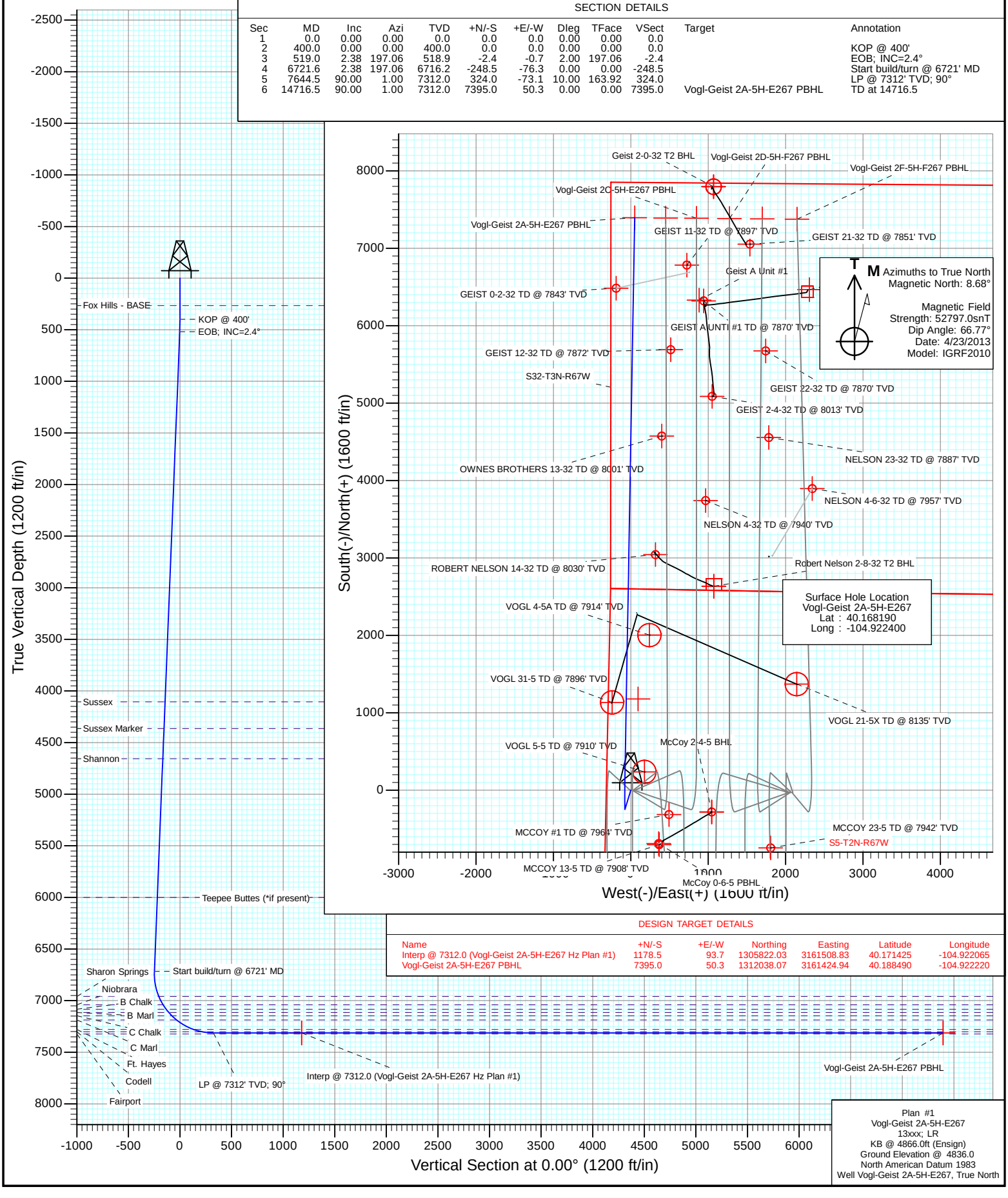
encana

Project: DJ Wattenberg
Site: S5-T2N-R67W (Vogl-McCoy)
Well: Vogl-Geist 2A-5H-E267
Wellbore: Hz
Design: Plan #1

CATHEDRAL

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | VSect | Target | Annotation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | | |
| 2 | 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | | KOP @ 400' |
| 3 | 519.0 | 2.38 | 197.06 | 518.9 | -2.4 | -0.7 | 2.00 | 197.06 | -2.4 | | EOB; INC=2.4° |
| 4 | 6721.6 | 2.38 | 197.06 | 6716.2 | -248.5 | -76.3 | 0.00 | 0.00 | -248.5 | | Start build/turn @ 6721' MD |
| 5 | 7644.5 | 90.00 | 1.00 | 7312.0 | 324.0 | -73.1 | 10.00 | 163.92 | 324.0 | | LP @ 7312' TVD; 90° |
| 6 | 14716.5 | 90.00 | 1.00 | 7312.0 | 7395.0 | 50.3 | 0.00 | 0.00 | 7395.0 | Vogl-Geist 2A-5H-E267 PBHL | TD at 14716.5 |




DESIGN TARGET DETAILS

| Name | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Interp @ 7312.0 (Vogl-Geist 2A-5H-E267 Hz Plan #1) | 1178.5 | 93.7 | 1305822.03 | 3161508.83 | 40.171425 | -104.922065 |
| Vogl-Geist 2A-5H-E267 PBHL | 7395.0 | 50.3 | 1312038.07 | 3161424.94 | 40.188490 | -104.922220 |

Plan #1
Vogl-Geist 2A-5H-E267
13xxx; LR
KB @ 4866.0ft (Ensign)
Ground Elevation @ 4836.0
North American Datum 1983
Well Vogl-Geist 2A-5H-E267, True North

# Cathedral Energy Services

Planning Report

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #1 | | |

**Project** DJ Wattenberg

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

**Site** S5-T2N-R67W (Vogl-McCoy)

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,303,967.76 ft | **Latitude:** | 40.166330 |
| **From:** | Lat/Long | **Easting:** | 3,161,787.74 ft | **Longitude:** | -104.921110 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | 13.200 in | **Grid Convergence:** | 0.37 ° |

**Well** Vogl-Geist 2A-5H-E267

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 ft | **Northing:** | 1,304,642.94 ft | **Latitude:** | 40.168190 |
| | **+E/-W** | 0.0 ft | **Easting:** | 3,161,422.82 ft | **Longitude:** | -104.922400 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 4,836.0 ft |

**Wellbore** Hz

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 4/23/2013 | 8.68 | 66.77 | 52,797 |

**Design** Plan #1

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | | **Phase:** | PLAN | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 0.00 |

**Plan Sections**

| 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 | |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 519.0 | 2.38 | 197.06 | 518.9 | -2.4 | -0.7 | 2.00 | 2.00 | 0.00 | 197.06 | |
| 6,721.6 | 2.38 | 197.06 | 6,716.2 | -248.5 | -76.3 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,644.5 | 90.00 | 1.00 | 7,312.0 | 324.0 | -73.1 | 10.00 | 9.49 | 17.76 | 163.92 | |
| 14,716.5 | 90.00 | 1.00 | 7,312.0 | 7,395.0 | 50.3 | 0.00 | 0.00 | 0.00 | 0.00 | Vogl-Geist 2A-5H-E2( |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | 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 | |
| 266.0 | 0.00 | 0.00 | 266.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Fox Hills - BASE |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | KOP @ 400' |
| 500.0 | 2.00 | 197.06 | 500.0 | -1.7 | -0.5 | -1.7 | 2.00 | 2.00 | |
| 519.0 | 2.38 | 197.06 | 518.9 | -2.4 | -0.7 | -2.4 | 2.00 | 2.00 | EOB; INC=2.4° |
| 600.0 | 2.38 | 197.06 | 599.9 | -5.6 | -1.7 | -5.6 | 0.00 | 0.00 | |
| 700.0 | 2.38 | 197.06 | 699.8 | -9.5 | -2.9 | -9.5 | 0.00 | 0.00 | |
| 800.0 | 2.38 | 197.06 | 799.7 | -13.5 | -4.1 | -13.5 | 0.00 | 0.00 | |
| 900.0 | 2.38 | 197.06 | 899.6 | -17.5 | -5.4 | -17.5 | 0.00 | 0.00 | |
| 1,000.0 | 2.38 | 197.06 | 999.6 | -21.4 | -6.6 | -21.4 | 0.00 | 0.00 | |
| 1,100.0 | 2.38 | 197.06 | 1,099.5 | -25.4 | -7.8 | -25.4 | 0.00 | 0.00 | |
| 1,200.0 | 2.38 | 197.06 | 1,199.4 | -29.4 | -9.0 | -29.4 | 0.00 | 0.00 | |
| 1,300.0 | 2.38 | 197.06 | 1,299.3 | -33.4 | -10.2 | -33.4 | 0.00 | 0.00 | |
| 1,400.0 | 2.38 | 197.06 | 1,399.2 | -37.3 | -11.5 | -37.3 | 0.00 | 0.00 | |
| 1,500.0 | 2.38 | 197.06 | 1,499.1 | -41.3 | -12.7 | -41.3 | 0.00 | 0.00 | |
| 1,600.0 | 2.38 | 197.06 | 1,599.0 | -45.3 | -13.9 | -45.3 | 0.00 | 0.00 | |
| 1,700.0 | 2.38 | 197.06 | 1,698.9 | -49.2 | -15.1 | -49.2 | 0.00 | 0.00 | |
| 1,800.0 | 2.38 | 197.06 | 1,798.9 | -53.2 | -16.3 | -53.2 | 0.00 | 0.00 | |
| 1,900.0 | 2.38 | 197.06 | 1,898.8 | -57.2 | -17.5 | -57.2 | 0.00 | 0.00 | |
| 2,000.0 | 2.38 | 197.06 | 1,998.7 | -61.1 | -18.8 | -61.1 | 0.00 | 0.00 | |
| 2,100.0 | 2.38 | 197.06 | 2,098.6 | -65.1 | -20.0 | -65.1 | 0.00 | 0.00 | |
| 2,200.0 | 2.38 | 197.06 | 2,198.5 | -69.1 | -21.2 | -69.1 | 0.00 | 0.00 | |
| 2,300.0 | 2.38 | 197.06 | 2,298.4 | -73.0 | -22.4 | -73.0 | 0.00 | 0.00 | |
| 2,400.0 | 2.38 | 197.06 | 2,398.3 | -77.0 | -23.6 | -77.0 | 0.00 | 0.00 | |
| 2,500.0 | 2.38 | 197.06 | 2,498.3 | -81.0 | -24.9 | -81.0 | 0.00 | 0.00 | |
| 2,600.0 | 2.38 | 197.06 | 2,598.2 | -84.9 | -26.1 | -84.9 | 0.00 | 0.00 | |
| 2,700.0 | 2.38 | 197.06 | 2,698.1 | -88.9 | -27.3 | -88.9 | 0.00 | 0.00 | |
| 2,800.0 | 2.38 | 197.06 | 2,798.0 | -92.9 | -28.5 | -92.9 | 0.00 | 0.00 | |
| 2,900.0 | 2.38 | 197.06 | 2,897.9 | -96.8 | -29.7 | -96.8 | 0.00 | 0.00 | |
| 3,000.0 | 2.38 | 197.06 | 2,997.8 | -100.8 | -30.9 | -100.8 | 0.00 | 0.00 | |
| 3,100.0 | 2.38 | 197.06 | 3,097.7 | -104.8 | -32.2 | -104.8 | 0.00 | 0.00 | |
| 3,200.0 | 2.38 | 197.06 | 3,197.7 | -108.8 | -33.4 | -108.8 | 0.00 | 0.00 | |
| 3,300.0 | 2.38 | 197.06 | 3,297.6 | -112.7 | -34.6 | -112.7 | 0.00 | 0.00 | |
| 3,400.0 | 2.38 | 197.06 | 3,397.5 | -116.7 | -35.8 | -116.7 | 0.00 | 0.00 | |
| 3,500.0 | 2.38 | 197.06 | 3,497.4 | -120.7 | -37.0 | -120.7 | 0.00 | 0.00 | |
| 3,600.0 | 2.38 | 197.06 | 3,597.3 | -124.6 | -38.3 | -124.6 | 0.00 | 0.00 | |
| 3,700.0 | 2.38 | 197.06 | 3,697.2 | -128.6 | -39.5 | -128.6 | 0.00 | 0.00 | |
| 3,800.0 | 2.38 | 197.06 | 3,797.1 | -132.6 | -40.7 | -132.6 | 0.00 | 0.00 | |
| 3,900.0 | 2.38 | 197.06 | 3,897.1 | -136.5 | -41.9 | -136.5 | 0.00 | 0.00 | |
| 4,000.0 | 2.38 | 197.06 | 3,997.0 | -140.5 | -43.1 | -140.5 | 0.00 | 0.00 | |
| 4,100.0 | 2.38 | 197.06 | 4,096.9 | -144.5 | -44.3 | -144.5 | 0.00 | 0.00 | |
| 4,108.1 | 2.38 | 197.06 | 4,105.0 | -144.8 | -44.4 | -144.8 | 0.00 | 0.00 | Sussex |
| 4,200.0 | 2.38 | 197.06 | 4,196.8 | -148.4 | -45.6 | -148.4 | 0.00 | 0.00 | |
| 4,300.0 | 2.38 | 197.06 | 4,296.7 | -152.4 | -46.8 | -152.4 | 0.00 | 0.00 | |
| 4,367.4 | 2.38 | 197.06 | 4,364.0 | -155.1 | -47.6 | -155.1 | 0.00 | 0.00 | Sussex Marker |
| 4,400.0 | 2.38 | 197.06 | 4,396.6 | -156.4 | -48.0 | -156.4 | 0.00 | 0.00 | |
| 4,500.0 | 2.38 | 197.06 | 4,496.5 | -160.3 | -49.2 | -160.3 | 0.00 | 0.00 | |
| 4,600.0 | 2.38 | 197.06 | 4,596.4 | -164.3 | -50.4 | -164.3 | 0.00 | 0.00 | |
| 4,659.6 | 2.38 | 197.06 | 4,656.0 | -166.7 | -51.2 | -166.7 | 0.00 | 0.00 | Shannon |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 4,700.0 | 2.38 | 197.06 | 4,696.4 | -168.3 | -51.7 | -168.3 | 0.00 | 0.00 | |
| 4,800.0 | 2.38 | 197.06 | 4,796.3 | -172.2 | -52.9 | -172.2 | 0.00 | 0.00 | |
| 4,900.0 | 2.38 | 197.06 | 4,896.2 | -176.2 | -54.1 | -176.2 | 0.00 | 0.00 | |
| 5,000.0 | 2.38 | 197.06 | 4,996.1 | -180.2 | -55.3 | -180.2 | 0.00 | 0.00 | |
| 5,100.0 | 2.38 | 197.06 | 5,096.0 | -184.1 | -56.5 | -184.1 | 0.00 | 0.00 | |
| 5,200.0 | 2.38 | 197.06 | 5,195.9 | -188.1 | -57.7 | -188.1 | 0.00 | 0.00 | |
| 5,300.0 | 2.38 | 197.06 | 5,295.8 | -192.1 | -59.0 | -192.1 | 0.00 | 0.00 | |
| 5,400.0 | 2.38 | 197.06 | 5,395.8 | -196.1 | -60.2 | -196.1 | 0.00 | 0.00 | |
| 5,500.0 | 2.38 | 197.06 | 5,495.7 | -200.0 | -61.4 | -200.0 | 0.00 | 0.00 | |
| 5,600.0 | 2.38 | 197.06 | 5,595.6 | -204.0 | -62.6 | -204.0 | 0.00 | 0.00 | |
| 5,700.0 | 2.38 | 197.06 | 5,695.5 | -208.0 | -63.8 | -208.0 | 0.00 | 0.00 | |
| 5,800.0 | 2.38 | 197.06 | 5,795.4 | -211.9 | -65.1 | -211.9 | 0.00 | 0.00 | |
| 5,900.0 | 2.38 | 197.06 | 5,895.3 | -215.9 | -66.3 | -215.9 | 0.00 | 0.00 | |
| 6,000.0 | 2.38 | 197.06 | 5,995.2 | -219.9 | -67.5 | -219.9 | 0.00 | 0.00 | |
| 6,004.8 | 2.38 | 197.06 | 6,000.0 | -220.1 | -67.5 | -220.1 | 0.00 | 0.00 | Teepee Buttes (*if present) |
| 6,100.0 | 2.38 | 197.06 | 6,095.2 | -223.8 | -68.7 | -223.8 | 0.00 | 0.00 | |
| 6,200.0 | 2.38 | 197.06 | 6,195.1 | -227.8 | -69.9 | -227.8 | 0.00 | 0.00 | |
| 6,300.0 | 2.38 | 197.06 | 6,295.0 | -231.8 | -71.1 | -231.8 | 0.00 | 0.00 | |
| 6,400.0 | 2.38 | 197.06 | 6,394.9 | -235.7 | -72.4 | -235.7 | 0.00 | 0.00 | |
| 6,500.0 | 2.38 | 197.06 | 6,494.8 | -239.7 | -73.6 | -239.7 | 0.00 | 0.00 | |
| 6,600.0 | 2.38 | 197.06 | 6,594.7 | -243.7 | -74.8 | -243.7 | 0.00 | 0.00 | |
| 6,700.0 | 2.38 | 197.06 | 6,694.6 | -247.6 | -76.0 | -247.6 | 0.00 | 0.00 | |
| 6,721.6 | 2.38 | 197.06 | 6,716.2 | -248.5 | -76.3 | -248.5 | 0.00 | 0.00 | Start build/turn @ 6721' MD |
| 6,800.0 | 5.59 | 354.26 | 6,794.5 | -246.2 | -77.1 | -246.2 | 10.00 | 4.10 | |
| 6,900.0 | 15.57 | 358.63 | 6,892.7 | -227.9 | -77.9 | -227.9 | 10.00 | 9.97 | |
| 6,969.1 | 22.47 | 359.41 | 6,958.0 | -205.4 | -78.3 | -205.4 | 10.00 | 9.99 | Sharon Springs |
| 7,000.0 | 25.56 | 359.62 | 6,986.2 | -192.9 | -78.4 | -192.9 | 10.00 | 10.00 | |
| 7,061.3 | 31.69 | 359.93 | 7,040.0 | -163.5 | -78.5 | -163.5 | 10.00 | 10.00 | Niobrara |
| 7,100.0 | 35.56 | 0.08 | 7,072.2 | -142.1 | -78.5 | -142.1 | 10.00 | 10.00 | |
| 7,113.4 | 36.90 | 0.12 | 7,083.0 | -134.2 | -78.5 | -134.2 | 10.00 | 10.00 | B Chalk |
| 7,153.2 | 40.88 | 0.24 | 7,114.0 | -109.2 | -78.4 | -109.2 | 10.00 | 10.00 | B Marl |
| 7,198.4 | 45.40 | 0.35 | 7,147.0 | -78.3 | -78.3 | -78.3 | 10.00 | 10.00 | C Chalk |
| 7,200.0 | 45.56 | 0.35 | 7,148.1 | -77.1 | -78.3 | -77.1 | 10.00 | 10.00 | |
| 7,258.7 | 51.43 | 0.47 | 7,187.0 | -33.2 | -77.9 | -33.2 | 10.00 | 10.00 | C Marl |
| 7,300.0 | 55.56 | 0.55 | 7,211.5 | 0.0 | -77.6 | 0.0 | 10.00 | 10.00 | |
| 7,332.3 | 58.79 | 0.60 | 7,229.0 | 27.1 | -77.4 | 27.1 | 10.00 | 10.00 | 7" |
| 7,400.0 | 65.55 | 0.70 | 7,260.6 | 86.9 | -76.7 | 86.9 | 10.00 | 10.00 | |
| 7,449.1 | 70.46 | 0.77 | 7,279.0 | 132.4 | -76.1 | 132.4 | 10.00 | 10.00 | Ft. Hayes |
| 7,500.0 | 75.55 | 0.83 | 7,293.9 | 181.1 | -75.4 | 181.1 | 10.00 | 10.00 | |
| 7,537.3 | 79.28 | 0.88 | 7,302.0 | 217.5 | -74.9 | 217.5 | 10.00 | 10.00 | Codell |
| 7,600.0 | 85.55 | 0.95 | 7,310.3 | 279.6 | -73.9 | 279.6 | 10.00 | 10.00 | |
| 7,644.5 | 90.00 | 1.00 | 7,312.0 | 324.0 | -73.1 | 324.0 | 10.00 | 10.00 | LP @ 7312' TVD; 90° |
| 7,700.0 | 90.00 | 1.00 | 7,312.0 | 379.6 | -72.2 | 379.6 | 0.00 | 0.00 | |
| 7,800.0 | 90.00 | 1.00 | 7,312.0 | 479.5 | -70.4 | 479.5 | 0.00 | 0.00 | |
| 7,900.0 | 90.00 | 1.00 | 7,312.0 | 579.5 | -68.7 | 579.5 | 0.00 | 0.00 | |
| 8,000.0 | 90.00 | 1.00 | 7,312.0 | 679.5 | -66.9 | 679.5 | 0.00 | 0.00 | |
| 8,100.0 | 90.00 | 1.00 | 7,312.0 | 779.5 | -65.2 | 779.5 | 0.00 | 0.00 | |
| 8,200.0 | 90.00 | 1.00 | 7,312.0 | 879.5 | -63.4 | 879.5 | 0.00 | 0.00 | |
| 8,300.0 | 90.00 | 1.00 | 7,312.0 | 979.5 | -61.7 | 979.5 | 0.00 | 0.00 | |
| 8,400.0 | 90.00 | 1.00 | 7,312.0 | 1,079.5 | -59.9 | 1,079.5 | 0.00 | 0.00 | |
| 8,500.0 | 90.00 | 1.00 | 7,312.0 | 1,179.4 | -58.2 | 1,179.4 | 0.00 | 0.00 | |
| 8,501.7 | 90.00 | 1.00 | 7,312.0 | 1,181.2 | -58.2 | 1,181.2 | 0.00 | 0.00 | Interp @ 7312.0 (Vogl-Geist 2A-5H-E267 Hz Pl |

| | | | |
|---|---|---|---|
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| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 8,600.0 | 90.00 | 1.00 | 7,312.0 | 1,279.4 | -56.5 | 1,279.4 | 0.00 | 0.00 | |
| 8,700.0 | 90.00 | 1.00 | 7,312.0 | 1,379.4 | -54.7 | 1,379.4 | 0.00 | 0.00 | |
| 8,800.0 | 90.00 | 1.00 | 7,312.0 | 1,479.4 | -53.0 | 1,479.4 | 0.00 | 0.00 | |
| 8,900.0 | 90.00 | 1.00 | 7,312.0 | 1,579.4 | -51.2 | 1,579.4 | 0.00 | 0.00 | |
| 9,000.0 | 90.00 | 1.00 | 7,312.0 | 1,679.4 | -49.5 | 1,679.4 | 0.00 | 0.00 | |
| 9,100.0 | 90.00 | 1.00 | 7,312.0 | 1,779.3 | -47.7 | 1,779.3 | 0.00 | 0.00 | |
| 9,200.0 | 90.00 | 1.00 | 7,312.0 | 1,879.3 | -46.0 | 1,879.3 | 0.00 | 0.00 | |
| 9,300.0 | 90.00 | 1.00 | 7,312.0 | 1,979.3 | -44.2 | 1,979.3 | 0.00 | 0.00 | |
| 9,400.0 | 90.00 | 1.00 | 7,312.0 | 2,079.3 | -42.5 | 2,079.3 | 0.00 | 0.00 | |
| 9,500.0 | 90.00 | 1.00 | 7,312.0 | 2,179.3 | -40.8 | 2,179.3 | 0.00 | 0.00 | |
| 9,600.0 | 90.00 | 1.00 | 7,312.0 | 2,279.3 | -39.0 | 2,279.3 | 0.00 | 0.00 | |
| 9,700.0 | 90.00 | 1.00 | 7,312.0 | 2,379.3 | -37.3 | 2,379.3 | 0.00 | 0.00 | |
| 9,800.0 | 90.00 | 1.00 | 7,312.0 | 2,479.2 | -35.5 | 2,479.2 | 0.00 | 0.00 | |
| 9,900.0 | 90.00 | 1.00 | 7,312.0 | 2,579.2 | -33.8 | 2,579.2 | 0.00 | 0.00 | |
| 10,000.0 | 90.00 | 1.00 | 7,312.0 | 2,679.2 | -32.0 | 2,679.2 | 0.00 | 0.00 | |
| 10,100.0 | 90.00 | 1.00 | 7,312.0 | 2,779.2 | -30.3 | 2,779.2 | 0.00 | 0.00 | |
| 10,200.0 | 90.00 | 1.00 | 7,312.0 | 2,879.2 | -28.5 | 2,879.2 | 0.00 | 0.00 | |
| 10,300.0 | 90.00 | 1.00 | 7,312.0 | 2,979.2 | -26.8 | 2,979.2 | 0.00 | 0.00 | |
| 10,400.0 | 90.00 | 1.00 | 7,312.0 | 3,079.1 | -25.0 | 3,079.1 | 0.00 | 0.00 | |
| 10,500.0 | 90.00 | 1.00 | 7,312.0 | 3,179.1 | -23.3 | 3,179.1 | 0.00 | 0.00 | |
| 10,600.0 | 90.00 | 1.00 | 7,312.0 | 3,279.1 | -21.6 | 3,279.1 | 0.00 | 0.00 | |
| 10,700.0 | 90.00 | 1.00 | 7,312.0 | 3,379.1 | -19.8 | 3,379.1 | 0.00 | 0.00 | |
| 10,800.0 | 90.00 | 1.00 | 7,312.0 | 3,479.1 | -18.1 | 3,479.1 | 0.00 | 0.00 | |
| 10,900.0 | 90.00 | 1.00 | 7,312.0 | 3,579.1 | -16.3 | 3,579.1 | 0.00 | 0.00 | |
| 11,000.0 | 90.00 | 1.00 | 7,312.0 | 3,679.1 | -14.6 | 3,679.1 | 0.00 | 0.00 | |
| 11,100.0 | 90.00 | 1.00 | 7,312.0 | 3,779.0 | -12.8 | 3,779.0 | 0.00 | 0.00 | |
| 11,200.0 | 90.00 | 1.00 | 7,312.0 | 3,879.0 | -11.1 | 3,879.0 | 0.00 | 0.00 | |
| 11,300.0 | 90.00 | 1.00 | 7,312.0 | 3,979.0 | -9.3 | 3,979.0 | 0.00 | 0.00 | |
| 11,400.0 | 90.00 | 1.00 | 7,312.0 | 4,079.0 | -7.6 | 4,079.0 | 0.00 | 0.00 | |
| 11,500.0 | 90.00 | 1.00 | 7,312.0 | 4,179.0 | -5.8 | 4,179.0 | 0.00 | 0.00 | |
| 11,600.0 | 90.00 | 1.00 | 7,312.0 | 4,279.0 | -4.1 | 4,279.0 | 0.00 | 0.00 | |
| 11,700.0 | 90.00 | 1.00 | 7,312.0 | 4,379.0 | -2.4 | 4,379.0 | 0.00 | 0.00 | |
| 11,800.0 | 90.00 | 1.00 | 7,312.0 | 4,478.9 | -0.6 | 4,478.9 | 0.00 | 0.00 | |
| 11,900.0 | 90.00 | 1.00 | 7,312.0 | 4,578.9 | 1.1 | 4,578.9 | 0.00 | 0.00 | |
| 12,000.0 | 90.00 | 1.00 | 7,312.0 | 4,678.9 | 2.9 | 4,678.9 | 0.00 | 0.00 | |
| 12,100.0 | 90.00 | 1.00 | 7,312.0 | 4,778.9 | 4.6 | 4,778.9 | 0.00 | 0.00 | |
| 12,200.0 | 90.00 | 1.00 | 7,312.0 | 4,878.9 | 6.4 | 4,878.9 | 0.00 | 0.00 | |
| 12,300.0 | 90.00 | 1.00 | 7,312.0 | 4,978.9 | 8.1 | 4,978.9 | 0.00 | 0.00 | |
| 12,400.0 | 90.00 | 1.00 | 7,312.0 | 5,078.8 | 9.9 | 5,078.8 | 0.00 | 0.00 | |
| 12,500.0 | 90.00 | 1.00 | 7,312.0 | 5,178.8 | 11.6 | 5,178.8 | 0.00 | 0.00 | |
| 12,600.0 | 90.00 | 1.00 | 7,312.0 | 5,278.8 | 13.4 | 5,278.8 | 0.00 | 0.00 | |
| 12,700.0 | 90.00 | 1.00 | 7,312.0 | 5,378.8 | 15.1 | 5,378.8 | 0.00 | 0.00 | |
| 12,800.0 | 90.00 | 1.00 | 7,312.0 | 5,478.8 | 16.8 | 5,478.8 | 0.00 | 0.00 | |
| 12,900.0 | 90.00 | 1.00 | 7,312.0 | 5,578.8 | 18.6 | 5,578.8 | 0.00 | 0.00 | |
| 13,000.0 | 90.00 | 1.00 | 7,312.0 | 5,678.8 | 20.3 | 5,678.8 | 0.00 | 0.00 | |
| 13,100.0 | 90.00 | 1.00 | 7,312.0 | 5,778.7 | 22.1 | 5,778.7 | 0.00 | 0.00 | |
| 13,200.0 | 90.00 | 1.00 | 7,312.0 | 5,878.7 | 23.8 | 5,878.7 | 0.00 | 0.00 | |
| 13,300.0 | 90.00 | 1.00 | 7,312.0 | 5,978.7 | 25.6 | 5,978.7 | 0.00 | 0.00 | |
| 13,400.0 | 90.00 | 1.00 | 7,312.0 | 6,078.7 | 27.3 | 6,078.7 | 0.00 | 0.00 | |
| 13,500.0 | 90.00 | 1.00 | 7,312.0 | 6,178.7 | 29.1 | 6,178.7 | 0.00 | 0.00 | |
| 13,600.0 | 90.00 | 1.00 | 7,312.0 | 6,278.7 | 30.8 | 6,278.7 | 0.00 | 0.00 | |
| 13,700.0 | 90.00 | 1.00 | 7,312.0 | 6,378.6 | 32.5 | 6,378.6 | 0.00 | 0.00 | |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 13,800.0 | 90.00 | 1.00 | 7,312.0 | 6,478.6 | 34.3 | 6,478.6 | 0.00 | 0.00 | |
| 13,900.0 | 90.00 | 1.00 | 7,312.0 | 6,578.6 | 36.0 | 6,578.6 | 0.00 | 0.00 | |
| 14,000.0 | 90.00 | 1.00 | 7,312.0 | 6,678.6 | 37.8 | 6,678.6 | 0.00 | 0.00 | |
| 14,100.0 | 90.00 | 1.00 | 7,312.0 | 6,778.6 | 39.5 | 6,778.6 | 0.00 | 0.00 | |
| 14,200.0 | 90.00 | 1.00 | 7,312.0 | 6,878.6 | 41.3 | 6,878.6 | 0.00 | 0.00 | |
| 14,300.0 | 90.00 | 1.00 | 7,312.0 | 6,978.6 | 43.0 | 6,978.6 | 0.00 | 0.00 | |
| 14,400.0 | 90.00 | 1.00 | 7,312.0 | 7,078.5 | 44.8 | 7,078.5 | 0.00 | 0.00 | |
| 14,500.0 | 90.00 | 1.00 | 7,312.0 | 7,178.5 | 46.5 | 7,178.5 | 0.00 | 0.00 | |
| 14,600.0 | 90.00 | 1.00 | 7,312.0 | 7,278.5 | 48.3 | 7,278.5 | 0.00 | 0.00 | |
| 14,700.0 | 90.00 | 1.00 | 7,312.0 | 7,378.5 | 50.0 | 7,378.5 | 0.00 | 0.00 | |
| 14,716.5 | 90.00 | 1.00 | 7,312.0 | 7,395.0 | 50.3 | 7,395.0 | 0.00 | 0.00 | TD at 14716.5 - Vogl-Geist 2A-5H-E267 PBHL |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| Interp @ 7312.0 (Vogl-G | 0.00 | 0.00 | 7,312.0 | 1,178.5 | 93.7 | 1,305,822.03 | 3,161,508.83 | 40.171425 | -104.922065 |
| - plan misses target center by 151.9ft at 8501.7ft MD (7312.0 TVD, 1181.2 N, -58.2 E) | | | | | | | | | |
| - Point | | | | | | | | | |
| Vogl-Geist 2A-5H-E267 | 0.00 | 0.00 | 7,312.0 | 7,395.0 | 50.3 | 1,312,038.07 | 3,161,424.94 | 40.188490 | -104.922220 |
| - plan hits target center | | | | | | | | | |
| - Point | | | | | | | | | |

**Casing Points**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (in) | Hole Diameter (in) |
|---|---|---|---|---|
| 7,332.3 | 7,229.0 | 7" | 0.000 | 0.000 |

**Formations**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---|---|---|---|---|---|
| 266.0 | 266.0 | Fox Hills - BASE | | | |
| 4,108.1 | 4,105.0 | Sussex | | | |
| 4,367.4 | 4,364.0 | Sussex Marker | | | |
| 4,659.6 | 4,656.0 | Shannon | | | |
| 6,004.8 | 6,000.0 | Teepee Buttes (*if present) | | | |
| 6,969.1 | 6,958.0 | Sharon Springs | | | |
| 7,061.3 | 7,040.0 | Niobrara | | | |
| 7,113.4 | 7,083.0 | B Chalk | | | |
| 7,153.2 | 7,114.0 | B Marl | | | |
| 7,198.4 | 7,147.0 | C Chalk | | | |
| 7,258.7 | 7,187.0 | C Marl | | | |
| 7,449.1 | 7,279.0 | Ft. Hayes | | | |
| 7,537.3 | 7,302.0 | Codell | | | |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Project:** | DJ Wattenberg | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site:** | S5-T2N-R67W (Vogl-McCoy) | **North Reference:** | True |
| **Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #1 | | |

**Plan Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 400.0 | 400.0 | 0.0 | 0.0 | KOP @ 400' |
| 519.0 | 518.9 | -2.4 | -0.7 | EOB; INC=2.4° |
| 6,721.6 | 6,716.2 | -248.5 | -76.3 | Start build/turn @ 6721' MD |
| 7,644.5 | 7,312.0 | 324.0 | -73.1 | LP @ 7312' TVD; 90° |
| 14,716.5 | 7,312.0 | 7,395.0 | 50.3 | TD at 14716.5 |

# EnCana Oil & Gas (USA) Inc

**DJ Wattenberg**
**S5-T2N-R67W (Vogl-McCoy)**
**Vogl-Geist 2A-5H-E267**
**Hz**
**Plan #1**

# Anticollision Report

**21 May, 2013**

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

| | |
|---|---|
| **Reference** | Plan #1 |

| | | | |
|---|---|---|---|
| **Filter type:** | NO GLOBAL FILTER: Using user defined selection & filtering criteria | | |
| **Interpolation Method:** | MD Interval 100.0ft | **Error Model:** | Systematic Ellipse |
| **Depth Range:** | Unlimited | **Scan Method:** | Closest Approach 3D |
| **Results Limited by:** | Maximum center-center distance of 500.0ft | **Error Surface:** | Elliptical Conic |
| **Warning Levels Evaluated at:** | 2.00 **Sigma** | | |

**Survey Tool Program** **Date** 5/21/2013

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 0.0 | 14,716.3 | Plan #1 (Hz) | MWD | Geolink MWD |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Summary**

| Site Name<br>Offset Well - Wellbore - Design | Reference Measured Depth (ft) | Offset Measured Depth (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|
| S5-T2N-R67W (Vogl-McCoy) | | | | | | |
| ALFRED SATER UNIT 2 (EXISTING) - KMG WELL - NO | | | | | | Out of range |
| CHENG 3-8A (EXISTING) - KMG WELL - SURVEYS | | | | | | Out of range |
| DIER 13-8 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| DIER 14-8 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| DIER 23-8 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| DIER 24-8 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| DIER 4-8 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| GEIST 0-2-32 (EXISTING) - ENCANA WELL - NO SURV | 13,802.2 | 7,323.6 | 223.4 | 94.1 | 1.727 | CC, ES, SF |
| GEIST 11-32 (EXISTING) - ENCANA WELL - NO SURVE | | | | | | Out of range |
| GEIST 12-32 (EXISTING) - ENCANA WELL - NO SURVE | 13,020.7 | 7,254.0 | 494.6 | 379.5 | 4.297 | CC, ES, SF |
| GEIST 2-0-32 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| GEIST 21-32 (EXISTING) - ENCANA WELL - NO SURVE | | | | | | Out of range |
| GEIST 22-32 (EXISTING) - ENCANA WELL - NO SURVE | | | | | | Out of range |
| GEIST 2-4-32 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| GEIST 4-2-32 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| GEIST A UNIT #1 (EXISTING) - ENCANA WELL - SURV | | | | | | Out of range |
| MCCOY #1 (EXISTING) - ENCANA WELL - NO SURVEY | | | | | | Out of range |
| MCCOY #1 (EXISTING) - ENCANA WELL - NO SURVEY | | | | | | Out of range |
| MCCOY 0-6-5 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| MCCOY 13-5 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| MCCOY 14-5 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| MCCOY 23-5 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| MCCOY 24-5 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| MCCOY 2-4-5 (EXISTING) - ENCANA WELL - SURVEYS | | | | | | Out of range |
| NELSON 23-32 (EXISTING) - ENCANA WELL - NO SUR | | | | | | Out of range |
| NELSON 4-32 (EXISTING) - ENCANA WELL - NO SURV | | | | | | Out of range |
| NELSON 4-6-32 (EXISTING) - ENCANA WELL - PLAN O | | | | | | Out of range |
| OWNES BROTHERS 13-32 (EXISTING) - ENCANA WE | 11,903.1 | 7,249.0 | 399.0 | 303.3 | 4.171 | CC, ES, SF |
| PROMINENCE 4-8 (EXISTING) - KMG WELL - NO SUR | | | | | | Out of range |
| ROBERT NELSON 14-32 (EXISTING) - ENCANA WELL | 10,370.1 | 7,252.0 | 344.2 | 274.9 | 4.971 | CC, ES |
| ROBERT NELSON 14-32 (EXISTING) - ENCANA WELL | 10,400.0 | 7,252.0 | 345.5 | 275.7 | 4.953 | SF |
| ROBERT NELSON 24-32 (EXISTING) - ENCANA WELL | | | | | | Out of range |
| ROBERT NELSON 2-8-32 (EXISTING) - ENCANA WELL | | | | | | Out of range |
| ROBERT NELSON 2-8-32 (EXISTING) - ENCANA WELL | | | | | | Out of range |
| ROBERT NELSON 2-8-32 (EXISTING) - ENCANA WELL | | | | | | Out of range |
| VOGL 21-5X (EXISTING) - KMG WELL - NO SURVEYS | | | | | | Out of range |
| VOGL 31-5 (EXISTING) - KMG WELL - NO SURVEYS | 8,439.1 | 7,475.1 | 187.7 | 136.8 | 3.687 | CC, ES, SF |
| VOGL 4-5A (EXISTING) - KMG WELL - NO SURVEYS | 9,329.2 | 7,276.0 | 284.1 | 232.4 | 5.496 | CC, ES, SF |
| VOGL 5-5 (EXISTING) - KMG WELL - NO SURVEYS | 7,560.9 | 7,279.9 | 250.6 | 224.0 | 9.404 | CC, ES, SF |
| VOGL 5-8A (EXISTING) - KMG WELL - NO SURVEYS | | | | | | Out of range |
| Vogl-Geist 2B-5H-E267 - Hz - Plan #1 | 400.0 | 400.0 | 19.6 | 18.3 | 15.147 | CC, ES |
| Vogl-Geist 2B-5H-E267 - Hz - Plan #1 | 14,716.5 | 14,513.0 | 455.6 | 223.0 | 1.958 | SF |
| Vogl-Geist 2C-5H-E267 - Hz - Plan #1 | 300.0 | 300.0 | 39.1 | 38.2 | 41.513 | CC, ES |
| Vogl-Geist 2C-5H-E267 - Hz - Plan #1 | 700.0 | 696.6 | 55.4 | 53.0 | 23.529 | SF |
| Vogl-Geist 2D-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-Geist 2E-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-Geist 2F-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-McCoy 2A-5H-E267 - Hz - Plan #1 | 200.0 | 199.0 | 8.4 | 7.8 | 14.170 | CC, ES |
| Vogl-McCoy 2A-5H-E267 - Hz - Plan #1 | 400.0 | 398.7 | 11.2 | 9.9 | 8.646 | SF |
| Vogl-McCoy 2B-5H-E267 - Hz - Plan #1 | 400.0 | 399.0 | 11.2 | 9.9 | 8.667 | CC, ES |
| Vogl-McCoy 2B-5H-E267 - Hz - Plan #1 | 7,325.4 | 7,308.8 | 99.4 | 73.9 | 3.901 | SF |
| Vogl-McCoy 2C-5H-E267 - Hz - Plan #1 | 400.0 | 400.0 | 30.7 | 29.4 | 23.802 | CC, ES |
| Vogl-McCoy 2C-5H-E267 - Hz - Plan #1 | 700.0 | 698.6 | 38.2 | 35.9 | 16.277 | SF |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Summary**

| Site Name<br>Offset Well - Wellbore - Design | Reference Measured Depth (ft) | Offset Measured Depth (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|
| S5-T2N-R67W (Vogl-McCoy) | | | | | | |
| Vogl-McCoy 2D-5H-E267 - Hz - Plan #1 | 200.0 | 200.0 | 50.3 | 49.7 | 84.770 | CC, ES |
| Vogl-McCoy 2D-5H-E267 - Hz - Plan #1 | 700.0 | 694.0 | 75.2 | 72.9 | 32.102 | SF |
| Vogl-McCoy 2E-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-McCoy 2F-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-McCoy 2G-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| Vogl-McCoy 2H-5H-F267 - Hz - Plan #1 | | | | | | Out of range |
| WANDELL 8-2-7 (EXISTING) - ENCANA WELL - SURVE | | | | | | Out of range |
| WANDELL 8-4-7 (EXISTING) - ENCANA WELL - SURVE | | | | | | Out of range |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - GEIST 0-2-32 (EXISTING) - ENCANA WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13,400.0 | 7,312.0 | 7,323.6 | 7,246.0 | 109.0 | 21.4 | -90.00 | 6,484.7 | -189.1 | 460.0 | 337.7 | 122.36 | 3.760 | |
| 13,500.0 | 7,312.0 | 7,323.6 | 7,246.0 | 110.8 | 21.4 | -90.00 | 6,484.7 | -189.1 | 375.8 | 251.7 | 124.10 | 3.028 | |
| 13,600.0 | 7,312.0 | 7,323.6 | 7,246.0 | 112.5 | 21.4 | -90.00 | 6,484.7 | -189.1 | 301.3 | 175.5 | 125.84 | 2.394 | |
| 13,700.0 | 7,312.0 | 7,323.6 | 7,246.0 | 114.3 | 21.4 | -90.00 | 6,484.7 | -189.1 | 245.7 | 118.1 | 127.59 | 1.925 | |
| 13,800.0 | 7,312.0 | 7,323.6 | 7,246.0 | 116.0 | 21.4 | -90.00 | 6,484.7 | -189.1 | 223.4 | 94.1 | 129.33 | 1.728 | |
| 13,802.2 | 7,312.0 | 7,323.6 | 7,246.0 | 116.1 | 21.4 | -90.00 | 6,484.7 | -189.1 | 223.4 | 94.1 | 129.37 | 1.727 | CC, ES, SF |
| 13,900.0 | 7,312.0 | 7,323.6 | 7,246.0 | 117.8 | 21.4 | -90.00 | 6,484.7 | -189.1 | 243.9 | 112.8 | 131.08 | 1.861 | |
| 14,000.0 | 7,312.0 | 7,323.6 | 7,246.0 | 119.5 | 21.4 | -90.00 | 6,484.7 | -189.1 | 298.4 | 165.6 | 132.82 | 2.247 | |
| 14,100.0 | 7,312.0 | 7,323.6 | 7,246.0 | 121.2 | 21.4 | -90.00 | 6,484.7 | -189.1 | 372.3 | 237.8 | 134.56 | 2.767 | |
| 14,200.0 | 7,312.0 | 7,323.6 | 7,246.0 | 123.0 | 21.4 | -90.00 | 6,484.7 | -189.1 | 456.3 | 320.0 | 136.31 | 3.347 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - GEIST 12-32 (EXISTING) - ENCANA WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 7872-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13,000.0 | 7,312.0 | 7,254.0 | 7,254.0 | 102.1 | 12.7 | 90.00 | 5,690.8 | 515.2 | 495.0 | 380.3 | 114.73 | 4.315 | |
| 13,020.7 | 7,312.0 | 7,254.0 | 7,254.0 | 102.4 | 12.7 | 90.00 | 5,690.8 | 515.2 | 494.6 | 379.5 | 115.09 | 4.297 | CC, ES, SF |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - OWNES BROTHERS 13-32 (EXISTING) - ENCANA WELL - NO SURVE

**Offset Site Error:** 0.0 ft

**Survey Program:** 8001-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11,700.0 | 7,312.0 | 7,249.0 | 7,249.0 | 79.5 | 12.7 | 90.00 | 4,575.0 | 400.1 | 447.7 | 355.6 | 92.14 | 4.859 | |
| 11,800.0 | 7,312.0 | 7,249.0 | 7,249.0 | 81.2 | 12.7 | 90.00 | 4,575.0 | 400.1 | 412.1 | 318.2 | 93.87 | 4.390 | |
| 11,900.0 | 7,312.0 | 7,249.0 | 7,249.0 | 83.0 | 12.7 | 90.00 | 4,575.0 | 400.1 | 399.0 | 303.4 | 95.60 | 4.173 | |
| 11,903.1 | 7,312.0 | 7,249.0 | 7,249.0 | 83.0 | 12.7 | 90.00 | 4,575.0 | 400.1 | 399.0 | 303.3 | 95.66 | 4.171 | CC, ES, SF |
| 12,000.0 | 7,312.0 | 7,249.0 | 7,249.0 | 84.7 | 12.7 | 90.00 | 4,575.0 | 400.1 | 410.6 | 313.3 | 97.34 | 4.218 | |
| 12,100.0 | 7,312.0 | 7,249.0 | 7,249.0 | 86.4 | 12.7 | 90.00 | 4,575.0 | 400.1 | 444.9 | 345.9 | 99.07 | 4.491 | |
| 12,200.0 | 7,312.0 | 7,249.0 | 7,249.0 | 88.2 | 12.7 | 90.00 | 4,575.0 | 400.1 | 497.3 | 396.5 | 100.81 | 4.933 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - ROBERT NELSON 14-32 (EXISTING) - ENCANA WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 8030-MWD

**Offset Well Error:** 0.0 ft

| Reference | | Offset | | Semi Major Axis | | | Offset Wellbore Centre | | Distance | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference (ft) | Offset (ft) | Highside Toolface (°) | +N/-S (ft) | +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
| 10,100.0 | 7,312.0 | 7,252.0 | 7,252.0 | 52.0 | 12.7 | 90.00 | 3,043.2 | 318.5 | 437.5 | 372.9 | 64.62 | 6.770 | |
| 10,200.0 | 7,312.0 | 7,252.0 | 7,252.0 | 53.7 | 12.7 | 90.00 | 3,043.2 | 318.5 | 383.9 | 317.6 | 66.33 | 5.788 | |
| 10,300.0 | 7,312.0 | 7,252.0 | 7,252.0 | 55.4 | 12.7 | 90.00 | 3,043.2 | 318.5 | 351.2 | 283.2 | 68.03 | 5.163 | |
| 10,370.1 | 7,312.0 | 7,252.0 | 7,252.0 | 56.6 | 12.7 | 90.00 | 3,043.2 | 318.5 | 344.2 | 274.9 | 69.23 | 4.971 | CC, ES |
| 10,400.0 | 7,312.0 | 7,252.0 | 7,252.0 | 57.1 | 12.7 | 90.00 | 3,043.2 | 318.5 | 345.5 | 275.7 | 69.74 | 4.953 | SF |
| 10,500.0 | 7,312.0 | 7,252.0 | 7,252.0 | 58.8 | 12.7 | 90.00 | 3,043.2 | 318.5 | 367.9 | 296.4 | 71.45 | 5.148 | |
| 10,600.0 | 7,312.0 | 7,252.0 | 7,252.0 | 60.5 | 12.7 | 90.00 | 3,043.2 | 318.5 | 413.9 | 340.7 | 73.17 | 5.657 | |
| 10,700.0 | 7,312.0 | 7,252.0 | 7,252.0 | 62.2 | 12.7 | 90.00 | 3,043.2 | 318.5 | 476.8 | 401.9 | 74.89 | 6.366 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - VOGL 31-5 (EXISTING) - KMG WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 500-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8,000.0 | 7,312.0 | 7,475.1 | 7,276.0 | 18.6 | 26.9 | -90.00 | 1,121.9 | -247.0 | 477.6 | 432.9 | 44.71 | 10.682 | |
| 8,100.0 | 7,312.0 | 7,475.1 | 7,276.0 | 19.9 | 26.9 | -90.00 | 1,121.9 | -247.0 | 387.6 | 341.6 | 46.03 | 8.422 | |
| 8,200.0 | 7,312.0 | 7,475.1 | 7,276.0 | 21.3 | 26.9 | -90.00 | 1,121.9 | -247.0 | 304.0 | 256.6 | 47.41 | 6.413 | |
| 8,300.0 | 7,312.0 | 7,475.1 | 7,276.0 | 22.7 | 26.9 | -90.00 | 1,121.9 | -247.0 | 233.7 | 184.8 | 48.85 | 4.784 | |
| 8,400.0 | 7,312.0 | 7,475.1 | 7,276.0 | 24.2 | 26.9 | -90.00 | 1,121.9 | -247.0 | 191.8 | 141.5 | 50.32 | 3.811 | |
| 8,439.1 | 7,312.0 | 7,475.1 | 7,276.0 | 24.8 | 26.9 | -90.00 | 1,121.9 | -247.0 | 187.7 | 136.8 | 50.92 | 3.687 | CC, ES, SF |
| 8,500.0 | 7,312.0 | 7,475.1 | 7,276.0 | 25.7 | 26.9 | -90.00 | 1,121.9 | -247.0 | 197.4 | 145.5 | 51.84 | 3.807 | |
| 8,600.0 | 7,312.0 | 7,475.1 | 7,276.0 | 27.2 | 26.9 | -90.00 | 1,121.9 | -247.0 | 247.2 | 193.9 | 53.38 | 4.632 | |
| 8,700.0 | 7,312.0 | 7,475.1 | 7,276.0 | 28.8 | 26.9 | -90.00 | 1,121.9 | -247.0 | 321.4 | 266.5 | 54.94 | 5.850 | |
| 8,800.0 | 7,312.0 | 7,475.1 | 7,276.0 | 30.4 | 26.9 | -90.00 | 1,121.9 | -247.0 | 406.8 | 350.2 | 56.53 | 7.196 | |
| 8,900.0 | 7,312.0 | 7,475.1 | 7,276.0 | 32.0 | 26.9 | -90.00 | 1,121.9 | -247.0 | 497.6 | 439.5 | 58.13 | 8.560 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - VOGL 4-5A (EXISTING) - KMG WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 7914-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9,000.0 | 7,312.0 | 7,276.0 | 7,276.0 | 33.6 | 12.7 | 90.00 | 2,003.6 | 240.3 | 434.8 | 388.6 | 46.27 | 9.397 | |
| 9,100.0 | 7,312.0 | 7,276.0 | 7,276.0 | 35.2 | 12.7 | 90.00 | 2,003.6 | 240.3 | 365.0 | 317.1 | 47.91 | 7.620 | |
| 9,200.0 | 7,312.0 | 7,276.0 | 7,276.0 | 36.9 | 12.7 | 90.00 | 2,003.6 | 240.3 | 312.1 | 262.5 | 49.55 | 6.299 | |
| 9,300.0 | 7,312.0 | 7,276.0 | 7,276.0 | 38.5 | 12.7 | 90.00 | 2,003.6 | 240.3 | 285.6 | 234.4 | 51.20 | 5.578 | |
| 9,329.2 | 7,312.0 | 7,276.0 | 7,276.0 | 39.0 | 12.7 | 90.00 | 2,003.6 | 240.3 | 284.1 | 232.4 | 51.69 | 5.496 | CC, ES, SF |
| 9,400.0 | 7,312.0 | 7,276.0 | 7,276.0 | 40.2 | 12.7 | 90.00 | 2,003.6 | 240.3 | 292.8 | 239.9 | 52.86 | 5.538 | |
| 9,500.0 | 7,312.0 | 7,276.0 | 7,276.0 | 41.9 | 12.7 | 90.00 | 2,003.6 | 240.3 | 331.5 | 276.9 | 54.53 | 6.079 | |
| 9,600.0 | 7,312.0 | 7,276.0 | 7,276.0 | 43.5 | 12.7 | 90.00 | 2,003.6 | 240.3 | 392.5 | 336.3 | 56.21 | 6.983 | |
| 9,700.0 | 7,312.0 | 7,276.0 | 7,276.0 | 45.2 | 12.7 | 90.00 | 2,003.6 | 240.3 | 467.1 | 409.2 | 57.89 | 8.069 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - VOGL 5-5 (EXISTING) - KMG WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 7910-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.63 | 236.8 | 176.1 | 296.2 | | | | |
| 100.0 | 100.0 | 74.0 | 74.0 | 0.1 | 0.1 | 36.63 | 236.8 | 176.1 | 295.1 | 294.8 | 0.25 | 1,173.144 | |
| 200.0 | 200.0 | 174.0 | 174.0 | 0.3 | 0.3 | 36.63 | 236.8 | 176.1 | 295.1 | 294.5 | 0.60 | 491.311 | |
| 300.0 | 300.0 | 274.0 | 274.0 | 0.5 | 0.5 | 36.63 | 236.8 | 176.1 | 295.1 | 294.1 | 0.95 | 310.720 | |
| 400.0 | 400.0 | 374.0 | 374.0 | 0.6 | 0.7 | 36.63 | 236.8 | 176.1 | 295.1 | 293.8 | 1.30 | 227.206 | |
| 500.0 | 500.0 | 474.0 | 474.0 | 0.8 | 0.8 | -160.54 | 236.8 | 176.1 | 296.7 | 295.1 | 1.65 | 180.111 | |
| 600.0 | 599.9 | 573.9 | 573.9 | 1.0 | 1.0 | -160.79 | 236.8 | 176.1 | 300.6 | 298.6 | 2.00 | 150.529 | |
| 700.0 | 699.8 | 673.8 | 673.8 | 1.2 | 1.2 | -161.05 | 236.8 | 176.1 | 304.5 | 302.2 | 2.35 | 129.761 | |
| 800.0 | 799.7 | 773.7 | 773.7 | 1.4 | 1.4 | -161.30 | 236.8 | 176.1 | 308.4 | 305.7 | 2.70 | 114.379 | |
| 900.0 | 899.6 | 873.6 | 873.6 | 1.6 | 1.5 | -161.54 | 236.8 | 176.1 | 312.4 | 309.3 | 3.05 | 102.532 | |
| 1,000.0 | 999.6 | 973.6 | 973.6 | 1.7 | 1.7 | -161.78 | 236.8 | 176.1 | 316.3 | 312.9 | 3.40 | 93.127 | |
| 1,100.0 | 1,099.5 | 1,073.5 | 1,073.5 | 1.9 | 1.9 | -162.01 | 236.8 | 176.1 | 320.3 | 316.5 | 3.75 | 85.481 | |
| 1,200.0 | 1,199.4 | 1,173.4 | 1,173.4 | 2.1 | 2.0 | -162.24 | 236.8 | 176.1 | 324.2 | 320.1 | 4.10 | 79.143 | |
| 1,300.0 | 1,299.3 | 1,273.3 | 1,273.3 | 2.3 | 2.2 | -162.46 | 236.8 | 176.1 | 328.2 | 323.7 | 4.45 | 73.805 | |
| 1,400.0 | 1,399.2 | 1,373.2 | 1,373.2 | 2.5 | 2.4 | -162.68 | 236.8 | 176.1 | 332.1 | 327.3 | 4.80 | 69.246 | |
| 1,500.0 | 1,499.1 | 1,473.1 | 1,473.1 | 2.7 | 2.6 | -162.89 | 236.8 | 176.1 | 336.1 | 330.9 | 5.15 | 65.309 | |
| 1,600.0 | 1,599.0 | 1,573.0 | 1,573.0 | 2.9 | 2.7 | -163.09 | 236.8 | 176.1 | 340.1 | 334.6 | 5.50 | 61.875 | |
| 1,700.0 | 1,698.9 | 1,672.9 | 1,672.9 | 3.1 | 2.9 | -163.29 | 236.8 | 176.1 | 344.0 | 338.2 | 5.85 | 58.852 | |
| 1,800.0 | 1,798.9 | 1,772.9 | 1,772.9 | 3.2 | 3.1 | -163.49 | 236.8 | 176.1 | 348.0 | 341.8 | 6.20 | 56.172 | |
| 1,900.0 | 1,898.8 | 1,872.8 | 1,872.8 | 3.4 | 3.3 | -163.68 | 236.8 | 176.1 | 352.0 | 345.4 | 6.55 | 53.780 | |
| 2,000.0 | 1,998.7 | 1,972.7 | 1,972.7 | 3.6 | 3.4 | -163.87 | 236.8 | 176.1 | 356.0 | 349.1 | 6.89 | 51.630 | |
| 2,100.0 | 2,098.6 | 2,072.6 | 2,072.6 | 3.8 | 3.6 | -164.05 | 236.8 | 176.1 | 360.0 | 352.7 | 7.24 | 49.689 | |
| 2,200.0 | 2,198.5 | 2,172.5 | 2,172.5 | 4.0 | 3.8 | -164.23 | 236.8 | 176.1 | 364.0 | 356.4 | 7.59 | 47.928 | |
| 2,300.0 | 2,298.4 | 2,272.4 | 2,272.4 | 4.2 | 4.0 | -164.41 | 236.8 | 176.1 | 368.0 | 360.0 | 7.94 | 46.322 | |
| 2,400.0 | 2,398.3 | 2,372.3 | 2,372.3 | 4.4 | 4.1 | -164.58 | 236.8 | 176.1 | 372.0 | 363.7 | 8.29 | 44.852 | |
| 2,500.0 | 2,498.3 | 2,472.3 | 2,472.3 | 4.6 | 4.3 | -164.75 | 236.8 | 176.1 | 376.0 | 367.3 | 8.64 | 43.501 | |
| 2,600.0 | 2,598.2 | 2,572.2 | 2,572.2 | 4.8 | 4.5 | -164.91 | 236.8 | 176.1 | 380.0 | 371.0 | 8.99 | 42.256 | |
| 2,700.0 | 2,698.1 | 2,672.1 | 2,672.1 | 4.9 | 4.7 | -165.07 | 236.8 | 176.1 | 384.0 | 374.6 | 9.34 | 41.105 | |
| 2,800.0 | 2,798.0 | 2,772.0 | 2,772.0 | 5.1 | 4.8 | -165.23 | 236.8 | 176.1 | 388.0 | 378.3 | 9.69 | 40.037 | |
| 2,900.0 | 2,897.9 | 2,871.9 | 2,871.9 | 5.3 | 5.0 | -165.39 | 236.8 | 176.1 | 392.0 | 382.0 | 10.04 | 39.043 | |
| 3,000.0 | 2,997.8 | 2,971.8 | 2,971.8 | 5.5 | 5.2 | -165.54 | 236.8 | 176.1 | 396.0 | 385.6 | 10.39 | 38.117 | |
| 3,100.0 | 3,097.7 | 3,071.7 | 3,071.7 | 5.7 | 5.4 | -165.69 | 236.8 | 176.1 | 400.0 | 389.3 | 10.74 | 37.252 | |
| 3,200.0 | 3,197.7 | 3,171.7 | 3,171.7 | 5.9 | 5.5 | -165.83 | 236.8 | 176.1 | 404.1 | 393.0 | 11.09 | 36.441 | |
| 3,300.0 | 3,297.6 | 3,271.6 | 3,271.6 | 6.1 | 5.7 | -165.97 | 236.8 | 176.1 | 408.1 | 396.7 | 11.44 | 35.680 | |
| 3,400.0 | 3,397.5 | 3,371.5 | 3,371.5 | 6.3 | 5.9 | -166.11 | 236.8 | 176.1 | 412.1 | 400.3 | 11.79 | 34.965 | |
| 3,500.0 | 3,497.4 | 3,471.4 | 3,471.4 | 6.5 | 6.1 | -166.25 | 236.8 | 176.1 | 416.2 | 404.0 | 12.14 | 34.291 | |
| 3,600.0 | 3,597.3 | 3,571.3 | 3,571.3 | 6.6 | 6.2 | -166.39 | 236.8 | 176.1 | 420.2 | 407.7 | 12.49 | 33.655 | |
| 3,700.0 | 3,697.2 | 3,671.2 | 3,671.2 | 6.8 | 6.4 | -166.52 | 236.8 | 176.1 | 424.2 | 411.4 | 12.83 | 33.053 | |
| 3,800.0 | 3,797.1 | 3,771.1 | 3,771.1 | 7.0 | 6.6 | -166.65 | 236.8 | 176.1 | 428.3 | 415.1 | 13.18 | 32.484 | |
| 3,900.0 | 3,897.1 | 3,871.1 | 3,871.1 | 7.2 | 6.8 | -166.77 | 236.8 | 176.1 | 432.3 | 418.8 | 13.53 | 31.945 | |
| 4,000.0 | 3,997.0 | 3,971.0 | 3,971.0 | 7.4 | 6.9 | -166.90 | 236.8 | 176.1 | 436.3 | 422.5 | 13.88 | 31.432 | |
| 4,100.0 | 4,096.9 | 4,070.9 | 4,070.9 | 7.6 | 7.1 | -167.02 | 236.8 | 176.1 | 440.4 | 426.2 | 14.23 | 30.945 | |
| 4,200.0 | 4,196.8 | 4,170.8 | 4,170.8 | 7.8 | 7.3 | -167.14 | 236.8 | 176.1 | 444.4 | 429.9 | 14.58 | 30.482 | |
| 4,300.0 | 4,296.7 | 4,270.7 | 4,270.7 | 8.0 | 7.5 | -167.26 | 236.8 | 176.1 | 448.5 | 433.6 | 14.93 | 30.040 | |
| 4,400.0 | 4,396.6 | 4,370.6 | 4,370.6 | 8.2 | 7.6 | -167.38 | 236.8 | 176.1 | 452.5 | 437.3 | 15.28 | 29.619 | |
| 4,500.0 | 4,496.5 | 4,470.5 | 4,470.5 | 8.3 | 7.8 | -167.49 | 236.8 | 176.1 | 456.6 | 441.0 | 15.63 | 29.216 | |
| 4,600.0 | 4,596.4 | 4,570.4 | 4,570.4 | 8.5 | 8.0 | -167.60 | 236.8 | 176.1 | 460.6 | 444.7 | 15.98 | 28.832 | |
| 4,700.0 | 4,696.4 | 4,670.4 | 4,670.4 | 8.7 | 8.2 | -167.71 | 236.8 | 176.1 | 464.7 | 448.4 | 16.33 | 28.464 | |
| 4,800.0 | 4,796.3 | 4,770.3 | 4,770.3 | 8.9 | 8.3 | -167.82 | 236.8 | 176.1 | 468.7 | 452.1 | 16.67 | 28.111 | |
| 4,900.0 | 4,896.2 | 4,870.2 | 4,870.2 | 9.1 | 8.5 | -167.93 | 236.8 | 176.1 | 472.8 | 455.8 | 17.02 | 27.773 | |
| 5,000.0 | 4,996.1 | 4,970.1 | 4,970.1 | 9.3 | 8.7 | -168.03 | 236.8 | 176.1 | 476.9 | 459.5 | 17.37 | 27.449 | |
| 5,100.0 | 5,096.0 | 5,070.0 | 5,070.0 | 9.5 | 8.8 | -168.13 | 236.8 | 176.1 | 480.9 | 463.2 | 17.72 | 27.138 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - VOGL 5-5 (EXISTING) - KMG WELL - NO SURVEYS

**Offset Site Error:** 0.0 ft

**Survey Program:** 7910-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,195.9 | 5,169.9 | 5,169.9 | 9.7 | 9.0 | -168.23 | 236.8 | 176.1 | 485.0 | 466.9 | 18.07 | 26.838 | |
| 5,300.0 | 5,295.8 | 5,269.8 | 5,269.8 | 9.9 | 9.2 | -168.33 | 236.8 | 176.1 | 489.1 | 470.6 | 18.42 | 26.550 | |
| 5,400.0 | 5,395.8 | 5,369.8 | 5,369.8 | 10.0 | 9.4 | -168.43 | 236.8 | 176.1 | 493.1 | 474.4 | 18.77 | 26.273 | |
| 5,500.0 | 5,495.7 | 5,469.7 | 5,469.7 | 10.2 | 9.5 | -168.53 | 236.8 | 176.1 | 497.2 | 478.1 | 19.12 | 26.007 | |
| 7,000.0 | 6,986.2 | 6,960.2 | 6,960.2 | 12.7 | 12.1 | 33.68 | 236.8 | 176.1 | 499.4 | 476.2 | 23.17 | 21.549 | |
| 7,100.0 | 7,072.2 | 7,046.2 | 7,046.2 | 12.6 | 12.3 | 39.47 | 236.8 | 176.1 | 456.5 | 433.6 | 22.85 | 19.979 | |
| 7,200.0 | 7,148.1 | 7,122.1 | 7,122.1 | 12.6 | 12.4 | 48.80 | 236.8 | 176.1 | 404.0 | 381.1 | 22.97 | 17.587 | |
| 7,300.0 | 7,211.5 | 7,185.5 | 7,185.5 | 12.8 | 12.5 | 61.71 | 236.8 | 176.1 | 347.1 | 323.2 | 23.90 | 14.522 | |
| 7,400.0 | 7,260.6 | 7,234.6 | 7,234.6 | 13.1 | 12.6 | 75.84 | 236.8 | 176.1 | 293.8 | 268.6 | 25.20 | 11.659 | |
| 7,500.0 | 7,293.9 | 7,267.9 | 7,267.9 | 13.6 | 12.7 | 86.62 | 236.8 | 176.1 | 257.6 | 231.4 | 26.17 | 9.844 | |
| 7,560.9 | 7,305.9 | 7,279.9 | 7,279.9 | 14.0 | 12.7 | 90.00 | 236.8 | 176.1 | 250.6 | 224.0 | 26.65 | 9.404 | CC, ES, SF |
| 7,600.0 | 7,310.3 | 7,284.3 | 7,284.3 | 14.3 | 12.7 | 90.69 | 236.8 | 176.1 | 253.6 | 226.7 | 26.94 | 9.415 | |
| 7,700.0 | 7,312.0 | 7,286.0 | 7,286.0 | 15.2 | 12.7 | 90.00 | 236.8 | 176.1 | 286.4 | 258.5 | 27.83 | 10.290 | |
| 7,800.0 | 7,312.0 | 7,286.0 | 7,286.0 | 16.2 | 12.7 | 90.00 | 236.8 | 176.1 | 345.9 | 317.1 | 28.86 | 11.988 | |
| 7,900.0 | 7,312.0 | 7,286.0 | 7,286.0 | 17.3 | 12.7 | 90.00 | 236.8 | 176.1 | 421.1 | 391.1 | 30.01 | 14.035 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-Geist 2B-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 90.05 | 0.0 | 19.6 | 19.6 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 90.05 | 0.0 | 19.6 | 19.6 | 19.3 | 0.24 | 80.060 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 90.05 | 0.0 | 19.6 | 19.6 | 19.0 | 0.59 | 32.966 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.5 | 0.5 | 90.05 | 0.0 | 19.6 | 19.6 | 18.6 | 0.94 | 20.756 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.6 | 0.6 | 90.05 | 0.0 | 19.6 | 19.6 | 18.3 | 1.29 | 15.147 | CC, ES |
| 500.0 | 500.0 | 500.0 | 500.0 | 0.8 | 0.8 | -111.76 | 0.0 | 19.6 | 20.1 | 18.5 | 1.64 | 12.264 | |
| 600.0 | 599.9 | 599.9 | 599.9 | 1.0 | 1.0 | -121.69 | 0.0 | 19.6 | 22.0 | 20.0 | 2.00 | 11.018 | |
| 700.0 | 699.8 | 699.5 | 699.5 | 1.2 | 1.2 | -128.42 | -0.4 | 20.3 | 25.0 | 22.6 | 2.35 | 10.631 | |
| 800.0 | 799.7 | 799.1 | 799.1 | 1.4 | 1.3 | -130.85 | -1.7 | 22.6 | 29.2 | 26.5 | 2.70 | 10.813 | |
| 900.0 | 899.6 | 898.7 | 898.5 | 1.6 | 1.5 | -130.32 | -3.8 | 26.4 | 34.6 | 31.5 | 3.06 | 11.286 | |
| 1,000.0 | 999.6 | 998.0 | 997.7 | 1.7 | 1.7 | -128.03 | -6.7 | 31.7 | 41.0 | 37.6 | 3.43 | 11.957 | |
| 1,100.0 | 1,099.5 | 1,097.2 | 1,096.6 | 1.9 | 1.9 | -124.85 | -10.5 | 38.4 | 48.7 | 44.9 | 3.80 | 12.799 | |
| 1,200.0 | 1,199.4 | 1,196.6 | 1,195.6 | 2.1 | 2.1 | -121.66 | -14.8 | 46.3 | 57.3 | 53.1 | 4.18 | 13.720 | |
| 1,300.0 | 1,299.3 | 1,296.2 | 1,294.8 | 2.3 | 2.3 | -119.29 | -19.2 | 54.2 | 66.1 | 61.6 | 4.55 | 14.524 | |
| 1,400.0 | 1,399.2 | 1,395.8 | 1,393.9 | 2.5 | 2.6 | -117.47 | -23.6 | 62.1 | 75.0 | 70.1 | 4.93 | 15.223 | |
| 1,500.0 | 1,499.1 | 1,495.4 | 1,493.1 | 2.7 | 2.8 | -116.04 | -28.0 | 70.0 | 84.0 | 78.7 | 5.30 | 15.834 | |
| 1,600.0 | 1,599.0 | 1,595.0 | 1,592.3 | 2.9 | 3.0 | -114.89 | -32.4 | 77.9 | 93.0 | 87.3 | 5.68 | 16.372 | |
| 1,700.0 | 1,698.9 | 1,694.5 | 1,691.4 | 3.1 | 3.2 | -113.93 | -36.7 | 85.8 | 102.0 | 95.9 | 6.05 | 16.848 | |
| 1,800.0 | 1,798.9 | 1,794.1 | 1,790.6 | 3.2 | 3.5 | -113.14 | -41.1 | 93.7 | 111.0 | 104.6 | 6.43 | 17.272 | |
| 1,900.0 | 1,898.8 | 1,893.7 | 1,889.8 | 3.4 | 3.7 | -112.46 | -45.5 | 101.7 | 120.1 | 113.3 | 6.80 | 17.653 | |
| 2,000.0 | 1,998.7 | 1,993.3 | 1,988.9 | 3.6 | 3.9 | -111.88 | -49.9 | 109.6 | 129.2 | 122.0 | 7.18 | 17.995 | |
| 2,100.0 | 2,098.6 | 2,092.9 | 2,088.1 | 3.8 | 4.1 | -111.38 | -54.3 | 117.5 | 138.3 | 130.7 | 7.55 | 18.305 | |
| 2,200.0 | 2,198.5 | 2,192.4 | 2,187.3 | 4.0 | 4.4 | -110.94 | -58.7 | 125.4 | 147.4 | 139.5 | 7.93 | 18.587 | |
| 2,300.0 | 2,298.4 | 2,292.0 | 2,286.5 | 4.2 | 4.6 | -110.55 | -63.1 | 133.3 | 156.5 | 148.2 | 8.30 | 18.845 | |
| 2,400.0 | 2,398.3 | 2,391.6 | 2,385.6 | 4.4 | 4.8 | -110.20 | -67.4 | 141.2 | 165.6 | 156.9 | 8.68 | 19.080 | |
| 2,500.0 | 2,498.3 | 2,491.2 | 2,484.8 | 4.6 | 5.1 | -109.89 | -71.8 | 149.1 | 174.7 | 165.7 | 9.05 | 19.297 | |
| 2,600.0 | 2,598.2 | 2,590.7 | 2,584.0 | 4.8 | 5.3 | -109.61 | -76.2 | 157.0 | 183.9 | 174.4 | 9.43 | 19.498 | |
| 2,700.0 | 2,698.1 | 2,690.3 | 2,683.1 | 4.9 | 5.5 | -109.35 | -80.6 | 164.9 | 193.0 | 183.2 | 9.80 | 19.683 | |
| 2,800.0 | 2,798.0 | 2,789.9 | 2,782.3 | 5.1 | 5.8 | -109.12 | -85.0 | 172.8 | 202.1 | 191.9 | 10.18 | 19.855 | |
| 2,900.0 | 2,897.9 | 2,889.5 | 2,881.5 | 5.3 | 6.0 | -108.91 | -89.4 | 180.8 | 211.3 | 200.7 | 10.56 | 20.015 | |
| 3,000.0 | 2,997.8 | 2,989.1 | 2,980.6 | 5.5 | 6.2 | -108.72 | -93.7 | 188.7 | 220.4 | 209.5 | 10.93 | 20.164 | |
| 3,100.0 | 3,097.7 | 3,088.6 | 3,079.8 | 5.7 | 6.4 | -108.54 | -98.1 | 196.6 | 229.5 | 218.2 | 11.31 | 20.304 | |
| 3,200.0 | 3,197.7 | 3,188.2 | 3,179.0 | 5.9 | 6.7 | -108.37 | -102.5 | 204.5 | 238.7 | 227.0 | 11.68 | 20.435 | |
| 3,300.0 | 3,297.6 | 3,287.8 | 3,278.1 | 6.1 | 6.9 | -108.22 | -106.9 | 212.4 | 247.8 | 235.8 | 12.06 | 20.558 | |
| 3,400.0 | 3,397.5 | 3,387.4 | 3,377.3 | 6.3 | 7.1 | -108.08 | -111.3 | 220.3 | 257.0 | 244.5 | 12.43 | 20.673 | |
| 3,500.0 | 3,497.4 | 3,487.0 | 3,476.5 | 6.5 | 7.4 | -107.95 | -115.7 | 228.2 | 266.1 | 253.3 | 12.81 | 20.782 | |
| 3,600.0 | 3,597.3 | 3,586.5 | 3,575.6 | 6.6 | 7.6 | -107.83 | -120.1 | 236.1 | 275.3 | 262.1 | 13.18 | 20.885 | |
| 3,700.0 | 3,697.2 | 3,686.1 | 3,674.8 | 6.8 | 7.8 | -107.71 | -124.4 | 244.0 | 284.4 | 270.9 | 13.56 | 20.982 | |
| 3,800.0 | 3,797.1 | 3,785.7 | 3,774.0 | 7.0 | 8.1 | -107.60 | -128.8 | 252.0 | 293.6 | 279.7 | 13.93 | 21.074 | |
| 3,900.0 | 3,897.1 | 3,885.3 | 3,873.1 | 7.2 | 8.3 | -107.50 | -133.2 | 259.9 | 302.7 | 288.4 | 14.31 | 21.161 | |
| 4,000.0 | 3,997.0 | 3,984.8 | 3,972.3 | 7.4 | 8.5 | -107.41 | -137.6 | 267.8 | 311.9 | 297.2 | 14.68 | 21.244 | |
| 4,100.0 | 4,096.9 | 4,084.4 | 4,071.5 | 7.6 | 8.8 | -107.32 | -142.0 | 275.7 | 321.0 | 306.0 | 15.06 | 21.323 | |
| 4,200.0 | 4,196.8 | 4,184.0 | 4,170.6 | 7.8 | 9.0 | -107.23 | -146.4 | 283.6 | 330.2 | 314.8 | 15.43 | 21.398 | |
| 4,300.0 | 4,296.7 | 4,283.6 | 4,269.8 | 8.0 | 9.3 | -107.15 | -150.7 | 291.5 | 339.4 | 323.6 | 15.81 | 21.470 | |
| 4,400.0 | 4,396.6 | 4,383.2 | 4,369.0 | 8.2 | 9.5 | -107.07 | -155.1 | 299.4 | 348.5 | 332.3 | 16.18 | 21.538 | |
| 4,500.0 | 4,496.5 | 4,482.7 | 4,468.1 | 8.3 | 9.7 | -107.00 | -159.5 | 307.3 | 357.7 | 341.1 | 16.56 | 21.603 | |
| 4,600.0 | 4,596.4 | 4,582.3 | 4,567.3 | 8.5 | 10.0 | -106.93 | -163.9 | 315.2 | 366.8 | 349.9 | 16.93 | 21.665 | |
| 4,700.0 | 4,696.4 | 4,681.9 | 4,666.5 | 8.7 | 10.2 | -106.87 | -168.3 | 323.1 | 376.0 | 358.7 | 17.31 | 21.725 | |
| 4,800.0 | 4,796.3 | 4,781.5 | 4,765.6 | 8.9 | 10.4 | -106.81 | -172.7 | 331.1 | 385.2 | 367.5 | 17.68 | 21.782 | |
| 4,900.0 | 4,896.2 | 4,881.1 | 4,864.8 | 9.1 | 10.7 | -106.75 | -177.1 | 339.0 | 394.3 | 376.3 | 18.06 | 21.837 | |
| 5,000.0 | 4,996.1 | 4,980.6 | 4,964.0 | 9.3 | 10.9 | -106.69 | -181.4 | 346.9 | 403.5 | 385.0 | 18.43 | 21.889 | |
| 5,100.0 | 5,096.0 | 5,080.2 | 5,063.1 | 9.5 | 11.1 | -106.64 | -185.8 | 354.8 | 412.6 | 393.8 | 18.81 | 21.940 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-Geist 2B-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,195.9 | 5,179.8 | 5,162.3 | 9.7 | 11.4 | -106.58 | -190.2 | 362.7 | 421.8 | 402.6 | 19.18 | 21.988 | |
| 5,300.0 | 5,295.8 | 5,279.4 | 5,261.5 | 9.9 | 11.6 | -106.53 | -194.6 | 370.6 | 431.0 | 411.4 | 19.56 | 22.035 | |
| 5,400.0 | 5,395.8 | 5,379.0 | 5,360.6 | 10.0 | 11.8 | -106.49 | -199.0 | 378.5 | 440.1 | 420.2 | 19.93 | 22.080 | |
| 5,500.0 | 5,495.7 | 5,478.5 | 5,459.8 | 10.2 | 12.1 | -106.44 | -203.4 | 386.4 | 449.3 | 429.0 | 20.31 | 22.123 | |
| 5,600.0 | 5,595.6 | 5,578.1 | 5,559.0 | 10.4 | 12.3 | -106.40 | -207.7 | 394.3 | 458.4 | 437.8 | 20.68 | 22.165 | |
| 5,700.0 | 5,695.5 | 5,677.7 | 5,658.1 | 10.6 | 12.5 | -106.36 | -212.1 | 402.3 | 467.6 | 446.5 | 21.06 | 22.205 | |
| 5,800.0 | 5,795.4 | 5,777.3 | 5,757.3 | 10.8 | 12.8 | -106.31 | -216.5 | 410.2 | 476.8 | 455.3 | 21.43 | 22.244 | |
| 5,900.0 | 5,895.3 | 5,876.8 | 5,856.5 | 11.0 | 13.0 | -106.28 | -220.9 | 418.1 | 485.9 | 464.1 | 21.81 | 22.282 | |
| 6,000.0 | 5,995.2 | 5,976.4 | 5,955.6 | 11.2 | 13.2 | -106.24 | -225.3 | 426.0 | 495.1 | 472.9 | 22.18 | 22.318 | |
| 12,900.0 | 7,312.0 | 12,704.2 | 7,093.0 | 100.3 | 100.6 | 63.89 | 5,582.7 | 465.6 | 497.8 | 316.6 | 181.19 | 2.747 | |
| 13,000.0 | 7,312.0 | 12,804.2 | 7,093.0 | 102.1 | 102.4 | 63.76 | 5,682.6 | 464.7 | 495.4 | 311.3 | 184.12 | 2.691 | |
| 13,100.0 | 7,312.0 | 12,904.2 | 7,093.0 | 103.8 | 104.1 | 63.62 | 5,782.6 | 463.8 | 493.1 | 306.0 | 187.04 | 2.636 | |
| 13,200.0 | 7,312.0 | 13,004.1 | 7,093.0 | 105.6 | 105.8 | 63.49 | 5,882.6 | 463.0 | 490.7 | 300.8 | 189.95 | 2.584 | |
| 13,300.0 | 7,312.0 | 13,104.1 | 7,093.0 | 107.3 | 107.6 | 63.35 | 5,982.5 | 462.1 | 488.4 | 295.6 | 192.85 | 2.533 | |
| 13,400.0 | 7,312.0 | 13,204.1 | 7,093.0 | 109.0 | 109.3 | 63.21 | 6,082.5 | 461.2 | 486.1 | 290.3 | 195.74 | 2.483 | |
| 13,500.0 | 7,312.0 | 13,304.0 | 7,093.0 | 110.8 | 111.0 | 63.07 | 6,182.4 | 460.4 | 483.7 | 285.1 | 198.62 | 2.435 | |
| 13,600.0 | 7,312.0 | 13,404.0 | 7,093.0 | 112.5 | 112.8 | 62.93 | 6,282.4 | 459.5 | 481.4 | 279.9 | 201.49 | 2.389 | |
| 13,700.0 | 7,312.0 | 13,504.0 | 7,093.0 | 114.3 | 114.5 | 62.79 | 6,382.4 | 458.6 | 479.1 | 274.7 | 204.35 | 2.344 | |
| 13,800.0 | 7,312.0 | 13,603.9 | 7,093.0 | 116.0 | 116.2 | 62.65 | 6,482.3 | 457.7 | 476.7 | 269.5 | 207.20 | 2.301 | |
| 13,900.0 | 7,312.0 | 13,703.9 | 7,093.0 | 117.8 | 118.0 | 62.50 | 6,582.3 | 456.9 | 474.4 | 264.4 | 210.03 | 2.259 | |
| 14,000.0 | 7,312.0 | 13,803.9 | 7,093.0 | 119.5 | 119.7 | 62.35 | 6,682.3 | 456.0 | 472.1 | 259.2 | 212.86 | 2.218 | |
| 14,100.0 | 7,312.0 | 13,903.8 | 7,093.0 | 121.2 | 121.5 | 62.21 | 6,782.2 | 455.1 | 469.8 | 254.1 | 215.67 | 2.178 | |
| 14,200.0 | 7,312.0 | 14,003.8 | 7,093.0 | 123.0 | 123.2 | 62.06 | 6,882.2 | 454.2 | 467.5 | 249.0 | 218.47 | 2.140 | |
| 14,300.0 | 7,312.0 | 14,103.8 | 7,093.0 | 124.7 | 124.9 | 61.90 | 6,982.1 | 453.4 | 465.1 | 243.9 | 221.26 | 2.102 | |
| 14,400.0 | 7,312.0 | 14,203.7 | 7,093.0 | 126.5 | 126.7 | 61.75 | 7,082.1 | 452.5 | 462.8 | 238.8 | 224.04 | 2.066 | |
| 14,500.0 | 7,312.0 | 14,303.7 | 7,093.0 | 128.2 | 128.4 | 61.60 | 7,182.1 | 451.6 | 460.5 | 233.7 | 226.81 | 2.031 | |
| 14,600.0 | 7,312.0 | 14,403.7 | 7,093.0 | 130.0 | 130.2 | 61.44 | 7,282.0 | 450.8 | 458.2 | 228.7 | 229.56 | 1.996 | |
| 14,700.0 | 7,312.0 | 14,503.6 | 7,093.0 | 131.7 | 131.9 | 61.28 | 7,382.0 | 449.9 | 455.9 | 223.6 | 232.29 | 1.963 | |
| 14,716.5 | 7,312.0 | 14,513.0 | 7,093.0 | 132.0 | 132.1 | 61.27 | 7,391.3 | 449.8 | 455.6 | 223.0 | 232.66 | 1.958 | SF |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-Geist 2C-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 90.05 | 0.0 | 39.1 | 39.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 90.05 | 0.0 | 39.1 | 39.1 | 38.9 | 0.24 | 160.120 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 90.05 | 0.0 | 39.1 | 39.1 | 38.5 | 0.59 | 65.932 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.5 | 0.5 | 90.05 | 0.0 | 39.1 | 39.1 | 38.2 | 0.94 | 41.513 | CC, ES |
| 400.0 | 400.0 | 399.3 | 399.3 | 0.6 | 0.6 | 90.45 | -0.3 | 39.9 | 39.9 | 38.7 | 1.29 | 30.951 | |
| 500.0 | 500.0 | 498.6 | 498.6 | 0.8 | 0.8 | -107.70 | -1.1 | 42.4 | 42.9 | 41.3 | 1.64 | 26.161 | |
| 600.0 | 599.9 | 597.7 | 597.6 | 1.0 | 1.0 | -110.57 | -2.5 | 46.4 | 48.3 | 46.3 | 2.00 | 24.208 | |
| 700.0 | 699.8 | 696.6 | 696.3 | 1.2 | 1.2 | -112.20 | -4.4 | 52.1 | 55.4 | 53.0 | 2.35 | 23.529 | SF |
| 800.0 | 799.7 | 795.3 | 794.7 | 1.4 | 1.4 | -112.80 | -6.9 | 59.4 | 64.1 | 61.4 | 2.72 | 23.587 | |
| 900.0 | 899.6 | 893.7 | 892.6 | 1.6 | 1.6 | -112.71 | -9.9 | 68.2 | 74.3 | 71.2 | 3.08 | 24.115 | |
| 1,000.0 | 999.6 | 991.8 | 990.1 | 1.7 | 1.9 | -112.17 | -13.4 | 78.6 | 86.1 | 82.7 | 3.45 | 24.963 | |
| 1,100.0 | 1,099.5 | 1,090.3 | 1,087.9 | 1.9 | 2.1 | -111.43 | -17.4 | 90.4 | 99.2 | 95.4 | 3.82 | 25.972 | |
| 1,200.0 | 1,199.4 | 1,189.4 | 1,186.2 | 2.1 | 2.4 | -110.84 | -21.5 | 102.3 | 112.4 | 108.2 | 4.19 | 26.827 | |
| 1,300.0 | 1,299.3 | 1,288.6 | 1,284.5 | 2.3 | 2.7 | -110.36 | -25.6 | 114.3 | 125.6 | 121.1 | 4.56 | 27.542 | |
| 1,400.0 | 1,399.2 | 1,387.7 | 1,382.8 | 2.5 | 2.9 | -109.98 | -29.6 | 126.2 | 138.9 | 133.9 | 4.93 | 28.149 | |
| 1,500.0 | 1,499.1 | 1,486.8 | 1,481.1 | 2.7 | 3.2 | -109.67 | -33.7 | 138.2 | 152.1 | 146.8 | 5.31 | 28.671 | |
| 1,600.0 | 1,599.0 | 1,585.9 | 1,579.4 | 2.9 | 3.5 | -109.40 | -37.7 | 150.1 | 165.4 | 159.7 | 5.68 | 29.124 | |
| 1,700.0 | 1,698.9 | 1,685.0 | 1,677.7 | 3.1 | 3.7 | -109.18 | -41.8 | 162.1 | 178.6 | 172.6 | 6.05 | 29.521 | |
| 1,800.0 | 1,798.9 | 1,784.1 | 1,776.0 | 3.2 | 4.0 | -108.99 | -45.9 | 174.0 | 191.9 | 185.5 | 6.42 | 29.872 | |
| 1,900.0 | 1,898.8 | 1,883.2 | 1,874.3 | 3.4 | 4.3 | -108.82 | -49.9 | 186.0 | 205.1 | 198.3 | 6.80 | 30.184 | |
| 2,000.0 | 1,998.7 | 1,982.4 | 1,972.6 | 3.6 | 4.6 | -108.67 | -54.0 | 197.9 | 218.4 | 211.2 | 7.17 | 30.464 | |
| 2,100.0 | 2,098.6 | 2,081.5 | 2,070.9 | 3.8 | 4.9 | -108.54 | -58.0 | 209.9 | 231.7 | 224.1 | 7.54 | 30.716 | |
| 2,200.0 | 2,198.5 | 2,180.6 | 2,169.3 | 4.0 | 5.1 | -108.42 | -62.1 | 221.9 | 244.9 | 237.0 | 7.91 | 30.944 | |
| 2,300.0 | 2,298.4 | 2,279.7 | 2,267.6 | 4.2 | 5.4 | -108.31 | -66.2 | 233.8 | 258.2 | 249.9 | 8.29 | 31.152 | |
| 2,400.0 | 2,398.3 | 2,378.8 | 2,365.9 | 4.4 | 5.7 | -108.22 | -70.2 | 245.8 | 271.4 | 262.8 | 8.66 | 31.342 | |
| 2,500.0 | 2,498.3 | 2,477.9 | 2,464.2 | 4.6 | 6.0 | -108.13 | -74.3 | 257.7 | 284.7 | 275.7 | 9.03 | 31.516 | |
| 2,600.0 | 2,598.2 | 2,577.1 | 2,562.5 | 4.8 | 6.2 | -108.05 | -78.3 | 269.7 | 298.0 | 288.6 | 9.41 | 31.676 | |
| 2,700.0 | 2,698.1 | 2,676.2 | 2,660.8 | 4.9 | 6.5 | -107.98 | -82.4 | 281.6 | 311.2 | 301.4 | 9.78 | 31.824 | |
| 2,800.0 | 2,798.0 | 2,775.3 | 2,759.1 | 5.1 | 6.8 | -107.92 | -86.5 | 293.6 | 324.5 | 314.3 | 10.15 | 31.961 | |
| 2,900.0 | 2,897.9 | 2,874.4 | 2,857.4 | 5.3 | 7.1 | -107.86 | -90.5 | 305.5 | 337.7 | 327.2 | 10.53 | 32.088 | |
| 3,000.0 | 2,997.8 | 2,973.5 | 2,955.7 | 5.5 | 7.4 | -107.80 | -94.6 | 317.5 | 351.0 | 340.1 | 10.90 | 32.206 | |
| 3,100.0 | 3,097.7 | 3,072.6 | 3,054.0 | 5.7 | 7.6 | -107.75 | -98.6 | 329.4 | 364.3 | 353.0 | 11.27 | 32.317 | |
| 3,200.0 | 3,197.7 | 3,171.8 | 3,152.3 | 5.9 | 7.9 | -107.70 | -102.7 | 341.4 | 377.5 | 365.9 | 11.65 | 32.420 | |
| 3,300.0 | 3,297.6 | 3,270.9 | 3,250.6 | 6.1 | 8.2 | -107.65 | -106.8 | 353.3 | 390.8 | 378.8 | 12.02 | 32.518 | |
| 3,400.0 | 3,397.5 | 3,370.0 | 3,349.0 | 6.3 | 8.5 | -107.61 | -110.8 | 365.3 | 404.1 | 391.7 | 12.39 | 32.609 | |
| 3,500.0 | 3,497.4 | 3,469.1 | 3,447.3 | 6.5 | 8.8 | -107.57 | -114.9 | 377.2 | 417.3 | 404.6 | 12.76 | 32.695 | |
| 3,600.0 | 3,597.3 | 3,568.2 | 3,545.6 | 6.6 | 9.0 | -107.54 | -118.9 | 389.2 | 430.6 | 417.5 | 13.14 | 32.776 | |
| 3,700.0 | 3,697.2 | 3,667.3 | 3,643.9 | 6.8 | 9.3 | -107.50 | -123.0 | 401.1 | 443.9 | 430.4 | 13.51 | 32.852 | |
| 3,800.0 | 3,797.1 | 3,766.4 | 3,742.2 | 7.0 | 9.6 | -107.47 | -127.1 | 413.1 | 457.1 | 443.3 | 13.88 | 32.924 | |
| 3,900.0 | 3,897.1 | 3,865.6 | 3,840.5 | 7.2 | 9.9 | -107.44 | -131.1 | 425.1 | 470.4 | 456.1 | 14.26 | 32.993 | |
| 4,000.0 | 3,997.0 | 3,964.7 | 3,938.8 | 7.4 | 10.2 | -107.41 | -135.2 | 437.0 | 483.7 | 469.0 | 14.63 | 33.058 | |
| 4,100.0 | 4,096.9 | 4,063.8 | 4,037.1 | 7.6 | 10.4 | -107.38 | -139.2 | 449.0 | 496.9 | 481.9 | 15.00 | 33.120 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2A-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -89.94 | 0.0 | -8.4 | 8.4 | | | | |
| 100.0 | 100.0 | 99.0 | 99.0 | 0.1 | 0.1 | -89.94 | 0.0 | -8.4 | 8.4 | 8.1 | 0.24 | 34.484 | |
| 200.0 | 200.0 | 199.0 | 199.0 | 0.3 | 0.3 | -89.94 | 0.0 | -8.4 | 8.4 | 7.8 | 0.59 | 14.170 | CC, ES |
| 300.0 | 300.0 | 298.9 | 298.9 | 0.5 | 0.5 | -86.29 | 0.6 | -9.0 | 9.0 | 8.1 | 0.94 | 9.597 | |
| 400.0 | 400.0 | 398.7 | 398.7 | 0.6 | 0.6 | -77.94 | 2.3 | -10.9 | 11.2 | 9.9 | 1.29 | 8.646 | SF |
| 500.0 | 500.0 | 498.3 | 498.2 | 0.8 | 0.8 | 99.80 | 5.3 | -14.1 | 15.3 | 13.6 | 1.64 | 9.309 | |
| 600.0 | 599.9 | 597.9 | 597.6 | 1.0 | 1.0 | 114.26 | 9.2 | -18.4 | 22.3 | 20.3 | 1.99 | 11.182 | |
| 700.0 | 699.8 | 697.5 | 697.0 | 1.2 | 1.2 | 121.66 | 13.2 | -22.8 | 30.2 | 27.9 | 2.35 | 12.879 | |
| 800.0 | 799.7 | 797.1 | 796.5 | 1.4 | 1.4 | 125.94 | 17.2 | -27.2 | 38.5 | 35.8 | 2.70 | 14.230 | |
| 900.0 | 899.6 | 896.7 | 895.9 | 1.6 | 1.6 | 128.70 | 21.2 | -31.6 | 46.8 | 43.8 | 3.06 | 15.307 | |
| 1,000.0 | 999.6 | 996.4 | 995.4 | 1.7 | 1.8 | 130.63 | 25.3 | -36.0 | 55.3 | 51.9 | 3.42 | 16.178 | |
| 1,100.0 | 1,099.5 | 1,096.0 | 1,094.8 | 1.9 | 2.0 | 132.04 | 29.3 | -40.4 | 63.8 | 60.0 | 3.78 | 16.894 | |
| 1,200.0 | 1,199.4 | 1,195.6 | 1,194.3 | 2.1 | 2.2 | 133.12 | 33.3 | -44.8 | 72.3 | 68.2 | 4.13 | 17.492 | |
| 1,300.0 | 1,299.3 | 1,295.3 | 1,293.7 | 2.3 | 2.4 | 133.97 | 37.4 | -49.2 | 80.9 | 76.4 | 4.49 | 17.998 | |
| 1,400.0 | 1,399.2 | 1,394.9 | 1,393.2 | 2.5 | 2.6 | 134.65 | 41.4 | -53.6 | 89.4 | 84.6 | 4.85 | 18.432 | |
| 1,500.0 | 1,499.1 | 1,494.5 | 1,492.6 | 2.7 | 2.8 | 135.22 | 45.4 | -58.0 | 98.0 | 92.8 | 5.21 | 18.807 | |
| 1,600.0 | 1,599.0 | 1,594.1 | 1,592.1 | 2.9 | 3.0 | 135.70 | 49.4 | -62.4 | 106.6 | 101.0 | 5.57 | 19.135 | |
| 1,700.0 | 1,698.9 | 1,693.8 | 1,691.5 | 3.1 | 3.2 | 136.10 | 53.5 | -66.8 | 115.2 | 109.2 | 5.93 | 19.424 | |
| 1,800.0 | 1,798.9 | 1,793.4 | 1,790.9 | 3.2 | 3.4 | 136.45 | 57.5 | -71.2 | 123.7 | 117.5 | 6.29 | 19.681 | |
| 1,900.0 | 1,898.8 | 1,893.0 | 1,890.4 | 3.4 | 3.6 | 136.76 | 61.5 | -75.6 | 132.3 | 125.7 | 6.65 | 19.910 | |
| 2,000.0 | 1,998.7 | 1,992.7 | 1,989.8 | 3.6 | 3.8 | 137.02 | 65.6 | -80.0 | 140.9 | 133.9 | 7.01 | 20.116 | |
| 2,100.0 | 2,098.6 | 2,092.3 | 2,089.3 | 3.8 | 4.0 | 137.26 | 69.6 | -84.4 | 149.5 | 142.2 | 7.37 | 20.303 | |
| 2,200.0 | 2,198.5 | 2,191.9 | 2,188.7 | 4.0 | 4.2 | 137.47 | 73.6 | -88.8 | 158.1 | 150.4 | 7.72 | 20.472 | |
| 2,300.0 | 2,298.4 | 2,291.5 | 2,288.2 | 4.2 | 4.5 | 137.66 | 77.6 | -93.2 | 166.7 | 158.7 | 8.08 | 20.626 | |
| 2,400.0 | 2,398.3 | 2,391.2 | 2,387.6 | 4.4 | 4.7 | 137.83 | 81.7 | -97.6 | 175.3 | 166.9 | 8.44 | 20.767 | |
| 2,500.0 | 2,498.3 | 2,490.8 | 2,487.1 | 4.6 | 4.9 | 137.98 | 85.7 | -102.0 | 184.0 | 175.1 | 8.80 | 20.897 | |
| 2,600.0 | 2,598.2 | 2,590.4 | 2,586.5 | 4.8 | 5.1 | 138.12 | 89.7 | -106.4 | 192.6 | 183.4 | 9.16 | 21.017 | |
| 2,700.0 | 2,698.1 | 2,690.0 | 2,686.0 | 4.9 | 5.3 | 138.25 | 93.8 | -110.8 | 201.2 | 191.6 | 9.52 | 21.128 | |
| 2,800.0 | 2,798.0 | 2,789.7 | 2,785.4 | 5.1 | 5.5 | 138.37 | 97.8 | -115.2 | 209.8 | 199.9 | 9.88 | 21.230 | |
| 2,900.0 | 2,897.9 | 2,889.3 | 2,884.9 | 5.3 | 5.7 | 138.48 | 101.8 | -119.6 | 218.4 | 208.1 | 10.24 | 21.326 | |
| 3,000.0 | 2,997.8 | 2,988.9 | 2,984.3 | 5.5 | 5.9 | 138.58 | 105.8 | -124.0 | 227.0 | 216.4 | 10.60 | 21.415 | |
| 3,100.0 | 3,097.7 | 3,088.6 | 3,083.8 | 5.7 | 6.1 | 138.67 | 109.9 | -128.4 | 235.6 | 224.7 | 10.96 | 21.498 | |
| 3,200.0 | 3,197.7 | 3,188.2 | 3,183.2 | 5.9 | 6.3 | 138.76 | 113.9 | -132.8 | 244.2 | 232.9 | 11.32 | 21.576 | |
| 3,300.0 | 3,297.6 | 3,287.8 | 3,282.7 | 6.1 | 6.5 | 138.84 | 117.9 | -137.2 | 252.8 | 241.2 | 11.68 | 21.650 | |
| 3,400.0 | 3,397.5 | 3,387.4 | 3,382.1 | 6.3 | 6.7 | 138.92 | 122.0 | -141.6 | 261.4 | 249.4 | 12.04 | 21.719 | |
| 3,500.0 | 3,497.4 | 3,487.1 | 3,481.6 | 6.5 | 6.9 | 138.99 | 126.0 | -146.0 | 270.1 | 257.7 | 12.40 | 21.783 | |
| 3,600.0 | 3,597.3 | 3,586.7 | 3,581.0 | 6.6 | 7.1 | 139.05 | 130.0 | -150.4 | 278.7 | 265.9 | 12.76 | 21.845 | |
| 3,700.0 | 3,697.2 | 3,686.3 | 3,680.5 | 6.8 | 7.3 | 139.11 | 134.1 | -154.8 | 287.3 | 274.2 | 13.12 | 21.903 | |
| 3,800.0 | 3,797.1 | 3,786.0 | 3,779.9 | 7.0 | 7.5 | 139.17 | 138.1 | -159.2 | 295.9 | 282.4 | 13.48 | 21.958 | |
| 3,900.0 | 3,897.1 | 3,885.6 | 3,879.4 | 7.2 | 7.7 | 139.23 | 142.1 | -163.6 | 304.5 | 290.7 | 13.84 | 22.010 | |
| 4,000.0 | 3,997.0 | 3,985.2 | 3,978.8 | 7.4 | 7.9 | 139.28 | 146.1 | -168.0 | 313.1 | 298.9 | 14.20 | 22.059 | |
| 4,100.0 | 4,096.9 | 4,084.8 | 4,078.3 | 7.6 | 8.1 | 139.33 | 150.2 | -172.4 | 321.8 | 307.2 | 14.56 | 22.106 | |
| 4,200.0 | 4,196.8 | 4,184.5 | 4,177.7 | 7.8 | 8.3 | 139.38 | 154.2 | -176.8 | 330.4 | 315.5 | 14.91 | 22.151 | |
| 4,300.0 | 4,296.7 | 4,284.1 | 4,277.2 | 8.0 | 8.5 | 139.42 | 158.2 | -181.2 | 339.0 | 323.7 | 15.27 | 22.193 | |
| 4,400.0 | 4,396.6 | 4,383.7 | 4,376.6 | 8.2 | 8.7 | 139.46 | 162.3 | -185.6 | 347.6 | 332.0 | 15.63 | 22.234 | |
| 4,500.0 | 4,496.5 | 4,483.3 | 4,476.1 | 8.3 | 8.9 | 139.50 | 166.3 | -190.0 | 356.2 | 340.2 | 15.99 | 22.273 | |
| 4,600.0 | 4,596.4 | 4,583.0 | 4,575.5 | 8.5 | 9.1 | 139.54 | 170.3 | -194.4 | 364.8 | 348.5 | 16.35 | 22.310 | |
| 4,700.0 | 4,696.4 | 4,682.6 | 4,675.0 | 8.7 | 9.3 | 139.58 | 174.3 | -198.8 | 373.5 | 356.7 | 16.71 | 22.346 | |
| 4,800.0 | 4,796.3 | 4,782.2 | 4,774.4 | 8.9 | 9.5 | 139.61 | 178.4 | -203.2 | 382.1 | 365.0 | 17.07 | 22.380 | |
| 4,900.0 | 4,896.2 | 4,881.9 | 4,873.9 | 9.1 | 9.7 | 139.65 | 182.4 | -207.6 | 390.7 | 373.3 | 17.43 | 22.412 | |
| 5,000.0 | 4,996.1 | 4,981.5 | 4,973.3 | 9.3 | 9.9 | 139.68 | 186.4 | -212.0 | 399.3 | 381.5 | 17.79 | 22.444 | |
| 5,100.0 | 5,096.0 | 5,081.1 | 5,072.8 | 9.5 | 10.1 | 139.71 | 190.5 | -216.5 | 407.9 | 389.8 | 18.15 | 22.474 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2A-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,195.9 | 5,180.7 | 5,172.2 | 9.7 | 10.3 | 139.74 | 194.5 | -220.9 | 416.5 | 398.0 | 18.51 | 22.503 | |
| 5,300.0 | 5,295.8 | 5,280.4 | 5,271.7 | 9.9 | 10.5 | 139.77 | 198.5 | -225.3 | 425.2 | 406.3 | 18.87 | 22.530 | |
| 5,400.0 | 5,395.8 | 5,380.0 | 5,371.1 | 10.0 | 10.7 | 139.79 | 202.5 | -229.7 | 433.8 | 414.5 | 19.23 | 22.557 | |
| 5,500.0 | 5,495.7 | 5,479.6 | 5,470.6 | 10.2 | 10.9 | 139.82 | 206.6 | -234.1 | 442.4 | 422.8 | 19.59 | 22.583 | |
| 5,600.0 | 5,595.6 | 5,579.3 | 5,570.0 | 10.4 | 11.1 | 139.84 | 210.6 | -238.5 | 451.0 | 431.1 | 19.95 | 22.608 | |
| 5,700.0 | 5,695.5 | 5,678.9 | 5,669.5 | 10.6 | 11.3 | 139.87 | 214.6 | -242.9 | 459.6 | 439.3 | 20.31 | 22.632 | |
| 5,800.0 | 5,795.4 | 5,778.5 | 5,768.9 | 10.8 | 11.5 | 139.89 | 218.7 | -247.3 | 468.2 | 447.6 | 20.67 | 22.655 | |
| 5,900.0 | 5,895.3 | 5,878.1 | 5,868.4 | 11.0 | 11.7 | 139.91 | 222.7 | -251.7 | 476.9 | 455.8 | 21.03 | 22.677 | |
| 6,000.0 | 5,995.2 | 5,977.8 | 5,967.8 | 11.2 | 11.9 | 139.94 | 226.7 | -256.1 | 485.5 | 464.1 | 21.39 | 22.699 | |
| 6,100.0 | 6,095.2 | 6,077.4 | 6,067.3 | 11.4 | 12.2 | 139.96 | 230.7 | -260.5 | 494.1 | 472.4 | 21.75 | 22.720 | |
| 6,700.0 | 6,694.6 | 7,162.0 | 7,050.0 | 12.5 | 13.5 | 118.87 | -30.6 | -304.0 | 475.4 | 449.9 | 25.48 | 18.659 | |
| 6,800.0 | 6,794.5 | 7,281.9 | 7,099.9 | 12.6 | 14.0 | -65.55 | -139.4 | -306.2 | 397.1 | 371.1 | 26.02 | 15.265 | |
| 6,900.0 | 6,892.7 | 7,305.7 | 7,107.0 | 12.7 | 14.1 | -87.27 | -162.1 | -306.5 | 320.8 | 295.1 | 25.75 | 12.461 | |
| 7,000.0 | 6,986.2 | 7,296.0 | 7,104.2 | 12.7 | 14.1 | -93.48 | -152.8 | -306.4 | 260.3 | 234.7 | 25.51 | 10.202 | |
| 7,100.0 | 7,072.2 | 7,271.4 | 7,096.4 | 12.6 | 13.9 | -91.17 | -129.5 | -306.0 | 229.2 | 203.8 | 25.43 | 9.014 | |
| 7,130.0 | 7,096.2 | 7,262.3 | 7,093.3 | 12.6 | 13.9 | -89.23 | -120.9 | -305.9 | 227.4 | 202.0 | 25.43 | 8.942 | |
| 7,200.0 | 7,148.1 | 7,239.0 | 7,084.7 | 12.6 | 13.8 | -82.95 | -99.3 | -305.5 | 236.7 | 211.3 | 25.39 | 9.324 | |
| 7,300.0 | 7,211.5 | 7,200.0 | 7,068.2 | 12.8 | 13.6 | -70.55 | -63.9 | -304.8 | 275.5 | 250.6 | 24.92 | 11.058 | |
| 7,400.0 | 7,260.6 | 7,162.4 | 7,050.2 | 13.1 | 13.5 | -58.07 | -31.0 | -304.0 | 330.8 | 307.1 | 23.76 | 13.925 | |
| 7,500.0 | 7,293.9 | 7,120.7 | 7,027.7 | 13.6 | 13.4 | -46.72 | 4.1 | -303.0 | 391.7 | 369.7 | 22.06 | 17.757 | |
| 7,600.0 | 7,310.3 | 7,077.8 | 7,001.9 | 14.3 | 13.3 | -37.92 | 38.4 | -301.8 | 452.3 | 431.8 | 20.59 | 21.967 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2B-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 90.04 | 0.0 | 11.2 | 11.2 | | | | |
| 100.0 | 100.0 | 99.0 | 99.0 | 0.1 | 0.1 | 90.04 | 0.0 | 11.2 | 11.2 | 10.9 | 0.24 | 45.979 | |
| 200.0 | 200.0 | 199.0 | 199.0 | 0.3 | 0.3 | 90.04 | 0.0 | 11.2 | 11.2 | 10.6 | 0.59 | 18.893 | |
| 300.0 | 300.0 | 299.0 | 299.0 | 0.5 | 0.5 | 90.04 | 0.0 | 11.2 | 11.2 | 10.2 | 0.94 | 11.883 | |
| 400.0 | 400.0 | 399.0 | 399.0 | 0.6 | 0.6 | 90.04 | 0.0 | 11.2 | 11.2 | 9.9 | 1.29 | 8.667 | CC, ES |
| 500.0 | 500.0 | 499.0 | 499.0 | 0.8 | 0.8 | -115.13 | 0.0 | 11.2 | 11.8 | 10.2 | 1.64 | 7.197 | |
| 600.0 | 599.9 | 598.9 | 598.9 | 1.0 | 1.0 | -130.40 | 0.0 | 11.2 | 14.0 | 12.0 | 1.99 | 7.047 | |
| 700.0 | 699.8 | 698.8 | 698.8 | 1.2 | 1.2 | -141.10 | 0.0 | 11.2 | 17.0 | 14.7 | 2.34 | 7.267 | |
| 800.0 | 799.7 | 798.7 | 798.7 | 1.4 | 1.3 | -148.43 | 0.0 | 11.2 | 20.4 | 17.7 | 2.69 | 7.586 | |
| 900.0 | 899.6 | 898.6 | 898.6 | 1.6 | 1.5 | -153.61 | 0.0 | 11.2 | 24.1 | 21.0 | 3.04 | 7.911 | |
| 1,000.0 | 999.6 | 998.6 | 998.6 | 1.7 | 1.7 | -157.41 | 0.0 | 11.2 | 27.8 | 24.5 | 3.39 | 8.213 | |
| 1,100.0 | 1,099.5 | 1,098.5 | 1,098.5 | 1.9 | 1.9 | -160.29 | 0.0 | 11.2 | 31.7 | 28.0 | 3.74 | 8.483 | |
| 1,200.0 | 1,199.4 | 1,198.4 | 1,198.4 | 2.1 | 2.0 | -162.54 | 0.0 | 11.2 | 35.7 | 31.6 | 4.09 | 8.723 | |
| 1,300.0 | 1,299.3 | 1,298.3 | 1,298.3 | 2.3 | 2.2 | -164.34 | 0.0 | 11.2 | 39.6 | 35.2 | 4.44 | 8.935 | |
| 1,400.0 | 1,399.2 | 1,398.2 | 1,398.2 | 2.5 | 2.4 | -165.81 | 0.0 | 11.2 | 43.6 | 38.9 | 4.78 | 9.122 | |
| 1,500.0 | 1,499.1 | 1,498.1 | 1,498.1 | 2.7 | 2.6 | -167.03 | 0.0 | 11.2 | 47.7 | 42.5 | 5.13 | 9.289 | |
| 1,600.0 | 1,599.0 | 1,598.0 | 1,598.0 | 2.9 | 2.7 | -168.07 | 0.0 | 11.2 | 51.7 | 46.3 | 5.48 | 9.438 | |
| 1,700.0 | 1,698.9 | 1,697.9 | 1,697.9 | 3.1 | 2.9 | -168.95 | 0.0 | 11.2 | 55.8 | 50.0 | 5.83 | 9.571 | |
| 1,800.0 | 1,798.9 | 1,797.9 | 1,797.9 | 3.2 | 3.1 | -169.71 | 0.0 | 11.2 | 59.9 | 53.7 | 6.18 | 9.692 | |
| 1,900.0 | 1,898.8 | 1,897.8 | 1,897.8 | 3.4 | 3.3 | -170.37 | 0.0 | 11.2 | 64.0 | 57.4 | 6.53 | 9.800 | |
| 2,000.0 | 1,998.7 | 1,997.7 | 1,997.7 | 3.6 | 3.4 | -170.96 | 0.0 | 11.2 | 68.1 | 61.2 | 6.88 | 9.899 | |
| 2,100.0 | 2,098.6 | 2,097.6 | 2,097.6 | 3.8 | 3.6 | -171.48 | 0.0 | 11.2 | 72.2 | 64.9 | 7.22 | 9.989 | |
| 2,200.0 | 2,198.5 | 2,197.5 | 2,197.5 | 4.0 | 3.8 | -171.94 | 0.0 | 11.2 | 76.3 | 68.7 | 7.57 | 10.072 | |
| 2,300.0 | 2,298.4 | 2,297.4 | 2,297.4 | 4.2 | 4.0 | -172.35 | 0.0 | 11.2 | 80.4 | 72.5 | 7.92 | 10.148 | |
| 2,400.0 | 2,398.3 | 2,397.3 | 2,397.3 | 4.4 | 4.1 | -172.73 | 0.0 | 11.2 | 84.5 | 76.2 | 8.27 | 10.217 | |
| 2,500.0 | 2,498.3 | 2,497.3 | 2,497.3 | 4.6 | 4.3 | -173.07 | 0.0 | 11.2 | 88.6 | 80.0 | 8.62 | 10.282 | |
| 2,600.0 | 2,598.2 | 2,597.2 | 2,597.2 | 4.8 | 4.5 | -173.38 | 0.0 | 11.2 | 92.7 | 83.8 | 8.97 | 10.342 | |
| 2,700.0 | 2,698.1 | 2,697.1 | 2,697.1 | 4.9 | 4.7 | -173.66 | 0.0 | 11.2 | 96.9 | 87.6 | 9.32 | 10.397 | |
| 2,800.0 | 2,798.0 | 2,797.0 | 2,797.0 | 5.1 | 4.8 | -173.92 | 0.0 | 11.2 | 101.0 | 91.3 | 9.67 | 10.449 | |
| 2,900.0 | 2,897.9 | 2,896.9 | 2,896.9 | 5.3 | 5.0 | -174.16 | 0.0 | 11.2 | 105.1 | 95.1 | 10.01 | 10.498 | |
| 3,000.0 | 2,997.8 | 2,996.8 | 2,996.8 | 5.5 | 5.2 | -174.38 | 0.0 | 11.2 | 109.3 | 98.9 | 10.36 | 10.543 | |
| 3,100.0 | 3,097.7 | 3,096.7 | 3,096.7 | 5.7 | 5.4 | -174.59 | 0.0 | 11.2 | 113.4 | 102.7 | 10.71 | 10.585 | |
| 3,200.0 | 3,197.7 | 3,196.7 | 3,196.7 | 5.9 | 5.5 | -174.78 | 0.0 | 11.2 | 117.5 | 106.5 | 11.06 | 10.625 | |
| 3,300.0 | 3,297.6 | 3,296.6 | 3,296.6 | 6.1 | 5.7 | -174.95 | 0.0 | 11.2 | 121.7 | 110.2 | 11.41 | 10.663 | |
| 3,400.0 | 3,397.5 | 3,396.5 | 3,396.5 | 6.3 | 5.9 | -175.12 | 0.0 | 11.2 | 125.8 | 114.0 | 11.76 | 10.698 | |
| 3,500.0 | 3,497.4 | 3,496.4 | 3,496.4 | 6.5 | 6.1 | -175.28 | 0.0 | 11.2 | 129.9 | 117.8 | 12.11 | 10.732 | |
| 3,600.0 | 3,597.3 | 3,596.3 | 3,596.3 | 6.6 | 6.2 | -175.42 | 0.0 | 11.2 | 134.1 | 121.6 | 12.46 | 10.763 | |
| 3,700.0 | 3,697.2 | 3,696.2 | 3,696.2 | 6.8 | 6.4 | -175.56 | 0.0 | 11.2 | 138.2 | 125.4 | 12.80 | 10.793 | |
| 3,800.0 | 3,797.1 | 3,796.1 | 3,796.1 | 7.0 | 6.6 | -175.69 | 0.0 | 11.2 | 142.3 | 129.2 | 13.15 | 10.822 | |
| 3,900.0 | 3,897.1 | 3,896.1 | 3,896.1 | 7.2 | 6.7 | -175.81 | 0.0 | 11.2 | 146.5 | 133.0 | 13.50 | 10.849 | |
| 4,000.0 | 3,997.0 | 3,996.0 | 3,996.0 | 7.4 | 6.9 | -175.93 | 0.0 | 11.2 | 150.6 | 136.8 | 13.85 | 10.875 | |
| 4,100.0 | 4,096.9 | 4,093.5 | 4,093.5 | 7.6 | 7.1 | -176.13 | 0.8 | 11.2 | 155.5 | 141.3 | 14.19 | 10.955 | |
| 4,200.0 | 4,196.8 | 4,190.7 | 4,190.7 | 7.8 | 7.3 | -176.50 | 3.2 | 11.3 | 162.0 | 147.5 | 14.54 | 11.142 | |
| 4,300.0 | 4,296.7 | 4,287.7 | 4,287.6 | 8.0 | 7.4 | -177.02 | 7.2 | 11.4 | 170.1 | 155.2 | 14.88 | 11.429 | |
| 4,400.0 | 4,396.6 | 4,384.4 | 4,384.1 | 8.2 | 7.6 | -177.64 | 12.9 | 11.6 | 179.8 | 164.6 | 15.22 | 11.811 | |
| 4,500.0 | 4,496.5 | 4,480.7 | 4,480.2 | 8.3 | 7.8 | -178.35 | 20.1 | 11.9 | 191.2 | 175.6 | 15.57 | 12.280 | |
| 4,600.0 | 4,596.4 | 4,576.7 | 4,575.7 | 8.5 | 8.0 | -179.10 | 29.0 | 12.2 | 204.1 | 188.2 | 15.91 | 12.831 | |
| 4,700.0 | 4,696.4 | 4,675.4 | 4,673.9 | 8.7 | 8.1 | -179.85 | 39.0 | 12.6 | 218.1 | 201.8 | 16.26 | 13.415 | |
| 4,800.0 | 4,796.3 | 4,774.4 | 4,772.4 | 8.9 | 8.3 | 179.49 | 49.1 | 12.9 | 232.1 | 215.5 | 16.60 | 13.976 | |
| 4,900.0 | 4,896.2 | 4,873.4 | 4,870.8 | 9.1 | 8.5 | 178.91 | 59.2 | 13.3 | 246.1 | 229.1 | 16.95 | 14.516 | |
| 5,000.0 | 4,996.1 | 4,972.3 | 4,969.3 | 9.3 | 8.7 | 178.38 | 69.3 | 13.7 | 260.1 | 242.8 | 17.30 | 15.035 | |
| 5,100.0 | 5,096.0 | 5,071.3 | 5,067.8 | 9.5 | 8.9 | 177.91 | 79.3 | 14.0 | 274.1 | 256.5 | 17.65 | 15.534 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2B-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,195.9 | 5,170.3 | 5,166.2 | 9.7 | 9.1 | 177.49 | 89.4 | 14.4 | 288.2 | 270.2 | 18.00 | 16.015 | |
| 5,300.0 | 5,295.8 | 5,269.3 | 5,264.7 | 9.9 | 9.3 | 177.11 | 99.5 | 14.7 | 302.3 | 283.9 | 18.34 | 16.479 | |
| 5,400.0 | 5,395.8 | 5,368.3 | 5,363.2 | 10.0 | 9.5 | 176.76 | 109.6 | 15.1 | 316.4 | 297.7 | 18.69 | 16.926 | |
| 5,500.0 | 5,495.7 | 5,467.3 | 5,461.7 | 10.2 | 9.7 | 176.44 | 119.7 | 15.5 | 330.5 | 311.4 | 19.04 | 17.357 | |
| 5,600.0 | 5,595.6 | 5,566.3 | 5,560.1 | 10.4 | 9.9 | 176.14 | 129.8 | 15.8 | 344.6 | 325.2 | 19.39 | 17.773 | |
| 5,700.0 | 5,695.5 | 5,665.2 | 5,658.6 | 10.6 | 10.2 | 175.87 | 139.8 | 16.2 | 358.7 | 339.0 | 19.74 | 18.175 | |
| 5,800.0 | 5,795.4 | 5,764.2 | 5,757.1 | 10.8 | 10.4 | 175.62 | 149.9 | 16.6 | 372.8 | 352.7 | 20.08 | 18.563 | |
| 5,900.0 | 5,895.3 | 5,863.2 | 5,855.5 | 11.0 | 10.6 | 175.39 | 160.0 | 16.9 | 386.9 | 366.5 | 20.43 | 18.939 | |
| 6,000.0 | 5,995.2 | 5,962.2 | 5,954.0 | 11.2 | 10.8 | 175.18 | 170.1 | 17.3 | 401.1 | 380.3 | 20.78 | 19.302 | |
| 6,100.0 | 6,095.2 | 6,061.2 | 6,052.5 | 11.4 | 11.0 | 174.97 | 180.2 | 17.6 | 415.2 | 394.1 | 21.13 | 19.654 | |
| 6,200.0 | 6,195.1 | 6,160.2 | 6,150.9 | 11.6 | 11.2 | 174.79 | 190.3 | 18.0 | 429.4 | 407.9 | 21.48 | 19.994 | |
| 6,300.0 | 6,295.0 | 6,259.1 | 6,249.4 | 11.7 | 11.4 | 174.61 | 200.3 | 18.4 | 443.5 | 421.7 | 21.82 | 20.324 | |
| 6,400.0 | 6,394.9 | 6,358.1 | 6,347.9 | 11.9 | 11.7 | 174.45 | 210.4 | 18.7 | 457.7 | 435.5 | 22.17 | 20.643 | |
| 6,500.0 | 6,494.8 | 6,457.1 | 6,446.3 | 12.1 | 11.9 | 174.29 | 220.5 | 19.1 | 471.8 | 449.3 | 22.52 | 20.953 | |
| 6,600.0 | 6,594.7 | 6,556.1 | 6,544.8 | 12.3 | 12.1 | 174.15 | 230.6 | 19.4 | 486.0 | 463.1 | 22.87 | 21.253 | |
| 6,900.0 | 6,892.7 | 7,308.1 | 7,223.1 | 12.7 | 12.7 | 35.41 | 21.3 | 21.9 | 426.6 | 402.3 | 24.29 | 17.559 | |
| 7,000.0 | 6,986.2 | 7,371.3 | 7,258.2 | 12.7 | 12.8 | 74.89 | -31.2 | 22.1 | 332.8 | 307.6 | 25.20 | 13.206 | |
| 7,100.0 | 7,072.2 | 7,371.4 | 7,258.3 | 12.6 | 12.8 | 100.47 | -31.3 | 22.1 | 239.6 | 214.2 | 25.33 | 9.457 | |
| 7,200.0 | 7,148.1 | 7,349.6 | 7,246.8 | 12.6 | 12.8 | 104.41 | -12.7 | 22.0 | 155.4 | 130.3 | 25.11 | 6.190 | |
| 7,300.0 | 7,211.5 | 7,317.8 | 7,228.9 | 12.8 | 12.7 | 93.98 | 13.5 | 22.0 | 102.2 | 76.8 | 25.39 | 4.024 | |
| 7,325.4 | 7,225.4 | 7,308.8 | 7,223.5 | 12.8 | 12.7 | 89.37 | 20.8 | 21.9 | 99.4 | 73.9 | 25.48 | 3.901 SF | |
| 7,400.0 | 7,260.6 | 7,280.7 | 7,206.1 | 13.1 | 12.7 | 72.64 | 42.9 | 21.9 | 120.5 | 95.5 | 25.04 | 4.812 | |
| 7,500.0 | 7,293.9 | 7,240.4 | 7,179.3 | 13.6 | 12.6 | 49.84 | 73.0 | 21.8 | 184.5 | 162.0 | 22.54 | 8.187 | |
| 7,600.0 | 7,310.3 | 7,200.0 | 7,150.4 | 14.3 | 12.6 | 34.26 | 101.1 | 21.7 | 257.3 | 237.5 | 19.79 | 13.001 | |
| 7,700.0 | 7,312.0 | 7,150.0 | 7,112.0 | 15.2 | 12.6 | 26.22 | 133.1 | 21.5 | 330.3 | 311.8 | 18.55 | 17.808 | |
| 7,800.0 | 7,312.0 | 7,119.4 | 7,087.2 | 16.2 | 12.6 | 23.56 | 151.0 | 21.4 | 408.0 | 389.5 | 18.48 | 22.084 | |
| 7,900.0 | 7,312.0 | 7,100.0 | 7,071.0 | 17.3 | 12.6 | 22.07 | 161.6 | 21.4 | 490.3 | 471.6 | 18.63 | 26.310 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2C-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 90.05 | 0.0 | 30.7 | 30.7 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 90.05 | 0.0 | 30.7 | 30.7 | 30.5 | 0.24 | 125.809 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 90.05 | 0.0 | 30.7 | 30.7 | 30.1 | 0.59 | 51.804 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.5 | 0.5 | 90.05 | 0.0 | 30.7 | 30.7 | 29.8 | 0.94 | 32.617 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.6 | 0.6 | 90.05 | 0.0 | 30.7 | 30.7 | 29.4 | 1.29 | 23.802 | CC, ES |
| 500.0 | 500.0 | 500.0 | 500.0 | 0.8 | 0.8 | -110.06 | 0.0 | 30.7 | 31.3 | 29.7 | 1.64 | 19.054 | |
| 600.0 | 599.9 | 599.4 | 599.4 | 1.0 | 1.0 | -117.41 | 0.5 | 31.4 | 33.7 | 31.7 | 2.00 | 16.884 | |
| 700.0 | 699.8 | 698.6 | 698.6 | 1.2 | 1.2 | -124.68 | 2.1 | 33.5 | 38.2 | 35.9 | 2.35 | 16.277 | SF |
| 800.0 | 799.7 | 797.6 | 797.5 | 1.4 | 1.4 | -130.88 | 4.7 | 36.9 | 44.9 | 42.2 | 2.70 | 16.639 | |
| 900.0 | 899.6 | 896.5 | 896.1 | 1.6 | 1.5 | -135.73 | 8.3 | 41.6 | 53.7 | 50.6 | 3.05 | 17.602 | |
| 1,000.0 | 999.6 | 995.9 | 995.4 | 1.7 | 1.7 | -139.27 | 12.3 | 46.8 | 63.3 | 59.9 | 3.40 | 18.614 | |
| 1,100.0 | 1,099.5 | 1,095.4 | 1,094.6 | 1.9 | 1.9 | -141.88 | 16.3 | 52.0 | 73.1 | 69.3 | 3.75 | 19.487 | |
| 1,200.0 | 1,199.4 | 1,194.9 | 1,193.9 | 2.1 | 2.1 | -143.86 | 20.3 | 57.2 | 83.0 | 78.9 | 4.10 | 20.238 | |
| 1,300.0 | 1,299.3 | 1,294.3 | 1,293.2 | 2.3 | 2.3 | -145.42 | 24.3 | 62.4 | 93.0 | 88.5 | 4.45 | 20.888 | |
| 1,400.0 | 1,399.2 | 1,393.8 | 1,392.4 | 2.5 | 2.5 | -146.68 | 28.4 | 67.6 | 103.0 | 98.2 | 4.80 | 21.455 | |
| 1,500.0 | 1,499.1 | 1,493.3 | 1,491.7 | 2.7 | 2.7 | -147.71 | 32.4 | 72.8 | 113.1 | 107.9 | 5.15 | 21.952 | |
| 1,600.0 | 1,599.0 | 1,592.8 | 1,590.9 | 2.9 | 2.9 | -148.58 | 36.4 | 78.0 | 123.2 | 117.7 | 5.50 | 22.390 | |
| 1,700.0 | 1,698.9 | 1,692.2 | 1,690.2 | 3.1 | 3.1 | -149.31 | 40.4 | 83.2 | 133.3 | 127.4 | 5.85 | 22.780 | |
| 1,800.0 | 1,798.9 | 1,791.7 | 1,789.4 | 3.2 | 3.3 | -149.94 | 44.4 | 88.4 | 143.4 | 137.2 | 6.20 | 23.128 | |
| 1,900.0 | 1,898.8 | 1,891.2 | 1,888.7 | 3.4 | 3.6 | -150.49 | 48.4 | 93.6 | 153.6 | 147.0 | 6.55 | 23.441 | |
| 2,000.0 | 1,998.7 | 1,990.6 | 1,987.9 | 3.6 | 3.8 | -150.97 | 52.4 | 98.8 | 163.8 | 156.9 | 6.90 | 23.723 | |
| 2,100.0 | 2,098.6 | 2,090.1 | 2,087.2 | 3.8 | 4.0 | -151.39 | 56.4 | 104.0 | 174.0 | 166.7 | 7.25 | 23.980 | |
| 2,200.0 | 2,198.5 | 2,189.6 | 2,186.5 | 4.0 | 4.2 | -151.77 | 60.4 | 109.2 | 184.1 | 176.5 | 7.61 | 24.213 | |
| 2,300.0 | 2,298.4 | 2,289.1 | 2,285.7 | 4.2 | 4.4 | -152.10 | 64.4 | 114.4 | 194.3 | 186.4 | 7.96 | 24.427 | |
| 2,400.0 | 2,398.3 | 2,388.5 | 2,385.0 | 4.4 | 4.6 | -152.41 | 68.4 | 119.6 | 204.5 | 196.2 | 8.31 | 24.623 | |
| 2,500.0 | 2,498.3 | 2,488.0 | 2,484.2 | 4.6 | 4.8 | -152.68 | 72.4 | 124.8 | 214.8 | 206.1 | 8.66 | 24.804 | |
| 2,600.0 | 2,598.2 | 2,587.5 | 2,583.5 | 4.8 | 5.0 | -152.93 | 76.4 | 130.0 | 225.0 | 216.0 | 9.01 | 24.971 | |
| 2,700.0 | 2,698.1 | 2,687.0 | 2,682.7 | 4.9 | 5.2 | -153.16 | 80.4 | 135.2 | 235.2 | 225.8 | 9.36 | 25.125 | |
| 2,800.0 | 2,798.0 | 2,786.4 | 2,782.0 | 5.1 | 5.4 | -153.37 | 84.4 | 140.4 | 245.4 | 235.7 | 9.71 | 25.269 | |
| 2,900.0 | 2,897.9 | 2,885.9 | 2,881.2 | 5.3 | 5.6 | -153.56 | 88.4 | 145.6 | 255.6 | 245.6 | 10.06 | 25.403 | |
| 3,000.0 | 2,997.8 | 2,985.4 | 2,980.5 | 5.5 | 5.8 | -153.74 | 92.5 | 150.8 | 265.9 | 255.4 | 10.41 | 25.528 | |
| 3,100.0 | 3,097.7 | 3,084.8 | 3,079.8 | 5.7 | 6.0 | -153.90 | 96.5 | 156.0 | 276.1 | 265.3 | 10.77 | 25.645 | |
| 3,200.0 | 3,197.7 | 3,184.3 | 3,179.0 | 5.9 | 6.2 | -154.05 | 100.5 | 161.2 | 286.3 | 275.2 | 11.12 | 25.755 | |
| 3,300.0 | 3,297.6 | 3,283.8 | 3,278.3 | 6.1 | 6.4 | -154.20 | 104.5 | 166.4 | 296.5 | 285.1 | 11.47 | 25.858 | |
| 3,400.0 | 3,397.5 | 3,383.3 | 3,377.5 | 6.3 | 6.7 | -154.33 | 108.5 | 171.6 | 306.8 | 295.0 | 11.82 | 25.956 | |
| 3,500.0 | 3,497.4 | 3,482.7 | 3,476.8 | 6.5 | 6.9 | -154.45 | 112.5 | 176.8 | 317.0 | 304.8 | 12.17 | 26.047 | |
| 3,600.0 | 3,597.3 | 3,582.2 | 3,576.0 | 6.6 | 7.1 | -154.57 | 116.5 | 182.0 | 327.3 | 314.7 | 12.52 | 26.134 | |
| 3,700.0 | 3,697.2 | 3,681.7 | 3,675.3 | 6.8 | 7.3 | -154.68 | 120.5 | 187.2 | 337.5 | 324.6 | 12.87 | 26.216 | |
| 3,800.0 | 3,797.1 | 3,781.2 | 3,774.6 | 7.0 | 7.5 | -154.78 | 124.5 | 192.4 | 347.7 | 334.5 | 13.23 | 26.293 | |
| 3,900.0 | 3,897.1 | 3,880.6 | 3,873.8 | 7.2 | 7.7 | -154.88 | 128.5 | 197.6 | 358.0 | 344.4 | 13.58 | 26.367 | |
| 4,000.0 | 3,997.0 | 3,980.1 | 3,973.1 | 7.4 | 7.9 | -154.97 | 132.5 | 202.8 | 368.2 | 354.3 | 13.93 | 26.437 | |
| 4,100.0 | 4,096.9 | 4,079.6 | 4,072.3 | 7.6 | 8.1 | -155.05 | 136.5 | 208.0 | 378.5 | 364.2 | 14.28 | 26.503 | |
| 4,200.0 | 4,196.8 | 4,179.0 | 4,171.6 | 7.8 | 8.3 | -155.14 | 140.5 | 213.2 | 388.7 | 374.1 | 14.63 | 26.567 | |
| 4,300.0 | 4,296.7 | 4,278.5 | 4,270.8 | 8.0 | 8.5 | -155.21 | 144.5 | 218.4 | 398.9 | 384.0 | 14.98 | 26.627 | |
| 4,400.0 | 4,396.6 | 4,378.0 | 4,370.1 | 8.2 | 8.7 | -155.29 | 148.5 | 223.6 | 409.2 | 393.9 | 15.33 | 26.685 | |
| 4,500.0 | 4,496.5 | 4,477.5 | 4,469.3 | 8.3 | 8.9 | -155.36 | 152.5 | 228.8 | 419.4 | 403.7 | 15.69 | 26.740 | |
| 4,600.0 | 4,596.4 | 4,576.9 | 4,568.6 | 8.5 | 9.1 | -155.42 | 156.5 | 234.0 | 429.7 | 413.6 | 16.04 | 26.792 | |
| 4,700.0 | 4,696.4 | 4,676.4 | 4,667.9 | 8.7 | 9.3 | -155.49 | 160.6 | 239.2 | 439.9 | 423.5 | 16.39 | 26.843 | |
| 4,800.0 | 4,796.3 | 4,775.9 | 4,767.1 | 8.9 | 9.6 | -155.55 | 164.6 | 244.4 | 450.2 | 433.4 | 16.74 | 26.891 | |
| 4,900.0 | 4,896.2 | 4,875.4 | 4,866.4 | 9.1 | 9.8 | -155.61 | 168.6 | 249.6 | 460.4 | 443.3 | 17.09 | 26.938 | |
| 5,000.0 | 4,996.1 | 4,974.8 | 4,965.6 | 9.3 | 10.0 | -155.66 | 172.6 | 254.8 | 470.7 | 453.2 | 17.44 | 26.982 | |
| 5,100.0 | 5,096.0 | 5,074.3 | 5,064.9 | 9.5 | 10.2 | -155.72 | 176.6 | 260.0 | 480.9 | 463.1 | 17.80 | 27.025 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2C-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,195.9 | 5,173.8 | 5,164.1 | 9.7 | 10.4 | -155.77 | 180.6 | 265.2 | 491.2 | 473.0 | 18.15 | 27.066 | |
| 7,000.0 | 6,986.2 | 7,242.2 | 7,085.2 | 12.7 | 14.3 | 86.61 | -111.8 | 388.5 | 484.1 | 458.7 | 25.43 | 19.033 | |
| 7,100.0 | 7,072.2 | 7,228.0 | 7,079.5 | 12.6 | 14.2 | 86.13 | -98.8 | 387.4 | 467.9 | 442.6 | 25.33 | 18.476 | |
| 7,136.0 | 7,100.8 | 7,219.9 | 7,076.1 | 12.6 | 14.2 | 85.19 | -91.4 | 386.7 | 466.7 | 441.4 | 25.30 | 18.449 | |
| 7,200.0 | 7,148.1 | 7,202.8 | 7,068.7 | 12.6 | 14.1 | 82.69 | -76.1 | 385.4 | 470.4 | 445.2 | 25.22 | 18.653 | |
| 7,300.0 | 7,211.5 | 7,171.2 | 7,053.7 | 12.8 | 14.0 | 77.13 | -48.4 | 382.9 | 489.2 | 464.1 | 25.08 | 19.503 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** S5-T2N-R67W (Vogl-McCoy) - Vogl-McCoy 2D-5H-E267 - Hz - Plan #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Total Uncertainty Axis | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 90.05 | 0.0 | 50.3 | 50.3 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 90.05 | 0.0 | 50.3 | 50.3 | 50.1 | 0.24 | 205.869 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 90.05 | 0.0 | 50.3 | 50.3 | 49.7 | 0.59 | 84.770 | CC, ES |
| 300.0 | 300.0 | 299.2 | 299.2 | 0.5 | 0.5 | 89.66 | 0.3 | 51.1 | 51.1 | 50.2 | 0.94 | 54.298 | |
| 400.0 | 400.0 | 398.3 | 398.3 | 0.6 | 0.6 | 88.59 | 1.3 | 53.5 | 53.5 | 52.2 | 1.29 | 41.514 | |
| 500.0 | 500.0 | 497.3 | 497.1 | 0.8 | 0.8 | -111.59 | 3.0 | 57.4 | 58.2 | 56.5 | 1.64 | 35.465 | |
| 600.0 | 599.9 | 595.8 | 595.5 | 1.0 | 1.0 | -116.53 | 5.4 | 62.8 | 65.6 | 63.6 | 1.99 | 32.953 | |
| 700.0 | 699.8 | 694.0 | 693.4 | 1.2 | 1.2 | -120.72 | 8.4 | 69.8 | 75.2 | 72.9 | 2.34 | 32.102 | SF |
| 800.0 | 799.7 | 792.1 | 791.1 | 1.4 | 1.5 | -124.07 | 12.1 | 78.3 | 86.8 | 84.1 | 2.69 | 32.219 | |
| 900.0 | 899.6 | 891.2 | 889.7 | 1.6 | 1.7 | -126.69 | 16.0 | 87.5 | 99.2 | 96.2 | 3.05 | 32.565 | |
| 1,000.0 | 999.6 | 990.4 | 988.3 | 1.7 | 1.9 | -128.72 | 20.0 | 96.6 | 111.8 | 108.4 | 3.40 | 32.885 | |
| 1,100.0 | 1,099.5 | 1,089.5 | 1,087.0 | 1.9 | 2.2 | -130.34 | 23.9 | 105.8 | 124.4 | 120.7 | 3.75 | 33.173 | |
| 1,200.0 | 1,199.4 | 1,188.7 | 1,185.6 | 2.1 | 2.4 | -131.66 | 27.9 | 114.9 | 137.2 | 133.1 | 4.10 | 33.428 | |
| 1,300.0 | 1,299.3 | 1,287.8 | 1,284.2 | 2.3 | 2.7 | -132.75 | 31.8 | 124.0 | 150.0 | 145.6 | 4.46 | 33.654 | |
| 1,400.0 | 1,399.2 | 1,386.9 | 1,382.9 | 2.5 | 2.9 | -133.67 | 35.8 | 133.2 | 162.9 | 158.1 | 4.81 | 33.854 | |
| 1,500.0 | 1,499.1 | 1,486.1 | 1,481.5 | 2.7 | 3.1 | -134.46 | 39.7 | 142.3 | 175.8 | 170.6 | 5.16 | 34.031 | |
| 1,600.0 | 1,599.0 | 1,585.2 | 1,580.2 | 2.9 | 3.4 | -135.14 | 43.7 | 151.5 | 188.7 | 183.2 | 5.52 | 34.189 | |
| 1,700.0 | 1,698.9 | 1,684.4 | 1,678.8 | 3.1 | 3.6 | -135.73 | 47.6 | 160.6 | 201.6 | 195.7 | 5.87 | 34.331 | |
| 1,800.0 | 1,798.9 | 1,783.5 | 1,777.4 | 3.2 | 3.9 | -136.25 | 51.5 | 169.7 | 214.6 | 208.4 | 6.23 | 34.458 | |
| 1,900.0 | 1,898.8 | 1,882.6 | 1,876.1 | 3.4 | 4.1 | -136.71 | 55.5 | 178.9 | 227.6 | 221.0 | 6.58 | 34.573 | |
| 2,000.0 | 1,998.7 | 1,981.8 | 1,974.7 | 3.6 | 4.4 | -137.13 | 59.4 | 188.0 | 240.6 | 233.6 | 6.94 | 34.677 | |
| 2,100.0 | 2,098.6 | 2,080.9 | 2,073.3 | 3.8 | 4.6 | -137.49 | 63.4 | 197.1 | 253.6 | 246.3 | 7.29 | 34.772 | |
| 2,200.0 | 2,198.5 | 2,180.0 | 2,172.0 | 4.0 | 4.8 | -137.83 | 67.3 | 206.3 | 266.6 | 258.9 | 7.65 | 34.858 | |
| 2,300.0 | 2,298.4 | 2,279.2 | 2,270.6 | 4.2 | 5.1 | -138.13 | 71.3 | 215.4 | 279.6 | 271.6 | 8.00 | 34.937 | |
| 2,400.0 | 2,398.3 | 2,378.3 | 2,369.3 | 4.4 | 5.3 | -138.41 | 75.2 | 224.6 | 292.6 | 284.3 | 8.36 | 35.010 | |
| 2,500.0 | 2,498.3 | 2,477.5 | 2,467.9 | 4.6 | 5.6 | -138.66 | 79.2 | 233.7 | 305.6 | 296.9 | 8.71 | 35.078 | |
| 2,600.0 | 2,598.2 | 2,576.6 | 2,566.5 | 4.8 | 5.8 | -138.89 | 83.1 | 242.8 | 318.7 | 309.6 | 9.07 | 35.140 | |
| 2,700.0 | 2,698.1 | 2,675.7 | 2,665.2 | 4.9 | 6.1 | -139.10 | 87.1 | 252.0 | 331.7 | 322.3 | 9.42 | 35.198 | |
| 2,800.0 | 2,798.0 | 2,774.9 | 2,763.8 | 5.1 | 6.3 | -139.30 | 91.0 | 261.1 | 344.8 | 335.0 | 9.78 | 35.251 | |
| 2,900.0 | 2,897.9 | 2,874.0 | 2,862.4 | 5.3 | 6.6 | -139.48 | 95.0 | 270.2 | 357.8 | 347.7 | 10.14 | 35.301 | |
| 3,000.0 | 2,997.8 | 2,973.2 | 2,961.1 | 5.5 | 6.8 | -139.65 | 98.9 | 279.4 | 370.9 | 360.4 | 10.49 | 35.348 | |
| 3,100.0 | 3,097.7 | 3,072.3 | 3,059.7 | 5.7 | 7.0 | -139.81 | 102.9 | 288.5 | 383.9 | 373.1 | 10.85 | 35.392 | |
| 3,200.0 | 3,197.7 | 3,171.4 | 3,158.4 | 5.9 | 7.3 | -139.96 | 106.8 | 297.7 | 397.0 | 385.8 | 11.20 | 35.433 | |
| 3,300.0 | 3,297.6 | 3,270.6 | 3,257.0 | 6.1 | 7.5 | -140.10 | 110.8 | 306.8 | 410.1 | 398.5 | 11.56 | 35.472 | |
| 3,400.0 | 3,397.5 | 3,369.7 | 3,355.6 | 6.3 | 7.8 | -140.23 | 114.7 | 315.9 | 423.1 | 411.2 | 11.92 | 35.508 | |
| 3,500.0 | 3,497.4 | 3,468.9 | 3,454.3 | 6.5 | 8.0 | -140.35 | 118.7 | 325.1 | 436.2 | 423.9 | 12.27 | 35.543 | |
| 3,600.0 | 3,597.3 | 3,568.0 | 3,552.9 | 6.6 | 8.3 | -140.46 | 122.6 | 334.2 | 449.2 | 436.6 | 12.63 | 35.575 | |
| 3,700.0 | 3,697.2 | 3,667.1 | 3,651.5 | 6.8 | 8.5 | -140.57 | 126.5 | 343.4 | 462.3 | 449.3 | 12.98 | 35.606 | |
| 3,800.0 | 3,797.1 | 3,766.3 | 3,750.2 | 7.0 | 8.8 | -140.67 | 130.5 | 352.5 | 475.4 | 462.0 | 13.34 | 35.635 | |
| 3,900.0 | 3,897.1 | 3,865.4 | 3,848.8 | 7.2 | 9.0 | -140.77 | 134.4 | 361.6 | 488.5 | 474.8 | 13.70 | 35.662 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Vogl-Geist 2A-5H-E267 |
| **Project:** | DJ Wattenberg | **TVD Reference:** | KB @ 4866.0ft (Ensign) |
| **Reference Site:** | S5-T2N-R67W (Vogl-McCoy) | **MD Reference:** | KB @ 4866.0ft (Ensign) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Vogl-Geist 2A-5H-E267 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Hz | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #1 | **Offset TVD Reference:** | Offset Datum |

Reference Depths are relative to KB @ 4866.0ft (Ensign)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Vogl-Geist 2A-5H-E267
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.37°