.50           | 177.30      | 7,768.4               | -5,250.1     | 39.5         | 370,951.37          | 538,645.79         | 32° 1' 11.370 N | 104° 20' 31.267 W |
| 13,102.0                                            | 89.80           | 178.60      | 7,767.3               | -5,345.0     | 42.9         | 370,856.44          | 538,649.19         | 32° 1' 10.431 N | 104° 20' 31.227 W |
| 13,196.0                                            | 89.50           | 180.10      | 7,767.8               | -5,439.0     | 43.9         | 370,762.45          | 538,650.26         | 32° 1' 9.501 N  | 104° 20' 31.214 W |
| 13,291.0                                            | 90.00           | 180.10      | 7,768.3               | -5,534.0     | 43.8         | 370,667.46          | 538,650.09         | 32° 1' 8.560 N  | 104° 20' 31.216 W |
| 13,387.0                                            | 91.00           | 180.10      | 7,767.4               | -5,630.0     | 43.6         | 370,571.46          | 538,649.92         | 32° 1' 7.610 N  | 104° 20' 31.218 W |
| 13,481.0                                            | 92.10           | 179.90      | 7,764.9               | -5,724.0     | 43.6         | 370,477.50          | 538,649.92         | 32° 1' 6.681 N  | 104° 20' 31.218 W |
| 13,575.0                                            | 90.90           | 181.70      | 7,762.4               | -5,817.9     | 42.3         | 370,383.54          | 538,648.61         | 32° 1' 5.751 N  | 104° 20' 31.233 W |
| 13,669.0                                            | 92.10           | 181.70      | 7,760.0               | -5,911.8     | 39.5         | 370,289.62          | 538,645.82         | 32° 1' 4.821 N  | 104° 20' 31.266 W |
| 13,763.0                                            | 90.50           | 181.40      | 7,757.8               | -6,005.8     | 37.0         | 370,195.68          | 538,643.28         | 32° 1' 3.892 N  | 104° 20' 31.295 W |
| 13,858.0                                            | 91.50           | 181.50      | 7,756.2               | -6,100.7     | 34.6         | 370,100.73          | 538,640.88         | 32° 1' 2.952 N  | 104° 20' 31.323 W |
| 13,952.0                                            | 90.40           | 179.90      | 7,754.6               | -6,194.7     | 33.4         | 370,006.75          | 538,639.73         | 32° 1' 2.022 N  | 104° 20' 31.336 W |
| 14,046.0                                            | 93.00           | 180.60      | 7,751.8               | -6,288.7     | 33.0         | 369,912.80          | 538,639.32         | 32° 1' 1.092 N  | 104° 20' 31.341 W |
| 14,140.0                                            | 91.80           | 179.40      | 7,747.9               | -6,382.6     | 33.0         | 369,818.89          | 538,639.32         | 32° 1' 0.163 N  | 104° 20' 31.341 W |
| 14,234.0                                            | 92.70           | 178.20      | 7,744.2               | -6,476.5     | 35.0         | 369,724.98          | 538,641.29         | 32° 0' 59.233 N | 104° 20' 31.318 W |
| 14,328.0                                            | 91.00           | 178.20      | 7,741.2               | -6,570.4     | 37.9         | 369,631.08          | 538,644.24         | 32° 0' 58.304 N | 104° 20' 31.283 W |
| 14,423.0                                            | 89.30           | 179.10      | 7,740.9               | -6,665.3     | 40.2         | 369,536.11          | 538,646.48         | 32° 0' 57.364 N | 104° 20' 31.257 W |
| 14,519.0                                            | 90.20           | 178.70      | 7,741.3               | -6,761.3     | 42.0         | 369,440.13          | 538,648.32         | 32° 0' 56.414 N | 104° 20' 31.236 W |
| 14,614.0                                            | 92.20           | 179.90      | 7,739.3               | -6,856.3     | 43.2         | 369,345.17          | 538,649.48         | 32° 0' 55.475 N | 104° 20' 31.222 W |
| 14,708.0                                            | 91.40           | 181.40      | 7,736.4               | -6,950.2     | 42.1         | 369,251.22          | 538,648.41         | 32° 0' 54.545 N | 104° 20' 31.234 W |
| 14,802.0                                            | 89.70           | 181.00      | 7,735.5               | -7,044.2     | 40.1         | 369,157.25          | 538,646.44         | 32° 0' 53.615 N | 104° 20' 31.257 W |
| 14,896.0                                            | 90.60           | 180.80      | 7,735.2               | -7,138.2     | 38.7         | 369,063.27          | 538,644.97         | 32° 0' 52.685 N | 104° 20' 31.274 W |
| 14,992.0                                            | 89.30           | 179.40      | 7,735.3               | -7,234.2     | 38.5         | 368,967.27          | 538,644.80         | 32° 0' 51.735 N | 104° 20' 31.276 W |
| 15,087.0                                            | 90.10           | 178.90      | 7,735.8               | -7,329.2     | 39.9         | 368,872.28          | 538,646.21         | 32° 0' 50.795 N | 104° 20' 31.260 W |
| 15,182.0                                            | 89.10           | 179.40      | 7,736.5               | -7,424.2     | 41.3         | 368,777.30          | 538,647.62         | 32° 0' 49.855 N | 104° 20' 31.243 W |
| 15,277.0                                            | 89.30           | 179.80      | 7,737.8               | -7,519.1     | 42.0         | 368,682.31          | 538,648.28         | 32° 0' 48.915 N | 104° 20' 31.235 W |
| 15,371.0                                            | 90.00           | 179.80      | 7,738.4               | -7,613.1     | 42.3         | 368,588.31          | 538,648.61         | 32° 0' 47.984 N | 104° 20' 31.232 W |
| 15,466.0                                            | 91.30           | 179.90      | 7,737.3               | -7,708.1     | 42.5         | 368,493.32          | 538,648.86         | 32° 0' 47.044 N | 104° 20' 31.229 W |
| 15,561.0                                            | 90.40           | 179.40      | 7,735.9               | -7,803.1     | 43.1         | 368,398.33          | 538,649.44         | 32° 0' 46.104 N | 104° 20' 31.222 W |
| 15,655.0                                            | 90.80           | 179.60      | 7,734.9               | -7,897.1     | 43.9         | 368,304.34          | 538,650.26         | 32° 0' 45.174 N | 104° 20' 31.212 W |



HP  
Survey Report - Geographic



|           |                              |                              |                                       |
|-----------|------------------------------|------------------------------|---------------------------------------|
| Company:  | COG Operating, LLC           | Local Co-ordinate Reference: | Well Cali Roll 24 Federal Com #2H     |
| Project:  | Eddy County, NM (NAD 83)     | TVD Reference:               | Well @ 3573.0usft (Scadriill Freedom) |
| Site:     | Sec 24, T26S, R25E           | MD Reference:                | Well @ 3573.0usft (Scadriill Freedom) |
| Well:     | Cali Roll 24 Federal Com #2H | North Reference:             | Grid                                  |
| Wellbore: | SideTrack #1                 | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | SideTrack #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         |
| 15,750.0                   | 92.40           | 179.40      | 7,732.3               | -7,992.1     | 44.8         | 368,209.39          | 538,651.09         | 32° 0' 44.234 N | 104° 20' 31.202 W |
| 15,844.0                   | 91.90           | 180.30      | 7,728.7               | -8,086.0     | 45.0         | 368,115.45          | 538,651.33         | 32° 0' 43.305 N | 104° 20' 31.199 W |
| 15,938.0                   | 91.40           | 179.10      | 7,726.0               | -8,180.0     | 45.5         | 368,021.50          | 538,651.83         | 32° 0' 42.375 N | 104° 20' 31.194 W |
| 16,032.0                   | 90.70           | 179.60      | 7,724.3               | -8,273.9     | 46.6         | 367,927.52          | 538,652.89         | 32° 0' 41.445 N | 104° 20' 31.181 W |
| 16,127.0                   | 91.00           | 180.30      | 7,722.9               | -8,368.9     | 46.7         | 367,832.53          | 538,652.98         | 32° 0' 40.505 N | 104° 20' 31.180 W |
| 16,221.0                   | 90.10           | 180.80      | 7,722.0               | -8,462.9     | 45.8         | 367,738.54          | 538,652.07         | 32° 0' 39.575 N | 104° 20' 31.191 W |
| 16,315.0                   | 90.80           | 180.80      | 7,721.3               | -8,556.9     | 44.4         | 367,644.55          | 538,650.76         | 32° 0' 38.645 N | 104° 20' 31.206 W |
| 16,410.0                   | 91.50           | 180.30      | 7,719.4               | -8,651.9     | 43.5         | 367,549.58          | 538,649.85         | 32° 0' 37.705 N | 104° 20' 31.216 W |
| 16,504.0                   | 90.20           | 179.90      | 7,718.0               | -8,745.9     | 43.4         | 367,455.59          | 538,649.68         | 32° 0' 36.775 N | 104° 20' 31.218 W |
| 16,598.0                   | 90.40           | 178.90      | 7,717.5               | -8,839.9     | 44.4         | 367,361.60          | 538,650.67         | 32° 0' 35.844 N | 104° 20' 31.207 W |
| 16,692.0                   | 91.30           | 178.60      | 7,716.1               | -8,933.8     | 46.4         | 367,267.63          | 538,652.72         | 32° 0' 34.914 N | 104° 20' 31.183 W |
| 16,786.0                   | 89.10           | 178.40      | 7,715.7               | -9,027.8     | 48.9         | 367,173.67          | 538,655.18         | 32° 0' 33.985 N | 104° 20' 31.154 W |
| 16,880.0                   | 89.80           | 178.00      | 7,716.6               | -9,121.7     | 51.8         | 367,079.72          | 538,658.13         | 32° 0' 33.055 N | 104° 20' 31.120 W |
| 16,975.0                   | 91.40           | 177.70      | 7,715.6               | -9,216.7     | 55.4         | 366,984.80          | 538,661.70         | 32° 0' 32.115 N | 104° 20' 31.078 W |
| 17,069.0                   | 89.90           | 178.60      | 7,714.6               | -9,310.6     | 58.4         | 366,890.86          | 538,664.73         | 32° 0' 31.186 N | 104° 20' 31.043 W |
| 17,163.0                   | 91.10           | 178.40      | 7,713.8               | -9,404.6     | 60.9         | 366,796.89          | 538,667.19         | 32° 0' 30.256 N | 104° 20' 31.014 W |
| 17,257.0                   | 90.50           | 178.70      | 7,712.5               | -9,498.5     | 63.3         | 366,702.93          | 538,669.57         | 32° 0' 29.326 N | 104° 20' 30.986 W |
| 17,351.0                   | 91.60           | 178.20      | 7,710.7               | -9,592.5     | 65.8         | 366,608.99          | 538,672.11         | 32° 0' 28.396 N | 104° 20' 30.957 W |
| 17,445.0                   | 90.70           | 178.70      | 7,708.8               | -9,686.4     | 68.3         | 366,515.04          | 538,674.65         | 32° 0' 27.467 N | 104° 20' 30.927 W |
| 17,539.0                   | 91.70           | 178.40      | 7,706.9               | -9,780.4     | 70.7         | 366,421.09          | 538,677.03         | 32° 0' 26.537 N | 104° 20' 30.899 W |
| 17,633.0                   | 93.00           | 177.80      | 7,703.0               | -9,874.2     | 73.8         | 366,327.22          | 538,680.14         | 32° 0' 25.608 N | 104° 20' 30.863 W |
| 17,687.0                   | 93.60           | 177.80      | 7,699.9               | -9,928.1     | 75.9         | 366,273.35          | 538,682.21         | 32° 0' 25.075 N | 104° 20' 30.839 W |
| 17,738.0                   | 93.60           | 177.80      | 7,696.7               | -9,979.0     | 77.9         | 366,222.49          | 538,684.17         | 32° 0' 24.571 N | 104° 20' 30.816 W |
| TD @ 17738' MD / 7697' TVD |                 |             |                       |              |              |                     |                    |                 |                   |

| Design Annotations    |                       |                   |              |                                              |
|-----------------------|-----------------------|-------------------|--------------|----------------------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                      |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                              |
| 5,289.0               | 5,288.1               | -32.7             | -35.5        | Tie-in to OH                                 |
| 12,747.1              | 7,773.7               | -4,990.5          | 28.4         | Crossed Section Line @ 12747' MD / 7774' TVD |
| 17,738.0              | 7,696.7               | -9,979.0          | 77.9         | TD @ 17738' MD / 7697' TVD                   |

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