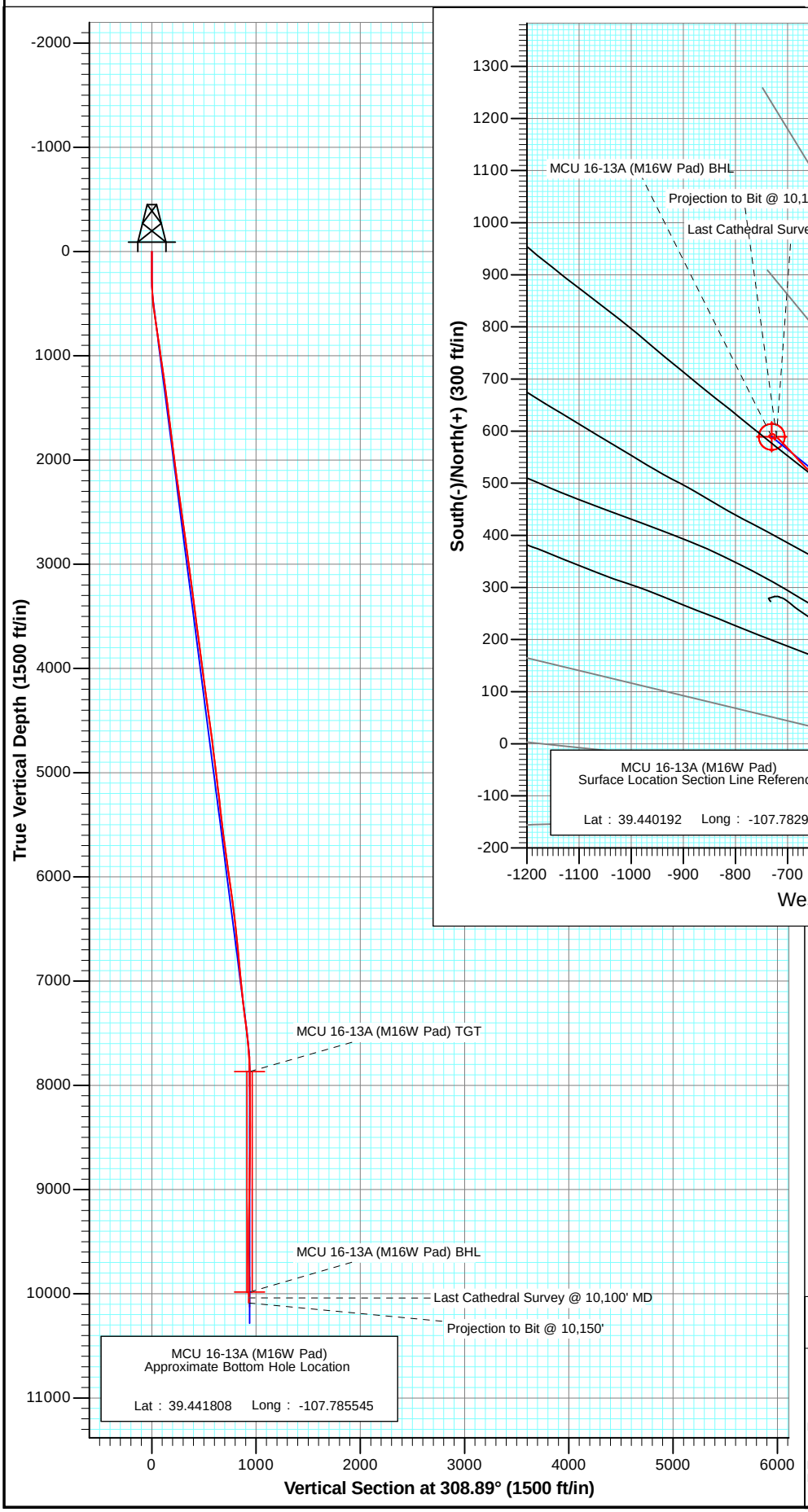
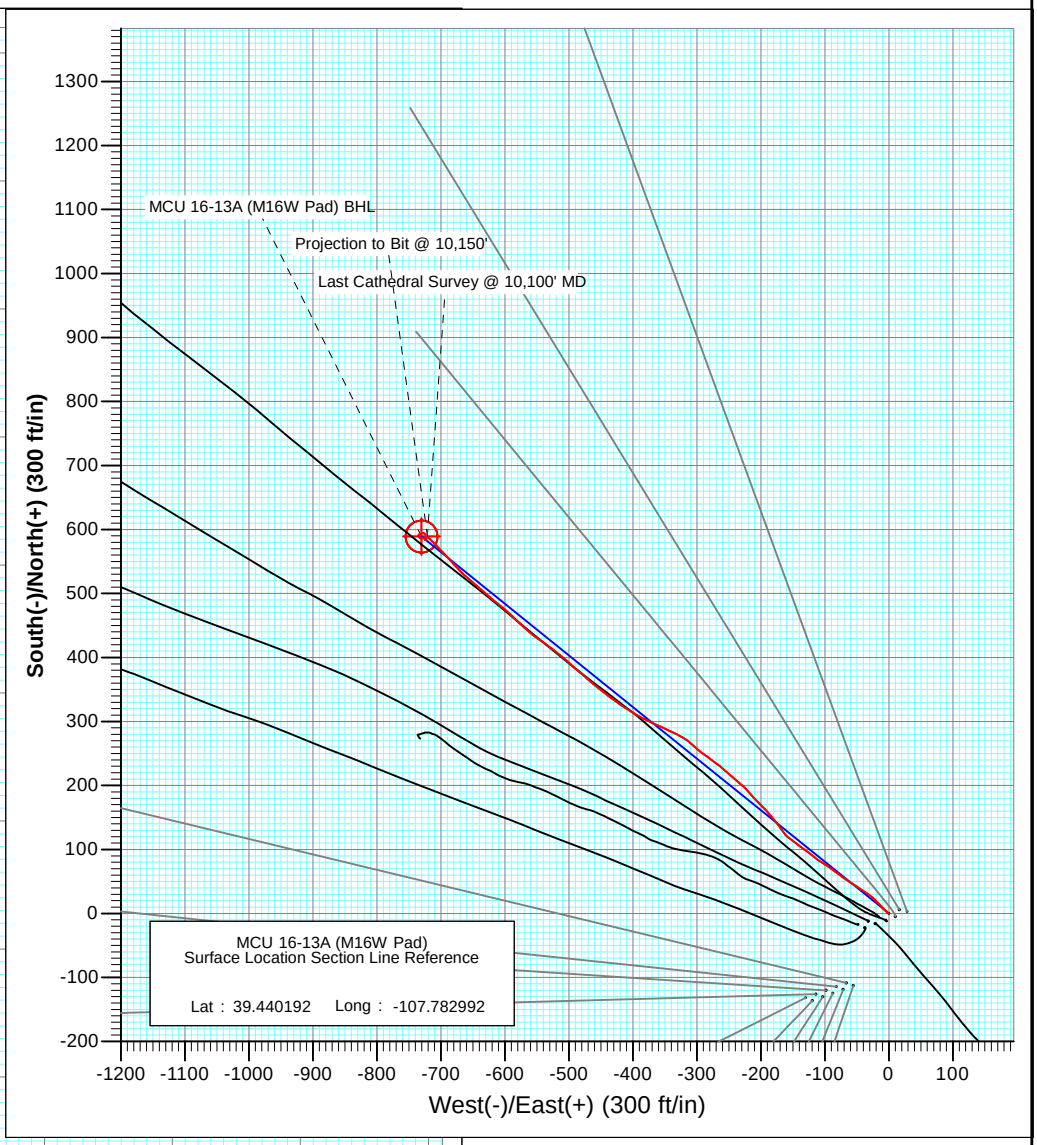
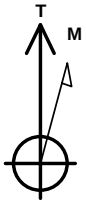
encana natural gas

Project: Mamm Creek
Site: M16W Pad (SWSW S16-T7S-R93W)
Well: MCU 16-13A (M16W Pad)
Wellbore: DD
Plan: FINAL

CATHEDRAL




Azimuths to True North
Magnetic North: 10.09°

Magnetic Field
Strength: 52105.8snT
Dip Angle: 65.70°
Date: 9/14/2012
Model: IGRF2010

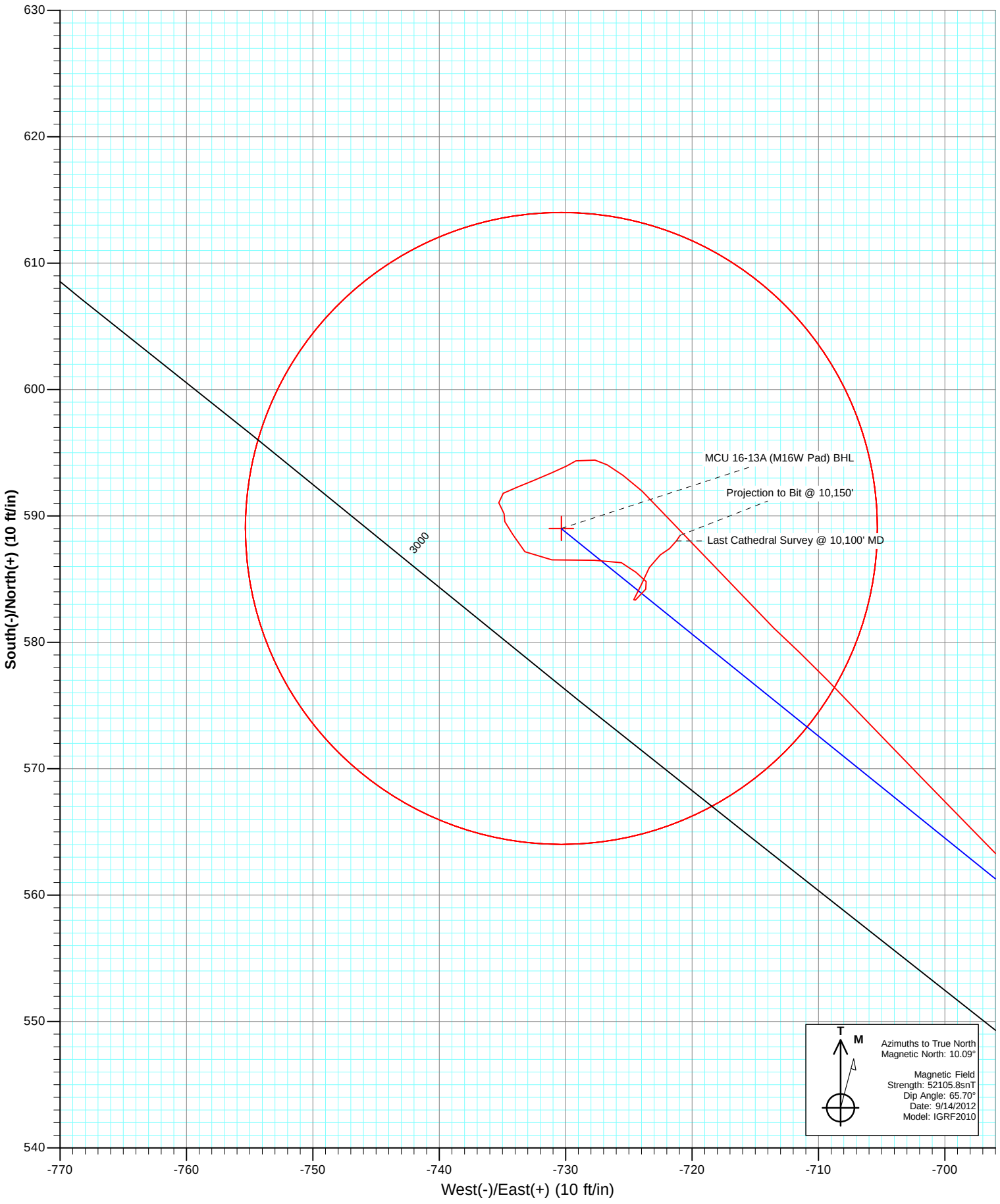
DD
MCU 16-13A (M16W Pad)
125449/179155 (SH) 125534/182455 (MH); SC

KBE @ 7903.0ft (Patterson #308)
North American Datum 1983
Well MCU 16-13A (M16W Pad), True North

| Target | Azimuth | Origin Type | N/S |
|---|---|---|---|
| MCU 16-13A (M16W Pad) BHL | 308.89 | Slot | 0.0 |

| Name | TVD | +N/-S | +E/-W | Latitude | Longitude |
|---|---|---|---|---|---|
| MCU 16-13A (M16W Pad) TGT | 7868.0 | 589.0 | -730.3 | 39.441809 | -107.785578 |
| MCU 16-13A (M16W Pad) BHL | 9984.0 | 589.0 | -730.3 | 39.441809 | -107.785578 |

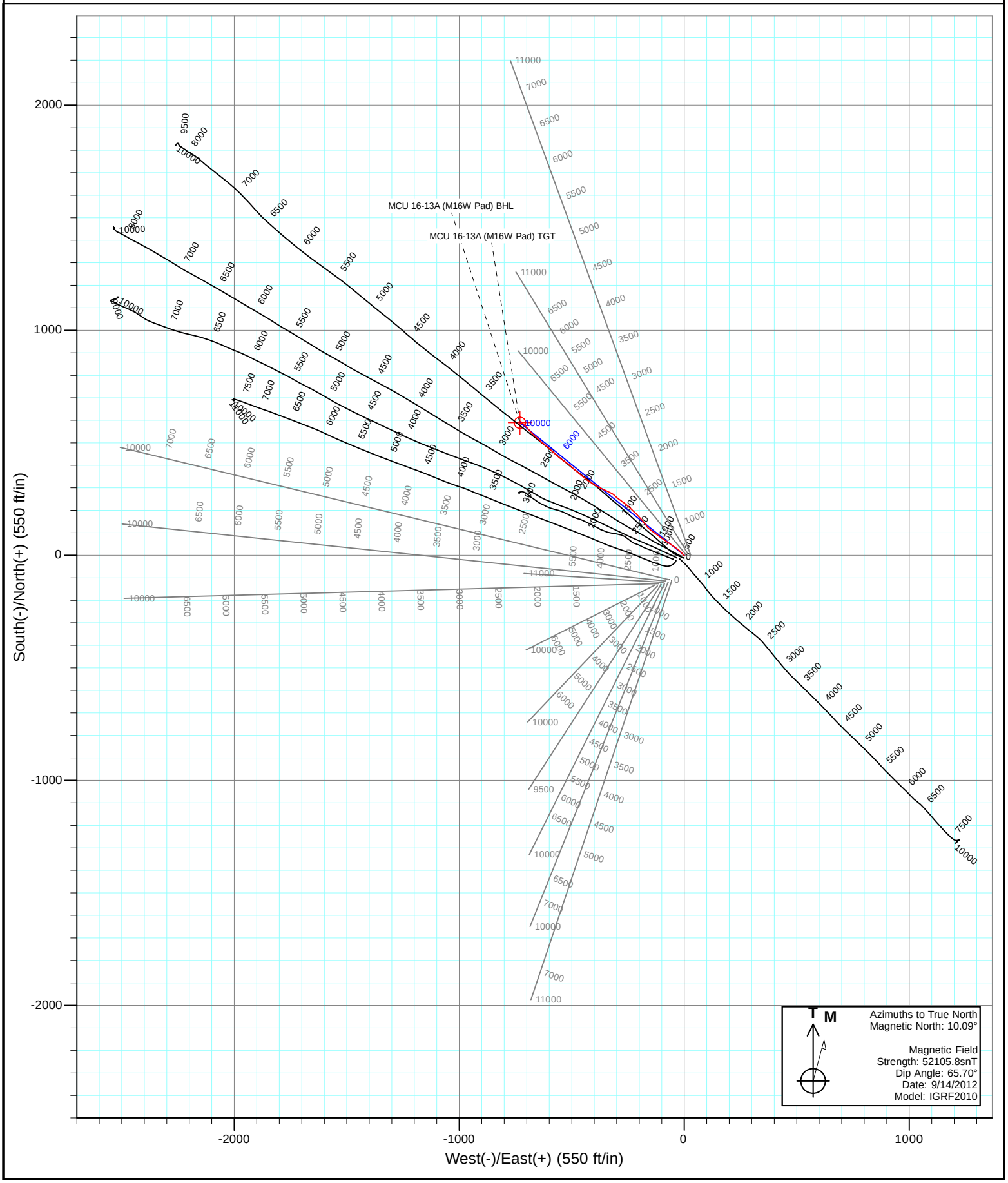
Project: Mamm Creek
Site: M16W Pad (SWSW S16-T7S-R93W)
Well: MCU 16-13A (M16W Pad)
Wellbore: DD
Plan: FINAL



encana natural gas

Project: Mamm Creek
Site: M16W Pad (SWSW S16-T7S-R93W)
Well: MCU 16-13A (M16W Pad)
Wellbore: DD
Design: FINAL

CATHEDRAL



# Cathedral Energy Services

## Survey Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well MCU 16-13A (M16W Pad) |
| **Project:** | Mamm Creek | **TVD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Site:** | M16W Pad (SWSW S16-T7S-R93W) | **MD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Well:** | MCU 16-13A (M16W Pad) | **North Reference:** | True |
| **Wellbore:** | DD | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | DD | **Database:** | USA EDM 5000 Multi Users DB |

**Project** Mamm Creek

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | |
| **Map Zone:** | Colorado Central Zone | | |

**Site** M16W Pad (SWSW S16-T7S-R93W)

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,593,196.15 ft | **Latitude:** | 39.439834 |
| **From:** | Lat/Long | **Easting:** | 2,355,193.71 ft | **Longitude:** | -107.783358 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | 13.200 in | **Grid Convergence:** | -1.44 ° |

**Well** MCU 16-13A (M16W Pad)

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 ft | **Northing:** | 1,593,323.89 ft | **Latitude:** | 39.440192 |
| | **+E/-W** | 0.0 ft | **Easting:** | 2,355,300.32 ft | **Longitude:** | -107.782992 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 7,881.0 ft |

**Wellbore** DD

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 9/14/2012 | 10.09 | 65.70 | 52,106 |

**Design** DD

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | 1.0 | **Phase:** | ACTUAL | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 308.89 |

**Survey Program** **Date** 9/24/2012

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 206.0 | 10,150.0 | Survey #1 (DD) | MWD | Geolink MWD |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 206.0 | 0.40 | 283.90 | 206.0 | 0.2 | -0.7 | 0.7 | 0.19 | 0.19 | |
| 237.0 | 0.50 | 269.50 | 237.0 | 0.2 | -0.9 | 0.9 | 0.48 | 0.32 | |
| 267.0 | 0.50 | 295.20 | 267.0 | 0.3 | -1.2 | 1.1 | 0.74 | 0.00 | |
| 298.0 | 1.20 | 307.80 | 298.0 | 0.5 | -1.6 | 1.5 | 2.32 | 2.26 | |
| 328.0 | 1.60 | 320.50 | 328.0 | 1.0 | -2.1 | 2.3 | 1.68 | 1.33 | |
| 359.0 | 2.50 | 318.60 | 359.0 | 1.9 | -2.8 | 3.4 | 2.91 | 2.90 | |
| 389.0 | 3.40 | 309.60 | 388.9 | 2.9 | -3.9 | 4.9 | 3.37 | 3.00 | |
| 480.0 | 6.40 | 316.80 | 479.6 | 8.3 | -9.5 | 12.6 | 3.36 | 3.30 | |
| 571.0 | 7.10 | 317.10 | 570.0 | 16.2 | -16.8 | 23.2 | 0.77 | 0.77 | |
| 663.0 | 7.90 | 311.90 | 661.2 | 24.5 | -25.4 | 35.1 | 1.14 | 0.87 | |
| 755.0 | 8.70 | 302.40 | 752.2 | 32.5 | -35.9 | 48.4 | 1.72 | 0.87 | |
| 846.0 | 8.80 | 303.80 | 842.1 | 40.1 | -47.5 | 62.1 | 0.26 | 0.11 | |

# Cathedral Energy Services

Survey Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well MCU 16-13A (M16W Pad) |
| **Project:** | Mamm Creek | **TVD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Site:** | M16W Pad (SWSW S16-T7S-R93W) | **MD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Well:** | MCU 16-13A (M16W Pad) | **North Reference:** | True |
| **Wellbore:** | DD | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | DD | **Database:** | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 937.0 | 8.40 | 303.80 | 932.1 | 47.6 | -58.8 | 75.7 | 0.44 | -0.44 | |
| 1,032.0 | 8.30 | 305.20 | 1,026.1 | 55.4 | -70.2 | 89.5 | 0.24 | -0.11 | |
| 1,115.0 | 8.30 | 305.40 | 1,108.2 | 62.4 | -80.0 | 101.4 | 0.03 | 0.00 | |
| 1,165.0 | 7.90 | 307.20 | 1,157.7 | 66.5 | -85.7 | 108.4 | 0.95 | -0.80 | |
| 1,257.0 | 8.00 | 304.20 | 1,248.9 | 74.0 | -96.0 | 121.1 | 0.46 | 0.11 | |
| 1,349.0 | 7.90 | 302.20 | 1,340.0 | 80.9 | -106.6 | 133.8 | 0.32 | -0.11 | |
| 1,440.0 | 7.10 | 307.90 | 1,430.2 | 87.7 | -116.4 | 145.6 | 1.20 | -0.88 | |
| 1,532.0 | 7.40 | 308.70 | 1,521.5 | 94.9 | -125.5 | 157.3 | 0.34 | 0.33 | |
| 1,623.0 | 7.60 | 305.10 | 1,611.7 | 102.0 | -135.0 | 169.1 | 0.56 | 0.22 | |
| 1,715.0 | 7.30 | 308.10 | 1,702.9 | 109.1 | -144.6 | 181.0 | 0.53 | -0.33 | |
| 1,806.0 | 7.20 | 305.10 | 1,793.2 | 116.0 | -153.8 | 192.5 | 0.43 | -0.11 | |
| 1,898.0 | 6.50 | 320.30 | 1,884.5 | 123.3 | -161.8 | 203.4 | 2.10 | -0.76 | |
| 1,989.0 | 6.90 | 324.40 | 1,974.9 | 131.7 | -168.3 | 213.7 | 0.68 | 0.44 | |
| 2,081.0 | 7.30 | 322.50 | 2,066.2 | 140.8 | -175.1 | 224.7 | 0.50 | 0.43 | |
| 2,173.0 | 8.80 | 320.40 | 2,157.3 | 150.9 | -183.1 | 237.3 | 1.66 | 1.63 | |
| 2,264.0 | 8.20 | 316.60 | 2,247.3 | 161.0 | -192.0 | 250.5 | 0.90 | -0.66 | |
| 2,356.0 | 8.20 | 315.10 | 2,338.4 | 170.4 | -201.1 | 263.5 | 0.23 | 0.00 | |
| 2,447.0 | 8.00 | 316.80 | 2,428.4 | 179.6 | -210.1 | 276.3 | 0.34 | -0.22 | |
| 2,539.0 | 7.30 | 320.60 | 2,519.6 | 188.8 | -218.1 | 288.3 | 0.94 | -0.76 | |
| 2,630.0 | 8.60 | 312.20 | 2,609.8 | 197.8 | -226.9 | 300.8 | 1.91 | 1.43 | |
| 2,722.0 | 7.90 | 310.40 | 2,700.8 | 206.5 | -236.8 | 314.0 | 0.81 | -0.76 | |
| 2,813.0 | 7.90 | 310.70 | 2,790.9 | 214.7 | -246.3 | 326.5 | 0.05 | 0.00 | |
| 2,905.0 | 7.70 | 311.70 | 2,882.1 | 222.9 | -255.7 | 338.9 | 0.26 | -0.22 | |
| 2,996.0 | 7.80 | 308.90 | 2,972.3 | 230.8 | -265.0 | 351.2 | 0.43 | 0.11 | |
| 3,088.0 | 7.70 | 305.00 | 3,063.4 | 238.3 | -274.9 | 363.6 | 0.58 | -0.11 | |
| 3,179.0 | 7.30 | 306.70 | 3,153.6 | 245.2 | -284.6 | 375.5 | 0.50 | -0.44 | |
| 3,271.0 | 7.20 | 307.40 | 3,244.9 | 252.2 | -293.8 | 387.1 | 0.15 | -0.11 | |
| 3,362.0 | 7.20 | 311.40 | 3,335.2 | 259.5 | -302.6 | 398.5 | 0.55 | 0.00 | |
| 3,454.0 | 6.80 | 312.40 | 3,426.5 | 267.0 | -311.0 | 409.7 | 0.45 | -0.43 | |
| 3,546.0 | 8.10 | 301.20 | 3,517.7 | 274.0 | -320.5 | 421.5 | 2.11 | 1.41 | |
| 3,637.0 | 8.00 | 295.60 | 3,607.8 | 280.0 | -331.7 | 434.0 | 0.87 | -0.11 | |
| 3,728.0 | 8.30 | 296.00 | 3,697.9 | 285.7 | -343.4 | 446.6 | 0.34 | 0.33 | |
| 3,820.0 | 8.00 | 293.90 | 3,789.0 | 291.2 | -355.2 | 459.3 | 0.46 | -0.33 | |
| 3,911.0 | 7.30 | 294.00 | 3,879.2 | 296.1 | -366.3 | 471.0 | 0.77 | -0.77 | |
| 4,002.0 | 7.10 | 297.90 | 3,969.5 | 301.1 | -376.5 | 482.1 | 0.58 | -0.22 | |
| 4,094.0 | 6.70 | 294.00 | 4,060.8 | 305.9 | -386.4 | 492.8 | 0.67 | -0.43 | |
| 4,185.0 | 8.40 | 303.70 | 4,151.0 | 311.8 | -396.8 | 504.6 | 2.33 | 1.87 | |
| 4,277.0 | 8.10 | 301.50 | 4,242.1 | 318.9 | -407.9 | 517.7 | 0.47 | -0.33 | |
| 4,368.0 | 8.00 | 305.10 | 4,332.2 | 325.9 | -418.6 | 530.4 | 0.56 | -0.11 | |
| 4,460.0 | 8.10 | 303.90 | 4,423.2 | 333.2 | -429.2 | 543.2 | 0.21 | 0.11 | |
| 4,551.0 | 7.70 | 308.30 | 4,513.4 | 340.5 | -439.3 | 555.7 | 0.80 | -0.44 | |
| 4,643.0 | 7.40 | 309.90 | 4,604.6 | 348.1 | -448.7 | 567.8 | 0.40 | -0.33 | |
| 4,734.0 | 7.10 | 308.00 | 4,694.9 | 355.4 | -457.6 | 579.3 | 0.42 | -0.33 | |
| 4,826.0 | 6.90 | 310.30 | 4,786.2 | 362.4 | -466.3 | 590.5 | 0.37 | -0.22 | |
| 4,917.0 | 7.00 | 312.30 | 4,876.5 | 369.7 | -474.6 | 601.5 | 0.29 | 0.11 | |
| 5,009.0 | 7.00 | 309.20 | 4,967.8 | 377.0 | -483.1 | 612.7 | 0.41 | 0.00 | |
| 5,100.0 | 6.80 | 311.40 | 5,058.2 | 384.1 | -491.4 | 623.6 | 0.36 | -0.22 | |
| 5,192.0 | 6.80 | 313.00 | 5,149.5 | 391.4 | -499.5 | 634.5 | 0.21 | 0.00 | |
| 5,284.0 | 6.60 | 309.40 | 5,240.9 | 398.5 | -507.5 | 645.2 | 0.51 | -0.22 | |
| 5,375.0 | 6.90 | 309.50 | 5,331.3 | 405.3 | -515.8 | 655.9 | 0.33 | 0.33 | |
| 5,467.0 | 6.50 | 305.90 | 5,422.6 | 411.8 | -524.3 | 666.6 | 0.63 | -0.43 | |
| 5,558.0 | 6.60 | 308.00 | 5,513.0 | 418.1 | -532.6 | 677.0 | 0.29 | 0.11 | |
| 5,650.0 | 6.20 | 305.00 | 5,604.5 | 424.2 | -540.8 | 687.3 | 0.57 | -0.43 | |

# Cathedral Energy Services

Survey Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well MCU 16-13A (M16W Pad) |
| **Project:** | Mamm Creek | **TVD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Site:** | M16W Pad (SWSW S16-T7S-R93W) | **MD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Well:** | MCU 16-13A (M16W Pad) | **North Reference:** | True |
| **Wellbore:** | DD | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | DD | **Database:** | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 5,741.0 | 8.50 | 304.00 | 5,694.7 | 430.8 | -550.4 | 698.9 | 2.53 | 2.53 | |
| 5,833.0 | 8.00 | 311.50 | 5,785.8 | 438.8 | -560.8 | 712.0 | 1.29 | -0.54 | |
| 5,924.0 | 8.00 | 312.00 | 5,875.9 | 447.2 | -570.3 | 724.7 | 0.08 | 0.00 | |
| 6,016.0 | 8.00 | 314.00 | 5,967.0 | 456.0 | -579.7 | 737.4 | 0.30 | 0.00 | |
| 6,108.0 | 7.80 | 313.40 | 6,058.1 | 464.7 | -588.8 | 750.0 | 0.24 | -0.22 | |
| 6,199.0 | 7.80 | 310.30 | 6,148.3 | 472.9 | -598.0 | 762.4 | 0.46 | 0.00 | |
| 6,290.0 | 7.50 | 310.20 | 6,238.5 | 480.8 | -607.2 | 774.5 | 0.33 | -0.33 | |
| 6,382.0 | 6.90 | 309.80 | 6,329.7 | 488.2 | -616.1 | 786.0 | 0.65 | -0.65 | |
| 6,473.0 | 6.80 | 308.70 | 6,420.1 | 495.0 | -624.5 | 796.9 | 0.18 | -0.11 | |
| 6,565.0 | 6.30 | 309.50 | 6,511.5 | 501.7 | -632.6 | 807.4 | 0.55 | -0.54 | |
| 6,657.0 | 5.90 | 313.90 | 6,603.0 | 508.2 | -639.9 | 817.1 | 0.67 | -0.43 | |
| 6,748.0 | 5.60 | 309.40 | 6,693.5 | 514.2 | -646.7 | 826.2 | 0.59 | -0.33 | |
| 6,840.0 | 5.20 | 313.70 | 6,785.1 | 519.9 | -653.2 | 834.9 | 0.62 | -0.43 | |
| 6,932.0 | 4.90 | 307.90 | 6,876.7 | 525.2 | -659.3 | 842.9 | 0.64 | -0.33 | |
| 7,024.0 | 5.80 | 314.40 | 6,968.3 | 530.9 | -665.7 | 851.5 | 1.18 | 0.98 | |
| 7,115.0 | 6.30 | 317.40 | 7,058.8 | 537.8 | -672.4 | 861.0 | 0.65 | 0.55 | |
| 7,207.0 | 5.60 | 313.80 | 7,150.3 | 544.6 | -679.1 | 870.5 | 0.86 | -0.76 | |
| 7,299.0 | 7.70 | 320.60 | 7,241.7 | 552.5 | -686.2 | 881.0 | 2.43 | 2.28 | |
| 7,390.0 | 7.00 | 316.10 | 7,332.0 | 561.2 | -693.9 | 892.5 | 1.00 | -0.77 | |
| 7,482.0 | 7.00 | 315.30 | 7,423.3 | 569.2 | -701.8 | 903.6 | 0.11 | 0.00 | |
| 7,543.0 | 6.90 | 316.60 | 7,483.8 | 574.5 | -706.9 | 910.9 | 0.31 | -0.16 | |
| 7,634.0 | 4.90 | 312.60 | 7,574.3 | 581.1 | -713.5 | 920.2 | 2.24 | -2.20 | |
| 7,725.0 | 4.90 | 319.60 | 7,665.0 | 586.7 | -718.9 | 927.9 | 0.66 | 0.00 | |
| 7,817.0 | 4.20 | 311.90 | 7,756.7 | 592.0 | -723.9 | 935.1 | 1.01 | -0.76 | |
| 7,908.0 | 1.60 | 281.00 | 7,847.6 | 594.4 | -727.7 | 939.6 | 3.24 | -2.86 | |
| 8,000.0 | 0.50 | 218.80 | 7,939.6 | 594.4 | -729.2 | 940.7 | 1.56 | -1.20 | |
| 8,092.0 | 0.60 | 258.50 | 8,031.6 | 594.0 | -729.9 | 941.0 | 0.42 | 0.11 | |
| 8,184.0 | 1.00 | 238.70 | 8,123.6 | 593.4 | -731.1 | 941.6 | 0.52 | 0.43 | |
| 8,275.0 | 1.00 | 254.30 | 8,214.6 | 592.8 | -732.5 | 942.3 | 0.30 | 0.00 | |
| 8,367.0 | 0.70 | 239.00 | 8,306.5 | 592.3 | -733.8 | 943.0 | 0.41 | -0.33 | |
| 8,459.0 | 0.90 | 252.50 | 8,398.5 | 591.8 | -734.9 | 943.6 | 0.30 | 0.22 | |
| 8,550.0 | 0.80 | 148.50 | 8,489.5 | 591.0 | -735.3 | 943.4 | 1.47 | -0.11 | |
| 8,642.0 | 0.40 | 165.40 | 8,581.5 | 590.2 | -734.9 | 942.5 | 0.47 | -0.43 | |
| 8,733.0 | 0.40 | 182.20 | 8,672.5 | 589.6 | -734.8 | 942.1 | 0.13 | 0.00 | |
| 8,825.0 | 1.20 | 137.80 | 8,764.5 | 588.5 | -734.2 | 940.9 | 1.04 | 0.87 | |
| 8,916.0 | 0.90 | 154.50 | 8,855.5 | 587.2 | -733.2 | 939.3 | 0.47 | -0.33 | |
| 9,007.0 | 2.30 | 89.70 | 8,946.5 | 586.5 | -731.1 | 937.3 | 2.29 | 1.54 | |
| 9,099.0 | 1.90 | 91.90 | 9,038.4 | 586.5 | -727.7 | 934.6 | 0.44 | -0.43 | |
| 9,190.0 | 0.80 | 103.30 | 9,129.4 | 586.3 | -725.6 | 932.9 | 1.24 | -1.21 | |
| 9,282.0 | 1.00 | 138.70 | 9,221.4 | 585.5 | -724.4 | 931.5 | 0.63 | 0.22 | |
| 9,373.0 | 0.40 | 115.60 | 9,312.4 | 584.8 | -723.6 | 930.4 | 0.72 | -0.66 | |
| 9,465.0 | 0.70 | 215.00 | 9,404.4 | 584.2 | -723.7 | 930.0 | 0.94 | 0.33 | |
| 9,557.0 | 0.80 | 230.40 | 9,496.4 | 583.3 | -724.5 | 930.1 | 0.24 | 0.11 | |
| 9,648.0 | 0.70 | 39.50 | 9,587.3 | 583.4 | -724.6 | 930.3 | 1.64 | -0.11 | |
| 9,740.0 | 0.90 | 17.00 | 9,679.3 | 584.5 | -724.0 | 930.5 | 0.40 | 0.22 | |
| 9,831.0 | 1.10 | 31.30 | 9,770.3 | 585.9 | -723.4 | 930.9 | 0.35 | 0.22 | |
| 9,923.0 | 0.60 | 59.30 | 9,862.3 | 586.9 | -722.5 | 930.9 | 0.69 | -0.54 | |
| 10,015.0 | 0.50 | 50.90 | 9,954.3 | 587.4 | -721.8 | 930.6 | 0.14 | -0.11 | |
| 10,100.0 | 0.60 | 34.20 | 10,039.3 | 588.0 | -721.2 | 930.6 | 0.22 | 0.12 | **Last Cathedral Survey @ 10,100' MD** |
| 10,150.0 | 0.60 | 34.20 | 10,089.3 | 588.5 | -720.9 | 930.6 | 0.00 | 0.00 | **Projection to Bit @ 10,150'** |

# Cathedral Energy Services

Survey Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well MCU 16-13A (M16W Pad) |
| **Project:** | Mamm Creek | **TVD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Site:** | M16W Pad (SWSW S16-T7S-R93W) | **MD Reference:** | KBE @ 7903.0ft (Patterson #308) |
| **Well:** | MCU 16-13A (M16W Pad) | **North Reference:** | True |
| **Wellbore:** | DD | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | DD | **Database:** | USA EDM 5000 Multi Users DB |

**Targets**

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| MCU 16-13A (M16W Pa | 0.00 | 0.00 | 7,868.0 | 589.0 | -730.3 | 1,593,931.07 | 2,354,585.02 | 39.441809 | -107.785578 |
| - survey misses target center by 5.9ft at 7928.4ft MD (7868.0 TVD, 594.5 N, -728.2 E) | | | | | | | | | |
| - Circle (radius 25.0) | | | | | | | | | |
| MCU 16-13A (M16W Pa | 0.00 | 0.00 | 9,984.0 | 589.0 | -730.3 | 1,593,931.07 | 2,354,585.02 | 39.441809 | -107.785578 |
| - survey misses target center by 8.9ft at 10044.6ft MD (9984.0 TVD, 587.6 N, -721.6 E) | | | | | | | | | |
| - Circle (radius 25.0) | | | | | | | | | |

**Survey Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 10,100.0 | 10,039.3 | 588.0 | -721.2 | Last Cathedral Survey @ 10,100' MD |
| 10,150.0 | 10,089.3 | 588.5 | -720.9 | Projection to Bit @ 10,150' |

Checked By: _____ Approved By: _____ Date: _____