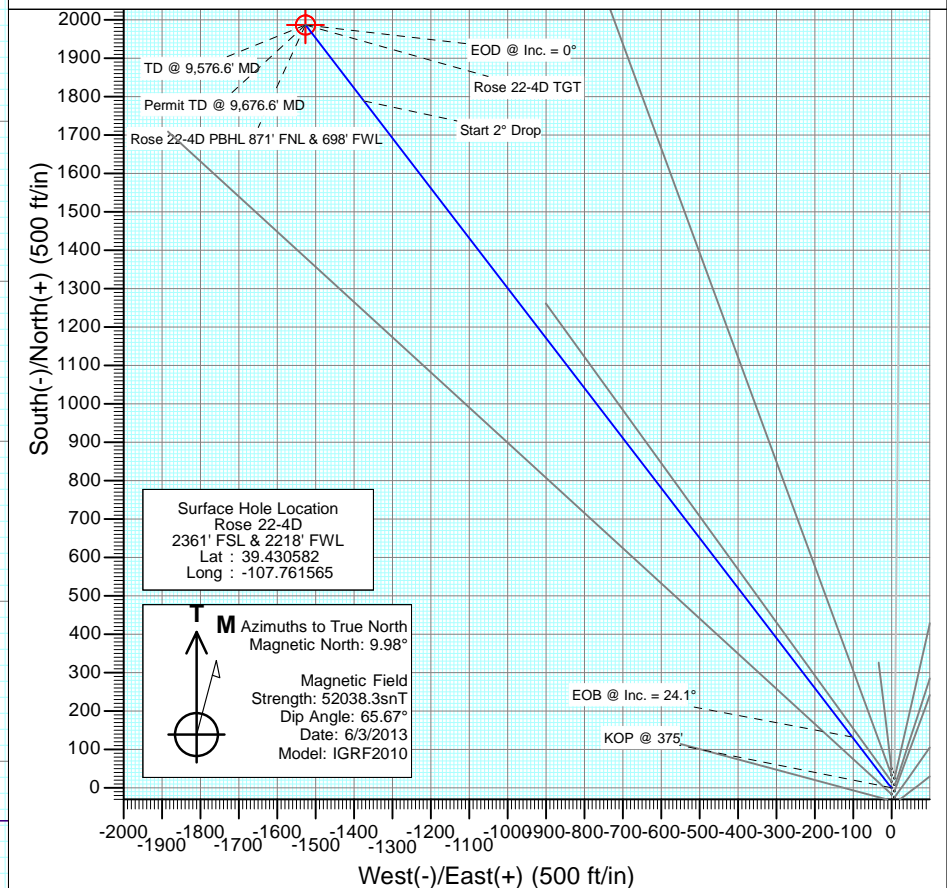


SECTION DETAILS

| Sec | MD     | Inc   | Azi    | TVD    | +N/-S  | +E/-W   | Dleg | TFace  | VSEct  | Target                              |
|-----|--------|-------|--------|--------|--------|---------|------|--------|--------|-------------------------------------|
| 1   | 0.0    | 0.00  | 0.00   | 0.0    | 0.0    | 0.0     | 0.00 | 0.00   | 0.0    |                                     |
| 2   | 375.0  | 0.00  | 0.00   | 375.0  | 0.0    | 0.0     | 0.00 | 0.00   | 0.0    |                                     |
| 3   | 1178.4 | 24.10 | 322.47 | 1154.9 | 132.0  | -101.4  | 3.00 | 322.47 | 166.5  |                                     |
| 4   | 6293.6 | 24.10 | 322.47 | 5824.1 | 1788.5 | -1373.9 | 0.00 | 0.00   | 2255.3 |                                     |
| 5   | 7498.6 | 0.00  | 0.00   | 6994.0 | 1986.6 | -1526.0 | 2.00 | 180.00 | 2505.1 | Rose 22-4D TGT                      |
| 6   | 9576.6 | 0.00  | 0.00   | 9072.0 | 1986.6 | -1526.0 | 0.00 | 0.00   | 2505.1 | Rose 22-4D PBHL 871' FNL & 698' FWL |
| 7   | 9676.6 | 0.00  | 0.00   | 9172.0 | 1986.6 | -1526.0 | 0.00 | 0.00   | 2505.1 |                                     |



DESIGN TARGET DETAILS

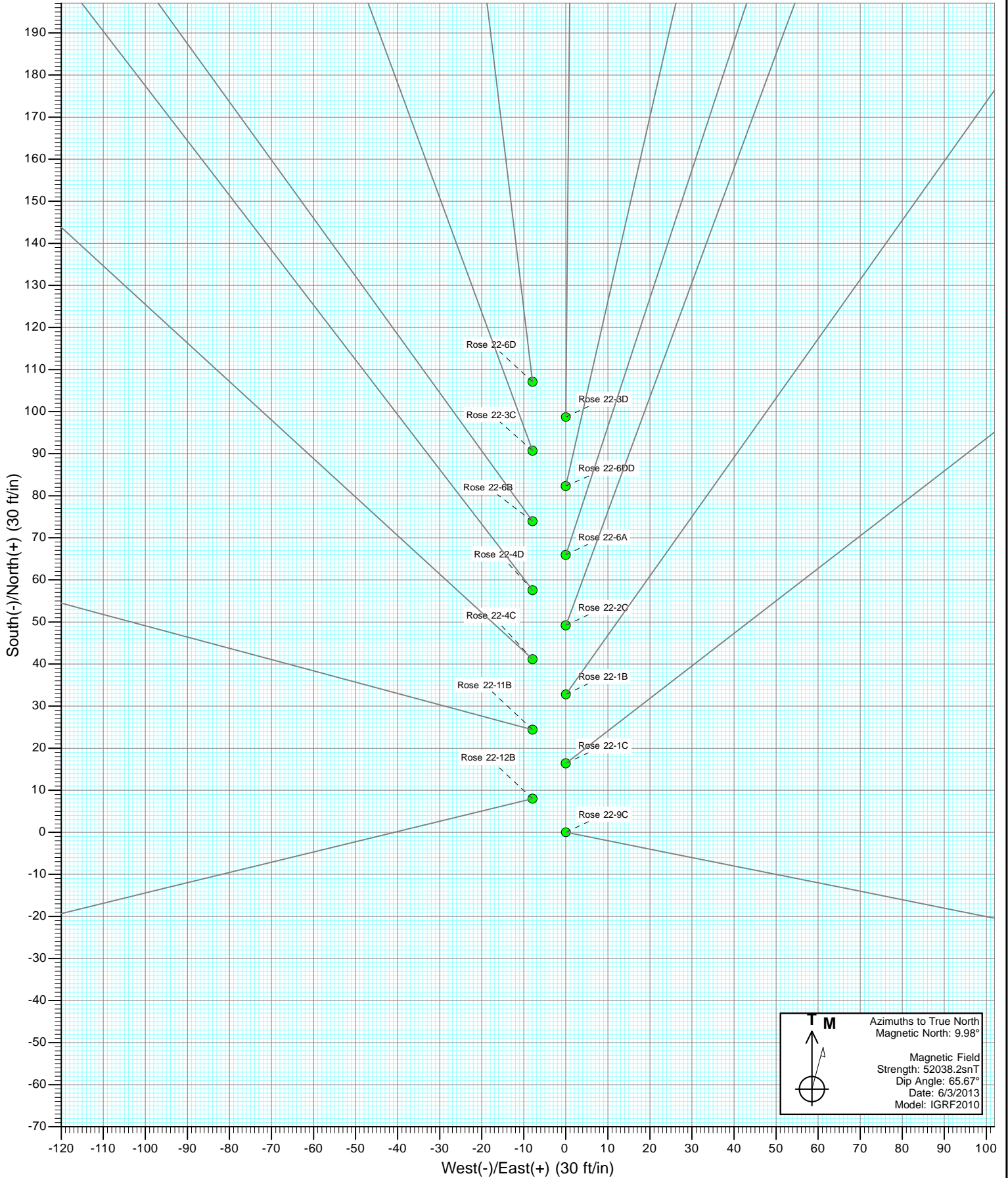
| Name                                | +N/-S  | +E/-W   | Northing   | Easting    | Latitude  | Longitude   |
|-------------------------------------|--------|---------|------------|------------|-----------|-------------|
| Rose 22-4D TGT                      | 1986.6 | -1526.0 | 1591697.32 | 2359786.71 | 39.436036 | -107.766968 |
| Rose 22-4D PBHL 871' FNL & 698' FWL | 1986.6 | -1526.0 | 1591697.32 | 2359786.71 | 39.436036 | -107.766968 |

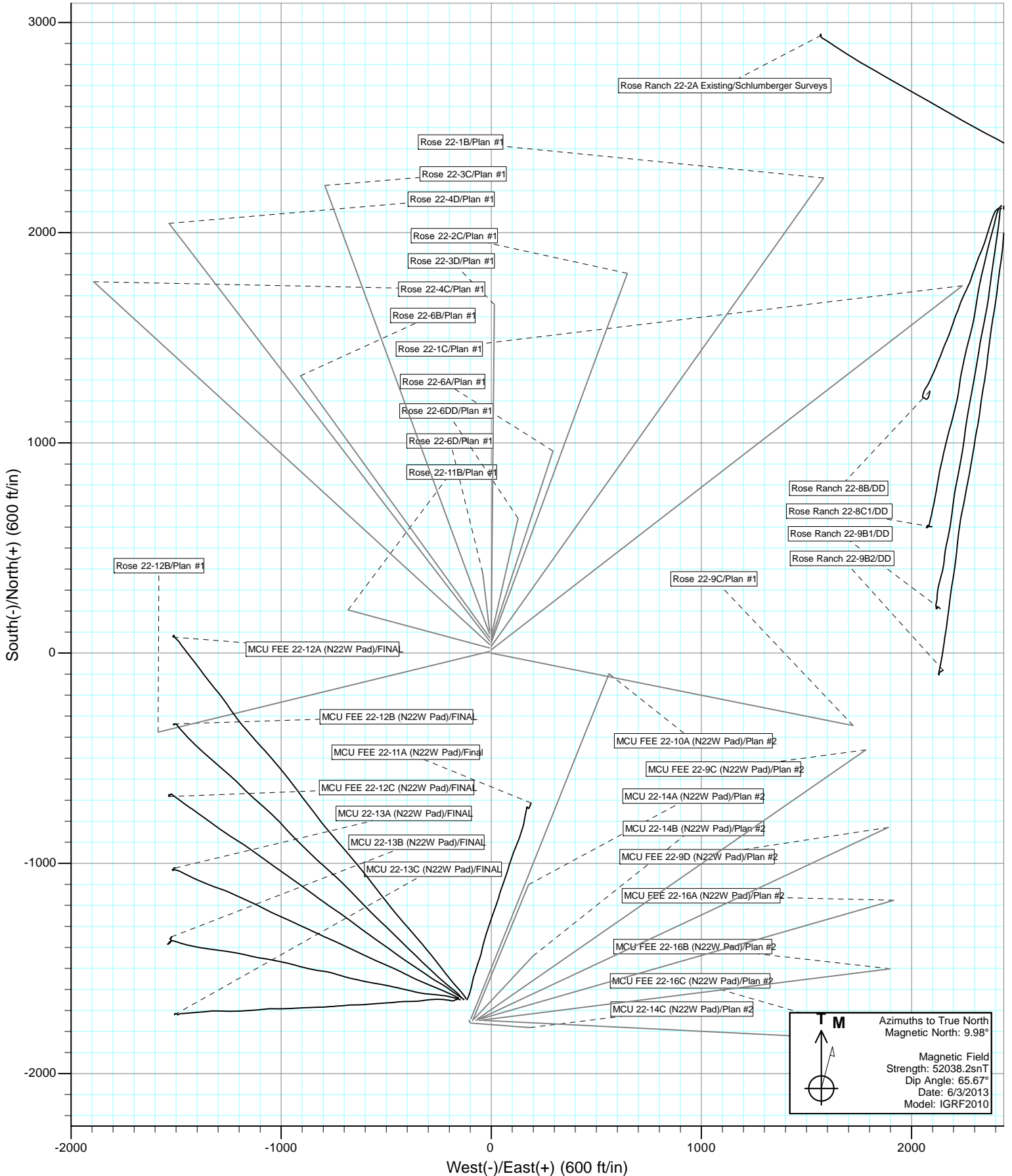
FORMATION TOP DETAILS

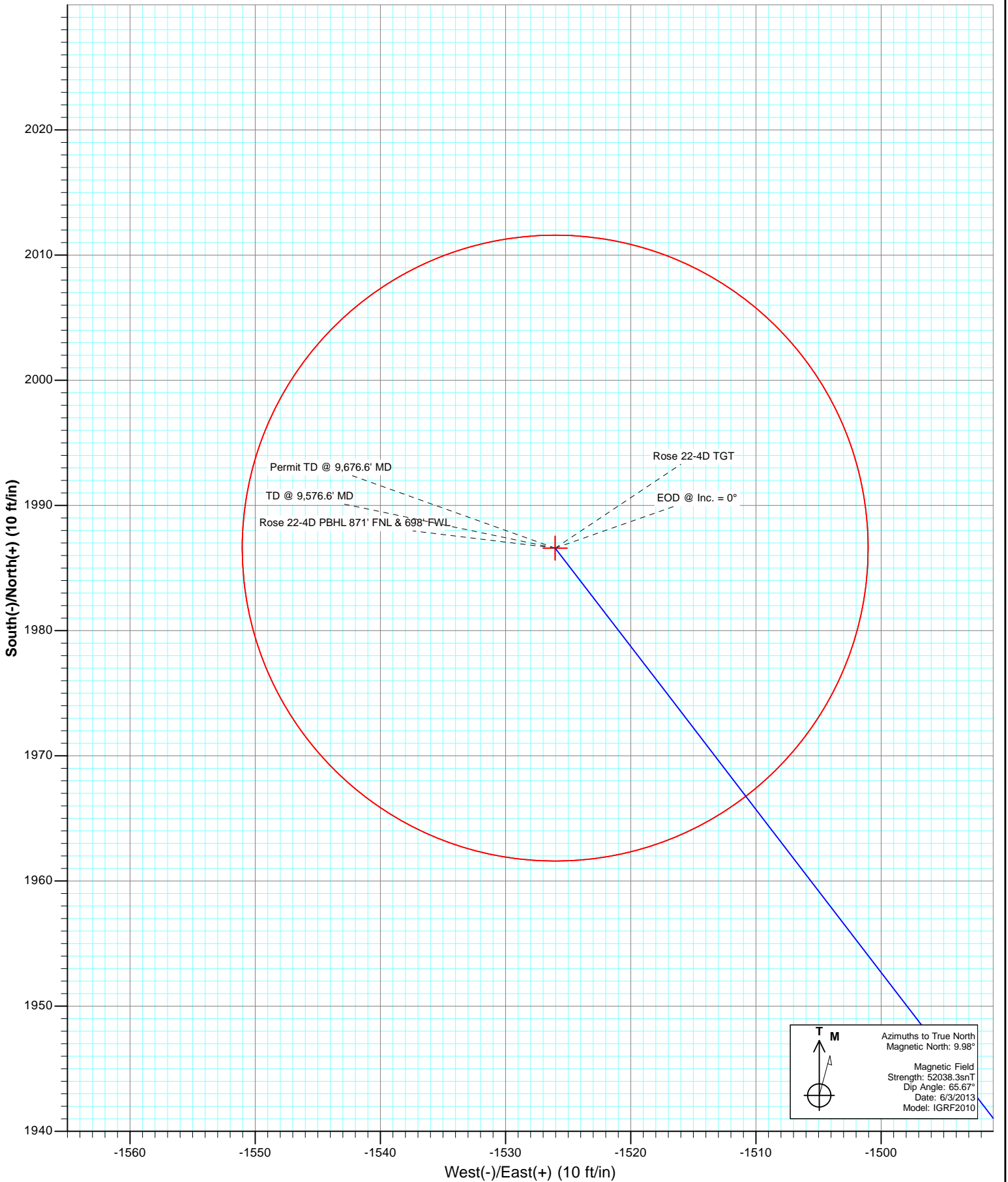
| TVDPath | MDPath | Formation        |
|---------|--------|------------------|
| 5372.0  | 5798.2 | Ohio Creek       |
| 5372.0  | 5798.2 | Top of Mesaverde |
| 5969.0  | 6450.4 | Williams Fork    |
| 6994.0  | 7498.6 | Top Gas          |
| 8071.0  | 8575.6 | Coal Ridge       |
| 8922.0  | 9426.6 | Rollins          |

Plan #1  
 Rose 22-4D  
 135XXX; SC  
 KB=22' @ 6972.0ft (Patterson #303)  
 Ground Elevation @ 6950.0  
 North American Datum 1983  
 Well Rose 22-4D, True North

Vertical Section at 322.47° (1200 ft/in)







# Cathedral Energy Services

## Planning Report

|  |  |
|--|--|
| <b>Database:</b> USA EDM 5000 Multi Users DB | <b>Local Co-ordinate Reference:</b> Well Rose 22-4D      |
| <b>Company:</b> EnCana Oil & Gas (USA) Inc   | <b>TVD Reference:</b> KB=22' @ 6972.0ft (Patterson #303) |
| <b>Project:</b> Mamm Creek                   | <b>MD Reference:</b> KB=22' @ 6972.0ft (Patterson #303)  |
| <b>Site:</b> K22W Pad                        | <b>North Reference:</b> True                             |
| <b>Well:</b> Rose 22-4D                      | <b>Survey Calculation Method:</b> Minimum Curvature      |
| <b>Wellbore:</b> OH                          |  |
| <b>Design:</b> Plan #1                       |  |

|   |                                     |  |
|---|-------------------------------------|--|
| <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      |                                     |  |

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

|                             |              |        |                            |                 |                      |             |
|-----------------------------|--------------|--------|----------------------------|-----------------|----------------------|-------------|
| <b>Well</b> Rose 22-4D      |              |        |                            |                 |                      |             |
| <b>Well Position</b>        | <b>+N/-S</b> | 0.0 ft | <b>Northing:</b>           | 1,589,673.36 ft | <b>Latitude:</b>     | 39.430582   |
|                             | <b>+E/-W</b> | 0.0 ft | <b>Easting:</b>            | 2,361,262.82 ft | <b>Longitude:</b>    | -107.761565 |
| <b>Position Uncertainty</b> |              | 0.0 ft | <b>Wellhead Elevation:</b> | ft              | <b>Ground Level:</b> | 6,950.0 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</b> |
|                    | IGRF2010          | 6/3/2013           | (°)                | (°)              | (nT)                  |
|                    |                   |                    | 9.98               | 65.67            | 52,038                |

|                          |                         |              |                      |                  |  |
|--------------------------|-------------------------|--------------|----------------------|------------------|--|
| <b>Design</b> Plan #1    |                         |              |                      |                  |  |
| <b>Audit Notes:</b>      |                         |              |                      |                  |  |
| <b>Version:</b>          | <b>Phase:</b>           | PLAN         | <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                  | 322.47           |  |

| <b>Plan Sections</b> |                 |             |                     |            |            |                       |                      |                     |         |                    |
|----------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|----------------------|---------------------|---------|--------------------|
| Measured Depth (ft)  | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | TFO (°) | Target             |
| 0.0                  | 0.00            | 0.00        | 0.0                 | 0.0        | 0.0        | 0.00                  | 0.00                 | 0.00                | 0.00    |                    |
| 375.0                | 0.00            | 0.00        | 375.0               | 0.0        | 0.0        | 0.00                  | 0.00                 | 0.00                | 0.00    |                    |
| 1,178.4              | 24.10           | 322.47      | 1,154.9             | 132.0      | -101.4     | 3.00                  | 3.00                 | 0.00                | 322.47  |                    |
| 6,293.6              | 24.10           | 322.47      | 5,824.1             | 1,788.5    | -1,373.9   | 0.00                  | 0.00                 | 0.00                | 0.00    |                    |
| 7,498.6              | 0.00            | 0.00        | 6,994.0             | 1,986.6    | -1,526.0   | 2.00                  | -2.00                | 0.00                | 180.00  | Rose 22-4D TGT     |
| 9,576.6              | 0.00            | 0.00        | 9,072.0             | 1,986.6    | -1,526.0   | 0.00                  | 0.00                 | 0.00                | 0.00    | Rose 22-4D PBHL 87 |
| 9,676.6              | 0.00            | 0.00        | 9,172.0             | 1,986.6    | -1,526.0   | 0.00                  | 0.00                 | 0.00                | 0.00    |                    |

# Cathedral Energy Services

## Planning Report

|                  |                             |                                     |                                    |
|------------------|-----------------------------|-------------------------------------|------------------------------------|
| <b>Database:</b> | USA EDM 5000 Multi Users DB | <b>Local Co-ordinate Reference:</b> | Well Rose 22-4D                    |
| <b>Company:</b>  | EnCana Oil & Gas (USA) Inc  | <b>TVD Reference:</b>               | KB=22' @ 6972.0ft (Patterson #303) |
| <b>Project:</b>  | Mamm Creek                  | <b>MD Reference:</b>                | KB=22' @ 6972.0ft (Patterson #303) |
| <b>Site:</b>     | K22W Pad                    | <b>North Reference:</b>             | True                               |
| <b>Well:</b>     | Rose 22-4D                  | <b>Survey Calculation Method:</b>   | Minimum Curvature                  |
| <b>Wellbore:</b> | OH                          |                                     |                                    |
| <b>Design:</b>   | Plan #1                     |                                     |                                    |

### Planned Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|-----------------------|
| 0.0                 | 0.00            | 0.00        | 0.0                 | 0.0        | 0.0        | 0.0                   | 0.00                  | 0.00                 |                       |
| 100.0               | 0.00            | 0.00        | 100.0               | 0.0        | 0.0        | 0.0                   | 0.00                  | 0.00                 |                       |
| 200.0               | 0.00            | 0.00        | 200.0               | 0.0        | 0.0        | 0.0                   | 0.00                  | 0.00                 |                       |
| 300.0               | 0.00            | 0.00        | 300.0               | 0.0        | 0.0        | 0.0                   | 0.00                  | 0.00                 |                       |
| 375.0               | 0.00            | 0.00        | 375.0               | 0.0        | 0.0        | 0.0                   | 0.00                  | 0.00                 | KOP @ 375'            |
| 400.0               | 0.75            | 322.47      | 400.0               | 0.1        | -0.1       | 0.2                   | 3.00                  | 3.00                 |                       |
| 500.0               | 3.75            | 322.47      | 499.9               | 3.2        | -2.5       | 4.1                   | 3.00                  | 3.00                 |                       |
| 600.0               | 6.75            | 322.47      | 599.5               | 10.5       | -8.1       | 13.2                  | 3.00                  | 3.00                 |                       |
| 700.0               | 9.75            | 322.47      | 698.4               | 21.9       | -16.8      | 27.6                  | 3.00                  | 3.00                 |                       |
| 800.0               | 12.75           | 322.47      | 796.5               | 37.3       | -28.7      | 47.1                  | 3.00                  | 3.00                 |                       |
| 900.0               | 15.75           | 322.47      | 893.4               | 56.9       | -43.7      | 71.7                  | 3.00                  | 3.00                 |                       |
| 1,000.0             | 18.75           | 322.47      | 988.9               | 80.4       | -61.7      | 101.4                 | 3.00                  | 3.00                 |                       |
| 1,100.0             | 21.75           | 322.47      | 1,082.7             | 107.8      | -82.8      | 136.0                 | 3.00                  | 3.00                 |                       |
| 1,178.4             | 24.10           | 322.47      | 1,154.9             | 132.0      | -101.4     | 166.5                 | 3.00                  | 3.00                 | EOB @ Inc. = 24.1°    |
| 1,200.0             | 24.10           | 322.47      | 1,174.6             | 139.0      | -106.8     | 175.3                 | 0.00                  | 0.00                 |                       |
| 1,278.4             | 24.10           | 322.47      | 1,246.2             | 164.4      | -126.3     | 207.3                 | 0.00                  | 0.00                 | Surface Casing        |
| 1,300.0             | 24.10           | 322.47      | 1,265.9             | 171.4      | -131.7     | 216.2                 | 0.00                  | 0.00                 |                       |
| 1,400.0             | 24.10           | 322.47      | 1,357.2             | 203.8      | -156.6     | 257.0                 | 0.00                  | 0.00                 |                       |
| 1,500.0             | 24.10           | 322.47      | 1,448.5             | 236.2      | -181.4     | 297.8                 | 0.00                  | 0.00                 |                       |
| 1,600.0             | 24.10           | 322.47      | 1,539.8             | 268.6      | -206.3     | 338.7                 | 0.00                  | 0.00                 |                       |
| 1,700.0             | 24.10           | 322.47      | 1,631.0             | 301.0      | -231.2     | 379.5                 | 0.00                  | 0.00                 |                       |
| 1,800.0             | 24.10           | 322.47      | 1,722.3             | 333.3      | -256.1     | 420.3                 | 0.00                  | 0.00                 |                       |
| 1,900.0             | 24.10           | 322.47      | 1,813.6             | 365.7      | -280.9     | 461.2                 | 0.00                  | 0.00                 |                       |
| 2,000.0             | 24.10           | 322.47      | 1,904.9             | 398.1      | -305.8     | 502.0                 | 0.00                  | 0.00                 |                       |
| 2,100.0             | 24.10           | 322.47      | 1,996.2             | 430.5      | -330.7     | 542.8                 | 0.00                  | 0.00                 |                       |
| 2,200.0             | 24.10           | 322.47      | 2,087.5             | 462.9      | -355.6     | 583.7                 | 0.00                  | 0.00                 |                       |
| 2,300.0             | 24.10           | 322.47      | 2,178.7             | 495.3      | -380.4     | 624.5                 | 0.00                  | 0.00                 |                       |
| 2,400.0             | 24.10           | 322.47      | 2,270.0             | 527.6      | -405.3     | 665.4                 | 0.00                  | 0.00                 |                       |
| 2,500.0             | 24.10           | 322.47      | 2,361.3             | 560.0      | -430.2     | 706.2                 | 0.00                  | 0.00                 |                       |
| 2,600.0             | 24.10           | 322.47      | 2,452.6             | 592.4      | -455.1     | 747.0                 | 0.00                  | 0.00                 |                       |
| 2,700.0             | 24.10           | 322.47      | 2,543.9             | 624.8      | -479.9     | 787.9                 | 0.00                  | 0.00                 |                       |
| 2,800.0             | 24.10           | 322.47      | 2,635.1             | 657.2      | -504.8     | 828.7                 | 0.00                  | 0.00                 |                       |
| 2,900.0             | 24.10           | 322.47      | 2,726.4             | 689.6      | -529.7     | 869.5                 | 0.00                  | 0.00                 |                       |
| 3,000.0             | 24.10           | 322.47      | 2,817.7             | 721.9      | -554.6     | 910.4                 | 0.00                  | 0.00                 |                       |
| 3,100.0             | 24.10           | 322.47      | 2,909.0             | 754.3      | -579.5     | 951.2                 | 0.00                  | 0.00                 |                       |
| 3,200.0             | 24.10           | 322.47      | 3,000.3             | 786.7      | -604.3     | 992.0                 | 0.00                  | 0.00                 |                       |
| 3,300.0             | 24.10           | 322.47      | 3,091.6             | 819.1      | -629.2     | 1,032.9               | 0.00                  | 0.00                 |                       |
| 3,400.0             | 24.10           | 322.47      | 3,182.8             | 851.5      | -654.1     | 1,073.7               | 0.00                  | 0.00                 |                       |
| 3,500.0             | 24.10           | 322.47      | 3,274.1             | 883.9      | -679.0     | 1,114.5               | 0.00                  | 0.00                 |                       |
| 3,600.0             | 24.10           | 322.47      | 3,365.4             | 916.3      | -703.8     | 1,155.4               | 0.00                  | 0.00                 |                       |
| 3,700.0             | 24.10           | 322.47      | 3,456.7             | 948.6      | -728.7     | 1,196.2               | 0.00                  | 0.00                 |                       |
| 3,800.0             | 24.10           | 322.47      | 3,548.0             | 981.0      | -753.6     | 1,237.1               | 0.00                  | 0.00                 |                       |
| 3,900.0             | 24.10           | 322.47      | 3,639.3             | 1,013.4    | -778.5     | 1,277.9               | 0.00                  | 0.00                 |                       |
| 4,000.0             | 24.10           | 322.47      | 3,730.5             | 1,045.8    | -803.3     | 1,318.7               | 0.00                  | 0.00                 |                       |
| 4,100.0             | 24.10           | 322.47      | 3,821.8             | 1,078.2    | -828.2     | 1,359.6               | 0.00                  | 0.00                 |                       |
| 4,200.0             | 24.10           | 322.47      | 3,913.1             | 1,110.6    | -853.1     | 1,400.4               | 0.00                  | 0.00                 |                       |
| 4,300.0             | 24.10           | 322.47      | 4,004.4             | 1,142.9    | -878.0     | 1,441.2               | 0.00                  | 0.00                 |                       |
| 4,400.0             | 24.10           | 322.47      | 4,095.7             | 1,175.3    | -902.8     | 1,482.1               | 0.00                  | 0.00                 |                       |
| 4,500.0             | 24.10           | 322.47      | 4,186.9             | 1,207.7    | -927.7     | 1,522.9               | 0.00                  | 0.00                 |                       |
| 4,600.0             | 24.10           | 322.47      | 4,278.2             | 1,240.1    | -952.6     | 1,563.7               | 0.00                  | 0.00                 |                       |
| 4,700.0             | 24.10           | 322.47      | 4,369.5             | 1,272.5    | -977.5     | 1,604.6               | 0.00                  | 0.00                 |                       |
| 4,800.0             | 24.10           | 322.47      | 4,460.8             | 1,304.9    | -1,002.3   | 1,645.4               | 0.00                  | 0.00                 |                       |

# Cathedral Energy Services

## Planning Report

|                  |                             |                                     |                                    |
|------------------|-----------------------------|-------------------------------------|------------------------------------|
| <b>Database:</b> | USA EDM 5000 Multi Users DB | <b>Local Co-ordinate Reference:</b> | Well Rose 22-4D                    |
| <b>Company:</b>  | EnCana Oil & Gas (USA) Inc  | <b>TVD Reference:</b>               | KB=22' @ 6972.0ft (Patterson #303) |
| <b>Project:</b>  | Mamm Creek                  | <b>MD Reference:</b>                | KB=22' @ 6972.0ft (Patterson #303) |
| <b>Site:</b>     | K22W Pad                    | <b>North Reference:</b>             | True                               |
| <b>Well:</b>     | Rose 22-4D                  | <b>Survey Calculation Method:</b>   | Minimum Curvature                  |
| <b>Wellbore:</b> | OH                          |                                     |                                    |
| <b>Design:</b>   | Plan #1                     |                                     |                                    |

| Planned Survey      |                 |             |                     |            |            |                       |                       |                      |                               |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|-------------------------------|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations         |
| 4,900.0             | 24.10           | 322.47      | 4,552.1             | 1,337.2    | -1,027.2   | 1,686.2               | 0.00                  | 0.00                 |                               |
| 5,000.0             | 24.10           | 322.47      | 4,643.4             | 1,369.6    | -1,052.1   | 1,727.1               | 0.00                  | 0.00                 |                               |
| 5,100.0             | 24.10           | 322.47      | 4,734.6             | 1,402.0    | -1,077.0   | 1,767.9               | 0.00                  | 0.00                 |                               |
| 5,200.0             | 24.10           | 322.47      | 4,825.9             | 1,434.4    | -1,101.9   | 1,808.8               | 0.00                  | 0.00                 |                               |
| 5,300.0             | 24.10           | 322.47      | 4,917.2             | 1,466.8    | -1,126.7   | 1,849.6               | 0.00                  | 0.00                 |                               |
| 5,400.0             | 24.10           | 322.47      | 5,008.5             | 1,499.2    | -1,151.6   | 1,890.4               | 0.00                  | 0.00                 |                               |
| 5,500.0             | 24.10           | 322.47      | 5,099.8             | 1,531.6    | -1,176.5   | 1,931.3               | 0.00                  | 0.00                 |                               |
| 5,600.0             | 24.10           | 322.47      | 5,191.0             | 1,563.9    | -1,201.4   | 1,972.1               | 0.00                  | 0.00                 |                               |
| 5,700.0             | 24.10           | 322.47      | 5,282.3             | 1,596.3    | -1,226.2   | 2,012.9               | 0.00                  | 0.00                 |                               |
| 5,798.2             | 24.10           | 322.47      | 5,372.0             | 1,628.1    | -1,250.7   | 2,053.0               | 0.00                  | 0.00                 | Top of Mesaverde - Ohio Creek |
| 5,800.0             | 24.10           | 322.47      | 5,373.6             | 1,628.7    | -1,251.1   | 2,053.8               | 0.00                  | 0.00                 |                               |
| 5,900.0             | 24.10           | 322.47      | 5,464.9             | 1,661.1    | -1,276.0   | 2,094.6               | 0.00                  | 0.00                 |                               |
| 6,000.0             | 24.10           | 322.47      | 5,556.2             | 1,693.5    | -1,300.9   | 2,135.4               | 0.00                  | 0.00                 |                               |
| 6,100.0             | 24.10           | 322.47      | 5,647.5             | 1,725.9    | -1,325.7   | 2,176.3               | 0.00                  | 0.00                 |                               |
| 6,200.0             | 24.10           | 322.47      | 5,738.7             | 1,758.2    | -1,350.6   | 2,217.1               | 0.00                  | 0.00                 |                               |
| 6,293.6             | 24.10           | 322.47      | 5,824.1             | 1,788.5    | -1,373.9   | 2,255.3               | 0.00                  | 0.00                 | Start 2° Drop                 |
| 6,300.0             | 23.97           | 322.47      | 5,830.0             | 1,790.6    | -1,375.5   | 2,257.9               | 2.00                  | -2.00                |                               |
| 6,400.0             | 21.97           | 322.47      | 5,922.1             | 1,821.6    | -1,399.3   | 2,297.0               | 2.00                  | -2.00                |                               |
| 6,450.4             | 20.96           | 322.47      | 5,969.0             | 1,836.2    | -1,410.5   | 2,315.4               | 2.00                  | -2.00                | Williams Fork                 |
| 6,500.0             | 19.97           | 322.47      | 6,015.5             | 1,850.0    | -1,421.1   | 2,332.8               | 2.00                  | -2.00                |                               |
| 6,600.0             | 17.97           | 322.47      | 6,110.0             | 1,875.7    | -1,440.9   | 2,365.3               | 2.00                  | -2.00                |                               |
| 6,700.0             | 15.97           | 322.47      | 6,205.7             | 1,898.9    | -1,458.7   | 2,394.5               | 2.00                  | -2.00                |                               |
| 6,800.0             | 13.97           | 322.47      | 6,302.3             | 1,919.4    | -1,474.4   | 2,420.3               | 2.00                  | -2.00                |                               |
| 6,900.0             | 11.97           | 322.47      | 6,399.7             | 1,937.2    | -1,488.1   | 2,442.7               | 2.00                  | -2.00                |                               |
| 7,000.0             | 9.97            | 322.47      | 6,497.9             | 1,952.3    | -1,499.7   | 2,461.8               | 2.00                  | -2.00                |                               |
| 7,100.0             | 7.97            | 322.47      | 6,596.6             | 1,964.6    | -1,509.2   | 2,477.4               | 2.00                  | -2.00                |                               |
| 7,200.0             | 5.97            | 322.47      | 6,695.9             | 1,974.3    | -1,516.6   | 2,489.5               | 2.00                  | -2.00                |                               |
| 7,300.0             | 3.97            | 322.47      | 6,795.5             | 1,981.1    | -1,521.8   | 2,498.2               | 2.00                  | -2.00                |                               |
| 7,400.0             | 1.97            | 322.47      | 6,895.4             | 1,985.2    | -1,525.0   | 2,503.4               | 2.00                  | -2.00                |                               |
| 7,498.6             | 0.00            | 0.00        | 6,994.0             | 1,986.6    | -1,526.0   | 2,505.1               | 2.00                  | -2.00                | EOD @ Inc. = 0° - Top Gas     |
| 7,500.0             | 0.00            | 0.00        | 6,995.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 7,600.0             | 0.00            | 0.00        | 7,095.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 7,700.0             | 0.00            | 0.00        | 7,195.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 7,800.0             | 0.00            | 0.00        | 7,295.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 7,900.0             | 0.00            | 0.00        | 7,395.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,000.0             | 0.00            | 0.00        | 7,495.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,100.0             | 0.00            | 0.00        | 7,595.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,200.0             | 0.00            | 0.00        | 7,695.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,300.0             | 0.00            | 0.00        | 7,795.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,400.0             | 0.00            | 0.00        | 7,895.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,500.0             | 0.00            | 0.00        | 7,995.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,575.6             | 0.00            | 0.00        | 8,071.0             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 | Coal Ridge                    |
| 8,600.0             | 0.00            | 0.00        | 8,095.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,700.0             | 0.00            | 0.00        | 8,195.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,800.0             | 0.00            | 0.00        | 8,295.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 8,900.0             | 0.00            | 0.00        | 8,395.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,000.0             | 0.00            | 0.00        | 8,495.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,100.0             | 0.00            | 0.00        | 8,595.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,200.0             | 0.00            | 0.00        | 8,695.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,300.0             | 0.00            | 0.00        | 8,795.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,400.0             | 0.00            | 0.00        | 8,895.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                               |
| 9,426.6             | 0.00            | 0.00        | 8,922.0             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 | Rollins                       |

# Cathedral Energy Services

## Planning Report

**Database:** USA EDM 5000 Multi Users DB  
**Company:** EnCana Oil & Gas (USA) Inc  
**Project:** Mamm Creek  
**Site:** K22W Pad  
**Well:** Rose 22-4D  
**Wellbore:** OH  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well Rose 22-4D  
**TVD Reference:** KB=22' @ 6972.0ft (Patterson #303)  
**MD Reference:** KB=22' @ 6972.0ft (Patterson #303)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature

### Planned Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations   |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|-------------------------|
| 9,500.0             | 0.00            | 0.00        | 8,995.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                         |
| 9,576.6             | 0.00            | 0.00        | 9,072.0             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 | TD @ 9,576.6' MD        |
| 9,600.0             | 0.00            | 0.00        | 9,095.4             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 |                         |
| 9,676.6             | 0.00            | 0.00        | 9,172.0             | 1,986.6    | -1,526.0   | 2,505.1               | 0.00                  | 0.00                 | Permit TD @ 9,676.6' MD |

### Targets

| Target Name<br>- hit/miss target<br>- Shape                                   | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude  | Longitude   |
|---|---------------|--------------|----------|------------|------------|---------------|--------------|-----------|-------------|
| Rose 22-4D PBHL 871' I<br>- plan hits target center<br>- Circle (radius 25.0) | 0.00          | 0.00         | 9,072.0  | 1,986.6    | -1,526.0   | 1,591,697.32  | 2,359,786.71 | 39.436036 | -107.766968 |
| Rose 22-4D TGT<br>- plan hits target center<br>- Point                        | 0.00          | 0.00         | 6,994.0  | 1,986.6    | -1,526.0   | 1,591,697.32  | 2,359,786.71 | 39.436036 | -107.766968 |

### Casing Points

| Measured Depth (ft) | Vertical Depth (ft) | Name           | Casing Diameter (in) | Hole Diameter (in) |
|---------------------|---------------------|----------------|----------------------|--------------------|
| 1,278.4             | 1,246.2             | Surface Casing |                      |                    |

### Formations

| Measured Depth (ft) | Vertical Depth (ft) | Name             | Lithology | Dip (°) | Dip Direction (°) |
|---------------------|---------------------|------------------|-----------|---------|-------------------|
| 5,798.2             | 5,372.0             | Top of Mesaverde |           |         |                   |
| 5,798.2             | 5,372.0             | Ohio Creek       |           |         |                   |
| 6,450.4             | 5,969.0             | Williams Fork    |           |         |                   |
| 7,498.6             | 6,994.0             | Top Gas          |           |         |                   |
| 8,575.6             | 8,071.0             | Coal Ridge       |           |         |                   |
| 9,426.6             | 8,922.0             | Rollins          |           |         |                   |

### Plan Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment                 |
|---------------------|---------------------|-------------------|------------|-------------------------|
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                         |
| 375.0               | 375.0               | 0.0               | 0.0        | KOP @ 375'              |
| 1,178.4             | 1,154.9             | 132.0             | -101.4     | EOB @ Inc. = 24.1°      |
| 6,293.6             | 5,824.1             | 1,788.5           | -1,373.9   | Start 2° Drop           |
| 7,498.6             | 6,994.0             | 1,986.6           | -1,526.0   | EOD @ Inc. = 0°         |
| 9,576.6             | 9,072.0             | 1,986.6           | -1,526.0   | TD @ 9,576.6' MD        |
| 9,676.6             | 9,172.0             | 1,986.6           | -1,526.0   | Permit TD @ 9,676.6' MD |