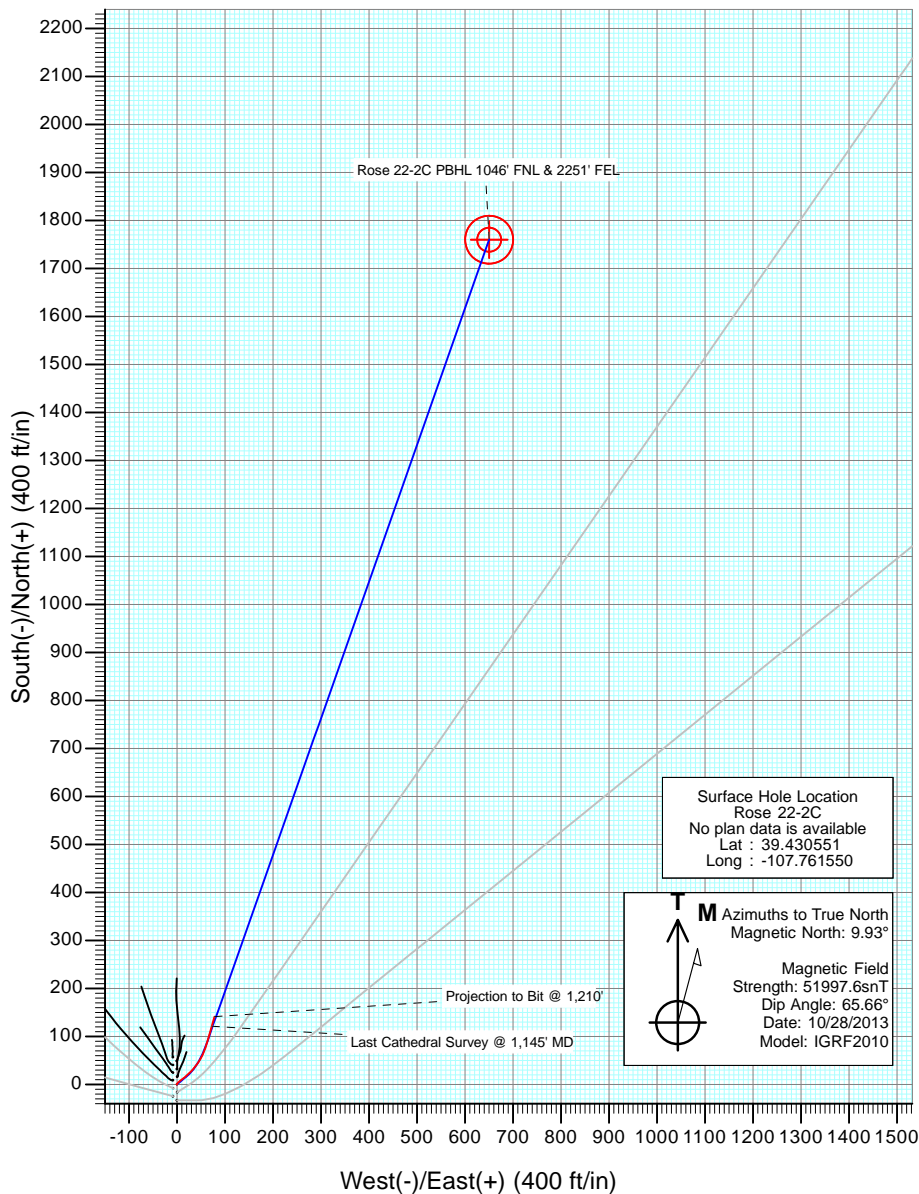
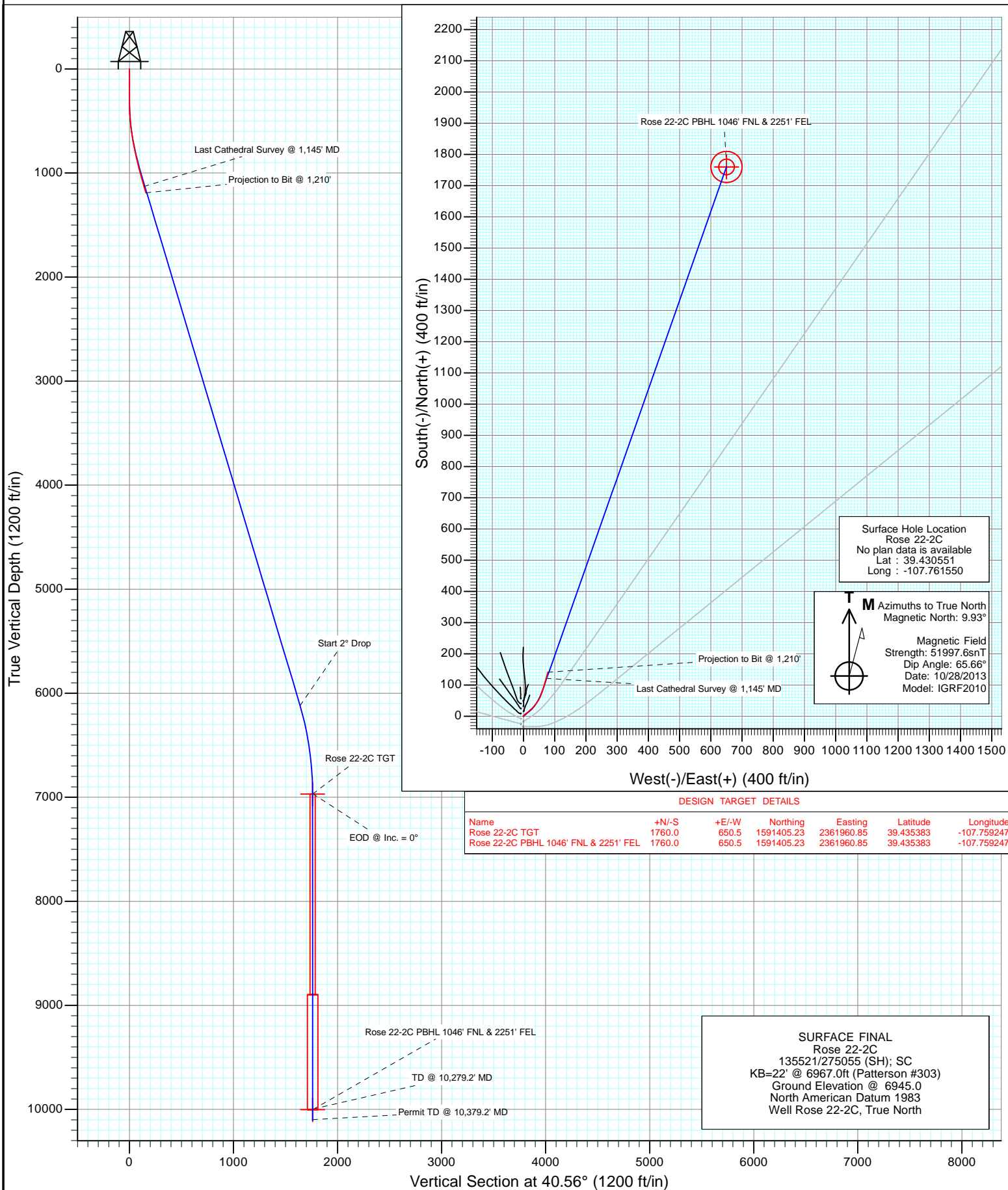




Project: Mamm Creek  
Site: K22W Pad  
Well: Rose 22-2C  
Wellbore: OH  
Design: SURFACE FINAL



#### DESIGN TARGET DETAILS

| Name                                  | +N/-S  | +E/-W | Northing   | Easting    | Latitude  | Longitude   |
|---------------------------------------|--------|-------|------------|------------|-----------|-------------|
| Rose 22-2C TGT                        | 1760.0 | 650.5 | 1591405.23 | 2361960.85 | 39.435383 | -107.759247 |
| Rose 22-2C PBHL 1046' FNL & 2251' FEL | 1760.0 | 650.5 | 1591405.23 | 2361960.85 | 39.435383 | -107.759247 |

**SURFACE FINAL**  
Rose 22-2C  
135521/275055 (SH); SC  
KB=22' @ 6967.0ft (Patterson #303)  
Ground Elevation @ 6945.0  
North American Datum 1983  
Well Rose 22-2C, True North

# Cathedral Energy Services

## Survey Report

|                  |                            |                                     |                                    |
|------------------|----------------------------|-------------------------------------|------------------------------------|
| <b>Company:</b>  | EnCana Oil & Gas (USA) Inc | <b>Local Co-ordinate Reference:</b> | Well Rose 22-2C                    |
| <b>Project:</b>  | Mamm Creek                 | <b>TVD Reference:</b>               | KB=22' @ 6967.0ft (Patterson #303) |
| <b>Site:</b>     | K22W Pad                   | <b>MD Reference:</b>                | KB=22' @ 6967.0ft (Patterson #303) |
| <b>Well:</b>     | Rose 22-2C                 | <b>North Reference:</b>             | True                               |
| <b>Wellbore:</b> | OH                         | <b>Survey Calculation Method:</b>   | Minimum Curvature                  |
| <b>Design:</b>   | SURFACE FINAL              | <b>Database:</b>                    | USA EDM 5000 Multi Users DB        |

|                    |                           |                      |                |
|--------------------|---------------------------|----------------------|----------------|
| <b>Project</b>     | Mamm Creek                |                      |                |
| <b>Map System:</b> | US State Plane 1983       | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | North American Datum 1983 |                      |                |
| <b>Map Zone:</b>   | Colorado Central Zone     |                      |                |

| Site                  |          | K22W Pad     |                 |                   |             |
|-----------------------|----------|--------------|-----------------|-------------------|-------------|
| Site Position:        |          | Northing:    | 1,589,615.65 ft | Latitude:         | 39.430424   |
| From:                 | Lat/Long | Easting:     | 2,361,269.29 ft | Longitude:        | -107.761537 |
| Position Uncertainty: | 0.0 ft   | Slot Radius: | 13.200 in       | Grid Convergence: | -1.43 °     |

|                      |            |        |                     |                 |               |             |
|----------------------|------------|--------|---------------------|-----------------|---------------|-------------|
| Well                 | Rose 22-2C |        |                     |                 |               |             |
| Well Position        | +N/-S      | 0.0 ft | Northing:           | 1,589,661.96 ft | Latitude:     | 39.430551   |
|                      | +E/-W      | 0.0 ft | Easting:            | 2,361,266.77 ft | Longitude:    | -107.761550 |
| Position Uncertainty |            | 0.0 ft | Wellhead Elevation: | ft              | Ground Level: | 6,945.0 ft  |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | OH                |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2010          | 10/28/2013         | 9.93                   | 65.66                | 51,998                     |

|                          |                         |               |              |                      |     |
|--------------------------|-------------------------|---------------|--------------|----------------------|-----|
| <b>Design</b>            | SURFACE FINAL           |               |              |                      |     |
| <b>Audit Notes:</b>      |                         |               |              |                      |     |
| <b>Version:</b>          | 1.0                     | <b>Phase:</b> | ACTUAL       | <b>Tie On Depth:</b> | 0.0 |
| <b>Vertical Section:</b> | <b>Depth From (TVD)</b> | <b>+N/-S</b>  | <b>+E/-W</b> | <b>Direction</b>     |     |
|                          | (ft)                    | (ft)          | (ft)         | (°)                  |     |
|                          | 0.0                     | 0.0           | 0.0          | 40.56                |     |

|                       |                |                          |                  |                    |  |
|-----------------------|----------------|--------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>    | 12/16/2013               |                  |                    |  |
| <b>From (ft)</b>      | <b>To (ft)</b> | <b>Survey (Wellbore)</b> | <b>Tool Name</b> | <b>Description</b> |  |
| 115.0                 | 1,210.0        | Survey #1 (OH)           | Geolink MWD      | Geolink MWD        |  |

|                            |                        |                    |                            |                   |                   |                              |                              |                             |                              |  |
|----------------------------|------------------------|--------------------|----------------------------|-------------------|-------------------|------------------------------|------------------------------|-----------------------------|------------------------------|--|
| <b>Survey</b>              |                        |                    |                            |                   |                   |                              |                              |                             |                              |  |
| <b>Measured Depth (ft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b> | <b>Vertical Section (ft)</b> | <b>Dogleg Rate (°/100ft)</b> | <b>Build Rate (°/100ft)</b> | <b>Formations / Comments</b> |  |
| 0.0                        | 0.00                   | 0.00               | 0.0                        | 0.0               | 0.0               | 0.0                          | 0.00                         | 0.00                        |                              |  |
| 115.0                      | 0.20                   | 297.90             | 115.0                      | 0.1               | -0.2              | 0.0                          | 0.17                         | 0.17                        |                              |  |
| 176.0                      | 0.20                   | 218.80             | 176.0                      | 0.1               | -0.3              | -0.2                         | 0.42                         | 0.00                        |                              |  |
| 206.0                      | 0.10                   | 248.30             | 206.0                      | 0.0               | -0.4              | -0.2                         | 0.41                         | -0.33                       |                              |  |
| 267.0                      | 0.10                   | 320.40             | 267.0                      | 0.0               | -0.5              | -0.3                         | 0.19                         | 0.00                        |                              |  |
| 297.0                      | 0.60                   | 11.80              | 297.0                      | 0.2               | -0.5              | -0.1                         | 1.81                         | 1.67                        |                              |  |
| 327.0                      | 1.30                   | 20.00              | 327.0                      | 0.7               | -0.3              | 0.3                          | 2.37                         | 2.33                        |                              |  |
| 388.0                      | 2.30                   | 41.40              | 388.0                      | 2.2               | 0.7               | 2.2                          | 1.95                         | 1.64                        |                              |  |
| 419.0                      | 3.00                   | 44.60              | 418.9                      | 3.3               | 1.7               | 3.6                          | 2.31                         | 2.26                        |                              |  |
| 449.0                      | 3.50                   | 47.50              | 448.9                      | 4.5               | 2.9               | 5.3                          | 1.75                         | 1.67                        |                              |  |
| 480.0                      | 4.30                   | 46.60              | 479.8                      | 5.9               | 4.5               | 7.4                          | 2.59                         | 2.58                        |                              |  |
| 510.0                      | 5.20                   | 54.10              | 509.7                      | 7.5               | 6.4               | 9.8                          | 3.64                         | 3.00                        |                              |  |
| 540.0                      | 5.80                   | 50.40              | 539.6                      | 9.2               | 8.7               | 12.7                         | 2.32                         | 2.00                        |                              |  |

# Cathedral Energy Services

## Survey Report

|                  |                            |                                     |                                    |
|------------------|----------------------------|-------------------------------------|------------------------------------|
| <b>Company:</b>  | EnCana Oil & Gas (USA) Inc | <b>Local Co-ordinate Reference:</b> | Well Rose 22-2C                    |
| <b>Project:</b>  | Mamm Creek                 | <b>TVD Reference:</b>               | KB=22' @ 6967.0ft (Patterson #303) |
| <b>Site:</b>     | K22W Pad                   | <b>MD Reference:</b>                | KB=22' @ 6967.0ft (Patterson #303) |
| <b>Well:</b>     | Rose 22-2C                 | <b>North Reference:</b>             | True                               |
| <b>Wellbore:</b> | OH                         | <b>Survey Calculation Method:</b>   | Minimum Curvature                  |
| <b>Design:</b>   | SURFACE FINAL              | <b>Database:</b>                    | USA EDM 5000 Multi Users DB        |

| Survey              |                 |             |                     |            |            |                       |                       |                      |   |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Formations / Comments   |
| 601.0               | 7.60            | 51.80       | 600.2               | 13.7       | 14.2       | 19.7                  | 2.96                  | 2.95                 |   |
| 662.0               | 9.40            | 49.00       | 660.5               | 19.5       | 21.1       | 28.5                  | 3.03                  | 2.95                 |   |
| 753.0               | 11.30           | 42.40       | 750.0               | 30.9       | 32.8       | 44.8                  | 2.46                  | 2.09                 |   |
| 844.0               | 12.60           | 34.10       | 839.0               | 45.7       | 44.3       | 63.6                  | 2.36                  | 1.43                 |   |
| 934.0               | 14.10           | 24.60       | 926.6               | 63.8       | 54.4       | 83.9                  | 2.95                  | 1.67                 |   |
| 1,025.0             | 16.60           | 15.90       | 1,014.4             | 86.4       | 62.6       | 106.4                 | 3.73                  | 2.75                 |   |
| 1,117.0             | 18.40           | 15.80       | 1,102.1             | 113.0      | 70.1       | 131.5                 | 1.96                  | 1.96                 |   |
| 1,145.0             | 18.50           | 15.60       | 1,128.7             | 121.6      | 72.5       | 139.5                 | 0.42                  | 0.36                 | Last Cathedral Survey @ 1,145' MD<br>Projection to Bit @ 1,210' |
| 1,210.0             | 18.50           | 15.60       | 1,190.3             | 141.4      | 78.1       | 158.2                 | 0.00                  | 0.00                 |   |

| Targets   |               |              |          |            |            |               |              |           |             |
|---|---------------|--------------|----------|------------|------------|---------------|--------------|-----------|-------------|
| Target Name   | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude  | Longitude   |
| Rose 22-2C TGT  | 0.00          | 0.00         | 6,969.0  | 1,760.0    | 650.5      | 1,591,405.23  | 2,361,960.85 | 39.435383 | -107.759247 |
| - hit/miss target   |               |              |          |            |            |               |              |           |             |
| - Shape   |               |              |          |            |            |               |              |           |             |
| - actual wellpath misses target center by 6028.3ft at 1210.0ft MD (1190.3 TVD, 141.4 N, 78.1 E) |               |              |          |            |            |               |              |           |             |
| - Circle (radius 25.0)  |               |              |          |            |            |               |              |           |             |
| Rose 22-2C PBHL 1046'   | 0.00          | 0.00         | 10,002.0 | 1,760.0    | 650.5      | 1,591,405.23  | 2,361,960.85 | 39.435383 | -107.759247 |
| - actual wellpath misses target center by 8977.4ft at 1210.0ft MD (1190.3 TVD, 141.4 N, 78.1 E) |               |              |          |            |            |               |              |           |             |
| - Circle (radius 50.0)  |               |              |          |            |            |               |              |           |             |

| Design Annotations  |                     |                   |            |                                   |  |
|---------------------|---------------------|-------------------|------------|-----------------------------------|--|
| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment                           |  |
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                                   |  |
| 1,145.0             | 1,128.7             | 121.6             | 72.5       | Last Cathedral Survey @ 1,145' MD |  |
| 1,210.0             | 1,190.3             | 141.4             | 78.1       | Projection to Bit @ 1,210'        |  |

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