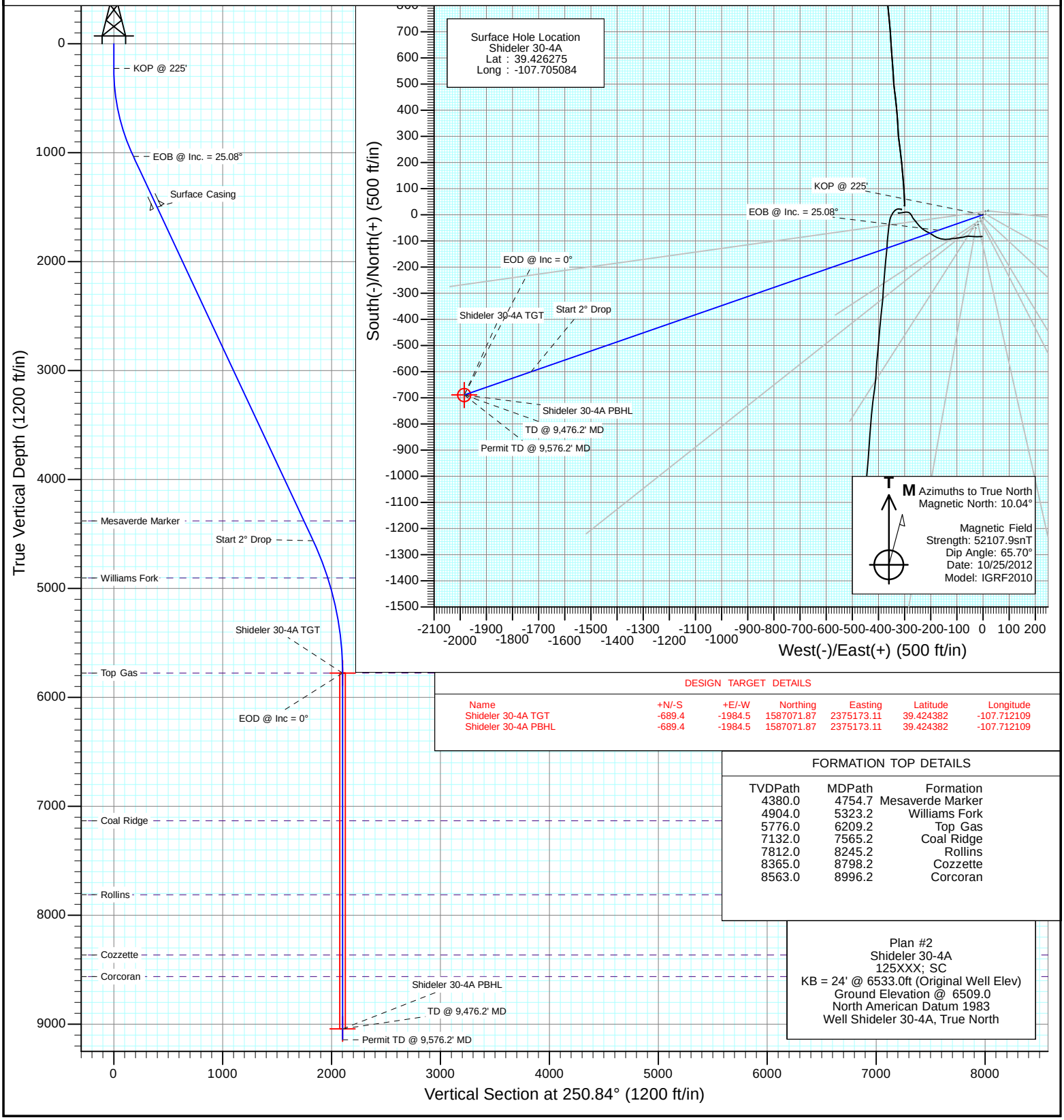
Project: Mamm Creek
Site: O19EB Pad
Well: Shideler 30-4A
Wellbore: OH
Design: Plan #2

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSect | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 2 | 225.0 | 0.00 | 0.00 | 225.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 3 | 1061.0 | 25.08 | 250.84 | 1034.5 | -59.1 | -170.1 | 3.00 | 250.84 | 180.1 | |
| 4 | 4955.3 | 25.08 | 250.84 | 4561.7 | -600.8 | -1729.4 | 0.00 | 0.00 | 1830.7 | |
| 5 | 6209.2 | 0.00 | 0.00 | 5776.0 | -689.4 | -1984.5 | 2.00 | 180.00 | 2100.8 | Shideler 30-4A TGT |
| 6 | 9476.2 | 0.00 | 0.00 | 9043.0 | -689.4 | -1984.5 | 0.00 | 0.00 | 2100.8 | Shideler 30-4A PBHL |
| 7 | 9576.2 | 0.00 | 0.00 | 9143.0 | -689.4 | -1984.5 | 0.00 | 0.00 | 2100.8 | |




DESIGN TARGET DETAILS

| Name | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Shideler 30-4A TGT | -689.4 | -1984.5 | 1587071.87 | 2375173.11 | 39.424382 | -107.712109 |
| Shideler 30-4A PBHL | -689.4 | -1984.5 | 1587071.87 | 2375173.11 | 39.424382 | -107.712109 |

FORMATION TOP DETAILS

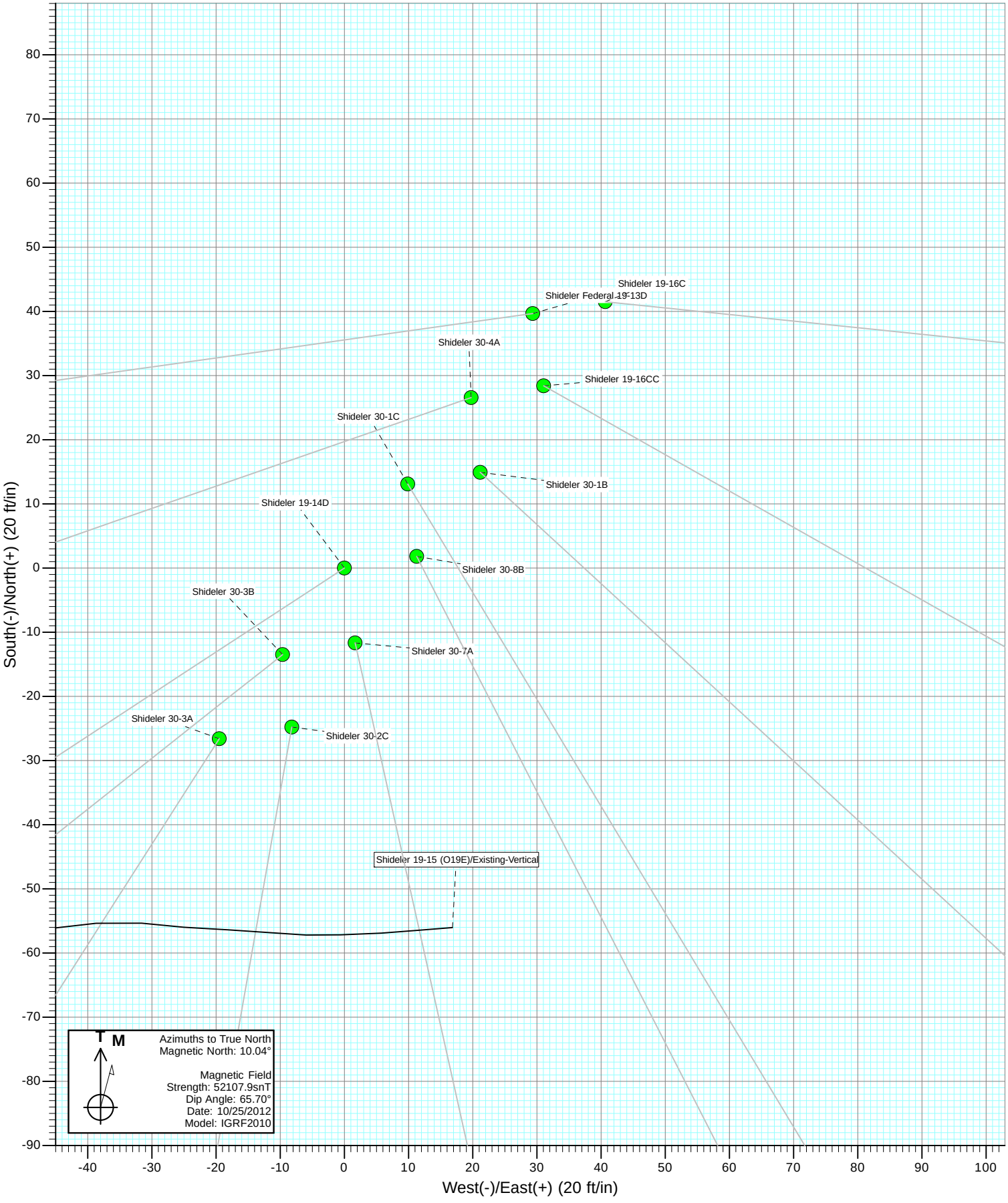
| TVDPath | MDPath | Formation |
|---|---|---|
| 4380.0 | 4754.7 | Mesaverde Marker |
| 4904.0 | 5323.2 | Williams Fork |
| 5776.0 | 6209.2 | Top Gas |
| 7132.0 | 7565.2 | Coal Ridge |
| 7812.0 | 8245.2 | Rollins |
| 8365.0 | 8798.2 | Cozzette |
| 8563.0 | 8996.2 | Corcoran |

Plan #2
Shideler 30-4A
125XXX; SC
KB = 24' @ 6533.0ft (Original Well Elev)
Ground Elevation @ 6509.0
North American Datum 1983
Well Shideler 30-4A, True North

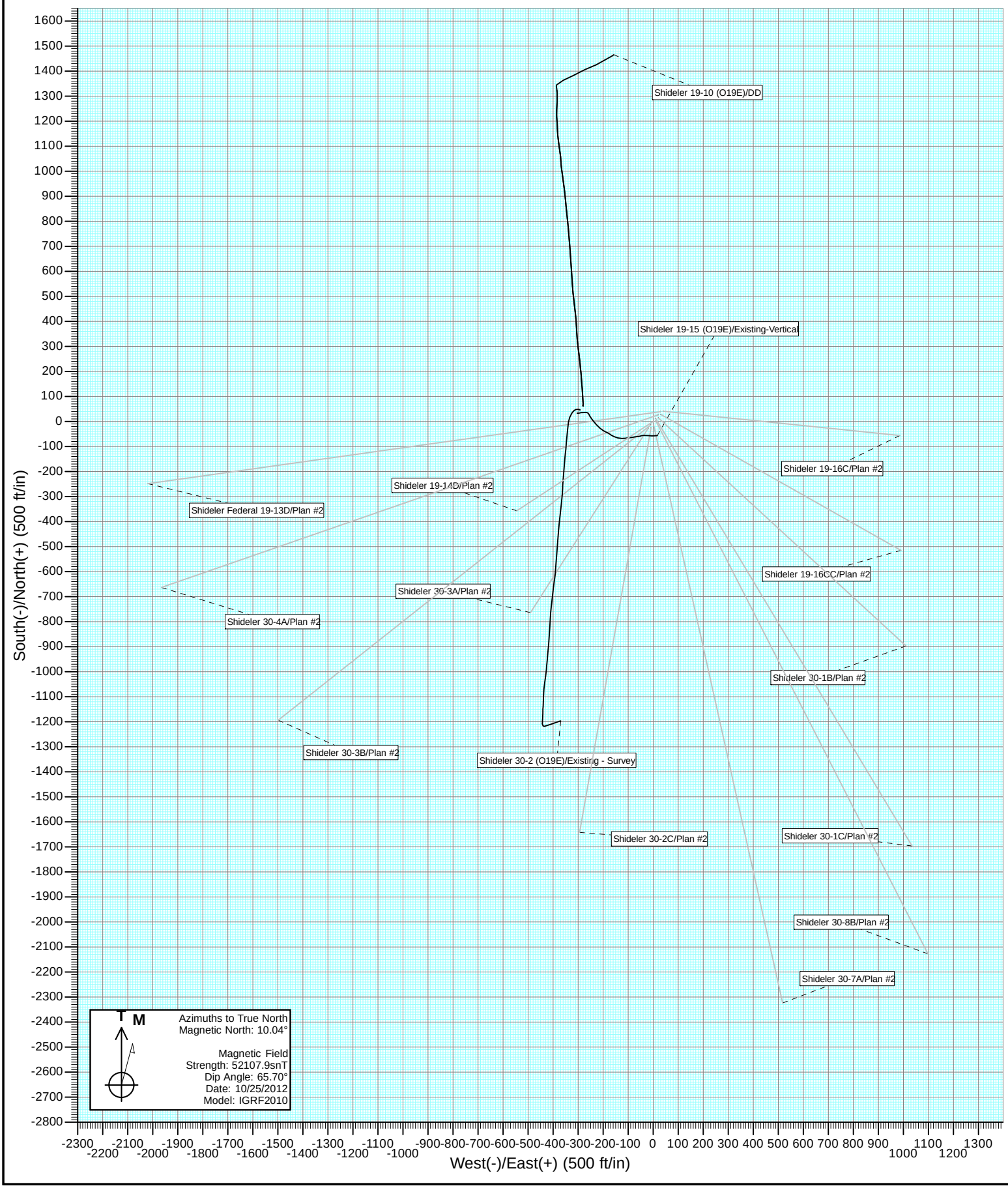
encana natural gas

Project: Mamm Creek
Site: O19EB Pad
Well:
Wellbore:
Design:

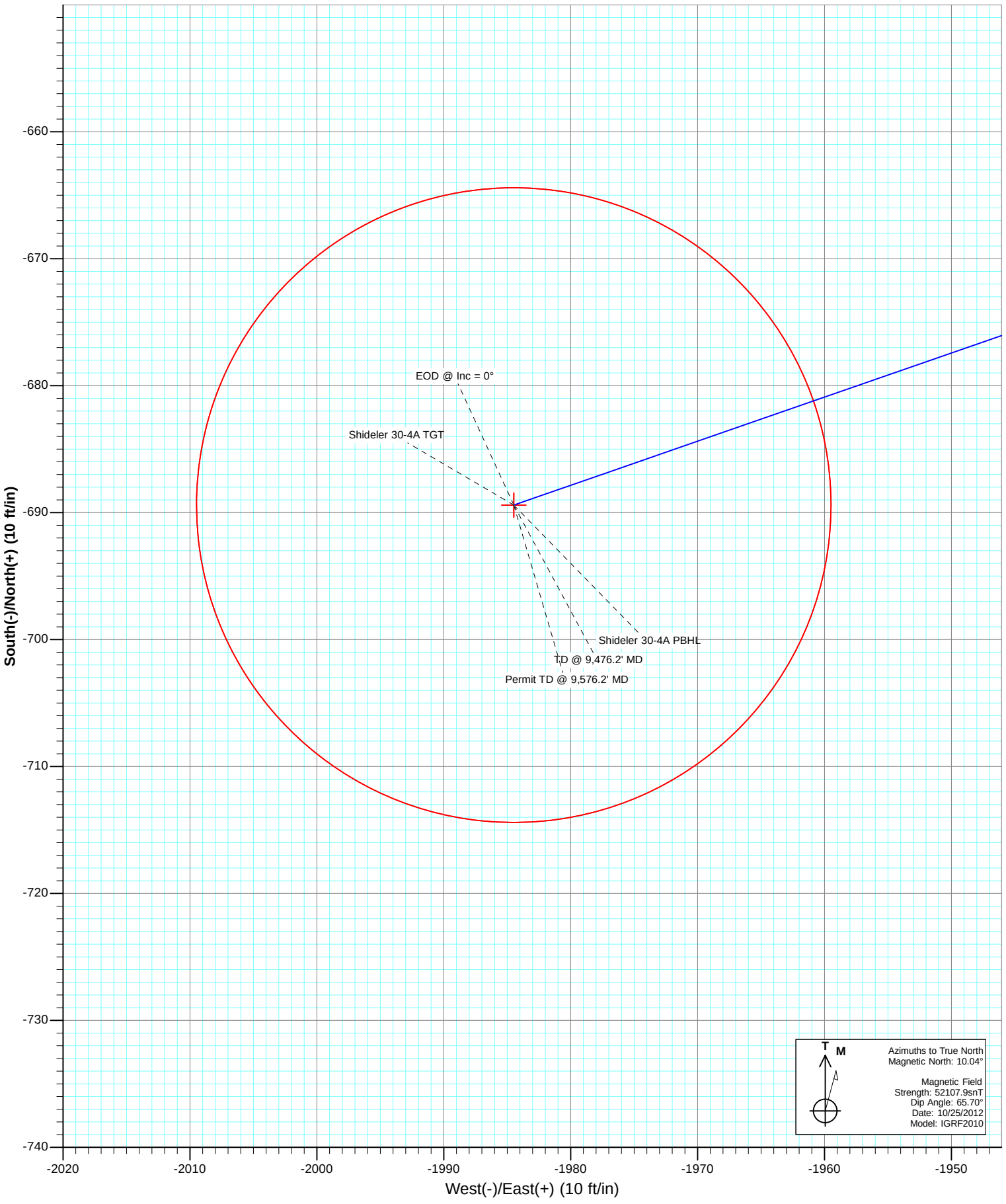
CATHEDRAL



Project: Mamm Creek
Site: O19EB Pad
Well:
Wellbore:
Design:



Project: Mamm Creek
Site: O19EB Pad
Well: Shideler 30-4A
Wellbore: OH
Plan: Plan #2



# Cathedral Energy Services

Planning Report

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Project:** | Mamm Creek | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site:** | O19EB Pad | **North Reference:** | True |
| **Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #2 | | |

**Project** Mamm Creek

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

**Site** O19EB Pad

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,587,688.01 ft | **Latitude:** | 39.426206 |
| **From:** | Lat/Long | **Easting:** | 2,377,164.37 ft | **Longitude:** | -107.705115 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | 13.200 in | **Grid Convergence:** | -1.39 ° |

**Well** Shideler 30-4A

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 ft | **Northing:** | 1,587,712.91 ft | **Latitude:** | 39.426275 |
| | **+E/-W** | 0.0 ft | **Easting:** | 2,377,173.74 ft | **Longitude:** | -107.705084 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 6,509.0 ft |

**Wellbore** OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 10/25/2012 | 10.04 | 65.70 | 52,108 |

**Design** Plan #2

**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 | 250.84 |

**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 | |
| 225.0 | 0.00 | 0.00 | 225.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1,061.0 | 25.08 | 250.84 | 1,034.5 | -59.1 | -170.1 | 3.00 | 3.00 | 0.00 | 250.84 | |
| 4,955.3 | 25.08 | 250.84 | 4,561.7 | -600.8 | -1,729.4 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 6,209.2 | 0.00 | 0.00 | 5,776.0 | -689.4 | -1,984.5 | 2.00 | -2.00 | 0.00 | 180.00 | Shideler 30-4A TGT |
| 9,476.2 | 0.00 | 0.00 | 9,043.0 | -689.4 | -1,984.5 | 0.00 | 0.00 | 0.00 | 0.00 | Shideler 30-4A PBHL |
| 9,576.2 | 0.00 | 0.00 | 9,143.0 | -689.4 | -1,984.5 | 0.00 | 0.00 | 0.00 | 0.00 | |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Project:** | Mamm Creek | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site:** | O19EB Pad | **North Reference:** | True |
| **Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #2 | | |

**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 | |
| 225.0 | 0.00 | 0.00 | 225.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | KOP @ 225' |
| 300.0 | 2.25 | 250.84 | 300.0 | -0.5 | -1.4 | 1.5 | 3.00 | 3.00 | |
| 400.0 | 5.25 | 250.84 | 399.8 | -2.6 | -7.6 | 8.0 | 3.00 | 3.00 | |
| 500.0 | 8.25 | 250.84 | 499.1 | -6.5 | -18.7 | 19.8 | 3.00 | 3.00 | |
| 600.0 | 11.25 | 250.84 | 597.6 | -12.0 | -34.7 | 36.7 | 3.00 | 3.00 | |
| 700.0 | 14.25 | 250.84 | 695.1 | -19.3 | -55.5 | 58.8 | 3.00 | 3.00 | |
| 800.0 | 17.25 | 250.84 | 791.4 | -28.2 | -81.1 | 85.9 | 3.00 | 3.00 | |
| 900.0 | 20.25 | 250.84 | 886.0 | -38.7 | -111.5 | 118.0 | 3.00 | 3.00 | |
| 1,000.0 | 23.25 | 250.84 | 978.9 | -50.9 | -146.5 | 155.1 | 3.00 | 3.00 | |
| 1,061.0 | 25.08 | 250.84 | 1,034.5 | -59.1 | -170.1 | 180.1 | 3.00 | 3.00 | EOB @ Inc. = 25.08° |
| 1,100.0 | 25.08 | 250.84 | 1,069.9 | -64.5 | -185.7 | 196.6 | 0.00 | 0.00 | |
| 1,200.0 | 25.08 | 250.84 | 1,160.5 | -78.4 | -225.8 | 239.0 | 0.00 | 0.00 | |
| 1,300.0 | 25.08 | 250.84 | 1,251.0 | -92.3 | -265.8 | 281.4 | 0.00 | 0.00 | |
| 1,400.0 | 25.08 | 250.84 | 1,341.6 | -106.2 | -305.8 | 323.8 | 0.00 | 0.00 | |
| 1,500.0 | 25.08 | 250.84 | 1,432.2 | -120.2 | -345.9 | 366.1 | 0.00 | 0.00 | |
| 1,574.9 | 25.08 | 250.84 | 1,500.0 | -130.6 | -375.9 | 397.9 | 0.00 | 0.00 | Surface Casing |
| 1,600.0 | 25.08 | 250.84 | 1,522.7 | -134.1 | -385.9 | 408.5 | 0.00 | 0.00 | |
| 1,700.0 | 25.08 | 250.84 | 1,613.3 | -148.0 | -425.9 | 450.9 | 0.00 | 0.00 | |
| 1,800.0 | 25.08 | 250.84 | 1,703.9 | -161.9 | -466.0 | 493.3 | 0.00 | 0.00 | |
| 1,900.0 | 25.08 | 250.84 | 1,794.5 | -175.8 | -506.0 | 535.7 | 0.00 | 0.00 | |
| 2,000.0 | 25.08 | 250.84 | 1,885.0 | -189.7 | -546.1 | 578.1 | 0.00 | 0.00 | |
| 2,100.0 | 25.08 | 250.84 | 1,975.6 | -203.6 | -586.1 | 620.5 | 0.00 | 0.00 | |
| 2,200.0 | 25.08 | 250.84 | 2,066.2 | -217.5 | -626.1 | 662.9 | 0.00 | 0.00 | |
| 2,300.0 | 25.08 | 250.84 | 2,156.7 | -231.4 | -666.2 | 705.2 | 0.00 | 0.00 | |
| 2,400.0 | 25.08 | 250.84 | 2,247.3 | -245.3 | -706.2 | 747.6 | 0.00 | 0.00 | |
| 2,500.0 | 25.08 | 250.84 | 2,337.9 | -259.3 | -746.3 | 790.0 | 0.00 | 0.00 | |
| 2,600.0 | 25.08 | 250.84 | 2,428.5 | -273.2 | -786.3 | 832.4 | 0.00 | 0.00 | |
| 2,700.0 | 25.08 | 250.84 | 2,519.0 | -287.1 | -826.3 | 874.8 | 0.00 | 0.00 | |
| 2,800.0 | 25.08 | 250.84 | 2,609.6 | -301.0 | -866.4 | 917.2 | 0.00 | 0.00 | |
| 2,900.0 | 25.08 | 250.84 | 2,700.2 | -314.9 | -906.4 | 959.6 | 0.00 | 0.00 | |
| 3,000.0 | 25.08 | 250.84 | 2,790.8 | -328.8 | -946.5 | 1,002.0 | 0.00 | 0.00 | |
| 3,100.0 | 25.08 | 250.84 | 2,881.3 | -342.7 | -986.5 | 1,044.3 | 0.00 | 0.00 | |
| 3,200.0 | 25.08 | 250.84 | 2,971.9 | -356.6 | -1,026.5 | 1,086.7 | 0.00 | 0.00 | |
| 3,300.0 | 25.08 | 250.84 | 3,062.5 | -370.5 | -1,066.6 | 1,129.1 | 0.00 | 0.00 | |
| 3,400.0 | 25.08 | 250.84 | 3,153.0 | -384.4 | -1,106.6 | 1,171.5 | 0.00 | 0.00 | |
| 3,500.0 | 25.08 | 250.84 | 3,243.6 | -398.4 | -1,146.7 | 1,213.9 | 0.00 | 0.00 | |
| 3,600.0 | 25.08 | 250.84 | 3,334.2 | -412.3 | -1,186.7 | 1,256.3 | 0.00 | 0.00 | |
| 3,700.0 | 25.08 | 250.84 | 3,424.8 | -426.2 | -1,226.7 | 1,298.7 | 0.00 | 0.00 | |
| 3,800.0 | 25.08 | 250.84 | 3,515.3 | -440.1 | -1,266.8 | 1,341.0 | 0.00 | 0.00 | |
| 3,900.0 | 25.08 | 250.84 | 3,605.9 | -454.0 | -1,306.8 | 1,383.4 | 0.00 | 0.00 | |
| 4,000.0 | 25.08 | 250.84 | 3,696.5 | -467.9 | -1,346.9 | 1,425.8 | 0.00 | 0.00 | |
| 4,100.0 | 25.08 | 250.84 | 3,787.1 | -481.8 | -1,386.9 | 1,468.2 | 0.00 | 0.00 | |
| 4,200.0 | 25.08 | 250.84 | 3,877.6 | -495.7 | -1,426.9 | 1,510.6 | 0.00 | 0.00 | |
| 4,300.0 | 25.08 | 250.84 | 3,968.2 | -509.6 | -1,467.0 | 1,553.0 | 0.00 | 0.00 | |
| 4,400.0 | 25.08 | 250.84 | 4,058.8 | -523.5 | -1,507.0 | 1,595.4 | 0.00 | 0.00 | |
| 4,500.0 | 25.08 | 250.84 | 4,149.3 | -537.4 | -1,547.1 | 1,637.8 | 0.00 | 0.00 | |
| 4,600.0 | 25.08 | 250.84 | 4,239.9 | -551.4 | -1,587.1 | 1,680.1 | 0.00 | 0.00 | |
| 4,700.0 | 25.08 | 250.84 | 4,330.5 | -565.3 | -1,627.1 | 1,722.5 | 0.00 | 0.00 | |
| 4,754.7 | 25.08 | 250.84 | 4,380.0 | -572.9 | -1,649.0 | 1,745.7 | 0.00 | 0.00 | Mesaverde Marker |

| | | | |
|---|---|---|---|
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| **Project:** | Mamm Creek | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site:** | O19EB Pad | **North Reference:** | True |
| **Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #2 | | |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| 4,800.0 | 25.08 | 250.84 | 4,421.1 | -579.2 | -1,667.2 | 1,764.9 | 0.00 | 0.00 | |
| 4,900.0 | 25.08 | 250.84 | 4,511.6 | -593.1 | -1,707.2 | 1,807.3 | 0.00 | 0.00 | |
| 4,955.3 | 25.08 | 250.84 | 4,561.7 | -600.8 | -1,729.4 | 1,830.7 | 0.00 | 0.00 | Start 2° Drop |
| 5,000.0 | 24.18 | 250.84 | 4,602.3 | -606.9 | -1,747.0 | 1,849.4 | 2.00 | -2.00 | |
| 5,100.0 | 22.18 | 250.84 | 4,694.3 | -619.8 | -1,784.1 | 1,888.7 | 2.00 | -2.00 | |
| 5,200.0 | 20.18 | 250.84 | 4,787.5 | -631.7 | -1,818.3 | 1,924.9 | 2.00 | -2.00 | |
| 5,300.0 | 18.18 | 250.84 | 4,881.9 | -642.5 | -1,849.3 | 1,957.7 | 2.00 | -2.00 | |
| 5,323.2 | 17.72 | 250.84 | 4,904.0 | -644.8 | -1,856.1 | 1,964.9 | 2.00 | -2.00 | Williams Fork |
| 5,400.0 | 16.18 | 250.84 | 4,977.5 | -652.1 | -1,877.2 | 1,987.3 | 2.00 | -2.00 | |
| 5,500.0 | 14.18 | 250.84 | 5,074.0 | -660.7 | -1,902.0 | 2,013.5 | 2.00 | -2.00 | |
| 5,600.0 | 12.18 | 250.84 | 5,171.3 | -668.2 | -1,923.5 | 2,036.3 | 2.00 | -2.00 | |
| 5,700.0 | 10.18 | 250.84 | 5,269.4 | -674.6 | -1,941.8 | 2,055.7 | 2.00 | -2.00 | |
| 5,800.0 | 8.18 | 250.84 | 5,368.1 | -679.8 | -1,956.9 | 2,071.6 | 2.00 | -2.00 | |
| 5,900.0 | 6.18 | 250.84 | 5,467.4 | -683.9 | -1,968.7 | 2,084.1 | 2.00 | -2.00 | |
| 6,000.0 | 4.18 | 250.84 | 5,566.9 | -686.9 | -1,977.3 | 2,093.2 | 2.00 | -2.00 | |
| 6,100.0 | 2.18 | 250.84 | 5,666.8 | -688.7 | -1,982.5 | 2,098.7 | 2.00 | -2.00 | |
| 6,209.2 | 0.00 | 0.00 | 5,776.0 | -689.4 | -1,984.5 | 2,100.8 | 2.00 | -2.00 | EOD @ Inc = 0° - Top Gas |
| 6,300.0 | 0.00 | 0.00 | 5,866.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,400.0 | 0.00 | 0.00 | 5,966.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,500.0 | 0.00 | 0.00 | 6,066.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,600.0 | 0.00 | 0.00 | 6,166.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,700.0 | 0.00 | 0.00 | 6,266.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,800.0 | 0.00 | 0.00 | 6,366.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 6,900.0 | 0.00 | 0.00 | 6,466.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,000.0 | 0.00 | 0.00 | 6,566.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,100.0 | 0.00 | 0.00 | 6,666.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,200.0 | 0.00 | 0.00 | 6,766.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,300.0 | 0.00 | 0.00 | 6,866.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,400.0 | 0.00 | 0.00 | 6,966.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,500.0 | 0.00 | 0.00 | 7,066.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,565.2 | 0.00 | 0.00 | 7,132.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | Coal Ridge |
| 7,600.0 | 0.00 | 0.00 | 7,166.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,700.0 | 0.00 | 0.00 | 7,266.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,800.0 | 0.00 | 0.00 | 7,366.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 7,900.0 | 0.00 | 0.00 | 7,466.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,000.0 | 0.00 | 0.00 | 7,566.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,100.0 | 0.00 | 0.00 | 7,666.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,200.0 | 0.00 | 0.00 | 7,766.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,245.2 | 0.00 | 0.00 | 7,812.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | Rollins |
| 8,300.0 | 0.00 | 0.00 | 7,866.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,400.0 | 0.00 | 0.00 | 7,966.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,500.0 | 0.00 | 0.00 | 8,066.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,600.0 | 0.00 | 0.00 | 8,166.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,700.0 | 0.00 | 0.00 | 8,266.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,798.2 | 0.00 | 0.00 | 8,365.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | Cozzette |
| 8,800.0 | 0.00 | 0.00 | 8,366.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,900.0 | 0.00 | 0.00 | 8,466.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 8,996.2 | 0.00 | 0.00 | 8,563.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | Corcoran |
| 9,000.0 | 0.00 | 0.00 | 8,566.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 9,100.0 | 0.00 | 0.00 | 8,666.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 9,200.0 | 0.00 | 0.00 | 8,766.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 9,300.0 | 0.00 | 0.00 | 8,866.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Project:** | Mamm Creek | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site:** | O19EB Pad | **North Reference:** | True |
| **Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | OH | | |
| **Design:** | Plan #2 | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations |
|---|---|---|---|---|---|---|---|---|---|
| 9,400.0 | 0.00 | 0.00 | 8,966.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 9,476.2 | 0.00 | 0.00 | 9,043.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | TD @ 9,476.2' MD |
| 9,500.0 | 0.00 | 0.00 | 9,066.8 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | |
| 9,576.2 | 0.00 | 0.00 | 9,143.0 | -689.4 | -1,984.5 | 2,100.8 | 0.00 | 0.00 | Permit TD @ 9,576.2' MD |

**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 |
|---|---|---|---|---|---|---|---|---|---|
| Shideler 30-4A PBHL<br>- plan hits target center<br>- Circle (radius 25.0) | 0.00 | 0.00 | 9,043.0 | -689.4 | -1,984.5 | 1,587,071.87 | 2,375,173.11 | 39.424382 | -107.712109 |
| Shideler 30-4A TGT<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 5,776.0 | -689.4 | -1,984.5 | 1,587,071.87 | 2,375,173.11 | 39.424382 | -107.712109 |

**Casing Points**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (in) | Hole Diameter (in) |
|---|---|---|---|---|
| 1,574.9 | 1,500.0 | Surface Casing | | |

**Formations**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---|---|---|---|---|---|
| 4,754.7 | 4,380.0 | Mesaverde Marker | | | |
| 5,323.2 | 4,904.0 | Williams Fork | | | |
| 6,209.2 | 5,776.0 | Top Gas | | | |
| 7,565.2 | 7,132.0 | Coal Ridge | | | |
| 8,245.2 | 7,812.0 | Rollins | | | |
| 8,798.2 | 8,365.0 | Cozzette | | | |
| 8,996.2 | 8,563.0 | Corcoran | | | |

**Plan Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 225.0 | 225.0 | 0.0 | 0.0 | KOP @ 225' |
| 1,061.0 | 1,034.5 | -59.1 | -170.1 | EOB @ Inc. = 25.08° |
| 4,955.3 | 4,561.7 | -600.8 | -1,729.4 | Start 2° Drop |
| 6,209.2 | 5,776.0 | -689.4 | -1,984.5 | EOD @ Inc = 0° |
| 9,476.2 | 9,043.0 | -689.4 | -1,984.5 | TD @ 9,476.2' MD |
| 9,576.2 | 9,143.0 | -689.4 | -1,984.5 | Permit TD @ 9,576.2' MD |

# EnCana Oil & Gas (USA) Inc

**Mamm Creek**
**O19EB Pad**
**Shideler 30-4A**
**OH**
**Plan #2**

# Anticollision Report

**13 November, 2012**

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

| | |
|---|---|
| **Reference** | Plan #2 |

| | | | |
|---|---|---|---|
| **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** 11/13/2012

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 0.0 | 9,576.2 | Plan #2 (OH) | MWD | Geolink MWD |

# Cathedral Energy Services

Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **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 |
|---|---|---|---|---|---|---|
| NWNE 25-7S-93W (B25 Pad) | | | | | | |
| Shideler 25-1 - DD - DD | | | | | | Out of range |
| O19E Pad | | | | | | |
| Shideler 19-10 (O19E) - DD - DD | 949.9 | 918.0 | 240.0 | 235.2 | 50.076 | CC, ES |
| Shideler 19-10 (O19E) - DD - DD | 1,300.0 | 1,202.7 | 302.1 | 293.9 | 37.100 | SF |
| Shideler 19-10 (O19E) - Surveys - Surveys | 949.9 | 918.0 | 240.0 | 235.2 | 50.076 | CC, ES |
| Shideler 19-10 (O19E) - Surveys - Surveys | 1,300.0 | 1,202.7 | 302.1 | 293.9 | 37.100 | SF |
| Shideler 19-15 (O19E) - Existing-Vertical - Existing-Vertic | 1,278.0 | 1,260.4 | 100.3 | 92.2 | 12.448 | CC, ES |
| Shideler 19-15 (O19E) - Existing-Vertical - Existing-Vertic | 1,300.0 | 1,280.8 | 100.7 | 92.5 | 12.284 | SF |
| Shideler 30-2 (O19E) - Existing - Survey - Existing - Surv | 1,515.4 | 1,477.8 | 75.8 | 67.0 | 8.656 | CC, ES |
| Shideler 30-2 (O19E) - Existing - Survey - Existing - Surv | 1,600.0 | 1,555.3 | 82.9 | 71.9 | 7.481 | SF |
| O19EB Pad | | | | | | |
| (Existing Offset) Shideler 19-6D - Existing - Existing | | | | | | Out of range |
| Shideler 19-14D - OH - Plan #2 | 720.2 | 715.4 | 30.4 | 27.1 | 9.385 | CC, ES |
| Shideler 19-14D - OH - Plan #2 | 800.0 | 794.2 | 32.4 | 28.5 | 8.221 | SF |
| Shideler 19-16C - OH - Plan #2 | 200.0 | 200.0 | 25.7 | 25.1 | 41.816 | CC |
| Shideler 19-16C - OH - Plan #2 | 200.0 | 200.0 | 25.7 | 25.1 | 41.815 | ES |
| Shideler 19-16C - OH - Plan #2 | 300.0 | 299.4 | 27.6 | 26.6 | 28.679 | SF |
| Shideler 19-16CC - OH - Plan #2 | 200.0 | 200.0 | 11.4 | 10.8 | 18.629 | CC, ES |
| Shideler 19-16CC - OH - Plan #2 | 300.0 | 300.0 | 12.9 | 11.9 | 13.393 | SF |
| Shideler 30-1B - OH - Plan #2 | 318.7 | 318.7 | 11.5 | 10.4 | 11.072 | CC, ES |
| Shideler 30-1B - OH - Plan #2 | 400.0 | 399.2 | 14.2 | 12.8 | 10.606 | SF |
| Shideler 30-1C - OH - Plan #2 | 200.0 | 200.0 | 16.7 | 16.1 | 27.206 | CC |
| Shideler 30-1C - OH - Plan #2 | 300.0 | 299.5 | 16.8 | 15.9 | 17.351 | ES |
| Shideler 30-1C - OH - Plan #2 | 400.0 | 398.2 | 20.0 | 18.6 | 14.796 | SF |
| Shideler 30-2C - OH - Plan #2 | 200.0 | 200.0 | 58.5 | 57.9 | 95.185 | CC, ES |
| Shideler 30-2C - OH - Plan #2 | 1,200.0 | 1,136.9 | 245.8 | 237.6 | 29.662 | SF |
| Shideler 30-3A - OH - Plan #2 | 200.0 | 200.0 | 66.1 | 65.5 | 107.598 | CC |
| Shideler 30-3A - OH - Plan #2 | 300.0 | 297.5 | 66.3 | 65.4 | 69.098 | ES |
| Shideler 30-3A - OH - Plan #2 | 1,000.0 | 978.7 | 103.4 | 97.5 | 17.519 | SF |
| Shideler 30-3B - OH - Plan #2 | 200.0 | 200.0 | 49.7 | 49.1 | 80.869 | CC, ES |
| Shideler 30-3B - OH - Plan #2 | 2,800.0 | 2,758.3 | 316.3 | 282.5 | 9.371 | SF |
| Shideler 30-7A - OH - Plan #2 | 336.6 | 335.1 | 41.7 | 40.6 | 37.938 | CC, ES |
| Shideler 30-7A - OH - Plan #2 | 600.0 | 588.8 | 61.0 | 58.7 | 26.745 | SF |
| Shideler 30-8B - OH - Plan #2 | 200.0 | 200.0 | 26.2 | 25.6 | 42.610 | CC, ES |
| Shideler 30-8B - OH - Plan #2 | 400.0 | 397.1 | 31.6 | 30.2 | 23.440 | SF |
| Shideler Federal 19-13D - OH - Plan #2 | 337.6 | 338.3 | 15.6 | 14.5 | 13.934 | CC |
| Shideler Federal 19-13D - OH - Plan #2 | 400.0 | 401.0 | 15.8 | 14.4 | 11.524 | ES |
| Shideler Federal 19-13D - OH - Plan #2 | 8,448.1 | 8,441.8 | 418.5 | 336.0 | 5.073 | SF |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19E Pad - Shideler 19-10 (O19E) - DD - DD

**Offset Site Error:** 0.0 ft

**Survey Program:** 154--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 | 23.9 | 23.9 | 0.0 | 0.0 | -83.26 | 35.4 | -299.6 | 301.6 | | | | |
| 100.0 | 100.0 | 123.5 | 123.5 | 0.1 | 0.2 | -83.23 | 35.6 | -299.6 | 301.7 | 301.4 | 0.33 | 917.871 | |
| 200.0 | 200.0 | 223.4 | 223.4 | 0.3 | 0.4 | -83.16 | 36.0 | -299.8 | 301.9 | 301.3 | 0.67 | 448.761 | |
| 300.0 | 300.0 | 323.2 | 323.2 | 0.5 | 0.5 | 26.26 | 36.6 | -299.9 | 300.8 | 299.8 | 1.02 | 294.215 | |
| 400.0 | 399.8 | 423.4 | 423.3 | 0.7 | 0.7 | 27.31 | 38.7 | -299.8 | 295.2 | 293.8 | 1.38 | 213.681 | |
| 500.0 | 499.1 | 519.1 | 518.9 | 1.0 | 0.9 | 29.52 | 43.9 | -299.7 | 285.5 | 283.8 | 1.76 | 162.047 | |
| 600.0 | 597.6 | 612.1 | 611.5 | 1.3 | 1.1 | 33.21 | 53.0 | -300.2 | 273.5 | 271.3 | 2.20 | 124.191 | |
| 700.0 | 695.1 | 704.9 | 703.2 | 1.7 | 1.4 | 38.79 | 66.6 | -300.7 | 260.2 | 257.5 | 2.76 | 94.320 | |
| 800.0 | 791.4 | 791.6 | 788.4 | 2.2 | 1.7 | 45.92 | 83.1 | -301.4 | 248.3 | 244.8 | 3.45 | 71.967 | |
| 900.0 | 886.0 | 875.9 | 870.5 | 2.9 | 2.0 | 54.49 | 102.3 | -302.8 | 241.0 | 236.7 | 4.30 | 56.037 | |
| 949.9 | 932.6 | 918.0 | 911.2 | 3.2 | 2.2 | 59.25 | 112.8 | -303.7 | 240.0 | 235.2 | 4.79 | 50.076 | CC, ES |
| 1,000.0 | 978.9 | 959.5 | 951.3 | 3.6 | 2.4 | 64.15 | 123.6 | -304.6 | 241.1 | 235.8 | 5.29 | 45.596 | |
| 1,100.0 | 1,069.9 | 1,041.8 | 1,030.4 | 4.4 | 2.8 | 74.16 | 146.0 | -306.4 | 250.8 | 244.5 | 6.32 | 39.680 | |
| 1,200.0 | 1,160.5 | 1,122.6 | 1,107.9 | 5.2 | 3.2 | 83.53 | 168.8 | -308.3 | 271.7 | 264.4 | 7.28 | 37.319 | |
| 1,300.0 | 1,251.0 | 1,202.7 | 1,184.5 | 6.0 | 3.6 | 91.62 | 192.3 | -310.5 | 302.1 | 293.9 | 8.14 | 37.100 | SF |
| 1,400.0 | 1,341.6 | 1,285.3 | 1,263.2 | 6.8 | 4.1 | 98.58 | 217.3 | -313.1 | 339.4 | 330.5 | 8.93 | 37.996 | |
| 1,500.0 | 1,432.2 | 1,364.8 | 1,338.8 | 7.6 | 4.5 | 104.10 | 241.5 | -316.0 | 381.4 | 371.7 | 9.69 | 39.367 | |
| 1,600.0 | 1,522.7 | 1,450.2 | 1,419.9 | 8.4 | 5.0 | 108.95 | 268.1 | -319.2 | 427.0 | 416.5 | 10.43 | 40.935 | |
| 1,700.0 | 1,613.3 | 1,535.2 | 1,500.9 | 9.2 | 5.5 | 112.93 | 293.7 | -322.3 | 473.7 | 462.6 | 11.17 | 42.411 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19E Pad - Shideler 19-10 (O19E) - Surveys - Surveys

**Offset Site Error:** 0.0 ft

**Survey Program:** 154-MWD2, 1295-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 | 23.9 | 23.9 | 0.0 | 0.0 | -83.26 | 35.4 | -299.6 | 301.6 | | | | |
| 100.0 | 100.0 | 123.5 | 123.5 | 0.1 | 0.2 | -83.23 | 35.6 | -299.6 | 301.7 | 301.4 | 0.33 | 917.871 | |
| 200.0 | 200.0 | 223.4 | 223.4 | 0.3 | 0.4 | -83.16 | 36.0 | -299.8 | 301.9 | 301.3 | 0.67 | 448.761 | |
| 300.0 | 300.0 | 323.2 | 323.2 | 0.5 | 0.5 | 26.26 | 36.6 | -299.9 | 300.8 | 299.8 | 1.02 | 294.215 | |
| 400.0 | 399.8 | 423.4 | 423.3 | 0.7 | 0.7 | 27.31 | 38.7 | -299.8 | 295.2 | 293.8 | 1.38 | 213.681 | |
| 500.0 | 499.1 | 519.1 | 518.9 | 1.0 | 0.9 | 29.52 | 43.9 | -299.7 | 285.5 | 283.8 | 1.76 | 162.047 | |
| 600.0 | 597.6 | 612.1 | 611.5 | 1.3 | 1.1 | 33.21 | 53.0 | -300.2 | 273.5 | 271.3 | 2.20 | 124.191 | |
| 700.0 | 695.1 | 704.9 | 703.2 | 1.7 | 1.4 | 38.79 | 66.6 | -300.7 | 260.2 | 257.5 | 2.76 | 94.320 | |
| 800.0 | 791.4 | 791.6 | 788.4 | 2.2 | 1.7 | 45.92 | 83.1 | -301.4 | 248.3 | 244.8 | 3.45 | 71.967 | |
| 900.0 | 886.0 | 875.9 | 870.5 | 2.9 | 2.0 | 54.49 | 102.3 | -302.8 | 241.0 | 236.7 | 4.30 | 56.037 | |
| 949.9 | 932.6 | 918.0 | 911.2 | 3.2 | 2.2 | 59.25 | 112.8 | -303.7 | 240.0 | 235.2 | 4.79 | 50.076 | CC, ES |
| 1,000.0 | 978.9 | 959.5 | 951.3 | 3.6 | 2.4 | 64.15 | 123.6 | -304.6 | 241.1 | 235.8 | 5.29 | 45.596 | |
| 1,100.0 | 1,069.9 | 1,041.8 | 1,030.4 | 4.4 | 2.8 | 74.16 | 146.0 | -306.4 | 250.8 | 244.5 | 6.32 | 39.680 | |
| 1,200.0 | 1,160.5 | 1,122.6 | 1,107.9 | 5.2 | 3.2 | 83.53 | 168.8 | -308.3 | 271.7 | 264.4 | 7.28 | 37.319 | |
| 1,300.0 | 1,251.0 | 1,202.7 | 1,184.5 | 6.0 | 3.6 | 91.62 | 192.3 | -310.5 | 302.1 | 293.9 | 8.14 | 37.100 | SF |
| 1,400.0 | 1,341.6 | 1,285.3 | 1,263.2 | 6.8 | 4.1 | 98.58 | 217.3 | -313.1 | 339.4 | 330.5 | 8.93 | 37.996 | |
| 1,500.0 | 1,432.2 | 1,364.8 | 1,338.8 | 7.6 | 4.5 | 104.10 | 241.5 | -316.0 | 381.4 | 371.7 | 9.69 | 39.367 | |
| 1,600.0 | 1,522.7 | 1,450.2 | 1,419.9 | 8.4 | 5.0 | 108.95 | 268.1 | -319.2 | 427.0 | 416.5 | 10.43 | 40.935 | |
| 1,700.0 | 1,613.3 | 1,535.2 | 1,500.9 | 9.2 | 5.5 | 112.93 | 293.7 | -322.3 | 473.7 | 462.6 | 11.17 | 42.411 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19E Pad - Shideler 19-15 (O19E) - Existing-Vertical - Existing-Vertical

**Offset Site Error:** 0.0 ft

**Survey Program:** 100-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 | 24.4 | 24.4 | 0.0 | 0.0 | -88.77 | 6.9 | -322.9 | 322.9 | | | | |
| 100.0 | 100.0 | 125.6 | 125.6 | 0.1 | 0.2 | -88.77 | 6.9 | -322.5 | 322.6 | 322.3 | 0.33 | 984.649 | |
| 200.0 | 200.0 | 226.7 | 226.7 | 0.3 | 0.4 | -88.82 | 6.6 | -321.9 | 322.0 | 321.3 | 0.68 | 474.075 | |
| 300.0 | 300.0 | 329.0 | 329.0 | 0.5 | 0.6 | 20.43 | 6.5 | -320.7 | 319.4 | 318.4 | 1.03 | 309.699 | |
| 400.0 | 399.8 | 430.4 | 430.4 | 0.7 | 0.7 | 21.01 | 6.8 | -318.8 | 311.5 | 310.1 | 1.38 | 224.996 | |
| 500.0 | 499.1 | 532.2 | 532.1 | 1.0 | 0.9 | 22.10 | 7.2 | -316.2 | 298.0 | 296.2 | 1.74 | 170.789 | |
| 600.0 | 597.6 | 632.8 | 632.6 | 1.3 | 1.1 | 23.84 | 7.9 | -312.6 | 278.8 | 276.7 | 2.12 | 131.526 | |
| 700.0 | 695.1 | 730.6 | 730.4 | 1.7 | 1.3 | 26.47 | 8.8 | -308.4 | 254.6 | 252.1 | 2.53 | 100.775 | |
| 800.0 | 791.4 | 826.3 | 826.0 | 2.2 | 1.5 | 30.19 | 9.1 | -303.9 | 226.1 | 223.1 | 3.00 | 75.325 | |
| 900.0 | 886.0 | 919.6 | 919.2 | 2.9 | 1.6 | 35.82 | 9.4 | -299.3 | 194.1 | 190.5 | 3.62 | 53.691 | |
| 1,000.0 | 978.9 | 1,011.1 | 1,010.5 | 3.6 | 1.8 | 44.70 | 9.9 | -294.6 | 160.3 | 155.8 | 4.50 | 35.645 | |
| 1,100.0 | 1,069.9 | 1,100.8 | 1,100.1 | 4.4 | 2.0 | 58.48 | 10.1 | -289.6 | 128.0 | 122.3 | 5.76 | 22.240 | |
| 1,200.0 | 1,160.5 | 1,189.5 | 1,188.7 | 5.2 | 2.2 | 77.68 | 9.5 | -284.5 | 105.9 | 98.7 | 7.20 | 14.702 | |
| 1,278.0 | 1,231.1 | 1,260.4 | 1,259.5 | 5.8 | 2.3 | 95.94 | 8.0 | -280.8 | 100.3 | 92.2 | 8.06 | 12.448 | CC, ES |
| 1,300.0 | 1,251.0 | 1,280.8 | 1,279.8 | 6.0 | 2.3 | 101.19 | 7.3 | -279.9 | 100.7 | 92.5 | 8.20 | 12.284 | SF |
| 1,400.0 | 1,341.6 | 1,372.1 | 1,370.9 | 6.8 | 2.5 | 122.64 | 2.6 | -276.5 | 112.9 | 104.6 | 8.31 | 13.585 | |
| 1,500.0 | 1,432.2 | 1,462.1 | 1,460.7 | 7.6 | 2.7 | 138.47 | -2.7 | -273.7 | 137.9 | 130.0 | 7.95 | 17.341 | |
| 1,600.0 | 1,522.7 | 1,551.2 | 1,549.6 | 8.4 | 2.9 | 149.28 | -7.7 | -270.8 | 171.0 | 163.4 | 7.58 | 22.545 | |
| 1,700.0 | 1,613.3 | 1,640.5 | 1,638.7 | 9.2 | 3.0 | 156.66 | -12.4 | -267.6 | 208.5 | 201.1 | 7.35 | 28.360 | |
| 1,800.0 | 1,703.9 | 1,729.4 | 1,727.5 | 10.0 | 3.2 | 161.84 | -17.0 | -264.4 | 248.3 | 241.0 | 7.26 | 34.204 | |
| 1,900.0 | 1,794.5 | 1,817.3 | 1,815.2 | 10.8 | 3.4 | 165.57 | -21.2 | -260.7 | 290.0 | 282.7 | 7.28 | 39.835 | |
| 2,000.0 | 1,885.0 | 1,908.8 | 1,906.4 | 11.6 | 3.6 | 168.50 | -25.8 | -257.0 | 332.3 | 324.9 | 7.37 | 45.062 | |
| 2,100.0 | 1,975.6 | 1,997.3 | 1,994.8 | 12.4 | 3.7 | 170.69 | -30.1 | -253.6 | 375.0 | 367.5 | 7.54 | 49.771 | |
| 2,200.0 | 2,066.2 | 2,086.6 | 2,084.0 | 13.3 | 3.9 | 172.43 | -34.3 | -250.1 | 418.3 | 410.6 | 7.74 | 54.030 | |
| 2,300.0 | 2,156.7 | 2,176.8 | 2,174.0 | 14.1 | 4.1 | 173.87 | -38.7 | -246.6 | 461.8 | 453.8 | 7.98 | 57.863 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19E Pad - Shideler 30-2 (O19E) - Existing - Survey - Existing - Survey

**Offset Site Error:** 0.0 ft

**Survey Program:** 164-MWD2

**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 | 23.9 | 23.9 | 0.0 | 0.0 | -86.29 | 20.2 | -312.1 | 312.8 | | | | |
| 100.0 | 100.0 | 123.4 | 123.4 | 0.1 | 0.2 | -86.27 | 20.4 | -312.2 | 312.9 | 312.6 | 0.33 | 949.003 | |
| 200.0 | 200.0 | 219.5 | 219.5 | 0.3 | 0.4 | -86.22 | 20.7 | -312.7 | 313.4 | 312.7 | 0.67 | 469.543 | |
| 300.0 | 300.0 | 308.8 | 308.7 | 0.5 | 0.5 | 23.12 | 21.4 | -315.3 | 315.1 | 314.1 | 1.00 | 316.089 | |
| 400.0 | 399.8 | 398.2 | 398.0 | 0.7 | 0.7 | 23.65 | 22.5 | -321.4 | 315.9 | 314.5 | 1.33 | 237.249 | |
| 500.0 | 499.1 | 496.5 | 495.8 | 1.0 | 0.9 | 24.09 | 20.8 | -329.9 | 313.6 | 311.9 | 1.69 | 185.307 | |
| 600.0 | 597.6 | 597.0 | 595.6 | 1.3 | 1.2 | 24.02 | 13.7 | -339.1 | 306.7 | 304.6 | 2.10 | 146.203 | |
| 700.0 | 695.1 | 700.6 | 698.0 | 1.7 | 1.5 | 23.34 | 0.9 | -348.5 | 294.5 | 291.9 | 2.57 | 114.546 | |
| 800.0 | 791.4 | 808.2 | 803.7 | 2.2 | 1.8 | 21.94 | -17.8 | -355.6 | 274.9 | 271.8 | 3.12 | 88.207 | |
| 900.0 | 886.0 | 908.8 | 901.5 | 2.9 | 2.2 | 19.56 | -40.9 | -359.2 | 247.9 | 244.2 | 3.68 | 67.388 | |
| 1,000.0 | 978.9 | 1,002.9 | 992.3 | 3.6 | 2.6 | 16.19 | -65.6 | -362.1 | 216.4 | 212.2 | 4.18 | 51.716 | |
| 1,100.0 | 1,069.9 | 1,096.2 | 1,082.2 | 4.4 | 3.0 | 11.69 | -90.4 | -364.6 | 181.1 | 176.5 | 4.60 | 39.350 | |
| 1,200.0 | 1,160.5 | 1,189.2 | 1,171.9 | 5.2 | 3.4 | 5.03 | -114.6 | -366.7 | 146.0 | 141.1 | 4.92 | 29.689 | |
| 1,300.0 | 1,251.0 | 1,280.1 | 1,259.7 | 6.0 | 3.9 | -5.14 | -138.3 | -368.4 | 113.5 | 108.2 | 5.24 | 21.641 | |
| 1,400.0 | 1,341.6 | 1,371.4 | 1,347.5 | 6.8 | 4.3 | -21.97 | -163.2 | -371.1 | 88.5 | 82.3 | 6.20 | 14.264 | |
| 1,500.0 | 1,432.2 | 1,463.7 | 1,436.3 | 7.6 | 4.8 | -46.79 | -188.3 | -373.2 | 76.0 | 67.7 | 8.34 | 9.114 | |
| 1,515.4 | 1,446.1 | 1,477.8 | 1,449.9 | 7.7 | 4.8 | -51.00 | -192.1 | -373.5 | 75.8 | 67.0 | 8.75 | 8.656 | CC, ES |
| 1,600.0 | 1,522.7 | 1,555.3 | 1,524.4 | 8.4 | 5.2 | -72.98 | -213.2 | -375.4 | 82.9 | 71.9 | 11.09 | 7.481 | SF |
| 1,700.0 | 1,613.3 | 1,647.1 | 1,612.6 | 9.2 | 5.7 | -92.20 | -238.5 | -377.7 | 105.5 | 92.3 | 13.17 | 8.013 | |
| 1,800.0 | 1,703.9 | 1,738.7 | 1,700.7 | 10.0 | 6.1 | -104.43 | -263.6 | -379.8 | 136.1 | 121.6 | 14.50 | 9.387 | |
| 1,900.0 | 1,794.5 | 1,830.4 | 1,789.0 | 10.8 | 6.6 | -112.37 | -288.6 | -381.3 | 170.7 | 155.2 | 15.50 | 11.011 | |
| 2,000.0 | 1,885.0 | 1,923.5 | 1,878.8 | 11.6 | 7.0 | -118.08 | -312.7 | -382.4 | 207.0 | 190.6 | 16.37 | 12.646 | |
| 2,100.0 | 1,975.6 | 2,018.1 | 1,970.2 | 12.4 | 7.5 | -122.01 | -337.1 | -384.7 | 243.4 | 226.2 | 17.23 | 14.127 | |
| 2,200.0 | 2,066.2 | 2,108.9 | 2,057.8 | 13.3 | 7.9 | -124.66 | -361.0 | -387.5 | 280.3 | 262.2 | 18.09 | 15.495 | |
| 2,300.0 | 2,156.7 | 2,199.5 | 2,145.1 | 14.1 | 8.4 | -126.65 | -385.2 | -389.9 | 318.2 | 299.2 | 18.97 | 16.776 | |
| 2,400.0 | 2,247.3 | 2,290.6 | 2,232.7 | 14.9 | 8.8 | -128.14 | -410.2 | -392.4 | 356.6 | 336.7 | 19.88 | 17.940 | |
| 2,500.0 | 2,337.9 | 2,381.7 | 2,320.0 | 15.7 | 9.3 | -129.22 | -435.9 | -395.0 | 395.4 | 374.6 | 20.81 | 19.001 | |
| 2,600.0 | 2,428.5 | 2,472.6 | 2,407.2 | 16.5 | 9.8 | -130.13 | -461.5 | -397.4 | 434.5 | 412.8 | 21.72 | 20.006 | |
| 2,700.0 | 2,519.0 | 2,563.3 | 2,494.3 | 17.3 | 10.2 | -131.01 | -486.4 | -399.2 | 473.9 | 451.3 | 22.62 | 20.954 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 19-14D - OH - Plan #2

**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 | -143.36 | -26.6 | -19.8 | 33.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -143.36 | -26.6 | -19.8 | 33.1 | 32.9 | 0.27 | 124.903 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -143.36 | -26.6 | -19.8 | 33.1 | 32.5 | 0.61 | 53.936 | |
| 300.0 | 300.0 | 299.2 | 299.2 | 0.5 | 0.5 | -35.27 | -26.9 | -20.3 | 32.5 | 31.6 | 0.96 | 33.787 | |
| 400.0 | 399.8 | 397.7 | 397.5 | 0.7 | 0.7 | -38.65 | -29.7 | -24.5 | 32.0 | 30.7 | 1.32 | 24.212 | |
| 415.7 | 415.4 | 413.1 | 412.9 | 0.7 | 0.7 | -39.36 | -30.4 | -25.6 | 32.0 | 30.6 | 1.39 | 23.089 | |
| 500.0 | 499.1 | 496.1 | 495.5 | 1.0 | 0.9 | -43.98 | -35.3 | -33.0 | 32.4 | 30.6 | 1.73 | 18.652 | |
| 600.0 | 597.6 | 595.9 | 594.3 | 1.3 | 1.2 | -53.32 | -42.5 | -44.0 | 32.0 | 29.7 | 2.27 | 14.129 | |
| 700.0 | 695.1 | 695.4 | 693.0 | 1.7 | 1.4 | -71.30 | -49.7 | -55.0 | 30.5 | 27.4 | 3.04 | 10.015 | |
| 720.2 | 714.7 | 715.4 | 712.8 | 1.8 | 1.5 | -76.17 | -51.1 | -57.3 | 30.4 | 27.1 | 3.24 | 9.385 | CC, ES |
| 800.0 | 791.4 | 794.2 | 791.0 | 2.2 | 1.7 | -98.18 | -56.8 | -66.0 | 32.4 | 28.5 | 3.94 | 8.221 | SF |
| 900.0 | 886.0 | 892.2 | 888.1 | 2.9 | 2.0 | -124.00 | -63.9 | -76.8 | 42.9 | 38.5 | 4.45 | 9.652 | |
| 1,000.0 | 978.9 | 989.0 | 984.0 | 3.6 | 2.3 | -140.97 | -70.9 | -87.5 | 62.5 | 57.9 | 4.64 | 13.480 | |
| 1,100.0 | 1,069.9 | 1,084.5 | 1,078.7 | 4.4 | 2.5 | -151.07 | -77.8 | -98.1 | 89.1 | 84.3 | 4.79 | 18.600 | |
| 1,200.0 | 1,160.5 | 1,179.7 | 1,173.1 | 5.2 | 2.8 | -156.84 | -84.7 | -108.6 | 118.0 | 113.0 | 5.02 | 23.528 | |
| 1,300.0 | 1,251.0 | 1,274.9 | 1,267.4 | 6.0 | 3.1 | -160.33 | -91.6 | -119.1 | 147.6 | 142.3 | 5.30 | 27.867 | |
| 1,400.0 | 1,341.6 | 1,370.2 | 1,361.8 | 6.8 | 3.4 | -162.65 | -98.5 | -129.6 | 177.5 | 171.9 | 5.61 | 31.657 | |
| 1,500.0 | 1,432.2 | 1,465.4 | 1,456.2 | 7.6 | 3.6 | -164.31 | -105.4 | -140.2 | 207.6 | 201.7 | 5.94 | 34.975 | |
| 1,600.0 | 1,522.7 | 1,560.6 | 1,550.6 | 8.4 | 3.9 | -165.55 | -112.3 | -150.7 | 237.9 | 231.6 | 6.28 | 37.894 | |
| 1,700.0 | 1,613.3 | 1,655.8 | 1,644.9 | 9.2 | 4.2 | -166.50 | -119.1 | -161.2 | 268.2 | 261.6 | 6.63 | 40.479 | |
| 1,800.0 | 1,703.9 | 1,751.0 | 1,739.3 | 10.0 | 4.5 | -167.27 | -126.0 | -171.7 | 298.5 | 291.6 | 6.98 | 42.782 | |
| 1,900.0 | 1,794.5 | 1,846.2 | 1,833.7 | 10.8 | 4.7 | -167.89 | -132.9 | -182.3 | 328.9 | 321.6 | 7.34 | 44.845 | |
| 2,000.0 | 1,885.0 | 1,941.4 | 1,928.1 | 11.6 | 5.0 | -168.41 | -139.8 | -192.8 | 359.4 | 351.7 | 7.69 | 46.704 | |
| 2,100.0 | 1,975.6 | 2,036.6 | 2,022.4 | 12.4 | 5.3 | -168.84 | -146.7 | -203.3 | 389.8 | 381.8 | 8.06 | 48.386 | |
| 2,200.0 | 2,066.2 | 2,131.8 | 2,116.8 | 13.3 | 5.6 | -169.22 | -153.6 | -213.8 | 420.3 | 411.9 | 8.42 | 49.916 | |
| 2,300.0 | 2,156.7 | 2,227.1 | 2,211.2 | 14.1 | 5.8 | -169.54 | -160.5 | -224.4 | 450.8 | 442.0 | 8.79 | 51.313 | |
| 2,400.0 | 2,247.3 | 2,322.3 | 2,305.6 | 14.9 | 6.1 | -169.82 | -167.3 | -234.9 | 481.3 | 472.1 | 9.15 | 52.594 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 19-16C - OH - Plan #2

**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 | 54.46 | 14.9 | 20.9 | 25.7 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 54.46 | 14.9 | 20.9 | 25.7 | 25.4 | 0.27 | 96.837 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 54.46 | 14.9 | 20.9 | 25.7 | 25.1 | 0.61 | 41.816 | CC |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 54.46 | 14.9 | 20.9 | 25.7 | 25.1 | 0.61 | 41.815 | ES |
| 300.0 | 300.0 | 299.4 | 299.4 | 0.5 | 0.5 | 165.33 | 14.9 | 21.5 | 27.6 | 26.6 | 0.96 | 28.679 | SF |
| 400.0 | 399.8 | 397.4 | 397.3 | 0.7 | 0.7 | 172.63 | 14.4 | 26.6 | 38.2 | 36.9 | 1.31 | 29.146 | |
| 500.0 | 499.1 | 493.0 | 492.3 | 1.0 | 0.9 | 179.28 | 13.4 | 36.3 | 58.8 | 57.1 | 1.65 | 35.528 | |
| 600.0 | 597.6 | 584.8 | 583.1 | 1.3 | 1.2 | -176.47 | 11.9 | 50.0 | 89.2 | 87.2 | 1.99 | 44.806 | |
| 700.0 | 695.1 | 673.2 | 669.8 | 1.7 | 1.5 | -173.84 | 10.2 | 67.2 | 128.7 | 126.4 | 2.32 | 55.537 | |
| 800.0 | 791.4 | 762.2 | 756.8 | 2.2 | 1.8 | -172.38 | 8.3 | 85.7 | 174.2 | 171.6 | 2.64 | 65.869 | |
| 900.0 | 886.0 | 848.7 | 841.5 | 2.9 | 2.2 | -171.60 | 6.4 | 103.6 | 224.3 | 221.3 | 2.97 | 75.632 | |
| 1,000.0 | 978.9 | 932.6 | 923.5 | 3.6 | 2.5 | -171.16 | 4.6 | 121.0 | 278.7 | 275.5 | 3.28 | 85.004 | |
| 1,100.0 | 1,069.9 | 1,013.7 | 1,002.8 | 4.4 | 2.8 | -171.01 | 2.9 | 137.8 | 337.2 | 333.6 | 3.60 | 93.569 | |
| 1,200.0 | 1,160.5 | 1,094.3 | 1,081.7 | 5.2 | 3.2 | -171.07 | 1.2 | 154.5 | 396.4 | 392.4 | 3.95 | 100.236 | |
| 1,300.0 | 1,251.0 | 1,174.9 | 1,160.5 | 6.0 | 3.5 | -171.12 | -0.5 | 171.2 | 455.6 | 451.3 | 4.31 | 105.789 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 19-16CC - OH - Plan #2

**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 | 80.84 | 1.8 | 11.3 | 11.4 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 80.84 | 1.8 | 11.3 | 11.4 | 11.2 | 0.27 | 43.142 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 80.84 | 1.8 | 11.3 | 11.4 | 10.8 | 0.61 | 18.629 | CC, ES |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.5 | 0.5 | -171.13 | 1.8 | 11.3 | 12.9 | 11.9 | 0.96 | 13.393 | SF |
| 400.0 | 399.8 | 398.9 | 398.9 | 0.7 | 0.7 | -169.35 | 0.6 | 13.5 | 21.4 | 20.0 | 1.31 | 16.287 | |
| 500.0 | 499.1 | 496.1 | 495.7 | 1.0 | 0.9 | -165.47 | -3.1 | 20.1 | 39.0 | 37.3 | 1.67 | 23.397 | |
| 600.0 | 597.6 | 590.3 | 589.1 | 1.3 | 1.1 | -162.76 | -9.0 | 30.5 | 65.7 | 63.7 | 2.04 | 32.261 | |
| 700.0 | 695.1 | 680.4 | 677.9 | 1.7 | 1.4 | -160.94 | -16.8 | 44.2 | 101.2 | 98.8 | 2.43 | 41.687 | |
| 800.0 | 791.4 | 765.6 | 761.0 | 2.2 | 1.8 | -159.61 | -26.0 | 60.4 | 144.8 | 142.0 | 2.83 | 51.098 | |
| 900.0 | 886.0 | 851.1 | 843.8 | 2.9 | 2.1 | -158.72 | -36.4 | 78.9 | 195.0 | 191.8 | 3.27 | 59.701 | |
| 1,000.0 | 978.9 | 934.9 | 925.0 | 3.6 | 2.5 | -158.35 | -46.7 | 97.0 | 249.5 | 245.8 | 3.71 | 67.165 | |
| 1,100.0 | 1,069.9 | 1,016.2 | 1,003.8 | 4.4 | 2.9 | -158.49 | -56.7 | 114.6 | 307.6 | 303.5 | 4.18 | 73.607 | |
| 1,200.0 | 1,160.5 | 1,097.0 | 1,082.0 | 5.2 | 3.3 | -158.98 | -66.5 | 132.1 | 366.5 | 361.9 | 4.67 | 78.544 | |
| 1,300.0 | 1,251.0 | 1,177.8 | 1,160.3 | 6.0 | 3.6 | -159.34 | -76.4 | 149.6 | 425.5 | 420.3 | 5.16 | 82.481 | |
| 1,400.0 | 1,341.6 | 1,258.5 | 1,238.5 | 6.8 | 4.0 | -159.61 | -86.3 | 167.1 | 484.4 | 478.8 | 5.65 | 85.691 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-1B - OH - Plan #2

**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 | 173.09 | -11.7 | 1.4 | 11.7 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 173.09 | -11.7 | 1.4 | 11.7 | 11.5 | 0.27 | 44.273 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 173.09 | -11.7 | 1.4 | 11.7 | 11.1 | 0.61 | 19.118 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.5 | 0.5 | -84.93 | -11.7 | 1.4 | 11.5 | 10.6 | 0.97 | 11.927 | |
| 318.7 | 318.7 | 318.7 | 318.7 | 0.5 | 0.5 | -89.03 | -11.7 | 1.4 | 11.5 | 10.4 | 1.04 | 11.072 | CC, ES |
| 400.0 | 399.8 | 399.2 | 399.2 | 0.7 | 0.7 | -115.66 | -12.6 | 2.5 | 14.2 | 12.8 | 1.34 | 10.606 | SF |
| 500.0 | 499.1 | 496.9 | 496.7 | 1.0 | 0.9 | -138.08 | -16.9 | 7.1 | 27.9 | 26.2 | 1.71 | 16.313 | |
| 600.0 | 597.6 | 592.1 | 591.3 | 1.3 | 1.1 | -145.72 | -24.3 | 15.1 | 51.7 | 49.6 | 2.10 | 24.591 | |
| 700.0 | 695.1 | 683.9 | 681.7 | 1.7 | 1.4 | -148.33 | -34.4 | 26.1 | 84.1 | 81.6 | 2.53 | 33.251 | |
| 800.0 | 791.4 | 771.3 | 767.2 | 2.2 | 1.7 | -149.18 | -46.8 | 39.6 | 124.5 | 121.5 | 3.00 | 41.503 | |
| 900.0 | 886.0 | 853.7 | 847.0 | 2.9 | 2.1 | -149.27 | -60.9 | 54.9 | 172.4 | 168.8 | 3.51 | 49.037 | |
| 1,000.0 | 978.9 | 931.8 | 921.6 | 3.6 | 2.5 | -148.97 | -76.4 | 71.7 | 227.0 | 223.0 | 4.07 | 55.810 | |
| 1,100.0 | 1,069.9 | 1,012.4 | 998.3 | 4.4 | 2.9 | -149.18 | -93.1 | 89.9 | 286.1 | 281.5 | 4.66 | 61.356 | |
| 1,200.0 | 1,160.5 | 1,092.4 | 1,074.6 | 5.2 | 3.4 | -149.88 | -109.8 | 107.9 | 346.0 | 340.7 | 5.28 | 65.553 | |
| 1,300.0 | 1,251.0 | 1,172.5 | 1,150.8 | 6.0 | 3.8 | -150.36 | -126.4 | 126.0 | 405.8 | 399.9 | 5.90 | 68.779 | |
| 1,400.0 | 1,341.6 | 1,252.6 | 1,227.0 | 6.8 | 4.3 | -150.73 | -143.0 | 144.0 | 465.7 | 459.2 | 6.53 | 71.330 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-1C - OH - Plan #2

**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 | -143.74 | -13.5 | -9.9 | 16.7 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -143.74 | -13.5 | -9.9 | 16.7 | 16.4 | 0.27 | 63.004 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -143.74 | -13.5 | -9.9 | 16.7 | 16.1 | 0.61 | 27.206 | CC |
| 300.0 | 300.0 | 299.5 | 299.5 | 0.5 | 0.5 | -45.61 | -15.7 | -8.6 | 16.8 | 15.9 | 0.97 | 17.351 | ES |
| 400.0 | 399.8 | 398.2 | 397.8 | 0.7 | 0.7 | -78.97 | -22.3 | -4.6 | 20.0 | 18.6 | 1.35 | 14.796 | SF |
| 500.0 | 499.1 | 495.0 | 493.9 | 1.0 | 1.0 | -107.15 | -33.0 | 1.8 | 33.9 | 32.1 | 1.76 | 19.210 | |
| 600.0 | 597.6 | 589.2 | 586.5 | 1.3 | 1.3 | -120.40 | -47.4 | 10.4 | 58.4 | 56.1 | 2.24 | 26.053 | |
| 700.0 | 695.1 | 680.0 | 675.0 | 1.7 | 1.7 | -126.53 | -64.9 | 21.0 | 91.3 | 88.5 | 2.79 | 32.773 | |
| 800.0 | 791.4 | 766.8 | 758.5 | 2.2 | 2.2 | -129.60 | -85.1 | 33.0 | 131.7 | 128.3 | 3.40 | 38.712 | |
| 900.0 | 886.0 | 849.0 | 836.6 | 2.9 | 2.7 | -131.14 | -107.1 | 46.3 | 178.9 | 174.9 | 4.09 | 43.793 | |
| 1,000.0 | 978.9 | 926.5 | 909.1 | 3.6 | 3.2 | -131.79 | -130.5 | 60.3 | 232.4 | 227.5 | 4.83 | 48.099 | |
| 1,100.0 | 1,069.9 | 1,000.0 | 976.8 | 4.4 | 3.7 | -132.49 | -155.1 | 75.0 | 291.3 | 285.7 | 5.63 | 51.766 | |
| 1,200.0 | 1,160.5 | 1,068.2 | 1,038.6 | 5.2 | 4.2 | -133.36 | -179.8 | 89.9 | 353.2 | 346.7 | 6.46 | 54.691 | |
| 1,300.0 | 1,251.0 | 1,139.9 | 1,102.6 | 6.0 | 4.8 | -133.78 | -207.6 | 106.5 | 417.0 | 409.7 | 7.31 | 57.031 | |
| 1,400.0 | 1,341.6 | 1,216.6 | 1,170.9 | 6.8 | 5.4 | -134.08 | -237.5 | 124.5 | 481.2 | 473.0 | 8.19 | 58.723 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-2C - OH - Plan #2

**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 | -151.43 | -51.4 | -28.0 | 58.5 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -151.43 | -51.4 | -28.0 | 58.5 | 58.2 | 0.27 | 220.428 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -151.43 | -51.4 | -28.0 | 58.5 | 57.9 | 0.61 | 95.185 | CC, ES |
| 300.0 | 300.0 | 297.1 | 297.1 | 0.5 | 0.5 | -43.92 | -53.8 | -28.4 | 59.8 | 58.9 | 0.96 | 62.301 | |
| 400.0 | 399.8 | 393.8 | 393.5 | 0.7 | 0.7 | -49.83 | -61.0 | -29.7 | 62.8 | 61.4 | 1.32 | 47.449 | |
| 500.0 | 499.1 | 489.8 | 488.7 | 1.0 | 1.0 | -58.87 | -73.0 | -31.8 | 68.5 | 66.8 | 1.73 | 39.543 | |
| 600.0 | 597.6 | 584.6 | 582.0 | 1.3 | 1.3 | -69.07 | -89.4 | -34.7 | 78.9 | 76.6 | 2.25 | 35.129 | |
| 700.0 | 695.1 | 678.0 | 673.1 | 1.7 | 1.7 | -78.53 | -110.0 | -38.3 | 94.9 | 92.0 | 2.91 | 32.629 | |
| 800.0 | 791.4 | 769.7 | 761.3 | 2.2 | 2.2 | -86.22 | -134.4 | -42.6 | 116.9 | 113.2 | 3.74 | 31.261 | |
| 900.0 | 886.0 | 859.3 | 846.3 | 2.9 | 2.7 | -92.02 | -162.3 | -47.6 | 144.7 | 140.0 | 4.72 | 30.643 | |
| 1,000.0 | 978.9 | 952.3 | 933.7 | 3.6 | 3.2 | -96.96 | -193.6 | -53.1 | 176.5 | 170.6 | 5.85 | 30.151 | |
| 1,100.0 | 1,069.9 | 1,044.7 | 1,020.5 | 4.4 | 3.8 | -101.77 | -224.7 | -58.6 | 210.4 | 203.3 | 7.07 | 29.772 | |
| 1,200.0 | 1,160.5 | 1,136.9 | 1,107.1 | 5.2 | 4.4 | -105.94 | -255.8 | -64.1 | 245.8 | 237.6 | 8.29 | 29.662 | SF |
| 1,300.0 | 1,251.0 | 1,229.0 | 1,193.7 | 6.0 | 4.9 | -109.08 | -286.8 | -69.6 | 282.2 | 272.7 | 9.50 | 29.717 | |
| 1,400.0 | 1,341.6 | 1,321.2 | 1,280.4 | 6.8 | 5.5 | -111.50 | -317.9 | -75.0 | 319.1 | 308.4 | 10.69 | 29.847 | |
| 1,500.0 | 1,432.2 | 1,413.4 | 1,367.0 | 7.6 | 6.1 | -113.43 | -348.9 | -80.5 | 356.4 | 344.5 | 11.88 | 30.007 | |
| 1,600.0 | 1,522.7 | 1,505.6 | 1,453.6 | 8.4 | 6.6 | -115.00 | -380.0 | -86.0 | 393.9 | 380.9 | 13.06 | 30.175 | |
| 1,700.0 | 1,613.3 | 1,597.8 | 1,540.2 | 9.2 | 7.2 | -116.29 | -411.0 | -91.5 | 431.7 | 417.5 | 14.23 | 30.342 | |
| 1,800.0 | 1,703.9 | 1,689.9 | 1,626.8 | 10.0 | 7.8 | -117.38 | -442.1 | -97.0 | 469.7 | 454.3 | 15.40 | 30.503 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-3A - OH - Plan #2

**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 | -143.56 | -53.2 | -39.3 | 66.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -143.56 | -53.2 | -39.3 | 66.1 | 65.8 | 0.27 | 249.173 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -143.56 | -53.2 | -39.3 | 66.1 | 65.5 | 0.61 | 107.598 | CC |
| 300.0 | 300.0 | 297.5 | 297.5 | 0.5 | 0.5 | -35.17 | -54.3 | -40.0 | 66.3 | 65.4 | 0.96 | 69.098 | ES |
| 400.0 | 399.8 | 394.0 | 393.8 | 0.7 | 0.7 | -38.53 | -59.5 | -43.3 | 67.4 | 66.1 | 1.31 | 51.290 | |
| 500.0 | 499.1 | 490.3 | 489.4 | 1.0 | 0.9 | -44.22 | -68.7 | -49.2 | 69.9 | 68.2 | 1.70 | 41.019 | |
| 600.0 | 597.6 | 587.0 | 584.9 | 1.3 | 1.2 | -51.67 | -81.9 | -57.6 | 74.6 | 72.4 | 2.18 | 34.148 | |
| 700.0 | 695.1 | 686.0 | 682.4 | 1.7 | 1.6 | -61.10 | -96.6 | -67.0 | 79.2 | 76.3 | 2.83 | 27.937 | |
| 800.0 | 791.4 | 784.5 | 779.3 | 2.2 | 1.9 | -72.49 | -111.2 | -76.3 | 84.0 | 80.3 | 3.71 | 22.659 | |
| 900.0 | 886.0 | 882.2 | 875.4 | 2.9 | 2.2 | -85.29 | -125.7 | -85.6 | 91.4 | 86.6 | 4.78 | 19.123 | |
| 1,000.0 | 978.9 | 978.7 | 970.5 | 3.6 | 2.6 | -98.28 | -140.0 | -94.7 | 103.4 | 97.5 | 5.90 | 17.519 | SF |
| 1,100.0 | 1,069.9 | 1,074.0 | 1,064.3 | 4.4 | 2.9 | -110.21 | -154.2 | -103.8 | 121.6 | 114.7 | 6.90 | 17.610 | |
| 1,200.0 | 1,160.5 | 1,169.0 | 1,157.8 | 5.2 | 3.2 | -119.44 | -168.3 | -112.8 | 144.4 | 136.6 | 7.72 | 18.692 | |
| 1,300.0 | 1,251.0 | 1,264.0 | 1,251.3 | 6.0 | 3.6 | -126.12 | -182.4 | -121.8 | 169.8 | 161.4 | 8.44 | 20.133 | |
| 1,400.0 | 1,341.6 | 1,359.1 | 1,344.8 | 6.8 | 3.9 | -131.07 | -196.5 | -130.8 | 197.0 | 187.9 | 9.09 | 21.663 | |
| 1,500.0 | 1,432.2 | 1,454.1 | 1,438.4 | 7.6 | 4.2 | -134.82 | -210.6 | -139.8 | 225.1 | 215.4 | 9.72 | 23.160 | |
| 1,600.0 | 1,522.7 | 1,549.1 | 1,531.9 | 8.4 | 4.6 | -137.74 | -224.7 | -148.8 | 254.0 | 243.7 | 10.33 | 24.577 | |
| 1,700.0 | 1,613.3 | 1,644.1 | 1,625.4 | 9.2 | 4.9 | -140.06 | -238.8 | -157.8 | 283.4 | 272.4 | 10.94 | 25.896 | |
| 1,800.0 | 1,703.9 | 1,739.1 | 1,719.0 | 10.0 | 5.2 | -141.95 | -252.9 | -166.8 | 313.1 | 301.5 | 11.55 | 27.113 | |
| 1,900.0 | 1,794.5 | 1,834.1 | 1,812.5 | 10.8 | 5.6 | -143.52 | -267.0 | -175.8 | 343.0 | 330.9 | 12.15 | 28.234 | |
| 2,000.0 | 1,885.0 | 1,929.2 | 1,906.0 | 11.6 | 5.9 | -144.83 | -281.1 | -184.8 | 373.2 | 360.4 | 12.75 | 29.265 | |
| 2,100.0 | 1,975.6 | 2,024.2 | 1,999.6 | 12.4 | 6.2 | -145.95 | -295.2 | -193.9 | 403.5 | 390.2 | 13.36 | 30.214 | |
| 2,200.0 | 2,066.2 | 2,119.2 | 2,093.1 | 13.3 | 6.6 | -146.92 | -309.3 | -202.9 | 434.0 | 420.0 | 13.96 | 31.088 | |
| 2,300.0 | 2,156.7 | 2,214.2 | 2,186.6 | 14.1 | 6.9 | -147.75 | -323.4 | -211.9 | 464.5 | 449.9 | 14.56 | 31.895 | |
| 2,400.0 | 2,247.3 | 2,309.2 | 2,280.2 | 14.9 | 7.2 | -148.49 | -337.5 | -220.9 | 495.1 | 479.9 | 15.17 | 32.641 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-3B - OH - Plan #2

**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 | -143.75 | -40.1 | -29.4 | 49.7 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -143.75 | -40.1 | -29.4 | 49.7 | 49.4 | 0.27 | 187.275 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -143.75 | -40.1 | -29.4 | 49.7 | 49.1 | 0.61 | 80.869 | CC, ES |
| 300.0 | 300.0 | 297.5 | 297.5 | 0.5 | 0.5 | -34.75 | -41.6 | -31.3 | 50.9 | 50.0 | 0.96 | 53.032 | |
| 400.0 | 399.8 | 394.9 | 394.6 | 0.7 | 0.7 | -36.49 | -46.2 | -37.2 | 53.0 | 51.6 | 1.32 | 40.135 | |
| 500.0 | 499.1 | 492.2 | 491.1 | 1.0 | 1.0 | -39.65 | -53.9 | -46.9 | 55.8 | 54.0 | 1.72 | 32.455 | |
| 600.0 | 597.6 | 589.4 | 586.7 | 1.3 | 1.3 | -43.89 | -64.6 | -60.4 | 59.6 | 57.3 | 2.20 | 27.042 | |
| 700.0 | 695.1 | 686.3 | 681.1 | 1.7 | 1.8 | -48.78 | -78.3 | -77.6 | 64.6 | 61.8 | 2.83 | 22.790 | |
| 800.0 | 791.4 | 783.0 | 774.0 | 2.2 | 2.3 | -53.91 | -94.9 | -98.6 | 71.1 | 67.4 | 3.67 | 19.365 | |
| 900.0 | 886.0 | 879.4 | 865.2 | 2.9 | 2.9 | -58.92 | -114.4 | -123.1 | 79.3 | 74.5 | 4.75 | 16.692 | |
| 1,000.0 | 978.9 | 976.4 | 955.2 | 3.6 | 3.5 | -63.69 | -136.7 | -151.2 | 89.1 | 83.0 | 6.06 | 14.695 | |
| 1,100.0 | 1,069.9 | 1,075.4 | 1,046.7 | 4.4 | 4.2 | -69.59 | -160.3 | -181.0 | 98.6 | 91.0 | 7.63 | 12.922 | |
| 1,200.0 | 1,160.5 | 1,174.4 | 1,138.2 | 5.2 | 4.9 | -75.03 | -183.8 | -210.7 | 108.8 | 99.5 | 9.27 | 11.738 | |
| 1,300.0 | 1,251.0 | 1,273.4 | 1,229.6 | 6.0 | 5.6 | -79.52 | -207.4 | -240.5 | 119.8 | 108.9 | 10.90 | 10.984 | |
| 1,400.0 | 1,341.6 | 1,372.4 | 1,321.0 | 6.8 | 6.3 | -83.24 | -231.0 | -270.2 | 131.4 | 118.8 | 12.52 | 10.489 | |
| 1,500.0 | 1,432.2 | 1,471.4 | 1,412.4 | 7.6 | 7.0 | -86.35 | -254.6 | -300.0 | 143.4 | 129.3 | 14.12 | 10.154 | |
| 1,600.0 | 1,522.7 | 1,570.4 | 1,503.9 | 8.4 | 7.7 | -88.98 | -278.1 | -329.7 | 155.8 | 140.1 | 15.70 | 9.922 | |
| 1,700.0 | 1,613.3 | 1,669.4 | 1,595.3 | 9.2 | 8.4 | -91.21 | -301.7 | -359.5 | 168.5 | 151.2 | 17.26 | 9.759 | |
| 1,800.0 | 1,703.9 | 1,768.4 | 1,686.7 | 10.0 | 9.2 | -93.14 | -325.3 | -389.2 | 181.4 | 162.6 | 18.81 | 9.642 | |
| 1,900.0 | 1,794.5 | 1,867.4 | 1,778.1 | 10.8 | 9.9 | -94.80 | -348.9 | -419.0 | 194.4 | 174.1 | 20.34 | 9.559 | |
| 2,000.0 | 1,885.0 | 1,966.4 | 1,869.6 | 11.6 | 10.6 | -96.26 | -372.5 | -448.7 | 207.7 | 185.8 | 21.86 | 9.499 | |
| 2,100.0 | 1,975.6 | 2,065.4 | 1,961.0 | 12.4 | 11.3 | -97.54 | -396.0 | -478.4 | 221.0 | 197.6 | 23.37 | 9.456 | |
| 2,200.0 | 2,066.2 | 2,164.4 | 2,052.4 | 13.3 | 12.0 | -98.67 | -419.6 | -508.2 | 234.4 | 209.5 | 24.87 | 9.425 | |
| 2,300.0 | 2,156.7 | 2,263.4 | 2,143.9 | 14.1 | 12.7 | -99.68 | -443.2 | -537.9 | 247.9 | 221.5 | 26.36 | 9.403 | |
| 2,400.0 | 2,247.3 | 2,362.4 | 2,235.3 | 14.9 | 13.4 | -100.59 | -466.8 | -567.7 | 261.5 | 233.6 | 27.85 | 9.389 | |
| 2,500.0 | 2,337.9 | 2,461.4 | 2,326.7 | 15.7 | 14.1 | -101.41 | -490.4 | -597.4 | 275.1 | 245.8 | 29.33 | 9.379 | |
| 2,600.0 | 2,428.5 | 2,560.3 | 2,418.1 | 16.5 | 14.8 | -102.15 | -513.9 | -627.2 | 288.8 | 258.0 | 30.81 | 9.374 | |
| 2,700.0 | 2,519.0 | 2,659.3 | 2,509.6 | 17.3 | 15.6 | -102.82 | -537.5 | -656.9 | 302.5 | 270.2 | 32.28 | 9.371 | |
| 2,800.0 | 2,609.6 | 2,758.3 | 2,601.0 | 18.1 | 16.3 | -103.44 | -561.1 | -686.7 | 316.3 | 282.5 | 33.75 | 9.371 | SF |
| 2,900.0 | 2,700.2 | 2,857.3 | 2,692.4 | 18.9 | 17.0 | -104.00 | -584.7 | -716.4 | 330.1 | 294.9 | 35.22 | 9.373 | |
| 3,000.0 | 2,790.8 | 2,956.3 | 2,783.9 | 19.8 | 17.7 | -104.52 | -608.3 | -746.1 | 343.9 | 307.2 | 36.68 | 9.376 | |
| 3,100.0 | 2,881.3 | 3,055.3 | 2,875.3 | 20.6 | 18.4 | -105.00 | -631.8 | -775.9 | 357.8 | 319.6 | 38.14 | 9.380 | |
| 3,200.0 | 2,971.9 | 3,154.3 | 2,966.7 | 21.4 | 19.1 | -105.44 | -655.4 | -805.6 | 371.6 | 332.0 | 39.60 | 9.385 | |
| 3,300.0 | 3,062.5 | 3,253.3 | 3,058.1 | 22.2 | 19.8 | -105.85 | -679.0 | -835.4 | 385.5 | 344.5 | 41.05 | 9.391 | |
| 3,400.0 | 3,153.0 | 3,352.3 | 3,149.6 | 23.0 | 20.5 | -106.23 | -702.6 | -865.1 | 399.4 | 356.9 | 42.51 | 9.397 | |
| 3,500.0 | 3,243.6 | 3,451.3 | 3,241.0 | 23.8 | 21.3 | -106.59 | -726.2 | -894.9 | 413.4 | 369.4 | 43.96 | 9.403 | |
| 3,600.0 | 3,334.2 | 3,550.3 | 3,332.4 | 24.7 | 22.0 | -106.92 | -749.7 | -924.6 | 427.3 | 381.9 | 45.41 | 9.409 | |
| 3,700.0 | 3,424.8 | 3,649.3 | 3,423.8 | 25.5 | 22.7 | -107.24 | -773.3 | -954.4 | 441.2 | 394.4 | 46.86 | 9.416 | |
| 3,800.0 | 3,515.3 | 3,748.3 | 3,515.3 | 26.3 | 23.4 | -107.53 | -796.9 | -984.1 | 455.2 | 406.9 | 48.31 | 9.423 | |
| 3,900.0 | 3,605.9 | 3,847.3 | 3,606.7 | 27.1 | 24.1 | -107.81 | -820.5 | -1,013.9 | 469.2 | 419.4 | 49.76 | 9.430 | |
| 4,000.0 | 3,696.5 | 3,946.3 | 3,698.1 | 27.9 | 24.8 | -108.07 | -844.0 | -1,043.6 | 483.2 | 432.0 | 51.20 | 9.436 | |
| 4,100.0 | 3,787.1 | 4,045.3 | 3,789.6 | 28.7 | 25.5 | -108.31 | -867.6 | -1,073.3 | 497.2 | 444.5 | 52.65 | 9.443 | |

# Cathedral Energy Services

## Anticollision Report

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-7A - OH - Plan #2

**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 | -154.70 | -38.2 | -18.1 | 42.3 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -154.70 | -38.2 | -18.1 | 42.3 | 42.0 | 0.27 | 159.457 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -154.70 | -38.2 | -18.1 | 42.3 | 41.7 | 0.61 | 68.856 | |
| 300.0 | 300.0 | 299.1 | 299.1 | 0.5 | 0.5 | -47.50 | -38.9 | -17.9 | 41.8 | 40.8 | 0.96 | 43.394 | |
| 336.6 | 336.6 | 335.1 | 335.0 | 0.6 | 0.5 | -50.30 | -40.1 | -17.7 | 41.7 | 40.6 | 1.10 | 37.938 | CC, ES |
| 400.0 | 399.8 | 397.0 | 396.8 | 0.7 | 0.7 | -57.93 | -43.8 | -16.8 | 42.3 | 40.9 | 1.33 | 31.682 | |
| 500.0 | 499.1 | 493.7 | 493.1 | 1.0 | 0.9 | -74.82 | -53.4 | -14.7 | 47.5 | 45.7 | 1.77 | 26.882 | |
| 600.0 | 597.6 | 588.8 | 587.0 | 1.3 | 1.2 | -91.43 | -67.5 | -11.5 | 61.0 | 58.7 | 2.28 | 26.745 | SF |
| 700.0 | 695.1 | 681.5 | 677.8 | 1.7 | 1.5 | -103.35 | -85.6 | -7.5 | 83.7 | 80.8 | 2.89 | 28.964 | |
| 800.0 | 791.4 | 771.4 | 765.0 | 2.2 | 2.0 | -110.81 | -107.3 | -2.7 | 114.5 | 110.9 | 3.60 | 31.840 | |
| 900.0 | 886.0 | 858.1 | 847.8 | 2.9 | 2.4 | -115.33 | -131.9 | 2.8 | 152.4 | 148.0 | 4.40 | 34.633 | |
| 1,000.0 | 978.9 | 941.1 | 926.2 | 3.6 | 2.9 | -118.02 | -159.0 | 8.9 | 196.5 | 191.2 | 5.29 | 37.119 | |
| 1,100.0 | 1,069.9 | 1,020.5 | 999.8 | 4.4 | 3.5 | -120.06 | -187.9 | 15.3 | 246.1 | 239.8 | 6.25 | 39.358 | |
| 1,200.0 | 1,160.5 | 1,100.0 | 1,072.2 | 5.2 | 4.1 | -121.73 | -219.8 | 22.5 | 299.0 | 291.7 | 7.26 | 41.187 | |
| 1,300.0 | 1,251.0 | 1,171.5 | 1,136.2 | 6.0 | 4.7 | -122.42 | -251.1 | 29.4 | 354.3 | 346.0 | 8.28 | 42.817 | |
| 1,400.0 | 1,341.6 | 1,243.3 | 1,199.1 | 6.8 | 5.3 | -122.61 | -284.7 | 36.9 | 411.9 | 402.6 | 9.32 | 44.197 | |
| 1,500.0 | 1,432.2 | 1,312.7 | 1,258.7 | 7.6 | 5.9 | -122.48 | -319.4 | 44.7 | 471.5 | 461.2 | 10.37 | 45.467 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler 30-8B - OH - Plan #2

**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 | -161.11 | -24.8 | -8.5 | 26.2 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -161.11 | -24.8 | -8.5 | 26.2 | 25.9 | 0.27 | 98.675 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -161.11 | -24.8 | -8.5 | 26.2 | 25.6 | 0.61 | 42.610 | CC, ES |
| 300.0 | 300.0 | 298.9 | 298.9 | 0.5 | 0.5 | -58.23 | -27.0 | -7.3 | 27.2 | 26.3 | 0.97 | 28.171 | |
| 400.0 | 399.8 | 397.1 | 396.7 | 0.7 | 0.7 | -77.19 | -33.8 | -3.9 | 31.6 | 30.2 | 1.35 | 23.440 | SF |
| 500.0 | 499.1 | 493.5 | 492.3 | 1.0 | 1.0 | -97.55 | -44.8 | 1.8 | 43.9 | 42.2 | 1.77 | 24.844 | |
| 600.0 | 597.6 | 587.4 | 584.8 | 1.3 | 1.3 | -111.12 | -59.6 | 9.3 | 66.1 | 63.8 | 2.26 | 29.300 | |
| 700.0 | 695.1 | 678.2 | 673.2 | 1.7 | 1.7 | -118.85 | -77.8 | 18.6 | 96.9 | 94.1 | 2.82 | 34.393 | |
| 800.0 | 791.4 | 765.1 | 756.9 | 2.2 | 2.2 | -123.21 | -98.7 | 29.3 | 135.5 | 132.0 | 3.46 | 39.146 | |
| 900.0 | 886.0 | 847.8 | 835.5 | 2.9 | 2.6 | -125.66 | -121.7 | 41.0 | 180.8 | 176.7 | 4.18 | 43.308 | |
| 1,000.0 | 978.9 | 926.0 | 908.6 | 3.6 | 3.2 | -126.97 | -146.2 | 53.5 | 232.4 | 227.5 | 4.96 | 46.874 | |
| 1,100.0 | 1,069.9 | 1,000.0 | 976.8 | 4.4 | 3.7 | -128.13 | -171.8 | 66.6 | 289.6 | 283.8 | 5.79 | 49.975 | |
| 1,200.0 | 1,160.5 | 1,069.9 | 1,040.1 | 5.2 | 4.2 | -129.35 | -198.2 | 80.1 | 349.8 | 343.1 | 6.67 | 52.477 | |
| 1,300.0 | 1,251.0 | 1,137.3 | 1,100.2 | 6.0 | 4.8 | -129.95 | -225.5 | 94.1 | 412.3 | 404.8 | 7.55 | 54.609 | |
| 1,400.0 | 1,341.6 | 1,200.0 | 1,154.9 | 6.8 | 5.4 | -130.17 | -252.6 | 107.9 | 476.9 | 468.5 | 8.43 | 56.556 | |

| | | | |
|---|---|---|---|
| **Company:** | EnCana Oil & Gas (USA) Inc | **Local Co-ordinate Reference:** | Well Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler Federal 19-13D - OH - Plan #2

**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 | 36.23 | 13.1 | 9.6 | 16.2 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 36.23 | 13.1 | 9.6 | 16.2 | 16.0 | 0.27 | 61.254 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 36.23 | 13.1 | 9.6 | 16.2 | 15.6 | 0.61 | 26.450 | |
| 300.0 | 300.0 | 300.6 | 300.5 | 0.5 | 0.5 | 141.53 | 12.7 | 7.0 | 15.7 | 14.7 | 0.97 | 16.138 | |
| 337.6 | 337.5 | 338.3 | 338.2 | 0.6 | 0.6 | 139.16 | 12.4 | 4.6 | 15.6 | 14.5 | 1.12 | 13.934 | CC |
| 400.0 | 399.8 | 401.0 | 400.7 | 0.7 | 0.7 | 134.42 | 11.6 | -0.9 | 15.8 | 14.4 | 1.37 | 11.524 | ES |
| 500.0 | 499.1 | 501.4 | 500.2 | 1.0 | 1.0 | 125.63 | 9.8 | -13.9 | 17.0 | 15.1 | 1.89 | 9.025 | |
| 600.0 | 597.6 | 601.7 | 598.7 | 1.3 | 1.4 | 116.95 | 7.3 | -32.1 | 19.5 | 16.9 | 2.58 | 7.555 | |
| 700.0 | 695.1 | 701.8 | 696.0 | 1.7 | 1.8 | 109.64 | 4.0 | -55.3 | 23.3 | 19.8 | 3.48 | 6.694 | |
| 800.0 | 791.4 | 801.8 | 791.9 | 2.2 | 2.4 | 104.06 | 0.0 | -83.5 | 28.3 | 23.8 | 4.57 | 6.193 | |
| 900.0 | 886.0 | 901.6 | 885.9 | 2.9 | 3.0 | 99.99 | -4.6 | -116.6 | 34.5 | 28.6 | 5.86 | 5.891 | |
| 1,000.0 | 978.9 | 1,001.3 | 978.0 | 3.6 | 3.8 | 97.07 | -9.9 | -154.4 | 41.7 | 34.4 | 7.33 | 5.697 | |
| 1,100.0 | 1,069.9 | 1,100.9 | 1,068.3 | 4.4 | 4.6 | 95.79 | -15.8 | -196.0 | 49.9 | 41.0 | 8.90 | 5.602 | |
| 1,200.0 | 1,160.5 | 1,200.5 | 1,158.5 | 5.2 | 5.4 | 95.59 | -21.6 | -237.9 | 58.1 | 47.6 | 10.49 | 5.540 | |
| 1,300.0 | 1,251.0 | 1,300.2 | 1,248.7 | 6.0 | 6.2 | 95.44 | -27.5 | -279.8 | 66.4 | 54.3 | 12.09 | 5.489 | |
| 1,400.0 | 1,341.6 | 1,399.8 | 1,338.9 | 6.8 | 7.0 | 95.32 | -33.4 | -321.8 | 74.6 | 60.9 | 13.69 | 5.448 | |
| 1,500.0 | 1,432.2 | 1,499.5 | 1,429.2 | 7.6 | 7.8 | 95.23 | -39.3 | -363.7 | 82.8 | 67.5 | 15.30 | 5.414 | |
| 1,600.0 | 1,522.7 | 1,599.2 | 1,519.4 | 8.4 | 8.6 | 95.15 | -45.2 | -405.6 | 91.1 | 74.2 | 16.92 | 5.385 | |
| 1,700.0 | 1,613.3 | 1,698.8 | 1,609.6 | 9.2 | 9.4 | 95.08 | -51.1 | -447.5 | 99.3 | 80.8 | 18.53 | 5.361 | |
| 1,800.0 | 1,703.9 | 1,798.5 | 1,699.8 | 10.0 | 10.3 | 95.03 | -57.0 | -489.4 | 107.6 | 87.4 | 20.15 | 5.340 | |
| 1,900.0 | 1,794.5 | 1,898.1 | 1,790.1 | 10.8 | 11.1 | 94.98 | -62.8 | -531.4 | 115.8 | 94.1 | 21.77 | 5.322 | |
| 2,000.0 | 1,885.0 | 1,997.8 | 1,880.3 | 11.6 | 11.9 | 94.94 | -68.7 | -573.3 | 124.1 | 100.7 | 23.39 | 5.306 | |
| 2,100.0 | 1,975.6 | 2,097.5 | 1,970.5 | 12.4 | 12.7 | 94.91 | -74.6 | -615.2 | 132.3 | 107.3 | 25.01 | 5.292 | |
| 2,200.0 | 2,066.2 | 2,197.1 | 2,060.7 | 13.3 | 13.5 | 94.88 | -80.5 | -657.1 | 140.6 | 114.0 | 26.63 | 5.279 | |
| 2,300.0 | 2,156.7 | 2,296.8 | 2,150.9 | 14.1 | 14.3 | 94.85 | -86.4 | -699.0 | 148.8 | 120.6 | 28.25 | 5.268 | |
| 2,400.0 | 2,247.3 | 2,396.4 | 2,241.2 | 14.9 | 15.2 | 94.82 | -92.3 | -741.0 | 157.1 | 127.2 | 29.88 | 5.258 | |
| 2,500.0 | 2,337.9 | 2,496.1 | 2,331.4 | 15.7 | 16.0 | 94.80 | -98.2 | -782.9 | 165.3 | 133.8 | 31.50 | 5.249 | |
| 2,600.0 | 2,428.5 | 2,595.8 | 2,421.6 | 16.5 | 16.8 | 94.78 | -104.0 | -824.8 | 173.6 | 140.5 | 33.12 | 5.241 | |
| 2,700.0 | 2,519.0 | 2,695.4 | 2,511.8 | 17.3 | 17.6 | 94.76 | -109.9 | -866.7 | 181.8 | 147.1 | 34.75 | 5.233 | |
| 2,800.0 | 2,609.6 | 2,795.1 | 2,602.1 | 18.1 | 18.4 | 94.75 | -115.8 | -908.7 | 190.1 | 153.7 | 36.37 | 5.226 | |
| 2,900.0 | 2,700.2 | 2,894.7 | 2,692.3 | 18.9 | 19.2 | 94.73 | -121.7 | -950.6 | 198.3 | 160.3 | 38.00 | 5.220 | |
| 3,000.0 | 2,790.8 | 2,994.4 | 2,782.5 | 19.8 | 20.1 | 94.72 | -127.6 | -992.5 | 206.6 | 167.0 | 39.62 | 5.214 | |
| 3,100.0 | 2,881.3 | 3,094.0 | 2,872.7 | 20.6 | 20.9 | 94.70 | -133.5 | -1,034.4 | 214.8 | 173.6 | 41.25 | 5.209 | |
| 3,200.0 | 2,971.9 | 3,193.7 | 2,962.9 | 21.4 | 21.7 | 94.69 | -139.4 | -1,076.3 | 223.1 | 180.2 | 42.87 | 5.204 | |
| 3,300.0 | 3,062.5 | 3,293.4 | 3,053.2 | 22.2 | 22.5 | 94.68 | -145.2 | -1,118.3 | 231.3 | 186.8 | 44.50 | 5.199 | |
| 3,400.0 | 3,153.0 | 3,393.0 | 3,143.4 | 23.0 | 23.3 | 94.67 | -151.1 | -1,160.2 | 239.6 | 193.5 | 46.12 | 5.195 | |
| 3,500.0 | 3,243.6 | 3,492.7 | 3,233.6 | 23.8 | 24.2 | 94.66 | -157.0 | -1,202.1 | 247.8 | 200.1 | 47.75 | 5.190 | |
| 3,600.0 | 3,334.2 | 3,592.3 | 3,323.8 | 24.7 | 25.0 | 94.65 | -162.9 | -1,244.0 | 256.1 | 206.7 | 49.37 | 5.187 | |
| 3,700.0 | 3,424.8 | 3,692.0 | 3,414.0 | 25.5 | 25.8 | 94.64 | -168.8 | -1,285.9 | 264.3 | 213.3 | 51.00 | 5.183 | |
| 3,800.0 | 3,515.3 | 3,791.7 | 3,504.3 | 26.3 | 26.6 | 94.63 | -174.7 | -1,327.9 | 272.6 | 219.9 | 52.62 | 5.180 | |
| 3,900.0 | 3,605.9 | 3,891.3 | 3,594.5 | 27.1 | 27.4 | 94.63 | -180.6 | -1,369.8 | 280.8 | 226.6 | 54.25 | 5.177 | |
| 4,000.0 | 3,696.5 | 3,991.0 | 3,684.7 | 27.9 | 28.3 | 94.62 | -186.4 | -1,411.7 | 289.1 | 233.2 | 55.87 | 5.174 | |
| 4,100.0 | 3,787.1 | 4,090.6 | 3,774.9 | 28.7 | 29.1 | 94.61 | -192.3 | -1,453.6 | 297.3 | 239.8 | 57.50 | 5.171 | |
| 4,200.0 | 3,877.6 | 4,190.3 | 3,865.2 | 29.5 | 29.9 | 94.61 | -198.2 | -1,495.5 | 305.6 | 246.4 | 59.13 | 5.168 | |
| 4,300.0 | 3,968.2 | 4,290.0 | 3,955.4 | 30.4 | 30.7 | 94.60 | -204.1 | -1,537.5 | 313.8 | 253.1 | 60.75 | 5.165 | |
| 4,400.0 | 4,058.8 | 4,389.6 | 4,045.6 | 31.2 | 31.5 | 94.59 | -210.0 | -1,579.4 | 322.1 | 259.7 | 62.38 | 5.163 | |
| 4,500.0 | 4,149.3 | 4,489.3 | 4,135.8 | 32.0 | 32.4 | 94.59 | -215.9 | -1,621.3 | 330.3 | 266.3 | 64.00 | 5.161 | |
| 4,600.0 | 4,239.9 | 4,588.9 | 4,226.0 | 32.8 | 33.2 | 94.58 | -221.8 | -1,663.2 | 338.6 | 272.9 | 65.63 | 5.159 | |
| 4,700.0 | 4,330.5 | 4,688.6 | 4,316.3 | 33.6 | 34.0 | 94.58 | -227.6 | -1,705.1 | 346.8 | 279.6 | 67.26 | 5.157 | |
| 4,800.0 | 4,421.1 | 4,788.3 | 4,406.5 | 34.4 | 34.8 | 94.57 | -233.5 | -1,747.1 | 355.1 | 286.2 | 68.88 | 5.155 | |
| 4,900.0 | 4,511.6 | 4,888.5 | 4,497.3 | 35.2 | 35.6 | 94.62 | -239.4 | -1,788.9 | 363.3 | 292.8 | 70.50 | 5.153 | |
| 5,000.0 | 4,602.3 | 4,989.3 | 4,590.0 | 36.1 | 36.4 | 95.15 | -244.9 | -1,828.3 | 371.2 | 299.2 | 72.03 | 5.153 | |

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 Shideler 30-4A |
| **Project:** | Mamm Creek | **TVD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

**Offset Design** O19EB Pad - Shideler Federal 19-13D - OH - Plan #2

**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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 4,694.3 | 5,090.1 | 4,683.9 | 36.8 | 37.0 | 95.81 | -250.0 | -1,864.4 | 378.6 | 305.2 | 73.42 | 5.156 | |
| 5,200.0 | 4,787.5 | 5,190.8 | 4,779.0 | 37.4 | 37.6 | 96.45 | -254.6 | -1,897.3 | 385.3 | 310.7 | 74.66 | 5.161 | |
| 5,300.0 | 4,881.9 | 5,291.4 | 4,875.2 | 38.0 | 38.2 | 97.06 | -258.7 | -1,926.7 | 391.5 | 315.7 | 75.77 | 5.167 | |
| 5,400.0 | 4,977.5 | 5,392.0 | 4,972.3 | 38.5 | 38.6 | 97.65 | -262.4 | -1,952.8 | 397.0 | 320.3 | 76.74 | 5.174 | |
| 5,500.0 | 5,074.0 | 5,492.6 | 5,070.1 | 39.0 | 39.0 | 98.22 | -265.6 | -1,975.5 | 401.9 | 324.4 | 77.58 | 5.181 | |
| 5,600.0 | 5,171.3 | 5,593.0 | 5,168.7 | 39.4 | 39.4 | 98.78 | -268.3 | -1,994.8 | 406.2 | 327.9 | 78.29 | 5.189 | |
| 5,700.0 | 5,269.4 | 5,693.4 | 5,267.7 | 39.8 | 39.7 | 99.31 | -270.5 | -2,010.6 | 409.9 | 331.0 | 78.88 | 5.197 | |
| 5,800.0 | 5,368.1 | 5,793.6 | 5,367.2 | 40.0 | 39.9 | 99.84 | -272.3 | -2,022.9 | 412.9 | 333.6 | 79.33 | 5.205 | |
| 5,900.0 | 5,467.4 | 5,893.8 | 5,467.0 | 40.3 | 40.0 | 100.35 | -273.5 | -2,031.8 | 415.3 | 335.6 | 79.66 | 5.213 | |
| 6,000.0 | 5,566.9 | 5,993.8 | 5,566.9 | 40.4 | 40.1 | 100.85 | -274.3 | -2,037.3 | 417.0 | 337.1 | 79.88 | 5.220 | |
| 6,100.0 | 5,666.8 | 6,093.8 | 5,666.8 | 40.5 | 40.2 | 101.35 | -274.5 | -2,039.2 | 418.0 | 338.1 | 79.97 | 5.227 | |
| 6,200.0 | 5,766.8 | 6,193.8 | 5,766.8 | 40.6 | 40.2 | 101.63 | -274.5 | -2,039.2 | 418.5 | 338.4 | 80.03 | 5.229 | |
| 6,300.0 | 5,866.8 | 6,293.8 | 5,866.8 | 40.6 | 40.3 | -7.52 | -274.5 | -2,039.2 | 418.5 | 338.3 | 80.12 | 5.223 | |
| 6,400.0 | 5,966.8 | 6,393.8 | 5,966.8 | 40.7 | 40.3 | -7.52 | -274.5 | -2,039.2 | 418.5 | 338.2 | 80.22 | 5.217 | |
| 6,500.0 | 6,066.8 | 6,493.8 | 6,066.8 | 40.7 | 40.4 | -7.52 | -274.5 | -2,039.2 | 418.5 | 338.1 | 80.31 | 5.210 | |
| 6,600.0 | 6,166.8 | 6,593.8 | 6,166.8 | 40.8 | 40.4 | -7.52 | -274.5 | -2,039.2 | 418.5 | 338.0 | 80.41 | 5.204 | |
| 6,700.0 | 6,266.8 | 6,693.8 | 6,266.8 | 40.8 | 40.5 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.9 | 80.51 | 5.197 | |
| 6,800.0 | 6,366.8 | 6,793.8 | 6,366.8 | 40.9 | 40.5 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.8 | 80.61 | 5.191 | |
| 6,900.0 | 6,466.8 | 6,893.8 | 6,466.8 | 40.9 | 40.6 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.7 | 80.72 | 5.184 | |
| 7,000.0 | 6,566.8 | 6,993.8 | 6,566.8 | 41.0 | 40.6 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.6 | 80.82 | 5.178 | |
| 7,100.0 | 6,666.8 | 7,093.8 | 6,666.8 | 41.0 | 40.7 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.5 | 80.93 | 5.171 | |
| 7,200.0 | 6,766.8 | 7,193.8 | 6,766.8 | 41.1 | 40.7 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.4 | 81.04 | 5.164 | |
| 7,300.0 | 6,866.8 | 7,293.8 | 6,866.8 | 41.1 | 40.8 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.3 | 81.14 | 5.157 | |
| 7,400.0 | 6,966.8 | 7,393.8 | 6,966.8 | 41.2 | 40.8 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.2 | 81.25 | 5.150 | |
| 7,500.0 | 7,066.8 | 7,493.8 | 7,066.8 | 41.2 | 40.9 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.1 | 81.36 | 5.143 | |
| 7,600.0 | 7,166.8 | 7,593.8 | 7,166.8 | 41.3 | 41.0 | -7.52 | -274.5 | -2,039.2 | 418.5 | 337.0 | 81.48 | 5.136 | |
| 7,700.0 | 7,266.8 | 7,693.8 | 7,266.8 | 41.3 | 41.0 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.9 | 81.59 | 5.129 | |
| 7,800.0 | 7,366.8 | 7,793.8 | 7,366.8 | 41.4 | 41.1 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.8 | 81.71 | 5.122 | |
| 7,900.0 | 7,466.8 | 7,893.8 | 7,466.8 | 41.5 | 41.1 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.6 | 81.82 | 5.114 | |
| 8,000.0 | 7,566.8 | 7,993.8 | 7,566.8 | 41.5 | 41.2 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.5 | 81.94 | 5.107 | |
| 8,100.0 | 7,666.8 | 8,093.8 | 7,666.8 | 41.6 | 41.2 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.4 | 82.06 | 5.099 | |
| 8,200.0 | 7,766.8 | 8,193.8 | 7,766.8 | 41.6 | 41.3 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.3 | 82.18 | 5.092 | |
| 8,300.0 | 7,866.8 | 8,293.8 | 7,866.8 | 41.7 | 41.4 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.2 | 82.30 | 5.084 | |
| 8,400.0 | 7,966.8 | 8,393.8 | 7,966.8 | 41.8 | 41.4 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.0 | 82.43 | 5.077 | |
| 8,448.1 | 8,014.9 | 8,441.8 | 8,014.9 | 41.8 | 41.5 | -7.52 | -274.5 | -2,039.2 | 418.5 | 336.0 | 82.49 | 5.073 | SF |
| 8,500.0 | 8,066.8 | 8,458.0 | 8,031.0 | 41.8 | 41.5 | -7.52 | -274.5 | -2,039.2 | 420.0 | 337.5 | 82.53 | 5.089 | |
| 8,600.0 | 8,166.8 | 8,458.0 | 8,031.0 | 41.9 | 41.5 | -7.52 | -274.5 | -2,039.2 | 439.9 | 357.3 | 82.59 | 5.327 | |
| 8,700.0 | 8,266.8 | 8,458.0 | 8,031.0 | 41.9 | 41.5 | -7.52 | -274.5 | -2,039.2 | 480.3 | 397.6 | 82.65 | 5.811 | |

| | | | |
|---|---|---|---|
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| **Reference Site:** | O19EB Pad | **MD Reference:** | KB = 24' @ 6533.0ft (Original Well Elev) |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Shideler 30-4A | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | OH | **Database:** | USA EDM 5000 Multi Users DB |
| **Reference Design:** | Plan #2 | **Offset TVD Reference:** | Offset Datum |

Reference Depths are relative to KB = 24' @ 6533.0ft (Original Well Ele
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Shideler 30-4A
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.39°