# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Churchill 28M-443**

Surface Location: Churchill 28J-HZ Pad Sec.28-T5N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4632.0

| +N/-S | +E/-W | Northing | Easting | Latittude | Longitude | Slot |
|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 1381539.29 | 3262115.23 | 40.376910 | -104.559170 | |

RKB - 15' WELL @ 4647.0ft (RKB - 15')

## WELLBORE TARGET DETAILS

| Name | TVD | +N/-S | +E/-W | Shape |
|---|---|---|---|---|
| SHL 250'FNL, 1425'FWL, SEC.28 | 1.0 | 0.0 | 0.0 | Point |
| BHL 2137'FNL, 2385'FWL, SEC.33 | 6805.0 | -7191.4 | 1003.3 | Point |

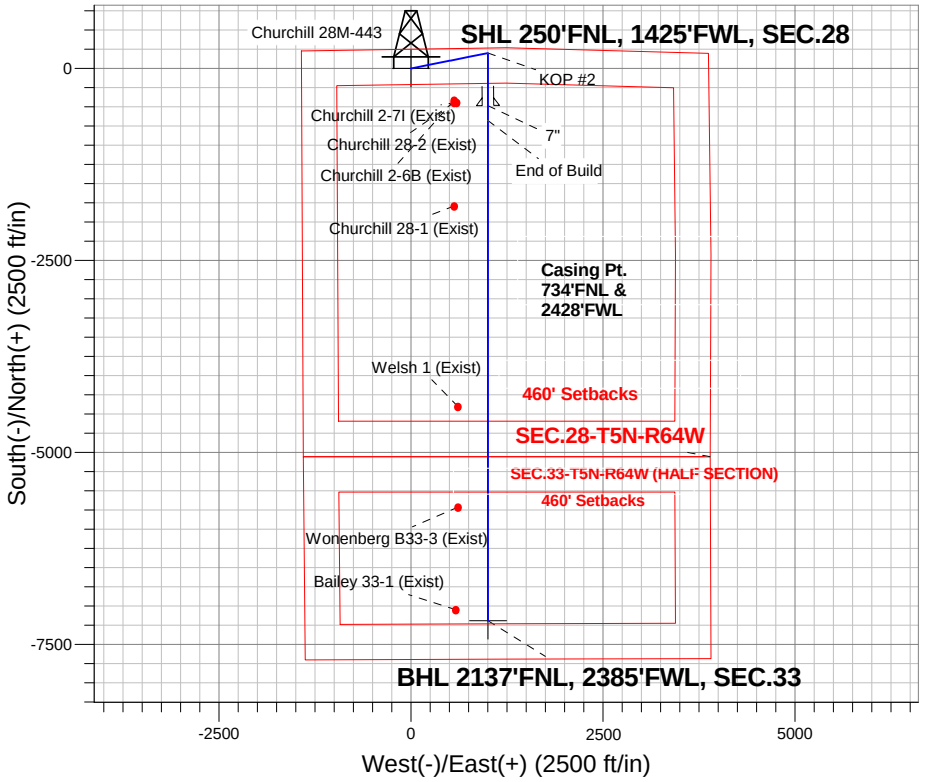

Azimuths to True North
Magnetic North: 8.41°

Magnetic Field
Strength: 52874.4snT
Dip Angle: 66.98°
Date: 12/30/2013
Model: IGRF2010

## ANNOTATIONS

| TVD | MD | Annotation |
|---|---|---|
| 400.0 | 400.0 | KOP #1 |
| 6043.7 | 6145.0 | KOP #2 |
| 6817.5 | 7461.2 | End of Build |

Churchill 28J-HZ Pad Sec.28-T5N-R64W
Churchill 28M-443
Plan #1 (12-30-13)
8:17, January 09 2014

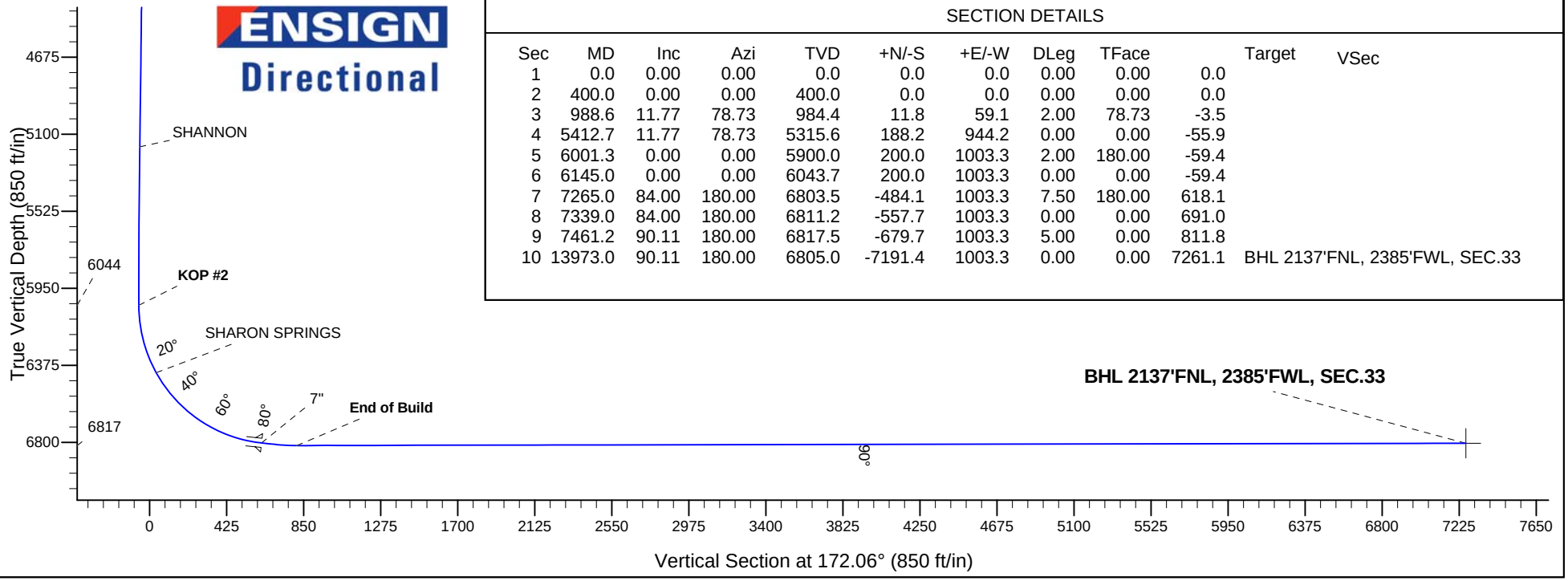






## SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | | Target | VSec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | | |
| 3 | 988.6 | 11.77 | 78.73 | 984.4 | 11.8 | 59.1 | 2.00 | 78.73 | -3.5 | | |
| 4 | 5412.7 | 11.77 | 78.73 | 5315.6 | 188.2 | 944.2 | 0.00 | 0.00 | -55.9 | | |
| 5 | 6001.3 | 0.00 | 0.00 | 5900.0 | 200.0 | 1003.3 | 2.00 | 180.00 | -59.4 | | |
| 6 | 6145.0 | 0.00 | 0.00 | 6043.7 | 200.0 | 1003.3 | 0.00 | 0.00 | -59.4 | | |
| 7 | 7265.0 | 84.00 | 180.00 | 6803.5 | -484.1 | 1003.3 | 7.50 | 180.00 | 618.1 | | |
| 8 | 7339.0 | 84.00 | 180.00 | 6811.2 | -557.7 | 1003.3 | 0.00 | 0.00 | 691.0 | | |
| 9 | 7461.2 | 90.11 | 180.00 | 6817.5 | -679.7 | 1003.3 | 5.00 | 0.00 | 811.8 | | |
| 10 | 13973.0 | 90.11 | 180.00 | 6805.0 | -7191.4 | 1003.3 | 0.00 | 0.00 | 7261.1 | BHL 2137'FNL, 2385'FWL, SEC.33 | |



ENSIGN Directional

# PETROLEUM DEVELOPMENT CORP Weld County CO

**SEC.28-T5N-R64W**
**Churchill 28J-HZ Pad Sec.28-T5N-R64W**
**Churchill 28M-443**

**Wellbore #1**

**Plan: Plan #1 (12-30-13)**

# Standard Planning Report

**09 January, 2014**

PDC ENERGY
Growing E&P Value

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Project:** | SEC.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **North Reference:** | True |
| **Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (12-30-13) | | |

**Project** SEC.28-T5N-R64W, Weld County, Colorado

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | Using Well Reference Point |
| **Map Zone:** | Colorado Northern Zone | | Using geodetic scale factor |

**Site** Churchill 28J-HZ Pad Sec.28-T5N-R64W

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,381,533.43 ft | **Latitude:** | 40.376900 |
| **From:** | Lat/Long | **Easting:** | 3,261,903.54 ft | **Longitude:** | -104.559930 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | " | **Grid Convergence:** | 0.61 ° |

**Well** Churchill 28M-443

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 3.6 ft | **Northing:** | 1,381,539.29 ft | **Latitude:** | 40.376910 |
| | **+E/-W** | 211.7 ft | **Easting:** | 3,262,115.23 ft | **Longitude:** | -104.559170 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 4,632.0 ft |

**Wellbore** Wellbore #1

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 12/30/2013 | 8.41 | 66.98 | 52,874 |

**Design** Plan #1 (12-30-13)

**Audit Notes:**

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

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 172.06 |

**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 | |
| 988.6 | 11.77 | 78.73 | 984.4 | 11.8 | 59.1 | 2.00 | 2.00 | 0.00 | 78.73 | |
| 5,412.7 | 11.77 | 78.73 | 5,315.6 | 188.2 | 944.2 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 6,001.3 | 0.00 | 0.00 | 5,900.0 | 200.0 | 1,003.3 | 2.00 | -2.00 | 0.00 | 180.00 | |
| 6,145.0 | 0.00 | 0.00 | 6,043.7 | 200.0 | 1,003.3 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,265.0 | 84.00 | 180.00 | 6,803.5 | -484.1 | 1,003.3 | 7.50 | 7.50 | 0.00 | 180.00 | |
| 7,339.0 | 84.00 | 180.00 | 6,811.2 | -557.7 | 1,003.3 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,461.2 | 90.11 | 180.00 | 6,817.5 | -679.7 | 1,003.3 | 5.00 | 5.00 | 0.00 | 0.00 | |
| 13,973.0 | 90.11 | 180.00 | 6,805.0 | -7,191.4 | 1,003.3 | 0.00 | 0.00 | 0.00 | 0.00 | BHL 2137'FNL, 238 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Project:** | SEC.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **North Reference:** | True |
| **Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (12-30-13) | | |

**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) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1.0 | 0.00 | 0.00 | 1.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| **SHL 250'FNL, 1425'FWL, SEC.28** | | | | | | | | | |
| 100.0 | 0.00 | 0.00 | 100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 200.0 | 0.00 | 0.00 | 200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| **KOP #1** | | | | | | | | | |
| 500.0 | 2.00 | 78.73 | 500.0 | 0.3 | 1.7 | -0.1 | 2.00 | 2.00 | 0.00 |
| 600.0 | 4.00 | 78.73 | 599.8 | 1.4 | 6.8 | -0.4 | 2.00 | 2.00 | 0.00 |
| 700.0 | 6.00 | 78.73 | 699.5 | 3.1 | 15.4 | -0.9 | 2.00 | 2.00 | 0.00 |
| 800.0 | 8.00 | 78.73 | 798.7 | 5.5 | 27.3 | -1.6 | 2.00 | 2.00 | 0.00 |
| 900.0 | 10.00 | 78.73 | 897.5 | 8.5 | 42.7 | -2.5 | 2.00 | 2.00 | 0.00 |
| 988.6 | 11.77 | 78.73 | 984.4 | 11.8 | 59.1 | -3.5 | 2.00 | 2.00 | 0.00 |
| 1,000.0 | 11.77 | 78.73 | 995.6 | 12.2 | 61.4 | -3.6 | 0.00 | 0.00 | 0.00 |
| 1,100.0 | 11.77 | 78.73 | 1,093.5 | 16.2 | 81.4 | -4.8 | 0.00 | 0.00 | 0.00 |
| 1,200.0 | 11.77 | 78.73 | 1,191.4 | 20.2 | 101.4 | -6.0 | 0.00 | 0.00 | 0.00 |
| 1,300.0 | 11.77 | 78.73 | 1,289.3 | 24.2 | 121.4 | -7.2 | 0.00 | 0.00 | 0.00 |
| 1,400.0 | 11.77 | 78.73 | 1,387.2 | 28.2 | 141.4 | -8.4 | 0.00 | 0.00 | 0.00 |
| 1,500.0 | 11.77 | 78.73 | 1,485.1 | 32.2 | 161.4 | -9.6 | 0.00 | 0.00 | 0.00 |
| 1,600.0 | 11.77 | 78.73 | 1,583.0 | 36.2 | 181.4 | -10.7 | 0.00 | 0.00 | 0.00 |
| 1,700.0 | 11.77 | 78.73 | 1,680.9 | 40.2 | 201.4 | -11.9 | 0.00 | 0.00 | 0.00 |
| 1,800.0 | 11.77 | 78.73 | 1,778.8 | 44.1 | 221.4 | -13.1 | 0.00 | 0.00 | 0.00 |
| 1,900.0 | 11.77 | 78.73 | 1,876.7 | 48.1 | 241.4 | -14.3 | 0.00 | 0.00 | 0.00 |
| 2,000.0 | 11.77 | 78.73 | 1,974.6 | 52.1 | 261.4 | -15.5 | 0.00 | 0.00 | 0.00 |
| 2,100.0 | 11.77 | 78.73 | 2,072.5 | 56.1 | 281.4 | -16.7 | 0.00 | 0.00 | 0.00 |
| 2,200.0 | 11.77 | 78.73 | 2,170.4 | 60.1 | 301.5 | -17.9 | 0.00 | 0.00 | 0.00 |
| 2,300.0 | 11.77 | 78.73 | 2,268.3 | 64.1 | 321.5 | -19.0 | 0.00 | 0.00 | 0.00 |
| 2,400.0 | 11.77 | 78.73 | 2,366.2 | 68.1 | 341.5 | -20.2 | 0.00 | 0.00 | 0.00 |
| 2,500.0 | 11.77 | 78.73 | 2,464.1 | 72.1 | 361.5 | -21.4 | 0.00 | 0.00 | 0.00 |
| 2,600.0 | 11.77 | 78.73 | 2,562.0 | 76.0 | 381.5 | -22.6 | 0.00 | 0.00 | 0.00 |
| 2,700.0 | 11.77 | 78.73 | 2,659.9 | 80.0 | 401.5 | -23.8 | 0.00 | 0.00 | 0.00 |
| 2,800.0 | 11.77 | 78.73 | 2,757.8 | 84.0 | 421.5 | -25.0 | 0.00 | 0.00 | 0.00 |
| 2,900.0 | 11.77 | 78.73 | 2,855.7 | 88.0 | 441.5 | -26.2 | 0.00 | 0.00 | 0.00 |
| 3,000.0 | 11.77 | 78.73 | 2,953.6 | 92.0 | 461.5 | -27.3 | 0.00 | 0.00 | 0.00 |
| 3,100.0 | 11.77 | 78.73 | 3,051.5 | 96.0 | 481.5 | -28.5 | 0.00 | 0.00 | 0.00 |
| 3,200.0 | 11.77 | 78.73 | 3,149.4 | 100.0 | 501.5 | -29.7 | 0.00 | 0.00 | 0.00 |
| 3,300.0 | 11.77 | 78.73 | 3,247.3 | 104.0 | 521.5 | -30.9 | 0.00 | 0.00 | 0.00 |
| 3,400.0 | 11.77 | 78.73 | 3,345.2 | 108.0 | 541.5 | -32.1 | 0.00 | 0.00 | 0.00 |
| 3,500.0 | 11.77 | 78.73 | 3,443.1 | 111.9 | 561.5 | -33.3 | 0.00 | 0.00 | 0.00 |
| 3,600.0 | 11.77 | 78.73 | 3,540.9 | 115.9 | 581.6 | -34.5 | 0.00 | 0.00 | 0.00 |
| 3,609.2 | 11.77 | 78.73 | 3,550.0 | 116.3 | 583.4 | -34.6 | 0.00 | 0.00 | 0.00 |
| **PARKMAN** | | | | | | | | | |
| 3,700.0 | 11.77 | 78.73 | 3,638.8 | 119.9 | 601.6 | -35.6 | 0.00 | 0.00 | 0.00 |
| 3,800.0 | 11.77 | 78.73 | 3,736.7 | 123.9 | 621.6 | -36.8 | 0.00 | 0.00 | 0.00 |
| 3,900.0 | 11.77 | 78.73 | 3,834.6 | 127.9 | 641.6 | -38.0 | 0.00 | 0.00 | 0.00 |
| 4,000.0 | 11.77 | 78.73 | 3,932.5 | 131.9 | 661.6 | -39.2 | 0.00 | 0.00 | 0.00 |
| 4,100.0 | 11.77 | 78.73 | 4,030.4 | 135.9 | 681.6 | -40.4 | 0.00 | 0.00 | 0.00 |
| 4,200.0 | 11.77 | 78.73 | 4,128.3 | 139.9 | 701.6 | -41.6 | 0.00 | 0.00 | 0.00 |
| 4,237.5 | 11.77 | 78.73 | 4,165.0 | 141.3 | 709.1 | -42.0 | 0.00 | 0.00 | 0.00 |
| **SUSSEX** | | | | | | | | | |
| 4,300.0 | 11.77 | 78.73 | 4,226.2 | 143.8 | 721.6 | -42.8 | 0.00 | 0.00 | 0.00 |
| 4,400.0 | 11.77 | 78.73 | 4,324.1 | 147.8 | 741.6 | -43.9 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Project:** | SEC.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **North Reference:** | True |
| **Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (12-30-13) | | |

**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) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 4,500.0 | 11.77 | 78.73 | 4,422.0 | 151.8 | 761.6 | -45.1 | 0.00 | 0.00 | 0.00 |
| 4,600.0 | 11.77 | 78.73 | 4,519.9 | 155.8 | 781.6 | -46.3 | 0.00 | 0.00 | 0.00 |
| 4,700.0 | 11.77 | 78.73 | 4,617.8 | 159.8 | 801.6 | -47.5 | 0.00 | 0.00 | 0.00 |
| 4,800.0 | 11.77 | 78.73 | 4,715.7 | 163.8 | 821.6 | -48.7 | 0.00 | 0.00 | 0.00 |
| 4,900.0 | 11.77 | 78.73 | 4,813.6 | 167.8 | 841.6 | -49.9 | 0.00 | 0.00 | 0.00 |
| 5,000.0 | 11.77 | 78.73 | 4,911.5 | 171.8 | 861.7 | -51.1 | 0.00 | 0.00 | 0.00 |
| 5,100.0 | 11.77 | 78.73 | 5,009.4 | 175.7 | 881.7 | -52.2 | 0.00 | 0.00 | 0.00 |
| 5,200.0 | 11.77 | 78.73 | 5,107.3 | 179.7 | 901.7 | -53.4 | 0.00 | 0.00 | 0.00 |
| 5,264.0 | 11.77 | 78.73 | 5,170.0 | 182.3 | 914.5 | -54.2 | 0.00 | 0.00 | 0.00 |
| **SHANNON** | | | | | | | | | |
| 5,300.0 | 11.77 | 78.73 | 5,205.2 | 183.7 | 921.7 | -54.6 | 0.00 | 0.00 | 0.00 |
| 5,400.0 | 11.77 | 78.73 | 5,303.1 | 187.7 | 941.7 | -55.8 | 0.00 | 0.00 | 0.00 |
| 5,412.7 | 11.77 | 78.73 | 5,315.6 | 188.2 | 944.2 | -55.9 | 0.00 | 0.00 | 0.00 |
| 5,500.0 | 10.03 | 78.73 | 5,401.2 | 191.4 | 960.4 | -56.9 | 2.00 | -2.00 | 0.00 |
| 5,600.0 | 8.03 | 78.73 | 5,500.0 | 194.5 | 975.8 | -57.8 | 2.00 | -2.00 | 0.00 |
| 5,700.0 | 6.03 | 78.73 | 5,599.2 | 196.9 | 987.8 | -58.5 | 2.00 | -2.00 | 0.00 |
| 5,800.0 | 4.03 | 78.73 | 5,698.9 | 198.6 | 996.4 | -59.0 | 2.00 | -2.00 | 0.00 |
| 5,900.0 | 2.03 | 78.73 | 5,798.7 | 199.6 | 1,001.6 | -59.3 | 2.00 | -2.00 | 0.00 |
| 6,000.0 | 0.03 | 78.73 | 5,898.7 | 200.0 | 1,003.3 | -59.4 | 2.00 | -2.00 | 0.00 |
| 6,001.3 | 0.00 | 0.00 | 5,900.0 | 200.0 | 1,003.3 | -59.4 | 2.00 | -2.00 | 0.00 |
| 6,100.0 | 0.00 | 0.00 | 5,998.7 | 200.0 | 1,003.3 | -59.4 | 0.00 | 0.00 | 0.00 |
| 6,145.0 | 0.00 | 0.00 | 6,043.7 | 200.0 | 1,003.3 | -59.4 | 0.00 | 0.00 | 0.00 |
| **KOP #2** | | | | | | | | | |
| 6,200.0 | 4.12 | 180.00 | 6,098.6 | 198.0 | 1,003.3 | -57.5 | 7.50 | 7.50 | 0.00 |
| 6,300.0 | 11.62 | 180.00 | 6,197.6 | 184.3 | 1,003.3 | -43.9 | 7.50 | 7.50 | 0.00 |
| 6,400.0 | 19.12 | 180.00 | 6,294.0 | 157.8 | 1,003.3 | -17.7 | 7.50 | 7.50 | 0.00 |
| 6,500.0 | 26.62 | 180.00 | 6,386.1 | 119.0 | 1,003.3 | 20.8 | 7.50 | 7.50 | 0.00 |
| 6,533.9 | 29.16 | 180.00 | 6,416.0 | 103.2 | 1,003.3 | 36.5 | 7.50 | 7.50 | 0.00 |
| **SHARON SPRINGS** | | | | | | | | | |
| 6,600.0 | 34.12 | 180.00 | 6,472.3 | 68.5 | 1,003.3 | 70.8 | 7.50 | 7.50 | 0.00 |
| 6,700.0 | 41.62 | 180.00 | 6,551.2 | 7.1 | 1,003.3 | 131.6 | 7.50 | 7.50 | 0.00 |
| 6,800.0 | 49.12 | 180.00 | 6,621.4 | -64.0 | 1,003.3 | 202.0 | 7.50 | 7.50 | 0.00 |
| 6,900.0 | 56.62 | 180.00 | 6,681.7 | -143.7 | 1,003.3 | 280.9 | 7.50 | 7.50 | 0.00 |
| 7,000.0 | 64.12 | 180.00 | 6,731.1 | -230.5 | 1,003.3 | 366.9 | 7.50 | 7.50 | 0.00 |
| 7,100.0 | 71.62 | 180.00 | 6,768.7 | -323.1 | 1,003.3 | 458.6 | 7.50 | 7.50 | 0.00 |
| 7,200.0 | 79.12 | 180.00 | 6,793.9 | -419.8 | 1,003.3 | 554.4 | 7.50 | 7.50 | 0.00 |
| 7,265.0 | 84.00 | 180.00 | 6,803.5 | -484.1 | 1,003.3 | 618.0 | 7.50 | 7.50 | 0.00 |
| **7"** | | | | | | | | | |
| 7,300.0 | 84.00 | 180.00 | 6,807.1 | -518.9 | 1,003.3 | 652.5 | 0.01 | 0.01 | 0.00 |
| 7,339.0 | 84.00 | 180.00 | 6,811.2 | -557.7 | 1,003.3 | 691.0 | 0.00 | 0.00 | 0.00 |
| 7,400.0 | 87.05 | 180.00 | 6,816.0 | -618.5 | 1,003.3 | 751.2 | 5.00 | 5.00 | 0.00 |
| 7,461.2 | 90.11 | 180.00 | 6,817.5 | -679.6 | 1,003.3 | 811.7 | 5.00 | 5.00 | 0.00 |
| **End of Build** | | | | | | | | | |
| 7,500.0 | 90.11 | 180.00 | 6,817.4 | -718.4 | 1,003.3 | 850.2 | 0.01 | 0.01 | 0.00 |
| 7,600.0 | 90.11 | 180.00 | 6,817.2 | -818.4 | 1,003.3 | 949.2 | 0.00 | 0.00 | 0.00 |
| 7,700.0 | 90.11 | 180.00 | 6,817.0 | -918.4 | 1,003.3 | 1,048.3 | 0.00 | 0.00 | 0.00 |
| 7,800.0 | 90.11 | 180.00 | 6,816.9 | -1,018.4 | 1,003.3 | 1,147.3 | 0.00 | 0.00 | 0.00 |
| 7,900.0 | 90.11 | 180.00 | 6,816.7 | -1,118.4 | 1,003.3 | 1,246.3 | 0.00 | 0.00 | 0.00 |
| 8,000.0 | 90.11 | 180.00 | 6,816.5 | -1,218.4 | 1,003.3 | 1,345.4 | 0.00 | 0.00 | 0.00 |
| 8,100.0 | 90.11 | 180.00 | 6,816.3 | -1,318.4 | 1,003.3 | 1,444.4 | 0.00 | 0.00 | 0.00 |
| 8,200.0 | 90.11 | 180.00 | 6,816.1 | -1,418.4 | 1,003.3 | 1,543.5 | 0.00 | 0.00 | 0.00 |
| 8,300.0 | 90.11 | 180.00 | 6,815.9 | -1,518.4 | 1,003.3 | 1,642.5 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Project:** | SEC.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **North Reference:** | True |
| **Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (12-30-13) | | |

**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) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 8,400.0 | 90.11 | 180.00 | 6,815.7 | -1,618.4 | 1,003.3 | 1,741.5 | 0.00 | 0.00 | 0.00 |
| 8,500.0 | 90.11 | 180.00 | 6,815.5 | -1,718.4 | 1,003.3 | 1,840.6 | 0.00 | 0.00 | 0.00 |
| 8,600.0 | 90.11 | 180.00 | 6,815.3 | -1,818.4 | 1,003.3 | 1,939.6 | 0.00 | 0.00 | 0.00 |
| 8,700.0 | 90.11 | 180.00 | 6,815.1 | -1,918.4 | 1,003.3 | 2,038.7 | 0.00 | 0.00 | 0.00 |
| 8,800.0 | 90.11 | 180.00 | 6,814.9 | -2,018.4 | 1,003.3 | 2,137.7 | 0.00 | 0.00 | 0.00 |
| 8,900.0 | 90.11 | 180.00 | 6,814.7 | -2,118.4 | 1,003.3 | 2,236.7 | 0.00 | 0.00 | 0.00 |
| 9,000.0 | 90.11 | 180.00 | 6,814.5 | -2,218.4 | 1,003.3 | 2,335.8 | 0.00 | 0.00 | 0.00 |
| 9,100.0 | 90.11 | 180.00 | 6,814.4 | -2,318.4 | 1,003.3 | 2,434.8 | 0.00 | 0.00 | 0.00 |
| 9,200.0 | 90.11 | 180.00 | 6,814.2 | -2,418.4 | 1,003.3 | 2,533.9 | 0.00 | 0.00 | 0.00 |
| 9,300.0 | 90.11 | 180.00 | 6,814.0 | -2,518.4 | 1,003.3 | 2,632.9 | 0.00 | 0.00 | 0.00 |
| 9,400.0 | 90.11 | 180.00 | 6,813.8 | -2,618.4 | 1,003.3 | 2,731.9 | 0.00 | 0.00 | 0.00 |
| 9,500.0 | 90.11 | 180.00 | 6,813.6 | -2,718.4 | 1,003.3 | 2,831.0 | 0.00 | 0.00 | 0.00 |
| 9,600.0 | 90.11 | 180.00 | 6,813.4 | -2,818.4 | 1,003.3 | 2,930.0 | 0.00 | 0.00 | 0.00 |
| 9,700.0 | 90.11 | 180.00 | 6,813.2 | -2,918.4 | 1,003.3 | 3,029.1 | 0.00 | 0.00 | 0.00 |
| 9,800.0 | 90.11 | 180.00 | 6,813.0 | -3,018.4 | 1,003.3 | 3,128.1 | 0.00 | 0.00 | 0.00 |
| 9,900.0 | 90.11 | 180.00 | 6,812.8 | -3,118.4 | 1,003.3 | 3,227.1 | 0.00 | 0.00 | 0.00 |
| 10,000.0 | 90.11 | 180.00 | 6,812.6 | -3,218.4 | 1,003.3 | 3,326.2 | 0.00 | 0.00 | 0.00 |
| 10,100.0 | 90.11 | 180.00 | 6,812.4 | -3,318.4 | 1,003.3 | 3,425.2 | 0.00 | 0.00 | 0.00 |
| 10,200.0 | 90.11 | 180.00 | 6,812.2 | -3,418.4 | 1,003.3 | 3,524.3 | 0.00 | 0.00 | 0.00 |
| 10,300.0 | 90.11 | 180.00 | 6,812.1 | -3,518.4 | 1,003.3 | 3,623.3 | 0.00 | 0.00 | 0.00 |
| 10,400.0 | 90.11 | 180.00 | 6,811.9 | -3,618.4 | 1,003.3 | 3,722.3 | 0.00 | 0.00 | 0.00 |
| 10,500.0 | 90.11 | 180.00 | 6,811.7 | -3,718.4 | 1,003.3 | 3,821.4 | 0.00 | 0.00 | 0.00 |
| 10,600.0 | 90.11 | 180.00 | 6,811.5 | -3,818.4 | 1,003.3 | 3,920.4 | 0.00 | 0.00 | 0.00 |
| 10,700.0 | 90.11 | 180.00 | 6,811.3 | -3,918.4 | 1,003.3 | 4,019.5 | 0.00 | 0.00 | 0.00 |
| 10,800.0 | 90.11 | 180.00 | 6,811.1 | -4,018.4 | 1,003.3 | 4,118.5 | 0.00 | 0.00 | 0.00 |
| 10,900.0 | 90.11 | 180.00 | 6,810.9 | -4,118.4 | 1,003.3 | 4,217.6 | 0.00 | 0.00 | 0.00 |
| 11,000.0 | 90.11 | 180.00 | 6,810.7 | -4,218.4 | 1,003.3 | 4,316.6 | 0.00 | 0.00 | 0.00 |
| 11,100.0 | 90.11 | 180.00 | 6,810.5 | -4,318.4 | 1,003.3 | 4,415.6 | 0.00 | 0.00 | 0.00 |
| 11,200.0 | 90.11 | 180.00 | 6,810.3 | -4,418.4 | 1,003.3 | 4,514.7 | 0.00 | 0.00 | 0.00 |
| 11,300.0 | 90.11 | 180.00 | 6,810.1 | -4,518.4 | 1,003.3 | 4,613.7 | 0.00 | 0.00 | 0.00 |
| 11,400.0 | 90.11 | 180.00 | 6,809.9 | -4,618.4 | 1,003.3 | 4,712.8 | 0.00 | 0.00 | 0.00 |
| 11,500.0 | 90.11 | 180.00 | 6,809.7 | -4,718.4 | 1,003.3 | 4,811.8 | 0.00 | 0.00 | 0.00 |
| 11,600.0 | 90.11 | 180.00 | 6,809.6 | -4,818.4 | 1,003.3 | 4,910.8 | 0.00 | 0.00 | 0.00 |
| 11,700.0 | 90.11 | 180.00 | 6,809.4 | -4,918.4 | 1,003.3 | 5,009.9 | 0.00 | 0.00 | 0.00 |
| 11,800.0 | 90.11 | 180.00 | 6,809.2 | -5,018.4 | 1,003.3 | 5,108.9 | 0.00 | 0.00 | 0.00 |
| 11,900.0 | 90.11 | 180.00 | 6,809.0 | -5,118.4 | 1,003.3 | 5,208.0 | 0.00 | 0.00 | 0.00 |
| 12,000.0 | 90.11 | 180.00 | 6,808.8 | -5,218.4 | 1,003.3 | 5,307.0 | 0.00 | 0.00 | 0.00 |
| 12,100.0 | 90.11 | 180.00 | 6,808.6 | -5,318.4 | 1,003.3 | 5,406.0 | 0.00 | 0.00 | 0.00 |
| 12,200.0 | 90.11 | 180.00 | 6,808.4 | -5,418.4 | 1,003.3 | 5,505.1 | 0.00 | 0.00 | 0.00 |
| 12,300.0 | 90.11 | 180.00 | 6,808.2 | -5,518.4 | 1,003.3 | 5,604.1 | 0.00 | 0.00 | 0.00 |
| 12,400.0 | 90.11 | 180.00 | 6,808.0 | -5,618.4 | 1,003.3 | 5,703.2 | 0.00 | 0.00 | 0.00 |
| 12,500.0 | 90.11 | 180.00 | 6,807.8 | -5,718.4 | 1,003.3 | 5,802.2 | 0.00 | 0.00 | 0.00 |
| 12,600.0 | 90.11 | 180.00 | 6,807.6 | -5,818.4 | 1,003.3 | 5,901.2 | 0.00 | 0.00 | 0.00 |
| 12,700.0 | 90.11 | 180.00 | 6,807.4 | -5,918.4 | 1,003.3 | 6,000.3 | 0.00 | 0.00 | 0.00 |
| 12,800.0 | 90.11 | 180.00 | 6,807.3 | -6,018.4 | 1,003.3 | 6,099.3 | 0.00 | 0.00 | 0.00 |
| 12,900.0 | 90.11 | 180.00 | 6,807.1 | -6,118.4 | 1,003.3 | 6,198.4 | 0.00 | 0.00 | 0.00 |
| 13,000.0 | 90.11 | 180.00 | 6,806.9 | -6,218.4 | 1,003.3 | 6,297.4 | 0.00 | 0.00 | 0.00 |
| 13,100.0 | 90.11 | 180.00 | 6,806.7 | -6,318.4 | 1,003.3 | 6,396.4 | 0.00 | 0.00 | 0.00 |
| 13,200.0 | 90.11 | 180.00 | 6,806.5 | -6,418.4 | 1,003.3 | 6,495.5 | 0.00 | 0.00 | 0.00 |
| 13,300.0 | 90.11 | 180.00 | 6,806.3 | -6,518.4 | 1,003.3 | 6,594.5 | 0.00 | 0.00 | 0.00 |
| 13,400.0 | 90.11 | 180.00 | 6,806.1 | -6,618.4 | 1,003.3 | 6,693.6 | 0.00 | 0.00 | 0.00 |
| 13,500.0 | 90.11 | 180.00 | 6,805.9 | -6,718.4 | 1,003.3 | 6,792.6 | 0.00 | 0.00 | 0.00 |
| 13,600.0 | 90.11 | 180.00 | 6,805.7 | -6,818.4 | 1,003.3 | 6,891.6 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Project:** | SEC.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **North Reference:** | True |
| **Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (12-30-13) | | |

**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) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 13,700.0 | 90.11 | 180.00 | 6,805.5 | -6,918.4 | 1,003.3 | 6,990.7 | 0.00 | 0.00 | 0.00 |
| 13,800.0 | 90.11 | 180.00 | 6,805.3 | -7,018.4 | 1,003.3 | 7,089.7 | 0.00 | 0.00 | 0.00 |
| 13,900.0 | 90.11 | 180.00 | 6,805.1 | -7,118.4 | 1,003.3 | 7,188.8 | 0.00 | 0.00 | 0.00 |
| 13,973.0 | 90.11 | 180.00 | 6,805.0 | -7,191.4 | 1,003.3 | 7,261.1 | 0.00 | 0.00 | 0.00 |
| **BHL 2137'FNL, 2385'FWL, SEC.33** | | | | | | | | | |

**Casing Points**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (") | Hole Diameter (") |
|---|---|---|---|---|
| 7,265.0 | 6,803.5 | 7" | 7 | 7-1/2 |

**Formations**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---|---|---|---|---|---|
| 3,609.2 | 3,550.0 | PARKMAN | | | |
| 4,237.5 | 4,165.0 | SUSSEX | | | |
| 5,264.0 | 5,170.0 | SHANNON | | | |
| 6,533.9 | 6,416.0 | SHARON SPRINGS | | | |

**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 #1 |
| 6,145.0 | 6,043.7 | 200.0 | 1,003.3 | KOP #2 |
| 7,461.2 | 6,817.5 | -679.6 | 1,003.3 | End of Build |

ENSIGN Directional

# PETROLEUM DEVELOPMENT CORP Weld County CO

**SEC.28-T5N-R64W**
**Churchill 28J-HZ Pad Sec.28-T5N-R64W**
**Churchill 28M-443**

**Wellbore #1**
**Plan #1 (12-30-13)**

# Anticollision Report

**09 January, 2014**

PDC ENERGY
Growing E&P Value

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Reference** Plan #1 (12-30-13)

| | | | |
|---|---|---|---|
| **Filter type:** | NO GLOBAL FILTER: Using user defined selection & filtering criteria | | |
| **Interpolation Method:** | MD Interval 100.0ft | **Error Model:** | ISCWSA |
| **Depth Range:** | Unlimited | **Scan Method:** | Closest Approach 3D |
| **Results Limited by:** | Maximum center-center distance of 10,000.0ft | **Error Surface:** | Elliptical Conic |

**Warning Levels Evaluated at:** 2.00 **Sigma**

**Survey Tool Program** **Date** 1/6/2014

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 0.0 | 13,973.0 | Plan #1 (12-30-13) (Wellbore #1) | MWD | MWD - Standard |

**Summary**

| Site Name / Offset Well - Wellbore - Design | Reference Measured Depth (ft) | Offset Measured Depth (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|
| Churchill 28J-HZ Pad Sec.28-T5N-R64W | | | | | | |
| Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13) | 400.0 | 402.0 | 91.9 | 90.4 | 58.271 | CC, ES |
| Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13) | 13,973.0 | 13,723.3 | 1,004.4 | 729.4 | 3.653 | SF |
| Churchill 28J-423 - Wellbore #1 - Plan #1 (12-30-13) | 400.0 | 401.0 | 61.3 | 59.7 | 38.903 | CC, ES |
| Churchill 28J-423 - Wellbore #1 - Plan #1 (12-30-13) | 13,973.0 | 13,896.5 | 660.5 | 381.4 | 2.367 | SF |
| Churchill 28M-343 - Wellbore #1 - Plan #1 (12-30-13) | 400.0 | 401.0 | 30.6 | 29.1 | 19.451 | CC, ES |
| Churchill 28M-343 - Wellbore #1 - Plan #1 (12-30-13) | 13,973.0 | 13,855.9 | 351.3 | 87.2 | 1.330 | Level 3, SF |
| Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W | | | | | | |
| Bailey 33-1 (Exist) - Wellbore #1 - Wellbore #1 | 13,827.3 | 6,845.3 | 420.8 | 147.1 | 1.537 | CC, ES, SF |
| Churchill 2-6B (Exist) - Wellbore #1 - Wellbore #1 | 7,195.4 | 6,775.1 | 440.5 | 286.7 | 2.864 | CC |
| Churchill 2-6B (Exist) - Wellbore #1 - Wellbore #1 | 7,200.0 | 6,775.9 | 440.5 | 286.6 | 2.863 | ES, SF |
| Churchill 2-7I (Exist) - Wellbore #1 - Wellbore #1 | 7,225.0 | 6,780.4 | 409.8 | 255.6 | 2.658 | CC, ES, SF |
| Churchill 28-1 (Exist) - Wellbore #1 - Wellbore #1 | 8,574.0 | 6,818.4 | 440.5 | 265.5 | 2.518 | CC, ES |
| Churchill 28-1 (Exist) - Wellbore #1 - Wellbore #1 | 8,600.0 | 6,818.3 | 441.2 | 265.9 | 2.516 | SF |
| Churchill 28-2 (Exist) - Wellbore #1 - Wellbore #1 | 7,225.0 | 6,780.4 | 440.5 | 286.3 | 2.857 | CC, ES, SF |
| Welsh 1 (Exist) - Wellbore #1 - Wellbore #1 | 11,182.4 | 6,811.4 | 393.0 | 170.2 | 1.764 | CC, ES |
| Welsh 1 (Exist) - Wellbore #1 - Wellbore #1 | 11,200.0 | 6,811.3 | 393.4 | 170.3 | 1.763 | SF |
| Wonenberg B33-3 (Exist) - Wellbore #1 - Wellbore #1 | 12,493.9 | 6,824.8 | 390.2 | 142.3 | 1.574 | CC |
| Wonenberg B33-3 (Exist) - Wellbore #1 - Wellbore #1 | 12,500.0 | 6,824.8 | 390.3 | 142.2 | 1.573 | ES, SF |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 2.0 | 2.0 | 0.0 | 0.0 | -89.99 | 0.0 | -91.9 | 91.9 | 91.9 | 0.00 | N/A | |
| 100.0 | 100.0 | 102.0 | 102.0 | 0.1 | 0.1 | -89.99 | 0.0 | -91.9 | 91.9 | 91.7 | 0.23 | 401.043 | |
| 200.0 | 200.0 | 202.0 | 202.0 | 0.3 | 0.3 | -89.99 | 0.0 | -91.9 | 91.9 | 91.3 | 0.68 | 135.452 | |
| 300.0 | 300.0 | 302.0 | 302.0 | 0.6 | 0.6 | -89.99 | 0.0 | -91.9 | 91.9 | 90.8 | 1.13 | 81.487 | |
| 400.0 | 400.0 | 402.0 | 402.0 | 0.8 | 0.8 | -89.99 | 0.0 | -91.9 | 91.9 | 90.4 | 1.58 | 58.271 | CC, ES |
| 500.0 | 500.0 | 502.0 | 502.0 | 1.0 | 1.0 | -168.92 | 0.0 | -91.9 | 93.7 | 91.6 | 2.02 | 46.360 | |
| 600.0 | 599.8 | 601.8 | 601.8 | 1.2 | 1.2 | -169.48 | 0.0 | -91.9 | 98.8 | 96.3 | 2.46 | 40.166 | |
| 700.0 | 699.5 | 701.5 | 701.5 | 1.5 | 1.5 | -170.30 | 0.0 | -91.9 | 107.4 | 104.5 | 2.90 | 36.984 | |

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

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 800.0 | 798.7 | 800.7 | 800.7 | 1.7 | 1.7 | -171.25 | 0.0 | -91.9 | 119.4 | 116.1 | 3.35 | 35.652 | |
| 900.0 | 897.5 | 899.5 | 899.5 | 2.0 | 1.9 | -172.22 | 0.0 | -91.9 | 134.9 | 131.1 | 3.80 | 35.529 | |
| 1,000.0 | 995.6 | 997.6 | 997.6 | 2.4 | 2.1 | -173.14 | 0.0 | -91.9 | 153.8 | 149.6 | 4.25 | 36.225 | |
| 1,100.0 | 1,093.5 | 1,095.5 | 1,095.5 | 2.8 | 2.3 | -173.94 | 0.0 | -91.9 | 174.1 | 169.4 | 4.70 | 37.016 | |
| 1,200.0 | 1,191.4 | 1,193.4 | 1,193.4 | 3.2 | 2.6 | -174.58 | 0.0 | -91.9 | 194.4 | 189.2 | 5.16 | 37.636 | |
| 1,300.0 | 1,289.3 | 1,291.3 | 1,291.3 | 3.6 | 2.8 | -175.09 | 0.0 | -91.9 | 214.7 | 209.1 | 5.63 | 38.133 | |
| 1,400.0 | 1,387.2 | 1,389.2 | 1,389.2 | 4.1 | 3.0 | -175.52 | 0.0 | -91.9 | 235.0 | 228.9 | 6.10 | 38.539 | |
| 1,500.0 | 1,485.1 | 1,487.1 | 1,487.1 | 4.5 | 3.2 | -175.87 | 0.0 | -91.9 | 255.4 | 248.8 | 6.57 | 38.876 | |
| 1,600.0 | 1,583.0 | 1,585.0 | 1,585.0 | 4.9 | 3.5 | -176.18 | 0.0 | -91.9 | 275.7 | 268.7 | 7.04 | 39.159 | |
| 1,700.0 | 1,680.9 | 1,682.9 | 1,682.9 | 5.4 | 3.7 | -176.44 | 0.0 | -91.9 | 296.1 | 288.6 | 7.52 | 39.400 | |
| 1,800.0 | 1,778.8 | 1,780.8 | 1,780.8 | 5.8 | 3.9 | -176.67 | 0.0 | -91.9 | 316.5 | 308.5 | 7.99 | 39.607 | |
| 1,900.0 | 1,876.7 | 1,878.7 | 1,878.7 | 6.2 | 4.1 | -176.87 | 0.0 | -91.9 | 336.8 | 328.4 | 8.47 | 39.786 | |
| 2,000.0 | 1,974.6 | 1,976.6 | 1,976.6 | 6.7 | 4.3 | -177.05 | 0.0 | -91.9 | 357.2 | 348.3 | 8.94 | 39.944 | |
| 2,100.0 | 2,072.5 | 2,074.5 | 2,074.5 | 7.1 | 4.6 | -177.21 | 0.0 | -91.9 | 377.6 | 368.2 | 9.42 | 40.083 | |
| 2,200.0 | 2,170.4 | 2,172.4 | 2,172.4 | 7.6 | 4.8 | -177.35 | 0.0 | -91.9 | 398.0 | 388.1 | 9.90 | 40.206 | |
| 2,300.0 | 2,268.3 | 2,270.3 | 2,270.3 | 8.0 | 5.0 | -177.48 | 0.0 | -91.9 | 418.3 | 408.0 | 10.38 | 40.316 | |
| 2,400.0 | 2,366.2 | 2,368.2 | 2,368.2 | 8.5 | 5.2 | -177.60 | 0.0 | -91.9 | 438.7 | 427.9 | 10.86 | 40.415 | |
| 2,500.0 | 2,464.1 | 2,466.1 | 2,466.1 | 8.9 | 5.4 | -177.71 | 0.0 | -91.9 | 459.1 | 447.8 | 11.33 | 40.504 | |
| 2,600.0 | 2,562.0 | 2,571.1 | 2,571.1 | 9.4 | 5.7 | -177.72 | 0.8 | -91.5 | 479.0 | 467.2 | 11.83 | 40.499 | |
| 2,700.0 | 2,659.9 | 2,680.7 | 2,680.6 | 9.8 | 5.9 | -177.38 | 5.1 | -89.3 | 496.8 | 484.5 | 12.33 | 40.303 | |
| 2,800.0 | 2,757.8 | 2,790.8 | 2,790.3 | 10.3 | 6.2 | -176.67 | 13.0 | -85.0 | 512.4 | 499.6 | 12.83 | 39.937 | |
| 2,900.0 | 2,855.7 | 2,889.7 | 2,888.7 | 10.7 | 6.4 | -175.90 | 22.0 | -80.3 | 526.9 | 513.6 | 13.32 | 39.564 | |
| 3,000.0 | 2,953.6 | 2,988.4 | 2,986.9 | 11.2 | 6.6 | -175.18 | 30.9 | -75.6 | 541.5 | 527.7 | 13.81 | 39.207 | |
| 3,100.0 | 3,051.5 | 3,087.1 | 3,085.1 | 11.6 | 6.8 | -174.49 | 39.8 | -70.9 | 556.2 | 541.9 | 14.31 | 38.865 | |
| 3,200.0 | 3,149.4 | 3,185.8 | 3,183.3 | 12.1 | 7.1 | -173.83 | 48.7 | -66.2 | 570.9 | 556.1 | 14.81 | 38.537 | |
| 3,300.0 | 3,247.3 | 3,284.5 | 3,281.4 | 12.5 | 7.3 | -173.21 | 57.6 | -61.5 | 585.7 | 570.4 | 15.32 | 38.223 | |
| 3,400.0 | 3,345.2 | 3,383.2 | 3,379.6 | 13.0 | 7.6 | -172.62 | 66.5 | -56.8 | 600.6 | 584.8 | 15.84 | 37.922 | |
| 3,500.0 | 3,443.1 | 3,481.9 | 3,477.8 | 13.4 | 7.8 | -172.06 | 75.4 | -52.1 | 615.6 | 599.2 | 16.36 | 37.634 | |
| 3,600.0 | 3,540.9 | 3,580.6 | 3,576.0 | 13.9 | 8.1 | -171.52 | 84.2 | -47.3 | 630.6 | 613.7 | 16.88 | 37.358 | |
| 3,700.0 | 3,638.8 | 3,679.3 | 3,674.2 | 14.3 | 8.3 | -171.01 | 93.1 | -42.6 | 645.6 | 628.2 | 17.40 | 37.093 | |
| 3,800.0 | 3,736.7 | 3,778.0 | 3,772.4 | 14.8 | 8.6 | -170.53 | 102.0 | -37.9 | 660.7 | 642.8 | 17.93 | 36.839 | |
| 3,900.0 | 3,834.6 | 3,876.7 | 3,870.6 | 15.2 | 8.8 | -170.06 | 110.9 | -33.2 | 675.8 | 657.4 | 18.47 | 36.596 | |
| 4,000.0 | 3,932.5 | 3,975.4 | 3,968.7 | 15.7 | 9.1 | -169.62 | 119.8 | -28.5 | 691.0 | 672.0 | 19.00 | 36.362 | |
| 4,100.0 | 4,030.4 | 4,074.1 | 4,066.9 | 16.1 | 9.3 | -169.19 | 128.7 | -23.8 | 706.3 | 686.7 | 19.54 | 36.137 | |
| 4,200.0 | 4,128.3 | 4,172.8 | 4,165.1 | 16.6 | 9.6 | -168.78 | 137.6 | -19.1 | 721.5 | 701.4 | 20.09 | 35.922 | |
| 4,300.0 | 4,226.2 | 4,271.5 | 4,263.3 | 17.0 | 9.9 | -168.39 | 146.5 | -14.4 | 736.8 | 716.2 | 20.63 | 35.714 | |
| 4,400.0 | 4,324.1 | 4,370.2 | 4,361.5 | 17.5 | 10.1 | -168.02 | 155.4 | -9.6 | 752.1 | 731.0 | 21.18 | 35.515 | |
| 4,500.0 | 4,422.0 | 4,468.9 | 4,459.7 | 17.9 | 10.4 | -167.66 | 164.3 | -4.9 | 767.5 | 745.8 | 21.73 | 35.323 | |
| 4,600.0 | 4,519.9 | 4,567.6 | 4,557.9 | 18.4 | 10.7 | -167.31 | 173.2 | -0.2 | 782.9 | 760.6 | 22.28 | 35.139 | |
| 4,700.0 | 4,617.8 | 4,666.3 | 4,656.0 | 18.8 | 10.9 | -166.98 | 182.1 | 4.5 | 798.3 | 775.4 | 22.83 | 34.961 | |
| 4,800.0 | 4,715.7 | 4,759.8 | 4,749.1 | 19.3 | 11.2 | -166.69 | 190.3 | 8.8 | 813.9 | 790.5 | 23.36 | 34.840 | |
| 4,900.0 | 4,813.6 | 4,847.4 | 4,836.4 | 19.7 | 11.4 | -166.58 | 195.9 | 11.8 | 830.6 | 806.8 | 23.83 | 34.859 | |
| 5,000.0 | 4,911.5 | 4,934.5 | 4,923.5 | 20.2 | 11.5 | -166.64 | 199.1 | 13.5 | 848.7 | 824.4 | 24.26 | 34.980 | |
| 5,100.0 | 5,009.4 | 5,022.5 | 5,011.4 | 20.6 | 11.7 | -166.86 | 200.0 | 14.0 | 868.0 | 843.4 | 24.68 | 35.175 | |
| 5,200.0 | 5,107.3 | 5,120.4 | 5,109.3 | 21.1 | 11.9 | -167.16 | 200.0 | 14.0 | 887.9 | 862.8 | 25.12 | 35.349 | |
| 5,300.0 | 5,205.2 | 5,218.3 | 5,207.2 | 21.5 | 12.1 | -167.44 | 200.0 | 14.0 | 907.9 | 882.3 | 25.58 | 35.495 | |
| 5,400.0 | 5,303.1 | 5,316.2 | 5,305.1 | 22.0 | 12.3 | -167.72 | 200.0 | 14.0 | 927.8 | 901.8 | 26.04 | 35.634 | |
| 5,500.0 | 5,401.2 | 5,414.3 | 5,403.2 | 22.4 | 12.5 | -168.03 | 200.0 | 14.0 | 946.5 | 920.0 | 26.52 | 35.687 | |
| 5,600.0 | 5,500.0 | 5,513.1 | 5,502.0 | 22.6 | 12.7 | -168.29 | 200.0 | 14.0 | 961.8 | 934.9 | 26.96 | 35.677 | |
| 5,700.0 | 5,599.2 | 5,612.3 | 5,601.2 | 22.9 | 12.9 | -168.48 | 200.0 | 14.0 | 973.8 | 946.5 | 27.37 | 35.585 | |
| 5,800.0 | 5,698.9 | 5,711.9 | 5,700.9 | 23.1 | 13.1 | -168.62 | 200.0 | 14.0 | 982.4 | 954.7 | 27.74 | 35.416 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,900.0 | 5,798.7 | 5,811.8 | 5,800.7 | 23.2 | 13.3 | -168.70 | 200.0 | 14.0 | 987.6 | 959.5 | 28.08 | 35.174 | |
| 6,000.0 | 5,898.7 | 5,911.8 | 5,900.7 | 23.4 | 13.5 | -168.73 | 199.9 | 14.0 | 989.4 | 961.0 | 28.38 | 34.863 | |
| 6,100.0 | 5,998.7 | 6,010.9 | 5,999.4 | 23.5 | 13.7 | -90.50 | 191.4 | 14.0 | 989.4 | 960.7 | 28.64 | 34.544 | |
| 6,200.0 | 6,098.6 | 6,106.8 | 6,093.1 | 23.6 | 13.7 | 88.42 | 171.2 | 14.0 | 989.7 | 960.9 | 28.81 | 34.355 | |
| 6,300.0 | 6,197.6 | 6,200.0 | 6,181.0 | 23.7 | 13.8 | 87.29 | 140.4 | 14.0 | 990.5 | 961.6 | 28.91 | 34.264 | |
| 6,400.0 | 6,294.0 | 6,291.5 | 6,263.0 | 23.7 | 13.9 | 86.21 | 100.0 | 14.0 | 991.6 | 962.6 | 28.99 | 34.203 | |
| 6,500.0 | 6,386.1 | 6,381.1 | 6,338.1 | 23.7 | 13.9 | 85.20 | 51.2 | 14.0 | 992.9 | 963.8 | 29.11 | 34.105 | |
| 6,600.0 | 6,472.3 | 6,469.1 | 6,405.8 | 23.8 | 14.0 | 84.27 | -5.0 | 14.0 | 994.4 | 965.1 | 29.33 | 33.907 | |
| 6,700.0 | 6,551.2 | 6,555.8 | 6,465.8 | 23.8 | 14.1 | 83.44 | -67.5 | 14.0 | 996.0 | 966.3 | 29.68 | 33.557 | |
| 6,800.0 | 6,621.4 | 6,641.4 | 6,517.6 | 23.9 | 14.5 | 82.70 | -135.6 | 14.0 | 997.6 | 967.3 | 30.22 | 33.007 | |
| 6,900.0 | 6,681.7 | 6,726.1 | 6,561.1 | 24.0 | 15.0 | 82.07 | -208.1 | 14.0 | 999.0 | 968.0 | 30.98 | 32.245 | |
| 7,000.0 | 6,731.1 | 6,810.0 | 6,596.1 | 24.3 | 15.5 | 81.56 | -284.4 | 14.0 | 1,000.2 | 968.3 | 31.97 | 31.287 | |
| 7,100.0 | 6,768.7 | 6,893.3 | 6,622.3 | 24.6 | 16.2 | 81.18 | -363.5 | 14.0 | 1,001.2 | 968.0 | 33.20 | 30.157 | |
| 7,200.0 | 6,793.9 | 6,976.3 | 6,639.7 | 25.0 | 17.0 | 80.92 | -444.5 | 14.0 | 1,001.9 | 967.3 | 34.67 | 28.902 | |
| 7,300.0 | 6,807.1 | 7,058.9 | 6,648.1 | 25.6 | 18.0 | 80.76 | -526.7 | 14.0 | 1,002.4 | 966.0 | 36.41 | 27.533 | |
| 7,400.0 | 6,816.0 | 7,150.3 | 6,648.9 | 26.4 | 19.1 | 80.32 | -618.1 | 14.0 | 1,003.7 | 965.2 | 38.46 | 26.096 | |
| 7,500.0 | 6,817.4 | 7,250.3 | 6,648.7 | 27.3 | 20.4 | 80.21 | -718.0 | 14.0 | 1,004.0 | 963.1 | 40.84 | 24.583 | |
| 7,600.0 | 6,817.2 | 7,350.3 | 6,648.5 | 28.3 | 21.8 | 80.21 | -818.0 | 14.0 | 1,004.0 | 960.5 | 43.52 | 23.072 | |
| 7,700.0 | 6,817.0 | 7,450.3 | 6,648.2 | 29.3 | 23.2 | 80.21 | -918.0 | 14.0 | 1,004.0 | 957.6 | 46.35 | 21.663 | |
| 7,800.0 | 6,816.9 | 7,550.3 | 6,648.0 | 30.5 | 24.8 | 80.20 | -1,018.0 | 14.0 | 1,004.0 | 954.7 | 49.31 | 20.362 | |
| 7,900.0 | 6,816.7 | 7,650.3 | 6,647.8 | 31.8 | 26.4 | 80.20 | -1,118.0 | 14.0 | 1,004.0 | 951.6 | 52.37 | 19.170 | |
| 8,000.0 | 6,816.5 | 7,750.3 | 6,647.6 | 33.1 | 28.0 | 80.20 | -1,218.0 | 14.0 | 1,004.0 | 948.5 | 55.53 | 18.080 | |
| 8,100.0 | 6,816.3 | 7,850.3 | 6,647.3 | 34.5 | 29.7 | 80.20 | -1,318.0 | 14.0 | 1,004.0 | 945.2 | 58.76 | 17.085 | |
| 8,200.0 | 6,816.1 | 7,950.3 | 6,647.1 | 36.0 | 31.4 | 80.20 | -1,418.0 | 14.0 | 1,004.0 | 942.0 | 62.06 | 16.178 | |
| 8,300.0 | 6,815.9 | 8,050.3 | 6,646.9 | 37.5 | 33.1 | 80.19 | -1,518.0 | 14.0 | 1,004.0 | 938.6 | 65.41 | 15.350 | |
| 8,400.0 | 6,815.7 | 8,150.3 | 6,646.7 | 39.0 | 34.8 | 80.19 | -1,618.0 | 14.0 | 1,004.0 | 935.2 | 68.81 | 14.592 | |
| 8,500.0 | 6,815.5 | 8,250.3 | 6,646.4 | 40.6 | 36.6 | 80.19 | -1,718.0 | 14.0 | 1,004.0 | 931.8 | 72.24 | 13.898 | |
| 8,600.0 | 6,815.3 | 8,350.3 | 6,646.2 | 42.2 | 38.3 | 80.19 | -1,818.0 | 14.0 | 1,004.0 | 928.3 | 75.71 | 13.261 | |
| 8,700.0 | 6,815.1 | 8,450.3 | 6,646.0 | 43.8 | 40.1 | 80.19 | -1,918.0 | 14.0 | 1,004.0 | 924.8 | 79.21 | 12.676 | |
| 8,800.0 | 6,814.9 | 8,550.3 | 6,645.7 | 45.5 | 41.9 | 80.18 | -2,018.0 | 14.0 | 1,004.1 | 921.3 | 82.74 | 12.136 | |
| 8,900.0 | 6,814.7 | 8,650.3 | 6,645.5 | 47.1 | 43.7 | 80.18 | -2,118.0 | 14.0 | 1,004.1 | 917.8 | 86.28 | 11.637 | |
| 9,000.0 | 6,814.5 | 8,750.3 | 6,645.3 | 48.8 | 45.5 | 80.18 | -2,218.0 | 14.0 | 1,004.1 | 914.2 | 89.85 | 11.175 | |
| 9,100.0 | 6,814.4 | 8,850.3 | 6,645.1 | 50.5 | 47.4 | 80.18 | -2,318.0 | 14.0 | 1,004.1 | 910.6 | 93.44 | 10.746 | |
| 9,200.0 | 6,814.2 | 8,950.3 | 6,644.8 | 52.2 | 49.2 | 80.18 | -2,418.0 | 14.0 | 1,004.1 | 907.0 | 97.04 | 10.347 | |
| 9,300.0 | 6,814.0 | 9,050.3 | 6,644.6 | 54.0 | 51.0 | 80.17 | -2,518.0 | 14.0 | 1,004.1 | 903.4 | 100.65 | 9.976 | |
| 9,400.0 | 6,813.8 | 9,150.3 | 6,644.4 | 55.7 | 52.9 | 80.17 | -2,618.0 | 14.0 | 1,004.1 | 899.8 | 104.28 | 9.629 | |
| 9,500.0 | 6,813.6 | 9,250.3 | 6,644.2 | 57.5 | 54.7 | 80.17 | -2,718.0 | 14.0 | 1,004.1 | 896.2 | 107.92 | 9.304 | |
| 9,600.0 | 6,813.4 | 9,350.3 | 6,643.9 | 59.3 | 56.6 | 80.17 | -2,818.0 | 14.0 | 1,004.1 | 892.5 | 111.57 | 9.000 | |
| 9,700.0 | 6,813.2 | 9,450.3 | 6,643.7 | 61.0 | 58.5 | 80.17 | -2,918.0 | 14.0 | 1,004.1 | 888.9 | 115.23 | 8.714 | |
| 9,800.0 | 6,813.0 | 9,550.3 | 6,643.5 | 62.8 | 60.3 | 80.16 | -3,018.0 | 14.0 | 1,004.1 | 885.2 | 118.90 | 8.445 | |
| 9,900.0 | 6,812.8 | 9,650.3 | 6,643.3 | 64.6 | 62.2 | 80.16 | -3,118.0 | 14.0 | 1,004.1 | 881.5 | 122.57 | 8.192 | |
| 10,000.0 | 6,812.6 | 9,750.3 | 6,643.0 | 66.4 | 64.1 | 80.16 | -3,218.0 | 14.0 | 1,004.1 | 877.9 | 126.25 | 7.953 | |
| 10,100.0 | 6,812.4 | 9,850.3 | 6,642.8 | 68.2 | 65.9 | 80.16 | -3,318.0 | 14.0 | 1,004.1 | 874.2 | 129.94 | 7.728 | |
| 10,200.0 | 6,812.2 | 9,950.3 | 6,642.6 | 70.0 | 67.8 | 80.16 | -3,418.0 | 14.0 | 1,004.1 | 870.5 | 133.63 | 7.514 | |
| 10,300.0 | 6,812.1 | 10,050.3 | 6,642.3 | 71.9 | 69.7 | 80.15 | -3,518.0 | 14.0 | 1,004.1 | 866.8 | 137.33 | 7.312 | |
| 10,400.0 | 6,811.9 | 10,150.3 | 6,642.1 | 73.7 | 71.6 | 80.15 | -3,618.0 | 14.0 | 1,004.1 | 863.1 | 141.04 | 7.120 | |
| 10,500.0 | 6,811.7 | 10,250.3 | 6,641.9 | 75.5 | 73.4 | 80.15 | -3,718.0 | 14.0 | 1,004.2 | 859.4 | 144.75 | 6.937 | |
| 10,600.0 | 6,811.5 | 10,350.3 | 6,641.7 | 77.3 | 75.3 | 80.15 | -3,818.0 | 14.0 | 1,004.2 | 855.7 | 148.46 | 6.764 | |
| 10,700.0 | 6,811.3 | 10,450.3 | 6,641.4 | 79.2 | 77.2 | 80.15 | -3,918.0 | 14.0 | 1,004.2 | 852.0 | 152.17 | 6.599 | |
| 10,800.0 | 6,811.1 | 10,550.3 | 6,641.2 | 81.0 | 79.1 | 80.14 | -4,018.0 | 14.0 | 1,004.2 | 848.3 | 155.90 | 6.441 | |
| 10,900.0 | 6,810.9 | 10,650.3 | 6,641.0 | 82.9 | 81.0 | 80.14 | -4,118.0 | 14.0 | 1,004.2 | 844.6 | 159.62 | 6.291 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-203 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11,000.0 | 6,810.7 | 10,750.3 | 6,640.8 | 84.7 | 82.9 | 80.14 | -4,218.0 | 14.0 | 1,004.2 | 840.8 | 163.35 | 6.148 | |
| 11,100.0 | 6,810.5 | 10,850.3 | 6,640.5 | 86.6 | 84.8 | 80.14 | -4,318.0 | 14.0 | 1,004.2 | 837.1 | 167.08 | 6.010 | |
| 11,200.0 | 6,810.3 | 10,950.3 | 6,640.3 | 88.4 | 86.7 | 80.14 | -4,418.0 | 14.0 | 1,004.2 | 833.4 | 170.81 | 5.879 | |
| 11,300.0 | 6,810.1 | 11,050.3 | 6,640.1 | 90.3 | 88.6 | 80.13 | -4,518.0 | 14.0 | 1,004.2 | 829.7 | 174.54 | 5.753 | |
| 11,400.0 | 6,809.9 | 11,150.3 | 6,639.8 | 92.1 | 90.5 | 80.13 | -4,618.0 | 14.0 | 1,004.2 | 825.9 | 178.28 | 5.633 | |
| 11,500.0 | 6,809.7 | 11,250.3 | 6,639.6 | 94.0 | 92.4 | 80.13 | -4,718.0 | 14.0 | 1,004.2 | 822.2 | 182.02 | 5.517 | |
| 11,600.0 | 6,809.6 | 11,350.3 | 6,639.4 | 95.9 | 94.3 | 80.13 | -4,818.0 | 14.0 | 1,004.2 | 818.5 | 185.76 | 5.406 | |
| 11,700.0 | 6,809.4 | 11,450.3 | 6,639.2 | 97.7 | 96.2 | 80.13 | -4,918.0 | 14.0 | 1,004.2 | 814.7 | 189.50 | 5.299 | |
| 11,800.0 | 6,809.2 | 11,550.3 | 6,638.9 | 99.6 | 98.1 | 80.12 | -5,018.0 | 14.0 | 1,004.2 | 811.0 | 193.25 | 5.197 | |
| 11,900.0 | 6,809.0 | 11,650.3 | 6,638.7 | 101.5 | 100.0 | 80.12 | -5,118.0 | 14.0 | 1,004.2 | 807.2 | 197.00 | 5.098 | |
| 12,000.0 | 6,808.8 | 11,750.3 | 6,638.5 | 103.3 | 101.9 | 80.12 | -5,218.0 | 14.0 | 1,004.2 | 803.5 | 200.75 | 5.003 | |
| 12,100.0 | 6,808.6 | 11,850.3 | 6,638.3 | 105.2 | 103.8 | 80.12 | -5,318.0 | 14.0 | 1,004.2 | 799.8 | 204.50 | 4.911 | |
| 12,200.0 | 6,808.4 | 11,950.3 | 6,638.0 | 107.1 | 105.7 | 80.12 | -5,418.0 | 14.0 | 1,004.3 | 796.0 | 208.25 | 4.822 | |
| 12,300.0 | 6,808.2 | 12,050.3 | 6,637.8 | 109.0 | 107.6 | 80.11 | -5,518.0 | 14.0 | 1,004.3 | 792.3 | 212.00 | 4.737 | |
| 12,400.0 | 6,808.0 | 12,150.3 | 6,637.6 | 110.8 | 109.5 | 80.11 | -5,618.0 | 14.0 | 1,004.3 | 788.5 | 215.76 | 4.655 | |
| 12,500.0 | 6,807.8 | 12,250.3 | 6,637.4 | 112.7 | 111.4 | 80.11 | -5,718.0 | 14.0 | 1,004.3 | 784.8 | 219.51 | 4.575 | |
| 12,600.0 | 6,807.6 | 12,350.3 | 6,637.1 | 114.6 | 113.3 | 80.11 | -5,818.0 | 14.0 | 1,004.3 | 781.0 | 223.27 | 4.498 | |
| 12,700.0 | 6,807.4 | 12,450.3 | 6,636.9 | 116.5 | 115.2 | 80.11 | -5,918.0 | 14.0 | 1,004.3 | 777.3 | 227.03 | 4.424 | |
| 12,800.0 | 6,807.3 | 12,550.3 | 6,636.7 | 118.4 | 117.1 | 80.10 | -6,018.0 | 14.0 | 1,004.3 | 773.5 | 230.79 | 4.352 | |
| 12,900.0 | 6,807.1 | 12,650.3 | 6,636.4 | 120.3 | 119.0 | 80.10 | -6,118.0 | 14.0 | 1,004.3 | 769.8 | 234.55 | 4.282 | |
| 13,000.0 | 6,806.9 | 12,750.3 | 6,636.2 | 122.1 | 120.9 | 80.10 | -6,218.0 | 14.0 | 1,004.3 | 766.0 | 238.31 | 4.214 | |
| 13,100.0 | 6,806.7 | 12,850.3 | 6,636.0 | 124.0 | 122.8 | 80.10 | -6,318.0 | 14.0 | 1,004.3 | 762.2 | 242.07 | 4.149 | |
| 13,200.0 | 6,806.5 | 12,950.3 | 6,635.8 | 125.9 | 124.7 | 80.10 | -6,418.0 | 14.0 | 1,004.3 | 758.5 | 245.83 | 4.085 | |
| 13,300.0 | 6,806.3 | 13,050.3 | 6,635.5 | 127.8 | 126.6 | 80.10 | -6,518.0 | 14.0 | 1,004.3 | 754.7 | 249.59 | 4.024 | |
| 13,400.0 | 6,806.1 | 13,150.3 | 6,635.3 | 129.7 | 128.5 | 80.09 | -6,618.0 | 14.0 | 1,004.3 | 751.0 | 253.36 | 3.964 | |
| 13,500.0 | 6,805.9 | 13,250.3 | 6,635.1 | 131.6 | 130.4 | 80.09 | -6,718.0 | 14.0 | 1,004.3 | 747.2 | 257.12 | 3.906 | |
| 13,600.0 | 6,805.7 | 13,350.3 | 6,634.9 | 133.5 | 132.4 | 80.09 | -6,818.0 | 14.0 | 1,004.3 | 743.4 | 260.89 | 3.850 | |
| 13,700.0 | 6,805.5 | 13,450.3 | 6,634.6 | 135.4 | 134.3 | 80.09 | -6,918.0 | 14.0 | 1,004.3 | 739.7 | 264.66 | 3.795 | |
| 13,800.0 | 6,805.3 | 13,550.3 | 6,634.4 | 137.3 | 136.2 | 80.09 | -7,018.0 | 14.0 | 1,004.4 | 735.9 | 268.42 | 3.742 | |
| 13,900.0 | 6,805.1 | 13,650.3 | 6,634.2 | 139.2 | 138.1 | 80.08 | -7,118.0 | 14.0 | 1,004.4 | 732.2 | 272.19 | 3.690 | |
| 13,973.0 | 6,805.0 | 13,723.3 | 6,634.0 | 140.6 | 139.5 | 80.08 | -7,191.0 | 14.0 | 1,004.4 | 729.4 | 274.94 | 3.653 | SF |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-423 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | -89.99 | 0.0 | -61.3 | 61.3 | 61.3 | 0.00 | N/A | |
| 100.0 | 100.0 | 101.0 | 101.0 | 0.1 | 0.1 | -89.99 | 0.0 | -61.3 | 61.3 | 61.1 | 0.23 | 270.009 | |
| 200.0 | 200.0 | 201.0 | 201.0 | 0.3 | 0.3 | -89.99 | 0.0 | -61.3 | 61.3 | 60.6 | 0.68 | 90.601 | |
| 300.0 | 300.0 | 301.0 | 301.0 | 0.6 | 0.6 | -89.99 | 0.0 | -61.3 | 61.3 | 60.2 | 1.13 | 54.433 | |
| 400.0 | 400.0 | 401.0 | 401.0 | 0.8 | 0.8 | -89.99 | 0.0 | -61.3 | 61.3 | 59.7 | 1.58 | 38.903 | CC, ES |
| 500.0 | 500.0 | 501.0 | 501.0 | 1.0 | 1.0 | -169.02 | 0.0 | -61.3 | 63.0 | 61.0 | 2.02 | 31.224 | |
| 600.0 | 599.8 | 600.8 | 600.8 | 1.2 | 1.2 | -169.84 | 0.0 | -61.3 | 68.2 | 65.7 | 2.46 | 27.733 | |
| 700.0 | 699.5 | 700.5 | 700.5 | 1.5 | 1.5 | -170.96 | 0.0 | -61.3 | 76.7 | 73.8 | 2.90 | 26.454 | |
| 800.0 | 798.7 | 799.7 | 799.7 | 1.7 | 1.7 | -172.16 | 0.0 | -61.3 | 88.8 | 85.5 | 3.35 | 26.532 | |
| 900.0 | 897.5 | 898.5 | 898.5 | 2.0 | 1.9 | -173.30 | 0.0 | -61.3 | 104.3 | 100.5 | 3.79 | 27.496 | |
| 1,000.0 | 995.6 | 996.6 | 996.6 | 2.4 | 2.1 | -174.30 | 0.0 | -61.3 | 123.3 | 119.0 | 4.24 | 29.054 | |
| 1,100.0 | 1,093.5 | 1,094.5 | 1,094.5 | 2.8 | 2.3 | -175.11 | 0.0 | -61.3 | 143.6 | 138.9 | 4.70 | 30.554 | |
| 1,200.0 | 1,191.4 | 1,192.4 | 1,192.4 | 3.2 | 2.6 | -175.72 | 0.0 | -61.3 | 163.9 | 158.8 | 5.16 | 31.761 | |
| 1,300.0 | 1,289.3 | 1,290.3 | 1,290.3 | 3.6 | 2.8 | -176.19 | 0.0 | -61.3 | 184.3 | 178.7 | 5.63 | 32.750 | |
| 1,400.0 | 1,387.2 | 1,388.2 | 1,388.2 | 4.1 | 3.0 | -176.57 | 0.0 | -61.3 | 204.6 | 198.6 | 6.10 | 33.574 | |
| 1,500.0 | 1,485.1 | 1,486.1 | 1,486.1 | 4.5 | 3.2 | -176.88 | 0.0 | -61.3 | 225.0 | 218.4 | 6.57 | 34.270 | |
| 1,600.0 | 1,583.0 | 1,591.4 | 1,591.4 | 4.9 | 3.5 | -177.05 | 0.7 | -60.0 | 244.1 | 237.1 | 7.04 | 34.657 | |
| 1,700.0 | 1,680.9 | 1,699.2 | 1,699.1 | 5.4 | 3.7 | -176.93 | 3.1 | -55.1 | 259.7 | 252.2 | 7.52 | 34.549 | |
| 1,800.0 | 1,778.8 | 1,808.1 | 1,807.5 | 5.8 | 3.9 | -176.55 | 7.3 | -46.5 | 271.8 | 263.8 | 8.00 | 33.972 | |
| 1,900.0 | 1,876.7 | 1,909.0 | 1,907.7 | 6.2 | 4.2 | -176.07 | 12.4 | -36.3 | 281.6 | 273.2 | 8.48 | 33.221 | |
| 2,000.0 | 1,974.6 | 2,008.5 | 2,006.6 | 6.7 | 4.4 | -175.62 | 17.3 | -26.3 | 291.5 | 282.5 | 8.96 | 32.535 | |
| 2,100.0 | 2,072.5 | 2,107.9 | 2,105.4 | 7.1 | 4.7 | -175.21 | 22.3 | -16.2 | 301.3 | 291.8 | 9.44 | 31.906 | |
| 2,200.0 | 2,170.4 | 2,207.4 | 2,204.3 | 7.6 | 4.9 | -174.82 | 27.3 | -6.2 | 311.1 | 301.2 | 9.93 | 31.330 | |
| 2,300.0 | 2,268.3 | 2,306.9 | 2,303.2 | 8.0 | 5.2 | -174.45 | 32.3 | 3.9 | 321.0 | 310.5 | 10.42 | 30.799 | |
| 2,400.0 | 2,366.2 | 2,406.4 | 2,402.0 | 8.5 | 5.4 | -174.11 | 37.2 | 13.9 | 330.8 | 319.9 | 10.92 | 30.309 | |
| 2,500.0 | 2,464.1 | 2,505.9 | 2,500.9 | 8.9 | 5.7 | -173.78 | 42.2 | 24.0 | 340.7 | 329.3 | 11.41 | 29.855 | |
| 2,600.0 | 2,562.0 | 2,605.4 | 2,599.7 | 9.4 | 6.0 | -173.48 | 47.2 | 34.0 | 350.6 | 338.7 | 11.91 | 29.434 | |
| 2,700.0 | 2,659.9 | 2,704.9 | 2,698.6 | 9.8 | 6.3 | -173.19 | 52.2 | 44.1 | 360.5 | 348.1 | 12.41 | 29.042 | |
| 2,800.0 | 2,757.8 | 2,804.4 | 2,797.5 | 10.3 | 6.5 | -172.92 | 57.1 | 54.1 | 370.4 | 357.5 | 12.92 | 28.677 | |
| 2,900.0 | 2,855.7 | 2,903.9 | 2,896.3 | 10.7 | 6.8 | -172.66 | 62.1 | 64.2 | 380.3 | 366.9 | 13.42 | 28.336 | |
| 3,000.0 | 2,953.6 | 3,003.4 | 2,995.2 | 11.2 | 7.1 | -172.41 | 67.1 | 74.2 | 390.2 | 376.3 | 13.93 | 28.016 | |
| 3,100.0 | 3,051.5 | 3,102.9 | 3,094.0 | 11.6 | 7.4 | -172.18 | 72.0 | 84.3 | 400.1 | 385.7 | 14.44 | 27.717 | |
| 3,200.0 | 3,149.4 | 3,202.4 | 3,192.9 | 12.1 | 7.7 | -171.96 | 77.0 | 94.3 | 410.1 | 395.1 | 14.95 | 27.435 | |
| 3,300.0 | 3,247.3 | 3,301.9 | 3,291.8 | 12.5 | 8.0 | -171.75 | 82.0 | 104.4 | 420.0 | 404.6 | 15.46 | 27.170 | |
| 3,400.0 | 3,345.2 | 3,401.4 | 3,390.6 | 13.0 | 8.3 | -171.54 | 87.0 | 114.4 | 430.0 | 414.0 | 15.97 | 26.920 | |
| 3,500.0 | 3,443.1 | 3,500.9 | 3,489.5 | 13.4 | 8.6 | -171.35 | 91.9 | 124.4 | 439.9 | 423.4 | 16.49 | 26.684 | |
| 3,600.0 | 3,540.9 | 3,600.3 | 3,588.3 | 13.9 | 8.8 | -171.17 | 96.9 | 134.5 | 449.9 | 432.9 | 17.00 | 26.461 | |
| 3,700.0 | 3,638.8 | 3,699.8 | 3,687.2 | 14.3 | 9.1 | -170.99 | 101.9 | 144.5 | 459.8 | 442.3 | 17.52 | 26.250 | |
| 3,800.0 | 3,736.7 | 3,799.3 | 3,786.1 | 14.8 | 9.4 | -170.82 | 106.9 | 154.6 | 469.8 | 451.7 | 18.03 | 26.050 | |
| 3,900.0 | 3,834.6 | 3,898.8 | 3,884.9 | 15.2 | 9.7 | -170.66 | 111.8 | 164.6 | 479.7 | 461.2 | 18.55 | 25.859 | |
| 4,000.0 | 3,932.5 | 3,998.3 | 3,983.8 | 15.7 | 10.0 | -170.50 | 116.8 | 174.7 | 489.7 | 470.6 | 19.07 | 25.679 | |
| 4,100.0 | 4,030.4 | 4,097.8 | 4,082.6 | 16.1 | 10.3 | -170.35 | 121.8 | 184.7 | 499.7 | 480.1 | 19.59 | 25.506 | |
| 4,200.0 | 4,128.3 | 4,197.3 | 4,181.5 | 16.6 | 10.6 | -170.21 | 126.7 | 194.8 | 509.7 | 489.6 | 20.11 | 25.342 | |
| 4,300.0 | 4,226.2 | 4,296.8 | 4,280.4 | 17.0 | 10.9 | -170.07 | 131.7 | 204.8 | 519.6 | 499.0 | 20.63 | 25.186 | |
| 4,400.0 | 4,324.1 | 4,396.3 | 4,379.2 | 17.5 | 11.2 | -169.94 | 136.7 | 214.9 | 529.6 | 508.5 | 21.15 | 25.036 | |
| 4,500.0 | 4,422.0 | 4,495.8 | 4,478.1 | 17.9 | 11.5 | -169.81 | 141.7 | 224.9 | 539.6 | 517.9 | 21.68 | 24.893 | |
| 4,600.0 | 4,519.9 | 4,595.3 | 4,576.9 | 18.4 | 11.8 | -169.69 | 146.6 | 235.0 | 549.6 | 527.4 | 22.20 | 24.756 | |
| 4,700.0 | 4,617.8 | 4,694.8 | 4,675.8 | 18.8 | 12.1 | -169.57 | 151.6 | 245.0 | 559.6 | 536.9 | 22.72 | 24.625 | |
| 4,800.0 | 4,715.7 | 4,794.3 | 4,774.7 | 19.3 | 12.4 | -169.46 | 156.6 | 255.1 | 569.6 | 546.3 | 23.25 | 24.500 | |
| 4,900.0 | 4,813.6 | 4,893.8 | 4,873.5 | 19.7 | 12.7 | -169.35 | 161.6 | 265.1 | 579.6 | 555.8 | 23.77 | 24.379 | |
| 5,000.0 | 4,911.5 | 4,993.3 | 4,972.4 | 20.2 | 13.0 | -169.24 | 166.5 | 275.2 | 589.6 | 565.3 | 24.30 | 24.264 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-423 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,009.4 | 5,092.7 | 5,071.2 | 20.6 | 13.3 | -169.14 | 171.5 | 285.2 | 599.6 | 574.7 | 24.82 | 24.152 | |
| 5,200.0 | 5,107.3 | 5,192.2 | 5,170.1 | 21.1 | 13.6 | -169.04 | 176.5 | 295.3 | 609.6 | 584.2 | 25.35 | 24.045 | |
| 5,300.0 | 5,205.2 | 5,291.7 | 5,269.0 | 21.5 | 13.9 | -168.94 | 181.4 | 305.3 | 619.6 | 593.7 | 25.88 | 23.943 | |
| 5,400.0 | 5,303.1 | 5,391.2 | 5,367.8 | 22.0 | 14.2 | -168.85 | 186.4 | 315.3 | 629.6 | 603.2 | 26.40 | 23.843 | |
| 5,500.0 | 5,401.2 | 5,490.8 | 5,466.8 | 22.4 | 14.5 | -168.76 | 191.4 | 325.4 | 638.3 | 611.3 | 26.95 | 23.687 | |
| 5,600.0 | 5,500.0 | 5,575.7 | 5,551.2 | 22.6 | 14.7 | -168.68 | 195.2 | 333.1 | 644.6 | 617.3 | 27.38 | 23.548 | |
| 5,700.0 | 5,599.2 | 5,658.7 | 5,634.0 | 22.9 | 14.9 | -168.64 | 197.9 | 338.5 | 650.2 | 622.4 | 27.74 | 23.442 | |
| 5,800.0 | 5,698.9 | 5,741.7 | 5,716.9 | 23.1 | 15.0 | -168.64 | 199.5 | 341.7 | 654.9 | 626.8 | 28.04 | 23.356 | |
| 5,900.0 | 5,798.7 | 5,824.8 | 5,800.0 | 23.2 | 15.2 | -168.69 | 200.0 | 342.8 | 658.7 | 630.4 | 28.29 | 23.283 | |
| 6,000.0 | 5,898.7 | 5,924.5 | 5,899.7 | 23.4 | 15.4 | -168.73 | 200.0 | 342.8 | 660.5 | 631.9 | 28.56 | 23.127 | |
| 6,100.0 | 5,998.7 | 6,024.5 | 5,999.7 | 23.5 | 15.5 | -90.00 | 200.0 | 342.8 | 660.5 | 631.6 | 28.93 | 22.831 | |
| 6,135.5 | 6,034.2 | 6,060.0 | 6,035.2 | 23.5 | 15.6 | 90.04 | 200.0 | 342.8 | 660.5 | 631.4 | 29.06 | 22.727 | |
| 6,200.0 | 6,098.6 | 6,124.5 | 6,099.6 | 23.6 | 15.7 | 89.99 | 198.0 | 342.8 | 660.5 | 631.2 | 29.27 | 22.564 | |
| 6,300.0 | 6,197.6 | 6,224.5 | 6,198.6 | 23.7 | 15.8 | 89.98 | 184.1 | 342.8 | 660.5 | 631.0 | 29.50 | 22.389 | |
| 6,400.0 | 6,294.0 | 6,324.4 | 6,294.9 | 23.7 | 15.9 | 89.97 | 157.5 | 342.8 | 660.5 | 630.8 | 29.65 | 22.275 | |
| 6,500.0 | 6,386.1 | 6,424.4 | 6,386.9 | 23.7 | 15.9 | 89.96 | 118.6 | 342.8 | 660.5 | 630.7 | 29.77 | 22.186 | |
| 6,600.0 | 6,472.3 | 6,524.3 | 6,473.0 | 23.8 | 16.0 | 89.95 | 68.0 | 342.8 | 660.5 | 630.6 | 29.92 | 22.072 | |
| 6,700.0 | 6,551.2 | 6,624.2 | 6,551.7 | 23.8 | 16.1 | 89.94 | 6.6 | 342.8 | 660.5 | 630.3 | 30.19 | 21.879 | |
| 6,800.0 | 6,621.4 | 6,724.2 | 6,621.8 | 23.9 | 16.2 | 89.94 | -64.5 | 342.8 | 660.5 | 629.9 | 30.65 | 21.552 | |
| 6,900.0 | 6,681.7 | 6,824.0 | 6,682.0 | 24.0 | 16.4 | 89.93 | -144.1 | 342.8 | 660.5 | 629.1 | 31.37 | 21.055 | |
| 7,000.0 | 6,731.1 | 6,923.9 | 6,731.3 | 24.3 | 16.7 | 89.92 | -230.9 | 342.8 | 660.5 | 628.1 | 32.42 | 20.376 | |
| 7,100.0 | 6,768.7 | 7,023.8 | 6,768.8 | 24.6 | 17.3 | 89.92 | -323.4 | 342.8 | 660.5 | 626.7 | 33.80 | 19.539 | |
| 7,200.0 | 6,793.9 | 7,123.7 | 6,794.0 | 25.0 | 18.1 | 89.92 | -420.0 | 342.8 | 660.5 | 625.0 | 35.53 | 18.589 | |
| 7,300.0 | 6,807.1 | 7,223.6 | 6,807.2 | 25.6 | 19.1 | 89.91 | -519.0 | 342.8 | 660.5 | 622.9 | 37.56 | 17.584 | |
| 7,400.0 | 6,816.0 | 7,323.6 | 6,816.0 | 26.4 | 20.3 | 89.91 | -618.5 | 342.8 | 660.5 | 620.6 | 39.86 | 16.572 | |
| 7,500.0 | 6,817.4 | 7,423.5 | 6,817.4 | 27.3 | 21.5 | 89.91 | -718.4 | 342.8 | 660.5 | 618.1 | 42.36 | 15.593 | |
| 7,600.0 | 6,817.2 | 7,523.5 | 6,817.2 | 28.3 | 22.8 | 89.91 | -818.4 | 342.8 | 660.5 | 615.5 | 45.05 | 14.663 | |
| 7,700.0 | 6,817.0 | 7,623.5 | 6,817.1 | 29.3 | 24.2 | 89.91 | -918.4 | 342.8 | 660.5 | 612.6 | 47.89 | 13.792 | |
| 7,800.0 | 6,816.9 | 7,723.5 | 6,816.9 | 30.5 | 25.7 | 89.91 | -1,018.4 | 342.8 | 660.5 | 609.6 | 50.87 | 12.985 | |
| 7,900.0 | 6,816.7 | 7,823.5 | 6,816.7 | 31.8 | 27.3 | 89.91 | -1,118.4 | 342.8 | 660.5 | 606.5 | 53.95 | 12.242 | |
| 8,000.0 | 6,816.5 | 7,923.5 | 6,816.5 | 33.1 | 28.8 | 89.91 | -1,218.4 | 342.8 | 660.5 | 603.4 | 57.13 | 11.561 | |
| 8,100.0 | 6,816.3 | 8,023.5 | 6,816.3 | 34.5 | 30.5 | 89.91 | -1,318.4 | 342.8 | 660.5 | 600.1 | 60.38 | 10.938 | |
| 8,200.0 | 6,816.1 | 8,123.5 | 6,816.1 | 36.0 | 32.1 | 89.91 | -1,418.4 | 342.8 | 660.5 | 596.8 | 63.71 | 10.368 | |
| 8,300.0 | 6,815.9 | 8,223.5 | 6,815.9 | 37.5 | 33.8 | 89.91 | -1,518.4 | 342.8 | 660.5 | 593.4 | 67.08 | 9.846 | |
| 8,400.0 | 6,815.7 | 8,323.5 | 6,815.7 | 39.0 | 35.5 | 89.91 | -1,618.4 | 342.8 | 660.5 | 590.0 | 70.50 | 9.368 | |
| 8,500.0 | 6,815.5 | 8,423.5 | 6,815.5 | 40.6 | 37.2 | 89.91 | -1,718.4 | 342.8 | 660.5 | 586.5 | 73.97 | 8.929 | |
| 8,600.0 | 6,815.3 | 8,523.5 | 6,815.3 | 42.2 | 39.0 | 89.91 | -1,818.4 | 342.8 | 660.5 | 583.0 | 77.47 | 8.526 | |
| 8,700.0 | 6,815.1 | 8,623.5 | 6,815.1 | 43.8 | 40.7 | 89.91 | -1,918.4 | 342.8 | 660.5 | 579.5 | 81.00 | 8.154 | |
| 8,800.0 | 6,814.9 | 8,723.5 | 6,814.9 | 45.5 | 42.5 | 89.91 | -2,018.4 | 342.8 | 660.5 | 575.9 | 84.56 | 7.811 | |
| 8,900.0 | 6,814.7 | 8,823.5 | 6,814.7 | 47.1 | 44.3 | 89.91 | -2,118.4 | 342.8 | 660.5 | 572.4 | 88.14 | 7.494 | |
| 9,000.0 | 6,814.5 | 8,923.5 | 6,814.6 | 48.8 | 46.1 | 89.91 | -2,218.4 | 342.8 | 660.5 | 568.8 | 91.75 | 7.199 | |
| 9,100.0 | 6,814.4 | 9,023.5 | 6,814.4 | 50.5 | 47.9 | 89.91 | -2,318.4 | 342.8 | 660.5 | 565.1 | 95.37 | 6.926 | |
| 9,200.0 | 6,814.2 | 9,123.5 | 6,814.2 | 52.2 | 49.7 | 89.91 | -2,418.4 | 342.8 | 660.5 | 561.5 | 99.01 | 6.671 | |
| 9,300.0 | 6,814.0 | 9,223.5 | 6,814.0 | 54.0 | 51.5 | 89.91 | -2,518.4 | 342.8 | 660.5 | 557.8 | 102.66 | 6.434 | |
| 9,400.0 | 6,813.8 | 9,323.5 | 6,813.8 | 55.7 | 53.3 | 89.91 | -2,618.4 | 342.8 | 660.5 | 554.2 | 106.33 | 6.212 | |
| 9,500.0 | 6,813.6 | 9,423.5 | 6,813.6 | 57.5 | 55.2 | 89.91 | -2,718.4 | 342.8 | 660.5 | 550.5 | 110.00 | 6.004 | |
| 9,600.0 | 6,813.4 | 9,523.5 | 6,813.4 | 59.3 | 57.0 | 89.91 | -2,818.4 | 342.8 | 660.5 | 546.8 | 113.69 | 5.809 | |
| 9,700.0 | 6,813.2 | 9,623.5 | 6,813.2 | 61.0 | 58.9 | 89.91 | -2,918.4 | 342.8 | 660.5 | 543.1 | 117.39 | 5.626 | |
| 9,800.0 | 6,813.0 | 9,723.5 | 6,813.0 | 62.8 | 60.7 | 89.91 | -3,018.4 | 342.8 | 660.5 | 539.4 | 121.10 | 5.454 | |
| 9,900.0 | 6,812.8 | 9,823.5 | 6,812.8 | 64.6 | 62.6 | 89.91 | -3,118.4 | 342.8 | 660.5 | 535.7 | 124.82 | 5.292 | |
| 10,000.0 | 6,812.6 | 9,923.5 | 6,812.6 | 66.4 | 64.4 | 89.91 | -3,218.4 | 342.8 | 660.5 | 532.0 | 128.54 | 5.138 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28J-423 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,100.0 | 6,812.4 | 10,023.5 | 6,812.4 | 68.2 | 66.3 | 89.91 | -3,318.4 | 342.8 | 660.5 | 528.2 | 132.27 | 4.994 | |
| 10,200.0 | 6,812.2 | 10,123.5 | 6,812.3 | 70.0 | 68.1 | 89.91 | -3,418.4 | 342.8 | 660.5 | 524.5 | 136.01 | 4.856 | |
| 10,300.0 | 6,812.1 | 10,223.5 | 6,812.1 | 71.9 | 70.0 | 89.91 | -3,518.4 | 342.8 | 660.5 | 520.7 | 139.75 | 4.726 | |
| 10,400.0 | 6,811.9 | 10,323.5 | 6,811.9 | 73.7 | 71.9 | 89.91 | -3,618.4 | 342.8 | 660.5 | 517.0 | 143.50 | 4.603 | |
| 10,500.0 | 6,811.7 | 10,423.5 | 6,811.7 | 75.5 | 73.8 | 89.91 | -3,718.4 | 342.8 | 660.5 | 513.2 | 147.25 | 4.486 | |
| 10,600.0 | 6,811.5 | 10,523.5 | 6,811.5 | 77.3 | 75.6 | 89.91 | -3,818.4 | 342.8 | 660.5 | 509.5 | 151.01 | 4.374 | |
| 10,700.0 | 6,811.3 | 10,623.5 | 6,811.3 | 79.2 | 77.5 | 89.91 | -3,918.4 | 342.8 | 660.5 | 505.7 | 154.77 | 4.268 | |
| 10,800.0 | 6,811.1 | 10,723.5 | 6,811.1 | 81.0 | 79.4 | 89.91 | -4,018.4 | 342.8 | 660.5 | 502.0 | 158.53 | 4.166 | |
| 10,900.0 | 6,810.9 | 10,823.5 | 6,810.9 | 82.9 | 81.3 | 89.91 | -4,118.4 | 342.8 | 660.5 | 498.2 | 162.30 | 4.070 | |
| 11,000.0 | 6,810.7 | 10,923.5 | 6,810.7 | 84.7 | 83.2 | 89.91 | -4,218.4 | 342.8 | 660.5 | 494.4 | 166.07 | 3.977 | |
| 11,100.0 | 6,810.5 | 11,023.5 | 6,810.5 | 86.6 | 85.0 | 89.91 | -4,318.4 | 342.8 | 660.5 | 490.7 | 169.85 | 3.889 | |
| 11,200.0 | 6,810.3 | 11,123.5 | 6,810.3 | 88.4 | 86.9 | 89.91 | -4,418.4 | 342.8 | 660.5 | 486.9 | 173.63 | 3.804 | |
| 11,300.0 | 6,810.1 | 11,223.5 | 6,810.1 | 90.3 | 88.8 | 89.91 | -4,518.4 | 342.8 | 660.5 | 483.1 | 177.41 | 3.723 | |
| 11,400.0 | 6,809.9 | 11,323.5 | 6,809.9 | 92.1 | 90.7 | 89.91 | -4,618.4 | 342.8 | 660.5 | 479.3 | 181.19 | 3.645 | |
| 11,500.0 | 6,809.7 | 11,423.5 | 6,809.8 | 94.0 | 92.6 | 89.91 | -4,718.4 | 342.8 | 660.5 | 475.5 | 184.97 | 3.571 | |
| 11,600.0 | 6,809.6 | 11,523.5 | 6,809.6 | 95.9 | 94.5 | 89.91 | -4,818.4 | 342.8 | 660.5 | 471.7 | 188.76 | 3.499 | |
| 11,700.0 | 6,809.4 | 11,623.5 | 6,809.4 | 97.7 | 96.4 | 89.91 | -4,918.4 | 342.8 | 660.5 | 467.9 | 192.55 | 3.430 | |
| 11,800.0 | 6,809.2 | 11,723.5 | 6,809.2 | 99.6 | 98.3 | 89.91 | -5,018.4 | 342.8 | 660.5 | 464.2 | 196.35 | 3.364 | |
| 11,900.0 | 6,809.0 | 11,823.5 | 6,809.0 | 101.5 | 100.2 | 89.91 | -5,118.4 | 342.8 | 660.5 | 460.4 | 200.14 | 3.300 | |
| 12,000.0 | 6,808.8 | 11,923.5 | 6,808.8 | 103.3 | 102.1 | 89.91 | -5,218.4 | 342.8 | 660.5 | 456.6 | 203.93 | 3.239 | |
| 12,100.0 | 6,808.6 | 12,023.5 | 6,808.6 | 105.2 | 104.0 | 89.91 | -5,318.4 | 342.8 | 660.5 | 452.8 | 207.73 | 3.180 | |
| 12,200.0 | 6,808.4 | 12,123.5 | 6,808.4 | 107.1 | 105.9 | 89.91 | -5,418.4 | 342.8 | 660.5 | 449.0 | 211.53 | 3.122 | |
| 12,300.0 | 6,808.2 | 12,223.5 | 6,808.2 | 109.0 | 107.8 | 89.91 | -5,518.4 | 342.8 | 660.5 | 445.2 | 215.33 | 3.067 | |
| 12,400.0 | 6,808.0 | 12,323.5 | 6,808.0 | 110.8 | 109.7 | 89.91 | -5,618.4 | 342.8 | 660.5 | 441.4 | 219.13 | 3.014 | |
| 12,500.0 | 6,807.8 | 12,423.5 | 6,807.8 | 112.7 | 111.6 | 89.91 | -5,718.4 | 342.8 | 660.5 | 437.6 | 222.94 | 2.963 | |
| 12,600.0 | 6,807.6 | 12,523.5 | 6,807.6 | 114.6 | 113.5 | 89.91 | -5,818.4 | 342.8 | 660.5 | 433.8 | 226.74 | 2.913 | |
| 12,700.0 | 6,807.4 | 12,623.5 | 6,807.5 | 116.5 | 115.4 | 89.91 | -5,918.4 | 342.8 | 660.5 | 429.9 | 230.55 | 2.865 | |
| 12,800.0 | 6,807.3 | 12,723.5 | 6,807.3 | 118.4 | 117.3 | 89.91 | -6,018.4 | 342.8 | 660.5 | 426.1 | 234.36 | 2.818 | |
| 12,900.0 | 6,807.1 | 12,823.5 | 6,807.1 | 120.3 | 119.2 | 89.91 | -6,118.4 | 342.8 | 660.5 | 422.3 | 238.16 | 2.773 | |
| 13,000.0 | 6,806.9 | 12,923.5 | 6,806.9 | 122.1 | 121.1 | 89.91 | -6,218.4 | 342.8 | 660.5 | 418.5 | 241.97 | 2.730 | |
| 13,100.0 | 6,806.7 | 13,023.5 | 6,806.7 | 124.0 | 123.0 | 89.91 | -6,318.4 | 342.8 | 660.5 | 414.7 | 245.78 | 2.687 | |
| 13,200.0 | 6,806.5 | 13,123.5 | 6,806.5 | 125.9 | 124.9 | 89.91 | -6,418.4 | 342.8 | 660.5 | 410.9 | 249.60 | 2.646 | |
| 13,300.0 | 6,806.3 | 13,223.5 | 6,806.3 | 127.8 | 126.8 | 89.91 | -6,518.4 | 342.8 | 660.5 | 407.1 | 253.41 | 2.606 | |
| 13,400.0 | 6,806.1 | 13,323.5 | 6,806.1 | 129.7 | 128.7 | 89.91 | -6,618.4 | 342.8 | 660.5 | 403.3 | 257.22 | 2.568 | |
| 13,500.0 | 6,805.9 | 13,423.5 | 6,805.9 | 131.6 | 130.6 | 89.91 | -6,718.4 | 342.8 | 660.5 | 399.5 | 261.03 | 2.530 | |
| 13,600.0 | 6,805.7 | 13,523.5 | 6,805.7 | 133.5 | 132.5 | 89.91 | -6,818.4 | 342.8 | 660.5 | 395.6 | 264.85 | 2.494 | |
| 13,700.0 | 6,805.5 | 13,623.5 | 6,805.5 | 135.4 | 134.4 | 89.91 | -6,918.4 | 342.8 | 660.5 | 391.8 | 268.66 | 2.458 | |
| 13,800.0 | 6,805.3 | 13,723.5 | 6,805.3 | 137.3 | 136.3 | 89.91 | -7,018.4 | 342.8 | 660.5 | 388.0 | 272.48 | 2.424 | |
| 13,900.0 | 6,805.1 | 13,823.5 | 6,805.1 | 139.2 | 138.2 | 89.91 | -7,118.4 | 342.8 | 660.5 | 384.2 | 276.30 | 2.391 | |
| 13,973.0 | 6,805.0 | 13,896.5 | 6,805.0 | 140.6 | 139.6 | 89.91 | -7,191.4 | 342.8 | 660.5 | 381.4 | 279.09 | 2.367 | SF |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28M-343 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | -89.97 | 0.0 | -30.6 | 30.6 | 30.6 | 0.00 | N/A | |
| 100.0 | 100.0 | 101.0 | 101.0 | 0.1 | 0.1 | -89.97 | 0.0 | -30.6 | 30.6 | 30.4 | 0.23 | 135.005 | |
| 200.0 | 200.0 | 201.0 | 201.0 | 0.3 | 0.3 | -89.97 | 0.0 | -30.6 | 30.6 | 30.0 | 0.68 | 45.301 | |
| 300.0 | 300.0 | 301.0 | 301.0 | 0.6 | 0.6 | -89.97 | 0.0 | -30.6 | 30.6 | 29.5 | 1.13 | 27.216 | |
| 400.0 | 400.0 | 401.0 | 401.0 | 0.8 | 0.8 | -89.97 | 0.0 | -30.6 | 30.6 | 29.1 | 1.58 | 19.451 | CC, ES |
| 500.0 | 500.0 | 501.0 | 501.0 | 1.0 | 1.0 | -169.30 | 0.0 | -30.6 | 32.4 | 30.3 | 2.02 | 16.037 | |
| 600.0 | 599.8 | 600.8 | 600.8 | 1.2 | 1.2 | -170.76 | 0.0 | -30.6 | 37.5 | 35.1 | 2.46 | 15.266 | |
| 700.0 | 699.5 | 700.5 | 700.5 | 1.5 | 1.5 | -172.48 | 0.0 | -30.6 | 46.1 | 43.2 | 2.90 | 15.903 | |
| 800.0 | 798.7 | 799.7 | 799.7 | 1.7 | 1.7 | -174.02 | 0.0 | -30.6 | 58.2 | 54.9 | 3.35 | 17.402 | |
| 900.0 | 897.5 | 898.5 | 898.5 | 2.0 | 1.9 | -175.26 | 0.0 | -30.6 | 73.8 | 70.0 | 3.79 | 19.457 | |
| 1,000.0 | 995.6 | 996.6 | 996.6 | 2.4 | 2.1 | -176.21 | 0.0 | -30.6 | 92.8 | 88.6 | 4.24 | 21.881 | |
| 1,100.0 | 1,093.5 | 1,098.3 | 1,098.3 | 2.8 | 2.3 | -176.80 | 0.5 | -29.0 | 111.6 | 106.9 | 4.69 | 23.786 | |
| 1,200.0 | 1,191.4 | 1,201.4 | 1,201.3 | 3.2 | 2.6 | -177.00 | 2.0 | -23.8 | 126.9 | 121.7 | 5.14 | 24.691 | |
| 1,300.0 | 1,289.3 | 1,305.5 | 1,304.9 | 3.6 | 2.8 | -176.96 | 4.5 | -15.0 | 138.6 | 133.0 | 5.60 | 24.751 | |
| 1,400.0 | 1,387.2 | 1,410.4 | 1,409.0 | 4.1 | 3.1 | -176.72 | 8.1 | -2.4 | 146.7 | 140.6 | 6.07 | 24.156 | |
| 1,500.0 | 1,485.1 | 1,515.7 | 1,512.9 | 4.5 | 3.4 | -176.31 | 12.7 | 13.9 | 151.2 | 144.7 | 6.56 | 23.052 | |
| 1,600.0 | 1,583.0 | 1,615.9 | 1,611.4 | 4.9 | 3.7 | -175.82 | 17.6 | 31.3 | 153.8 | 146.7 | 7.05 | 21.819 | |
| 1,700.0 | 1,680.9 | 1,715.8 | 1,709.8 | 5.4 | 4.0 | -175.36 | 22.6 | 48.6 | 156.3 | 148.8 | 7.54 | 20.729 | |
| 1,800.0 | 1,778.8 | 1,815.8 | 1,808.1 | 5.8 | 4.3 | -174.91 | 27.5 | 66.0 | 158.9 | 150.8 | 8.04 | 19.758 | |
| 1,900.0 | 1,876.7 | 1,915.8 | 1,906.4 | 6.2 | 4.7 | -174.47 | 32.5 | 83.3 | 161.4 | 152.9 | 8.54 | 18.898 | |
| 2,000.0 | 1,974.6 | 2,015.7 | 2,004.7 | 6.7 | 5.0 | -174.05 | 37.4 | 100.7 | 164.0 | 155.0 | 9.05 | 18.120 | |
| 2,100.0 | 2,072.5 | 2,115.7 | 2,103.0 | 7.1 | 5.4 | -173.64 | 42.4 | 118.0 | 166.6 | 157.1 | 9.57 | 17.418 | |
| 2,200.0 | 2,170.4 | 2,215.6 | 2,201.3 | 7.6 | 5.8 | -173.24 | 47.3 | 135.4 | 169.2 | 159.1 | 10.08 | 16.783 | |
| 2,300.0 | 2,268.3 | 2,315.6 | 2,299.7 | 8.0 | 6.2 | -172.85 | 52.2 | 152.8 | 171.8 | 161.2 | 10.60 | 16.205 | |
| 2,400.0 | 2,366.2 | 2,415.5 | 2,398.0 | 8.5 | 6.6 | -172.48 | 57.2 | 170.1 | 174.4 | 163.3 | 11.13 | 15.677 | |
| 2,500.0 | 2,464.1 | 2,515.5 | 2,496.3 | 8.9 | 6.9 | -172.12 | 62.1 | 187.5 | 177.1 | 165.4 | 11.65 | 15.193 | |
| 2,600.0 | 2,562.0 | 2,615.5 | 2,594.6 | 9.4 | 7.3 | -171.76 | 67.1 | 204.8 | 179.7 | 167.5 | 12.18 | 14.748 | |
| 2,700.0 | 2,659.9 | 2,715.4 | 2,692.9 | 9.8 | 7.7 | -171.42 | 72.0 | 222.2 | 182.3 | 169.6 | 12.72 | 14.337 | |
| 2,800.0 | 2,757.8 | 2,815.4 | 2,791.3 | 10.3 | 8.1 | -171.09 | 77.0 | 239.5 | 185.0 | 171.7 | 13.25 | 13.958 | |
| 2,900.0 | 2,855.7 | 2,915.3 | 2,889.6 | 10.7 | 8.5 | -170.77 | 81.9 | 256.9 | 187.6 | 173.8 | 13.79 | 13.605 | |
| 3,000.0 | 2,953.6 | 3,015.3 | 2,987.9 | 11.2 | 8.9 | -170.45 | 86.8 | 274.2 | 190.3 | 176.0 | 14.33 | 13.277 | |
| 3,100.0 | 3,051.5 | 3,115.3 | 3,086.2 | 11.6 | 9.3 | -170.15 | 91.8 | 291.6 | 192.9 | 178.1 | 14.87 | 12.972 | |
| 3,200.0 | 3,149.4 | 3,215.2 | 3,184.5 | 12.1 | 9.7 | -169.85 | 96.7 | 309.0 | 195.6 | 180.2 | 15.42 | 12.686 | |
| 3,300.0 | 3,247.3 | 3,315.2 | 3,282.8 | 12.5 | 10.1 | -169.56 | 101.7 | 326.3 | 198.3 | 182.3 | 15.97 | 12.419 | |
| 3,400.0 | 3,345.2 | 3,415.1 | 3,381.2 | 13.0 | 10.5 | -169.28 | 106.6 | 343.7 | 201.0 | 184.4 | 16.52 | 12.168 | |
| 3,500.0 | 3,443.1 | 3,515.1 | 3,479.5 | 13.4 | 10.9 | -169.01 | 111.6 | 361.0 | 203.6 | 186.6 | 17.07 | 11.932 | |
| 3,600.0 | 3,540.9 | 3,615.1 | 3,577.8 | 13.9 | 11.3 | -168.74 | 116.5 | 378.4 | 206.3 | 188.7 | 17.62 | 11.709 | |
| 3,700.0 | 3,638.8 | 3,715.0 | 3,676.1 | 14.3 | 11.7 | -168.48 | 121.4 | 395.7 | 209.0 | 190.8 | 18.17 | 11.500 | |
| 3,800.0 | 3,736.7 | 3,815.0 | 3,774.4 | 14.8 | 12.1 | -168.23 | 126.4 | 413.1 | 211.7 | 193.0 | 18.73 | 11.302 | |
| 3,900.0 | 3,834.6 | 3,914.9 | 3,872.7 | 15.2 | 12.5 | -167.98 | 131.3 | 430.4 | 214.4 | 195.1 | 19.29 | 11.114 | |
| 4,000.0 | 3,932.5 | 4,014.9 | 3,971.1 | 15.7 | 12.9 | -167.74 | 136.3 | 447.8 | 217.1 | 197.2 | 19.85 | 10.937 | |
| 4,100.0 | 4,030.4 | 4,114.9 | 4,069.4 | 16.1 | 13.3 | -167.50 | 141.2 | 465.2 | 219.8 | 199.4 | 20.41 | 10.768 | |
| 4,200.0 | 4,128.3 | 4,214.8 | 4,167.7 | 16.6 | 13.7 | -167.27 | 146.1 | 482.5 | 222.5 | 201.5 | 20.98 | 10.608 | |
| 4,300.0 | 4,226.2 | 4,314.8 | 4,266.0 | 17.0 | 14.1 | -167.05 | 151.1 | 499.9 | 225.2 | 203.7 | 21.54 | 10.455 | |
| 4,400.0 | 4,324.1 | 4,414.7 | 4,364.3 | 17.5 | 14.5 | -166.83 | 156.0 | 517.2 | 227.9 | 205.8 | 22.11 | 10.310 | |
| 4,500.0 | 4,422.0 | 4,514.7 | 4,462.6 | 17.9 | 14.9 | -166.62 | 161.0 | 534.6 | 230.7 | 208.0 | 22.68 | 10.172 | |
| 4,600.0 | 4,519.9 | 4,614.7 | 4,561.0 | 18.4 | 15.3 | -166.41 | 165.9 | 551.9 | 233.4 | 210.1 | 23.25 | 10.040 | |
| 4,700.0 | 4,617.8 | 4,714.6 | 4,659.3 | 18.8 | 15.7 | -166.21 | 170.9 | 569.3 | 236.1 | 212.3 | 23.82 | 9.913 | |
| 4,800.0 | 4,715.7 | 4,814.6 | 4,757.6 | 19.3 | 16.2 | -166.01 | 175.8 | 586.6 | 238.8 | 214.4 | 24.39 | 9.793 | |
| 4,900.0 | 4,813.6 | 4,914.5 | 4,855.9 | 19.7 | 16.6 | -165.81 | 180.7 | 604.0 | 241.6 | 216.6 | 24.96 | 9.677 | |
| 5,000.0 | 4,911.5 | 5,014.5 | 4,954.2 | 20.2 | 17.0 | -165.62 | 185.7 | 621.4 | 244.3 | 218.8 | 25.54 | 9.566 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28M-343 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,009.4 | 5,109.1 | 5,047.4 | 20.6 | 17.3 | -165.50 | 190.2 | 637.1 | 247.8 | 221.7 | 26.07 | 9.505 | |
| 5,200.0 | 5,107.3 | 5,200.0 | 5,137.4 | 21.1 | 17.6 | -165.60 | 193.7 | 649.5 | 254.2 | 227.7 | 26.53 | 9.581 | |
| 5,300.0 | 5,205.2 | 5,293.0 | 5,229.8 | 21.5 | 17.8 | -165.91 | 196.5 | 659.4 | 263.7 | 236.7 | 26.96 | 9.779 | |
| 5,400.0 | 5,303.1 | 5,384.0 | 5,320.5 | 22.0 | 18.0 | -166.38 | 198.5 | 666.3 | 276.1 | 248.8 | 27.35 | 10.096 | |
| 5,500.0 | 5,401.2 | 5,474.4 | 5,410.9 | 22.4 | 18.1 | -166.98 | 199.6 | 670.3 | 290.3 | 262.6 | 27.70 | 10.480 | |
| 5,600.0 | 5,500.0 | 5,564.6 | 5,501.0 | 22.6 | 18.2 | -167.57 | 200.0 | 671.7 | 304.2 | 276.2 | 27.99 | 10.867 | |
| 5,700.0 | 5,599.2 | 5,663.8 | 5,600.2 | 22.9 | 18.4 | -168.10 | 200.0 | 671.7 | 316.1 | 287.9 | 28.28 | 11.180 | |
| 5,800.0 | 5,698.9 | 5,763.5 | 5,699.9 | 23.1 | 18.5 | -168.45 | 200.0 | 671.7 | 324.7 | 296.2 | 28.55 | 11.373 | |
| 5,900.0 | 5,798.7 | 5,863.3 | 5,799.7 | 23.2 | 18.7 | -168.66 | 200.0 | 671.7 | 329.9 | 301.1 | 28.80 | 11.453 | |
| 6,000.0 | 5,898.7 | 5,963.3 | 5,899.7 | 23.4 | 18.8 | -168.72 | 200.0 | 671.7 | 331.6 | 302.6 | 29.04 | 11.420 | |
| 6,100.0 | 5,998.7 | 6,063.3 | 5,999.7 | 23.5 | 18.9 | -90.13 | 199.2 | 671.7 | 331.6 | 302.3 | 29.37 | 11.290 | |
| 6,200.0 | 6,098.6 | 6,162.2 | 6,098.0 | 23.6 | 19.0 | 88.33 | 188.4 | 671.7 | 331.8 | 302.3 | 29.50 | 11.249 | |
| 6,300.0 | 6,197.6 | 6,259.8 | 6,192.7 | 23.7 | 19.1 | 86.59 | 165.4 | 671.7 | 332.2 | 302.7 | 29.54 | 11.248 | |
| 6,400.0 | 6,294.0 | 6,356.2 | 6,282.7 | 23.7 | 19.2 | 84.94 | 131.0 | 671.7 | 333.0 | 303.4 | 29.58 | 11.256 | |
| 6,500.0 | 6,386.1 | 6,451.6 | 6,366.7 | 23.7 | 19.2 | 83.37 | 86.1 | 671.7 | 333.9 | 304.2 | 29.67 | 11.252 | |
| 6,600.0 | 6,472.3 | 6,545.9 | 6,443.7 | 23.8 | 19.2 | 81.93 | 31.7 | 671.7 | 335.0 | 305.1 | 29.87 | 11.216 | |
| 6,700.0 | 6,551.2 | 6,639.3 | 6,512.9 | 23.8 | 19.3 | 80.64 | -31.1 | 671.7 | 336.1 | 306.0 | 30.18 | 11.138 | |
| 6,800.0 | 6,621.4 | 6,732.0 | 6,573.3 | 23.9 | 19.4 | 79.50 | -101.3 | 671.7 | 337.3 | 306.7 | 30.66 | 11.000 | |
| 6,900.0 | 6,681.7 | 6,824.1 | 6,624.5 | 24.0 | 19.6 | 78.53 | -177.7 | 671.7 | 338.4 | 307.1 | 31.32 | 10.807 | |
| 7,000.0 | 6,731.1 | 6,915.6 | 6,666.0 | 24.3 | 19.9 | 77.75 | -259.3 | 671.7 | 339.4 | 307.2 | 32.15 | 10.556 | |
| 7,100.0 | 6,768.7 | 7,006.7 | 6,697.2 | 24.6 | 20.3 | 77.15 | -344.8 | 671.7 | 340.2 | 307.0 | 33.18 | 10.252 | |
| 7,200.0 | 6,793.9 | 7,097.6 | 6,718.1 | 25.0 | 20.9 | 76.76 | -433.1 | 671.7 | 340.7 | 306.3 | 34.41 | 9.901 | |
| 7,300.0 | 6,807.1 | 7,188.2 | 6,728.2 | 25.6 | 21.6 | 76.45 | -523.1 | 671.7 | 341.2 | 305.2 | 35.98 | 9.482 | |
| 7,400.0 | 6,816.0 | 7,283.0 | 6,729.0 | 26.4 | 22.5 | 75.17 | -617.9 | 671.7 | 343.1 | 305.4 | 37.67 | 9.109 | |
| 7,500.0 | 6,817.4 | 7,383.0 | 6,728.4 | 27.3 | 23.6 | 74.82 | -717.9 | 671.7 | 343.6 | 303.9 | 39.75 | 8.644 | |
| 7,600.0 | 6,817.2 | 7,483.0 | 6,727.8 | 28.3 | 24.8 | 74.75 | -817.9 | 671.7 | 343.7 | 301.4 | 42.32 | 8.123 | |
| 7,700.0 | 6,817.0 | 7,583.0 | 6,727.3 | 29.3 | 26.1 | 74.69 | -917.9 | 671.7 | 343.8 | 298.8 | 45.04 | 7.634 | |
| 7,800.0 | 6,816.9 | 7,683.0 | 6,726.7 | 30.5 | 27.4 | 74.62 | -1,017.9 | 671.7 | 344.0 | 296.1 | 47.90 | 7.181 | |
| 7,900.0 | 6,816.7 | 7,783.0 | 6,726.1 | 31.8 | 28.8 | 74.56 | -1,117.9 | 671.7 | 344.1 | 293.2 | 50.86 | 6.765 | |
| 8,000.0 | 6,816.5 | 7,883.0 | 6,725.5 | 33.1 | 30.3 | 74.50 | -1,217.9 | 671.7 | 344.2 | 290.3 | 53.91 | 6.384 | |
| 8,100.0 | 6,816.3 | 7,983.0 | 6,724.9 | 34.5 | 31.9 | 74.43 | -1,317.9 | 671.7 | 344.3 | 287.2 | 57.04 | 6.035 | |
| 8,200.0 | 6,816.1 | 8,083.0 | 6,724.3 | 36.0 | 33.4 | 74.37 | -1,417.9 | 671.7 | 344.4 | 284.1 | 60.24 | 5.717 | |
| 8,300.0 | 6,815.9 | 8,183.0 | 6,723.7 | 37.5 | 35.1 | 74.30 | -1,517.9 | 671.7 | 344.5 | 281.0 | 63.49 | 5.426 | |
| 8,400.0 | 6,815.7 | 8,283.0 | 6,723.1 | 39.0 | 36.7 | 74.24 | -1,617.9 | 671.7 | 344.6 | 277.8 | 66.78 | 5.160 | |
| 8,500.0 | 6,815.5 | 8,382.9 | 6,722.5 | 40.6 | 38.4 | 74.17 | -1,717.9 | 671.7 | 344.7 | 274.6 | 70.11 | 4.917 | |
| 8,600.0 | 6,815.3 | 8,482.9 | 6,721.9 | 42.2 | 40.1 | 74.11 | -1,817.9 | 671.7 | 344.8 | 271.3 | 73.47 | 4.693 | |
| 8,700.0 | 6,815.1 | 8,582.9 | 6,721.3 | 43.8 | 41.8 | 74.05 | -1,917.9 | 671.7 | 344.9 | 268.1 | 76.87 | 4.487 | |
| 8,800.0 | 6,814.9 | 8,682.9 | 6,720.7 | 45.5 | 43.5 | 73.98 | -2,017.9 | 671.7 | 345.0 | 264.8 | 80.28 | 4.298 | |
| 8,900.0 | 6,814.7 | 8,782.9 | 6,720.1 | 47.1 | 45.2 | 73.92 | -2,117.9 | 671.7 | 345.1 | 261.4 | 83.72 | 4.123 | |
| 9,000.0 | 6,814.5 | 8,882.9 | 6,719.5 | 48.8 | 47.0 | 73.85 | -2,217.9 | 671.7 | 345.3 | 258.1 | 87.18 | 3.960 | |
| 9,100.0 | 6,814.4 | 8,982.9 | 6,718.9 | 50.5 | 48.8 | 73.79 | -2,317.9 | 671.7 | 345.4 | 254.7 | 90.65 | 3.810 | |
| 9,200.0 | 6,814.2 | 9,082.9 | 6,718.3 | 52.2 | 50.5 | 73.73 | -2,417.9 | 671.7 | 345.5 | 251.3 | 94.14 | 3.670 | |
| 9,300.0 | 6,814.0 | 9,182.9 | 6,717.8 | 54.0 | 52.3 | 73.66 | -2,517.8 | 671.7 | 345.6 | 248.0 | 97.64 | 3.540 | |
| 9,400.0 | 6,813.8 | 9,282.9 | 6,717.2 | 55.7 | 54.1 | 73.60 | -2,617.8 | 671.7 | 345.7 | 244.6 | 101.15 | 3.418 | |
| 9,500.0 | 6,813.6 | 9,382.9 | 6,716.6 | 57.5 | 55.9 | 73.53 | -2,717.8 | 671.7 | 345.8 | 241.2 | 104.67 | 3.304 | |
| 9,600.0 | 6,813.4 | 9,482.9 | 6,716.0 | 59.3 | 57.8 | 73.47 | -2,817.8 | 671.7 | 345.9 | 237.7 | 108.19 | 3.197 | |
| 9,700.0 | 6,813.2 | 9,582.9 | 6,715.4 | 61.0 | 59.6 | 73.41 | -2,917.8 | 671.7 | 346.1 | 234.3 | 111.73 | 3.097 | |
| 9,800.0 | 6,813.0 | 9,682.9 | 6,714.8 | 62.8 | 61.4 | 73.34 | -3,017.8 | 671.7 | 346.2 | 230.9 | 115.27 | 3.003 | |
| 9,900.0 | 6,812.8 | 9,782.9 | 6,714.2 | 64.6 | 63.2 | 73.28 | -3,117.8 | 671.7 | 346.3 | 227.5 | 118.82 | 2.914 | |
| 10,000.0 | 6,812.6 | 9,882.9 | 6,713.6 | 66.4 | 65.1 | 73.22 | -3,217.8 | 671.7 | 346.4 | 224.0 | 122.37 | 2.831 | |
| 10,100.0 | 6,812.4 | 9,982.9 | 6,713.0 | 68.2 | 66.9 | 73.15 | -3,317.8 | 671.7 | 346.5 | 220.6 | 125.93 | 2.752 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Churchill 28J-HZ Pad Sec.28-T5N-R64W - Churchill 28M-343 - Wellbore #1 - Plan #1 (12-30-13)

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,200.0 | 6,812.2 | 10,082.9 | 6,712.4 | 70.0 | 68.8 | 73.09 | -3,417.8 | 671.7 | 346.6 | 217.1 | 129.49 | 2.677 | |
| 10,300.0 | 6,812.1 | 10,182.9 | 6,711.8 | 71.9 | 70.6 | 73.03 | -3,517.8 | 671.7 | 346.7 | 213.7 | 133.05 | 2.606 | |
| 10,400.0 | 6,811.9 | 10,282.9 | 6,711.2 | 73.7 | 72.5 | 72.96 | -3,617.8 | 671.7 | 346.9 | 210.2 | 136.62 | 2.539 | |
| 10,500.0 | 6,811.7 | 10,382.9 | 6,710.6 | 75.5 | 74.3 | 72.90 | -3,717.8 | 671.7 | 347.0 | 206.8 | 140.18 | 2.475 | |
| 10,600.0 | 6,811.5 | 10,482.9 | 6,710.0 | 77.3 | 76.2 | 72.84 | -3,817.8 | 671.7 | 347.1 | 203.3 | 143.76 | 2.415 | |
| 10,700.0 | 6,811.3 | 10,582.9 | 6,709.4 | 79.2 | 78.0 | 72.77 | -3,917.8 | 671.7 | 347.2 | 199.9 | 147.33 | 2.357 | |
| 10,800.0 | 6,811.1 | 10,682.9 | 6,708.9 | 81.0 | 79.9 | 72.71 | -4,017.8 | 671.7 | 347.3 | 196.4 | 150.90 | 2.302 | |
| 10,900.0 | 6,810.9 | 10,782.9 | 6,708.3 | 82.9 | 81.8 | 72.65 | -4,117.8 | 671.7 | 347.5 | 193.0 | 154.48 | 2.249 | |
| 11,000.0 | 6,810.7 | 10,882.9 | 6,707.7 | 84.7 | 83.6 | 72.58 | -4,217.8 | 671.7 | 347.6 | 189.5 | 158.05 | 2.199 | |
| 11,100.0 | 6,810.5 | 10,982.9 | 6,707.1 | 86.6 | 85.5 | 72.52 | -4,317.8 | 671.7 | 347.7 | 186.1 | 161.63 | 2.151 | |
| 11,200.0 | 6,810.3 | 11,082.9 | 6,706.5 | 88.4 | 87.4 | 72.46 | -4,417.8 | 671.7 | 347.8 | 182.6 | 165.21 | 2.105 | |
| 11,300.0 | 6,810.1 | 11,182.9 | 6,705.9 | 90.3 | 89.3 | 72.39 | -4,517.8 | 671.7 | 347.9 | 179.2 | 168.79 | 2.061 | |
| 11,400.0 | 6,809.9 | 11,282.9 | 6,705.3 | 92.1 | 91.2 | 72.33 | -4,617.8 | 671.7 | 348.1 | 175.7 | 172.36 | 2.019 | |
| 11,500.0 | 6,809.7 | 11,382.9 | 6,704.7 | 94.0 | 93.0 | 72.27 | -4,717.8 | 671.7 | 348.2 | 172.2 | 175.94 | 1.979 | |
| 11,600.0 | 6,809.6 | 11,482.9 | 6,704.1 | 95.9 | 94.9 | 72.20 | -4,817.8 | 671.7 | 348.3 | 168.8 | 179.52 | 1.940 | |
| 11,700.0 | 6,809.4 | 11,582.9 | 6,703.5 | 97.7 | 96.8 | 72.14 | -4,917.8 | 671.7 | 348.4 | 165.3 | 183.10 | 1.903 | |
| 11,800.0 | 6,809.2 | 11,682.9 | 6,702.9 | 99.6 | 98.7 | 72.08 | -5,017.8 | 671.7 | 348.6 | 161.9 | 186.67 | 1.867 | |
| 11,900.0 | 6,809.0 | 11,782.9 | 6,702.3 | 101.5 | 100.6 | 72.02 | -5,117.8 | 671.7 | 348.7 | 158.4 | 190.25 | 1.833 | |
| 12,000.0 | 6,808.8 | 11,882.9 | 6,701.7 | 103.3 | 102.5 | 71.95 | -5,217.8 | 671.7 | 348.8 | 155.0 | 193.83 | 1.800 | |
| 12,100.0 | 6,808.6 | 11,982.9 | 6,701.1 | 105.2 | 104.3 | 71.89 | -5,317.8 | 671.7 | 348.9 | 151.5 | 197.40 | 1.768 | |
| 12,200.0 | 6,808.4 | 12,082.9 | 6,700.5 | 107.1 | 106.2 | 71.83 | -5,417.8 | 671.7 | 349.1 | 148.1 | 200.98 | 1.737 | |
| 12,300.0 | 6,808.2 | 12,182.9 | 6,700.0 | 109.0 | 108.1 | 71.77 | -5,517.8 | 671.7 | 349.2 | 144.6 | 204.55 | 1.707 | |
| 12,400.0 | 6,808.0 | 12,282.9 | 6,699.4 | 110.8 | 110.0 | 71.70 | -5,617.8 | 671.7 | 349.3 | 141.2 | 208.12 | 1.678 | |
| 12,500.0 | 6,807.8 | 12,382.9 | 6,698.8 | 112.7 | 111.9 | 71.64 | -5,717.8 | 671.7 | 349.4 | 137.7 | 211.69 | 1.651 | |
| 12,600.0 | 6,807.6 | 12,482.9 | 6,698.2 | 114.6 | 113.8 | 71.58 | -5,817.8 | 671.7 | 349.6 | 134.3 | 215.26 | 1.624 | |
| 12,700.0 | 6,807.4 | 12,582.9 | 6,697.6 | 116.5 | 115.7 | 71.52 | -5,917.8 | 671.7 | 349.7 | 130.9 | 218.83 | 1.598 | |
| 12,800.0 | 6,807.3 | 12,682.9 | 6,697.0 | 118.4 | 117.6 | 71.45 | -6,017.8 | 671.7 | 349.8 | 127.4 | 222.40 | 1.573 | |
| 12,900.0 | 6,807.1 | 12,782.9 | 6,696.4 | 120.3 | 119.5 | 71.39 | -6,117.8 | 671.7 | 349.9 | 124.0 | 225.96 | 1.549 | |
| 13,000.0 | 6,806.9 | 12,882.9 | 6,695.8 | 122.1 | 121.4 | 71.33 | -6,217.8 | 671.7 | 350.1 | 120.5 | 229.53 | 1.525 | |
| 13,100.0 | 6,806.7 | 12,982.9 | 6,695.2 | 124.0 | 123.3 | 71.27 | -6,317.8 | 671.7 | 350.2 | 117.1 | 233.09 | 1.502 | |
| 13,200.0 | 6,806.5 | 13,082.9 | 6,694.6 | 125.9 | 125.2 | 71.20 | -6,417.7 | 671.7 | 350.3 | 113.7 | 236.65 | 1.480 | Level 3 |
| 13,300.0 | 6,806.3 | 13,182.9 | 6,694.0 | 127.8 | 127.1 | 71.14 | -6,517.7 | 671.7 | 350.5 | 110.2 | 240.21 | 1.459 | Level 3 |
| 13,400.0 | 6,806.1 | 13,282.9 | 6,693.4 | 129.7 | 129.0 | 71.08 | -6,617.7 | 671.7 | 350.6 | 106.8 | 243.77 | 1.438 | Level 3 |
| 13,500.0 | 6,805.9 | 13,382.9 | 6,692.8 | 131.6 | 130.9 | 71.02 | -6,717.7 | 671.7 | 350.7 | 103.4 | 247.33 | 1.418 | Level 3 |
| 13,600.0 | 6,805.7 | 13,482.9 | 6,692.2 | 133.5 | 132.8 | 70.96 | -6,817.7 | 671.7 | 350.8 | 100.0 | 250.89 | 1.398 | Level 3 |
| 13,700.0 | 6,805.5 | 13,582.9 | 6,691.6 | 135.4 | 134.7 | 70.89 | -6,917.7 | 671.7 | 351.0 | 96.5 | 254.44 | 1.379 | Level 3 |
| 13,800.0 | 6,805.3 | 13,682.9 | 6,691.1 | 137.3 | 136.6 | 70.83 | -7,017.7 | 671.7 | 351.1 | 93.1 | 257.99 | 1.361 | Level 3 |
| 13,900.0 | 6,805.1 | 13,782.9 | 6,690.5 | 139.2 | 138.5 | 70.77 | -7,117.7 | 671.7 | 351.2 | 89.7 | 261.54 | 1.343 | Level 3 |
| 13,973.0 | 6,805.0 | 13,855.9 | 6,690.0 | 140.6 | 139.9 | 70.73 | -7,190.7 | 671.7 | 351.3 | 87.2 | 264.13 | 1.330 | Level 3, SF |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Bailey 33-1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 40.0 | 40.0 | 0.0 | 0.8 | 175.27 | -7,045.7 | 582.5 | 7,069.8 | 7,069.0 | 0.80 | 8,835.011 | |
| 100.0 | 100.0 | 140.0 | 140.0 | 0.1 | 2.8 | 175.27 | -7,045.7 | 582.5 | 7,069.8 | 7,066.9 | 2.91 | 2,427.321 | |
| 200.0 | 200.0 | 240.0 | 240.0 | 0.3 | 4.8 | 175.27 | -7,045.7 | 582.5 | 7,069.8 | 7,064.6 | 5.14 | 1,376.152 | |
| 300.0 | 300.0 | 340.0 | 340.0 | 0.6 | 6.8 | 175.27 | -7,045.7 | 582.5 | 7,069.8 | 7,062.4 | 7.36 | 960.291 | |
| 400.0 | 400.0 | 440.0 | 440.0 | 0.8 | 8.8 | 175.27 | -7,045.7 | 582.5 | 7,069.8 | 7,060.2 | 9.59 | 737.443 | |
| 500.0 | 500.0 | 540.0 | 540.0 | 1.0 | 10.8 | 96.56 | -7,045.7 | 582.5 | 7,070.0 | 7,058.2 | 11.80 | 599.051 | |
| 600.0 | 599.8 | 639.8 | 639.8 | 1.2 | 12.8 | 96.59 | -7,045.7 | 582.5 | 7,070.6 | 7,056.5 | 14.02 | 504.455 | |
| 700.0 | 699.5 | 739.5 | 739.5 | 1.5 | 14.8 | 96.64 | -7,045.7 | 582.5 | 7,071.6 | 7,055.3 | 16.25 | 435.263 | |
| 800.0 | 798.7 | 838.7 | 838.7 | 1.7 | 16.8 | 96.71 | -7,045.7 | 582.5 | 7,073.0 | 7,054.5 | 18.50 | 382.319 | |
| 900.0 | 897.5 | 937.5 | 937.5 | 2.0 | 18.7 | 96.79 | -7,045.7 | 582.5 | 7,074.9 | 7,054.1 | 20.78 | 340.391 | |
| 1,000.0 | 995.6 | 1,035.6 | 1,035.6 | 2.4 | 20.7 | 96.90 | -7,045.7 | 582.5 | 7,077.2 | 7,054.1 | 23.11 | 306.292 | |
| 1,100.0 | 1,093.5 | 1,133.5 | 1,133.5 | 2.8 | 22.7 | 97.06 | -7,045.7 | 582.5 | 7,079.7 | 7,054.3 | 25.46 | 278.102 | |
| 1,200.0 | 1,191.4 | 1,231.4 | 1,231.4 | 3.2 | 24.6 | 97.23 | -7,045.7 | 582.5 | 7,082.3 | 7,054.5 | 27.82 | 254.548 | |
| 1,300.0 | 1,289.3 | 1,329.3 | 1,329.3 | 3.6 | 26.6 | 97.39 | -7,045.7 | 582.5 | 7,084.9 | 7,054.7 | 30.20 | 234.612 | |
| 1,400.0 | 1,387.2 | 1,427.2 | 1,427.2 | 4.1 | 28.5 | 97.55 | -7,045.7 | 582.5 | 7,087.7 | 7,055.1 | 32.58 | 217.542 | |
| 1,500.0 | 1,485.1 | 1,525.1 | 1,525.1 | 4.5 | 30.5 | 97.71 | -7,045.7 | 582.5 | 7,090.4 | 7,055.5 | 34.97 | 202.774 | |
| 1,600.0 | 1,583.0 | 1,623.0 | 1,623.0 | 4.9 | 32.5 | 97.87 | -7,045.7 | 582.5 | 7,093.2 | 7,055.9 | 37.36 | 189.877 | |
| 1,700.0 | 1,680.9 | 1,720.9 | 1,720.9 | 5.4 | 34.4 | 98.03 | -7,045.7 | 582.5 | 7,096.1 | 7,056.4 | 39.75 | 178.521 | |
| 1,800.0 | 1,778.8 | 1,818.8 | 1,818.8 | 5.8 | 36.4 | 98.18 | -7,045.7 | 582.5 | 7,099.1 | 7,056.9 | 42.14 | 168.449 | |
| 1,900.0 | 1,876.7 | 1,916.7 | 1,916.7 | 6.2 | 38.3 | 98.34 | -7,045.7 | 582.5 | 7,102.1 | 7,057.5 | 44.54 | 159.457 | |
| 2,000.0 | 1,974.6 | 2,014.6 | 2,014.6 | 6.7 | 40.3 | 98.50 | -7,045.7 | 582.5 | 7,105.1 | 7,058.2 | 46.94 | 151.380 | |
| 2,100.0 | 2,072.5 | 2,112.5 | 2,112.5 | 7.1 | 42.3 | 98.66 | -7,045.7 | 582.5 | 7,108.2 | 7,058.9 | 49.33 | 144.087 | |
| 2,200.0 | 2,170.4 | 2,210.4 | 2,210.4 | 7.6 | 44.2 | 98.82 | -7,045.7 | 582.5 | 7,111.4 | 7,059.6 | 51.73 | 137.469 | |
| 2,300.0 | 2,268.3 | 2,308.3 | 2,308.3 | 8.0 | 46.2 | 98.98 | -7,045.7 | 582.5 | 7,114.6 | 7,060.5 | 54.13 | 131.438 | |
| 2,400.0 | 2,366.2 | 2,406.2 | 2,406.2 | 8.5 | 48.1 | 99.14 | -7,045.7 | 582.5 | 7,117.9 | 7,061.4 | 56.53 | 125.919 | |
| 2,500.0 | 2,464.1 | 2,504.1 | 2,504.1 | 8.9 | 50.1 | 99.30 | -7,045.7 | 582.5 | 7,121.2 | 7,062.3 | 58.93 | 120.849 | |
| 2,600.0 | 2,562.0 | 2,602.0 | 2,602.0 | 9.4 | 52.0 | 99.46 | -7,045.7 | 582.5 | 7,124.6 | 7,063.3 | 61.33 | 116.177 | |
| 2,700.0 | 2,659.9 | 2,699.9 | 2,699.9 | 9.8 | 54.0 | 99.62 | -7,045.7 | 582.5 | 7,128.1 | 7,064.3 | 63.72 | 111.858 | |
| 2,800.0 | 2,757.8 | 2,797.8 | 2,797.8 | 10.3 | 56.0 | 99.77 | -7,045.7 | 582.5 | 7,131.6 | 7,065.4 | 66.12 | 107.853 | |
| 2,900.0 | 2,855.7 | 2,895.7 | 2,895.7 | 10.7 | 57.9 | 99.93 | -7,045.7 | 582.5 | 7,135.1 | 7,066.6 | 68.52 | 104.129 | |
| 3,000.0 | 2,953.6 | 2,993.6 | 2,993.6 | 11.2 | 59.9 | 100.09 | -7,045.7 | 582.5 | 7,138.8 | 7,067.8 | 70.92 | 100.658 | |
| 3,100.0 | 3,051.5 | 3,091.5 | 3,091.5 | 11.6 | 61.8 | 100.25 | -7,045.7 | 582.5 | 7,142.4 | 7,069.1 | 73.32 | 97.416 | |
| 3,200.0 | 3,149.4 | 3,189.4 | 3,189.4 | 12.1 | 63.8 | 100.41 | -7,045.7 | 582.5 | 7,146.2 | 7,070.4 | 75.72 | 94.379 | |
| 3,300.0 | 3,247.3 | 3,287.3 | 3,287.3 | 12.5 | 65.7 | 100.56 | -7,045.7 | 582.5 | 7,150.0 | 7,071.8 | 78.12 | 91.530 | |
| 3,400.0 | 3,345.2 | 3,385.2 | 3,385.2 | 13.0 | 67.7 | 100.72 | -7,045.7 | 582.5 | 7,153.8 | 7,073.3 | 80.51 | 88.852 | |
| 3,500.0 | 3,443.1 | 3,483.1 | 3,483.1 | 13.4 | 69.7 | 100.88 | -7,045.7 | 582.5 | 7,157.7 | 7,074.8 | 82.91 | 86.329 | |
| 3,600.0 | 3,540.9 | 3,580.9 | 3,580.9 | 13.9 | 71.6 | 101.04 | -7,045.7 | 582.5 | 7,161.7 | 7,076.3 | 85.31 | 83.950 | |
| 3,700.0 | 3,638.8 | 3,678.8 | 3,678.8 | 14.3 | 73.6 | 101.19 | -7,045.7 | 582.5 | 7,165.7 | 7,078.0 | 87.71 | 81.701 | |
| 3,800.0 | 3,736.7 | 3,776.7 | 3,776.7 | 14.8 | 75.5 | 101.35 | -7,045.7 | 582.5 | 7,169.7 | 7,079.6 | 90.10 | 79.573 | |
| 3,900.0 | 3,834.6 | 3,874.6 | 3,874.6 | 15.2 | 77.5 | 101.51 | -7,045.7 | 582.5 | 7,173.9 | 7,081.4 | 92.50 | 77.556 | |
| 4,000.0 | 3,932.5 | 3,972.5 | 3,972.5 | 15.7 | 79.5 | 101.66 | -7,045.7 | 582.5 | 7,178.0 | 7,083.2 | 94.90 | 75.642 | |
| 4,100.0 | 4,030.4 | 4,070.4 | 4,070.4 | 16.1 | 81.4 | 101.82 | -7,045.7 | 582.5 | 7,182.3 | 7,085.0 | 97.29 | 73.823 | |
| 4,200.0 | 4,128.3 | 4,168.3 | 4,168.3 | 16.6 | 83.4 | 101.97 | -7,045.7 | 582.5 | 7,186.6 | 7,086.9 | 99.69 | 72.092 | |
| 4,300.0 | 4,226.2 | 4,266.2 | 4,266.2 | 17.0 | 85.3 | 102.13 | -7,045.7 | 582.5 | 7,190.9 | 7,088.8 | 102.08 | 70.443 | |
| 4,400.0 | 4,324.1 | 4,364.1 | 4,364.1 | 17.5 | 87.3 | 102.29 | -7,045.7 | 582.5 | 7,195.3 | 7,090.8 | 104.48 | 68.871 | |
| 4,500.0 | 4,422.0 | 4,462.0 | 4,462.0 | 17.9 | 89.2 | 102.44 | -7,045.7 | 582.5 | 7,199.8 | 7,092.9 | 106.87 | 67.370 | |
| 4,600.0 | 4,519.9 | 4,559.9 | 4,559.9 | 18.4 | 91.2 | 102.60 | -7,045.7 | 582.5 | 7,204.3 | 7,095.0 | 109.26 | 65.935 | |
| 4,700.0 | 4,617.8 | 4,657.8 | 4,657.8 | 18.8 | 93.2 | 102.75 | -7,045.7 | 582.5 | 7,208.9 | 7,097.2 | 111.66 | 64.563 | |
| 4,800.0 | 4,715.7 | 4,755.7 | 4,755.7 | 19.3 | 95.1 | 102.91 | -7,045.7 | 582.5 | 7,213.5 | 7,099.4 | 114.05 | 63.249 | |
| 4,900.0 | 4,813.6 | 4,853.6 | 4,853.6 | 19.7 | 97.1 | 103.06 | -7,045.7 | 582.5 | 7,218.2 | 7,101.7 | 116.44 | 61.989 | |
| 5,000.0 | 4,911.5 | 4,951.5 | 4,951.5 | 20.2 | 99.0 | 103.22 | -7,045.7 | 582.5 | 7,222.9 | 7,104.1 | 118.83 | 60.782 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Bailey 33-1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,009.4 | 5,049.4 | 5,049.4 | 20.6 | 101.0 | 103.37 | -7,045.7 | 582.5 | 7,227.7 | 7,106.4 | 121.22 | 59.622 | |
| 5,200.0 | 5,107.3 | 5,147.3 | 5,147.3 | 21.1 | 102.9 | 103.52 | -7,045.7 | 582.5 | 7,232.5 | 7,108.9 | 123.62 | 58.508 | |
| 5,300.0 | 5,205.2 | 5,245.2 | 5,245.2 | 21.5 | 104.9 | 103.68 | -7,045.7 | 582.5 | 7,237.4 | 7,111.4 | 126.01 | 57.437 | |
| 5,400.0 | 5,303.1 | 5,343.1 | 5,343.1 | 22.0 | 106.9 | 103.83 | -7,045.7 | 582.5 | 7,242.4 | 7,114.0 | 128.40 | 56.406 | |
| 5,500.0 | 5,401.2 | 5,441.2 | 5,441.2 | 22.4 | 108.8 | 104.05 | -7,045.7 | 582.5 | 7,247.0 | 7,116.3 | 130.76 | 55.423 | |
| 5,600.0 | 5,500.0 | 5,540.0 | 5,540.0 | 22.6 | 110.8 | 104.25 | -7,045.7 | 582.5 | 7,250.9 | 7,117.9 | 133.03 | 54.505 | |
| 5,700.0 | 5,599.2 | 5,639.2 | 5,639.2 | 22.9 | 112.8 | 104.40 | -7,045.7 | 582.5 | 7,254.0 | 7,118.7 | 135.27 | 53.625 | |
| 5,800.0 | 5,698.9 | 5,738.9 | 5,738.9 | 23.1 | 114.8 | 104.51 | -7,045.7 | 582.5 | 7,256.2 | 7,118.7 | 137.48 | 52.782 | |
| 5,900.0 | 5,798.7 | 5,838.7 | 5,838.7 | 23.2 | 116.8 | 104.58 | -7,045.7 | 582.5 | 7,257.5 | 7,117.9 | 139.64 | 51.974 | |
| 6,000.0 | 5,898.7 | 5,938.7 | 5,938.7 | 23.4 | 118.8 | 104.60 | -7,045.7 | 582.5 | 7,257.9 | 7,116.2 | 141.76 | 51.200 | |
| 6,100.0 | 5,998.7 | 6,038.7 | 6,038.7 | 23.5 | 120.8 | -176.68 | -7,045.7 | 582.5 | 7,257.9 | 7,114.1 | 143.87 | 50.448 | |
| 6,200.0 | 6,098.6 | 6,138.6 | 6,138.6 | 23.6 | 122.8 | 3.33 | -7,045.7 | 582.5 | 7,256.0 | 7,110.4 | 145.58 | 49.843 | |
| 6,300.0 | 6,197.6 | 6,237.6 | 6,237.6 | 23.7 | 124.8 | 3.40 | -7,045.7 | 582.5 | 7,242.3 | 7,097.3 | 144.99 | 49.952 | |
| 6,400.0 | 6,294.0 | 6,334.0 | 6,334.0 | 23.7 | 126.7 | 3.54 | -7,045.7 | 582.5 | 7,215.9 | 7,074.1 | 141.81 | 50.885 | |
| 6,500.0 | 6,386.1 | 6,426.1 | 6,426.1 | 23.7 | 128.5 | 3.76 | -7,045.7 | 582.5 | 7,177.1 | 7,041.1 | 136.02 | 52.766 | |
| 6,600.0 | 6,472.3 | 6,512.3 | 6,512.3 | 23.8 | 130.2 | 4.09 | -7,045.7 | 582.5 | 7,126.6 | 6,999.0 | 127.68 | 55.817 | |
| 6,700.0 | 6,551.2 | 6,591.2 | 6,591.2 | 23.8 | 131.8 | 4.56 | -7,045.7 | 582.5 | 7,065.4 | 6,948.5 | 116.93 | 60.422 | |
| 6,800.0 | 6,621.4 | 6,661.4 | 6,661.4 | 23.9 | 133.2 | 5.26 | -7,045.7 | 582.5 | 6,994.4 | 6,890.4 | 104.04 | 67.226 | |
| 6,900.0 | 6,681.7 | 6,721.7 | 6,721.7 | 24.0 | 134.4 | 6.32 | -7,045.7 | 582.5 | 6,914.9 | 6,825.4 | 89.46 | 77.297 | |
| 7,000.0 | 6,731.1 | 6,771.1 | 6,771.1 | 24.3 | 135.4 | 8.05 | -7,045.7 | 582.5 | 6,828.2 | 6,754.1 | 74.11 | 92.137 | |
| 7,100.0 | 6,768.7 | 6,808.7 | 6,808.7 | 24.6 | 136.2 | 11.23 | -7,045.7 | 582.5 | 6,735.8 | 6,675.1 | 60.66 | 111.033 | |
| 7,200.0 | 6,793.9 | 6,833.9 | 6,833.9 | 25.0 | 136.7 | 18.60 | -7,045.7 | 582.5 | 6,639.3 | 6,579.4 | 59.86 | 110.917 | |
| 7,300.0 | 6,807.1 | 6,847.1 | 6,847.1 | 25.6 | 136.9 | 31.67 | -7,045.7 | 582.5 | 6,540.4 | 6,456.4 | 84.04 | 77.822 | |
| 7,400.0 | 6,816.0 | 6,856.0 | 6,856.0 | 26.4 | 137.1 | 51.81 | -7,045.7 | 582.5 | 6,441.0 | 6,317.9 | 123.17 | 52.295 | |
| 7,500.0 | 6,817.4 | 6,857.4 | 6,857.4 | 27.3 | 137.1 | 91.65 | -7,045.7 | 582.5 | 6,341.3 | 6,182.4 | 158.86 | 39.918 | |
| 7,600.0 | 6,817.2 | 6,857.2 | 6,857.2 | 28.3 | 137.1 | 91.63 | -7,045.7 | 582.5 | 6,241.5 | 6,081.3 | 160.17 | 38.968 | |
| 7,700.0 | 6,817.0 | 6,857.0 | 6,857.0 | 29.3 | 137.1 | 91.60 | -7,045.7 | 582.5 | 6,141.7 | 5,980.2 | 161.56 | 38.015 | |
| 7,800.0 | 6,816.9 | 6,856.9 | 6,856.9 | 30.5 | 137.1 | 91.58 | -7,045.7 | 582.5 | 6,042.0 | 5,879.0 | 163.02 | 37.063 | |
| 7,900.0 | 6,816.7 | 6,856.7 | 6,856.7 | 31.8 | 137.1 | 91.55 | -7,045.7 | 582.5 | 5,942.2 | 5,777.7 | 164.53 | 36.115 | |
| 8,000.0 | 6,816.5 | 6,856.5 | 6,856.5 | 33.1 | 137.1 | 91.52 | -7,045.7 | 582.5 | 5,842.5 | 5,676.4 | 166.10 | 35.175 | |
| 8,100.0 | 6,816.3 | 6,856.3 | 6,856.3 | 34.5 | 137.1 | 91.50 | -7,045.7 | 582.5 | 5,742.7 | 5,575.0 | 167.70 | 34.244 | |
| 8,200.0 | 6,816.1 | 6,856.1 | 6,856.1 | 36.0 | 137.1 | 91.47 | -7,045.7 | 582.5 | 5,643.0 | 5,473.7 | 169.34 | 33.324 | |
| 8,300.0 | 6,815.9 | 6,855.9 | 6,855.9 | 37.5 | 137.1 | 91.44 | -7,045.7 | 582.5 | 5,543.3 | 5,372.3 | 171.01 | 32.416 | |
| 8,400.0 | 6,815.7 | 6,855.7 | 6,855.7 | 39.0 | 137.1 | 91.42 | -7,045.7 | 582.5 | 5,443.6 | 5,270.9 | 172.70 | 31.521 | |
| 8,500.0 | 6,815.5 | 6,855.5 | 6,855.5 | 40.6 | 137.1 | 91.39 | -7,045.7 | 582.5 | 5,343.9 | 5,169.5 | 174.41 | 30.640 | |
| 8,600.0 | 6,815.3 | 6,855.3 | 6,855.3 | 42.2 | 137.1 | 91.37 | -7,045.7 | 582.5 | 5,244.2 | 5,068.1 | 176.14 | 29.772 | |
| 8,700.0 | 6,815.1 | 6,855.1 | 6,855.1 | 43.8 | 137.1 | 91.34 | -7,045.7 | 582.5 | 5,144.5 | 4,966.7 | 177.89 | 28.919 | |
| 8,800.0 | 6,814.9 | 6,854.9 | 6,854.9 | 45.5 | 137.1 | 91.31 | -7,045.7 | 582.5 | 5,044.9 | 4,865.2 | 179.66 | 28.080 | |
| 8,900.0 | 6,814.7 | 6,854.7 | 6,854.7 | 47.1 | 137.1 | 91.29 | -7,045.7 | 582.5 | 4,945.2 | 4,763.8 | 181.43 | 27.256 | |
| 9,000.0 | 6,814.5 | 6,854.5 | 6,854.5 | 48.8 | 137.1 | 91.26 | -7,045.7 | 582.5 | 4,845.6 | 4,662.4 | 183.22 | 26.447 | |
| 9,100.0 | 6,814.4 | 6,854.4 | 6,854.4 | 50.5 | 137.1 | 91.24 | -7,045.7 | 582.5 | 4,746.0 | 4,561.0 | 185.02 | 25.651 | |
| 9,200.0 | 6,814.2 | 6,854.2 | 6,854.2 | 52.2 | 137.1 | 91.21 | -7,045.7 | 582.5 | 4,646.4 | 4,459.6 | 186.83 | 24.870 | |
| 9,300.0 | 6,814.0 | 6,854.0 | 6,854.0 | 54.0 | 137.1 | 91.18 | -7,045.7 | 582.5 | 4,546.8 | 4,358.2 | 188.64 | 24.103 | |
| 9,400.0 | 6,813.8 | 6,853.8 | 6,853.8 | 55.7 | 137.1 | 91.16 | -7,045.7 | 582.5 | 4,447.3 | 4,256.8 | 190.46 | 23.350 | |
| 9,500.0 | 6,813.6 | 6,853.6 | 6,853.6 | 57.5 | 137.1 | 91.13 | -7,045.7 | 582.5 | 4,347.7 | 4,155.4 | 192.29 | 22.610 | |
| 9,600.0 | 6,813.4 | 6,853.4 | 6,853.4 | 59.3 | 137.1 | 91.10 | -7,045.7 | 582.5 | 4,248.2 | 4,054.1 | 194.13 | 21.884 | |
| 9,700.0 | 6,813.2 | 6,853.2 | 6,853.2 | 61.0 | 137.1 | 91.08 | -7,045.7 | 582.5 | 4,148.7 | 3,952.7 | 195.97 | 21.171 | |
| 9,800.0 | 6,813.0 | 6,853.0 | 6,853.0 | 62.8 | 137.1 | 91.05 | -7,045.7 | 582.5 | 4,049.2 | 3,851.4 | 197.81 | 20.470 | |
| 9,900.0 | 6,812.8 | 6,852.8 | 6,852.8 | 64.6 | 137.1 | 91.03 | -7,045.7 | 582.5 | 3,949.8 | 3,750.1 | 199.66 | 19.783 | |
| 10,000.0 | 6,812.6 | 6,852.6 | 6,852.6 | 66.4 | 137.1 | 91.00 | -7,045.7 | 582.5 | 3,850.4 | 3,648.9 | 201.51 | 19.107 | |
| 10,100.0 | 6,812.4 | 6,852.4 | 6,852.4 | 68.2 | 137.0 | 90.97 | -7,045.7 | 582.5 | 3,751.0 | 3,547.6 | 203.37 | 18.444 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Bailey 33-1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,200.0 | 6,812.2 | 6,852.2 | 6,852.2 | 70.0 | 137.0 | 90.95 | -7,045.7 | 582.5 | 3,651.6 | 3,446.4 | 205.23 | 17.793 | |
| 10,300.0 | 6,812.1 | 6,852.1 | 6,852.1 | 71.9 | 137.0 | 90.92 | -7,045.7 | 582.5 | 3,552.3 | 3,345.2 | 207.09 | 17.154 | |
| 10,400.0 | 6,811.9 | 6,851.9 | 6,851.9 | 73.7 | 137.0 | 90.90 | -7,045.7 | 582.5 | 3,453.0 | 3,244.1 | 208.96 | 16.525 | |
| 10,500.0 | 6,811.7 | 6,851.7 | 6,851.7 | 75.5 | 137.0 | 90.87 | -7,045.7 | 582.5 | 3,353.8 | 3,143.0 | 210.82 | 15.908 | |
| 10,600.0 | 6,811.5 | 6,851.5 | 6,851.5 | 77.3 | 137.0 | 90.84 | -7,045.7 | 582.5 | 3,254.6 | 3,041.9 | 212.69 | 15.302 | |
| 10,700.0 | 6,811.3 | 6,851.3 | 6,851.3 | 79.2 | 137.0 | 90.82 | -7,045.7 | 582.5 | 3,155.5 | 2,940.9 | 214.57 | 14.706 | |
| 10,800.0 | 6,811.1 | 6,851.1 | 6,851.1 | 81.0 | 137.0 | 90.79 | -7,045.7 | 582.5 | 3,056.4 | 2,840.0 | 216.44 | 14.121 | |
| 10,900.0 | 6,810.9 | 6,850.9 | 6,850.9 | 82.9 | 137.0 | 90.77 | -7,045.7 | 582.5 | 2,957.4 | 2,739.1 | 218.32 | 13.546 | |
| 11,000.0 | 6,810.7 | 6,850.7 | 6,850.7 | 84.7 | 137.0 | 90.74 | -7,045.7 | 582.5 | 2,858.5 | 2,638.3 | 220.20 | 12.981 | |
| 11,100.0 | 6,810.5 | 6,850.5 | 6,850.5 | 86.6 | 137.0 | 90.71 | -7,045.7 | 582.5 | 2,759.6 | 2,537.5 | 222.08 | 12.426 | |
| 11,200.0 | 6,810.3 | 6,850.3 | 6,850.3 | 88.4 | 137.0 | 90.69 | -7,045.7 | 582.5 | 2,660.8 | 2,436.8 | 223.96 | 11.881 | |
| 11,300.0 | 6,810.1 | 6,850.1 | 6,850.1 | 90.3 | 137.0 | 90.66 | -7,045.7 | 582.5 | 2,562.1 | 2,336.3 | 225.84 | 11.345 | |
| 11,400.0 | 6,809.9 | 6,849.9 | 6,849.9 | 92.1 | 137.0 | 90.63 | -7,045.7 | 582.5 | 2,463.5 | 2,235.8 | 227.73 | 10.818 | |
| 11,500.0 | 6,809.7 | 6,849.7 | 6,849.7 | 94.0 | 137.0 | 90.61 | -7,045.7 | 582.5 | 2,365.1 | 2,135.4 | 229.61 | 10.300 | |
| 11,600.0 | 6,809.6 | 6,849.6 | 6,849.6 | 95.9 | 137.0 | 90.58 | -7,045.7 | 582.5 | 2,266.7 | 2,035.2 | 231.50 | 9.791 | |
| 11,700.0 | 6,809.4 | 6,849.4 | 6,849.4 | 97.7 | 137.0 | 90.56 | -7,045.7 | 582.5 | 2,168.5 | 1,935.1 | 233.39 | 9.291 | |
| 11,800.0 | 6,809.2 | 6,849.2 | 6,849.2 | 99.6 | 137.0 | 90.53 | -7,045.7 | 582.5 | 2,070.5 | 1,835.3 | 235.28 | 8.800 | |
| 11,900.0 | 6,809.0 | 6,849.0 | 6,849.0 | 101.5 | 137.0 | 90.50 | -7,045.7 | 582.5 | 1,972.7 | 1,735.6 | 237.17 | 8.318 | |
| 12,000.0 | 6,808.8 | 6,848.8 | 6,848.8 | 103.3 | 137.0 | 90.48 | -7,045.7 | 582.5 | 1,875.1 | 1,636.1 | 239.06 | 7.844 | |
| 12,100.0 | 6,808.6 | 6,848.6 | 6,848.6 | 105.2 | 137.0 | 90.45 | -7,045.7 | 582.5 | 1,777.8 | 1,536.9 | 240.95 | 7.378 | |
| 12,200.0 | 6,808.4 | 6,848.4 | 6,848.4 | 107.1 | 137.0 | 90.43 | -7,045.7 | 582.5 | 1,680.8 | 1,438.0 | 242.85 | 6.921 | |
| 12,300.0 | 6,808.2 | 6,848.2 | 6,848.2 | 109.0 | 137.0 | 90.40 | -7,045.7 | 582.5 | 1,584.2 | 1,339.5 | 244.74 | 6.473 | |
| 12,400.0 | 6,808.0 | 6,848.0 | 6,848.0 | 110.8 | 137.0 | 90.37 | -7,045.7 | 582.5 | 1,488.1 | 1,241.4 | 246.64 | 6.033 | |
| 12,500.0 | 6,807.8 | 6,847.8 | 6,847.8 | 112.7 | 137.0 | 90.35 | -7,045.7 | 582.5 | 1,392.4 | 1,143.9 | 248.53 | 5.603 | |
| 12,600.0 | 6,807.6 | 6,847.6 | 6,847.6 | 114.6 | 137.0 | 90.32 | -7,045.7 | 582.5 | 1,297.5 | 1,047.0 | 250.43 | 5.181 | |
| 12,700.0 | 6,807.4 | 6,847.4 | 6,847.4 | 116.5 | 136.9 | 90.29 | -7,045.7 | 582.5 | 1,203.3 | 951.0 | 252.32 | 4.769 | |
| 12,800.0 | 6,807.3 | 6,847.3 | 6,847.3 | 118.4 | 136.9 | 90.27 | -7,045.7 | 582.5 | 1,110.2 | 855.9 | 254.22 | 4.367 | |
| 12,900.0 | 6,807.1 | 6,847.1 | 6,847.1 | 120.3 | 136.9 | 90.24 | -7,045.7 | 582.5 | 1,018.3 | 762.2 | 256.12 | 3.976 | |
| 13,000.0 | 6,806.9 | 6,846.9 | 6,846.9 | 122.1 | 136.9 | 90.22 | -7,045.7 | 582.5 | 928.2 | 670.2 | 258.02 | 3.597 | |
| 13,100.0 | 6,806.7 | 6,846.7 | 6,846.7 | 124.0 | 136.9 | 90.19 | -7,045.7 | 582.5 | 840.3 | 580.4 | 259.92 | 3.233 | |
| 13,200.0 | 6,806.5 | 6,846.5 | 6,846.5 | 125.9 | 136.9 | 90.16 | -7,045.7 | 582.5 | 755.4 | 493.6 | 261.82 | 2.885 | |
| 13,300.0 | 6,806.3 | 6,846.3 | 6,846.3 | 127.8 | 136.9 | 90.14 | -7,045.7 | 582.5 | 674.7 | 410.9 | 263.72 | 2.558 | |
| 13,400.0 | 6,806.1 | 6,846.1 | 6,846.1 | 129.7 | 136.9 | 90.11 | -7,045.7 | 582.5 | 599.8 | 334.1 | 265.62 | 2.258 | |
| 13,500.0 | 6,805.9 | 6,845.9 | 6,845.9 | 131.6 | 136.9 | 90.09 | -7,045.7 | 582.5 | 533.1 | 265.6 | 267.52 | 1.993 | |
| 13,600.0 | 6,805.7 | 6,845.7 | 6,845.7 | 133.5 | 136.9 | 90.06 | -7,045.7 | 582.5 | 478.3 | 208.9 | 269.42 | 1.775 | |
| 13,700.0 | 6,805.5 | 6,845.5 | 6,845.5 | 135.4 | 136.9 | 90.03 | -7,045.7 | 582.5 | 439.7 | 168.4 | 271.32 | 1.621 | |
| 13,800.0 | 6,805.3 | 6,845.3 | 6,845.3 | 137.3 | 136.9 | 90.01 | -7,045.7 | 582.5 | 421.7 | 148.5 | 273.22 | 1.544 | |
| 13,827.3 | 6,805.3 | 6,845.3 | 6,845.3 | 137.8 | 136.9 | 90.00 | -7,045.7 | 582.5 | 420.8 | 147.1 | 273.74 | 1.537 | CC, ES, SF |
| 13,900.0 | 6,805.1 | 6,845.1 | 6,845.1 | 139.2 | 136.9 | 89.98 | -7,045.7 | 582.5 | 427.1 | 151.9 | 275.12 | 1.552 | |
| 13,973.0 | 6,805.0 | 6,845.0 | 6,845.0 | 140.6 | 136.9 | 89.96 | -7,045.7 | 582.5 | 445.3 | 168.8 | 276.51 | 1.611 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-6B (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 126.42 | -415.3 | 562.8 | 699.7 | | | | |
| 100.0 | 100.0 | 82.0 | 82.0 | 0.1 | 1.6 | 126.42 | -415.3 | 562.8 | 699.4 | 697.7 | 1.75 | 399.097 | |
| 200.0 | 200.0 | 182.0 | 182.0 | 0.3 | 3.6 | 126.42 | -415.3 | 562.8 | 699.4 | 695.5 | 3.98 | 175.858 | |
| 300.0 | 300.0 | 282.0 | 282.0 | 0.6 | 5.6 | 126.42 | -415.3 | 562.8 | 699.4 | 693.2 | 6.20 | 112.776 | |
| 400.0 | 400.0 | 382.0 | 382.0 | 0.8 | 7.6 | 126.42 | -415.3 | 562.8 | 699.4 | 691.0 | 8.43 | 83.002 | |
| 500.0 | 500.0 | 482.0 | 482.0 | 1.0 | 9.6 | 47.82 | -415.3 | 562.8 | 698.3 | 687.6 | 10.64 | 65.635 | |
| 600.0 | 599.8 | 581.8 | 581.8 | 1.2 | 11.6 | 48.19 | -415.3 | 562.8 | 694.8 | 681.9 | 12.84 | 54.114 | |
| 700.0 | 699.5 | 681.5 | 681.5 | 1.5 | 13.6 | 48.82 | -415.3 | 562.8 | 689.0 | 673.9 | 15.04 | 45.816 | |
| 800.0 | 798.7 | 780.7 | 780.7 | 1.7 | 15.6 | 49.71 | -415.3 | 562.8 | 681.0 | 663.8 | 17.24 | 39.504 | |
| 900.0 | 897.5 | 879.5 | 879.5 | 2.0 | 17.6 | 50.88 | -415.3 | 562.8 | 670.9 | 651.5 | 19.45 | 34.500 | |
| 1,000.0 | 995.6 | 977.6 | 977.6 | 2.4 | 19.6 | 52.31 | -415.3 | 562.8 | 659.0 | 637.3 | 21.68 | 30.397 | |
| 1,100.0 | 1,093.5 | 1,075.5 | 1,075.5 | 2.8 | 21.5 | 53.73 | -415.3 | 562.8 | 646.5 | 622.5 | 23.98 | 26.959 | |
| 1,200.0 | 1,191.4 | 1,173.4 | 1,173.4 | 3.2 | 23.5 | 55.19 | -415.3 | 562.8 | 634.5 | 608.2 | 26.31 | 24.119 | |
| 1,300.0 | 1,289.3 | 1,271.3 | 1,271.3 | 3.6 | 25.4 | 56.71 | -415.3 | 562.8 | 622.9 | 594.3 | 28.65 | 21.742 | |
| 1,400.0 | 1,387.2 | 1,369.2 | 1,369.2 | 4.1 | 27.4 | 58.28 | -415.3 | 562.8 | 611.8 | 580.8 | 31.01 | 19.728 | |
| 1,500.0 | 1,485.1 | 1,467.1 | 1,467.1 | 4.5 | 29.3 | 59.91 | -415.3 | 562.8 | 601.1 | 567.7 | 33.39 | 18.005 | |
| 1,600.0 | 1,583.0 | 1,565.0 | 1,565.0 | 4.9 | 31.3 | 61.59 | -415.3 | 562.8 | 591.0 | 555.2 | 35.77 | 16.520 | |
| 1,700.0 | 1,680.9 | 1,662.9 | 1,662.9 | 5.4 | 33.3 | 63.33 | -415.3 | 562.8 | 581.4 | 543.2 | 38.18 | 15.230 | |
| 1,800.0 | 1,778.8 | 1,760.8 | 1,760.8 | 5.8 | 35.2 | 65.13 | -415.3 | 562.8 | 572.4 | 531.8 | 40.59 | 14.102 | |
| 1,900.0 | 1,876.7 | 1,858.7 | 1,858.7 | 6.2 | 37.2 | 66.97 | -415.3 | 562.8 | 564.0 | 520.9 | 43.01 | 13.112 | |
| 2,000.0 | 1,974.6 | 1,956.6 | 1,956.6 | 6.7 | 39.1 | 68.87 | -415.3 | 562.8 | 556.1 | 510.7 | 45.44 | 12.238 | |
| 2,100.0 | 2,072.5 | 2,054.5 | 2,054.5 | 7.1 | 41.1 | 70.82 | -415.3 | 562.8 | 549.0 | 501.1 | 47.88 | 11.465 | |
| 2,200.0 | 2,170.4 | 2,152.4 | 2,152.4 | 7.6 | 43.0 | 72.82 | -415.3 | 562.8 | 542.5 | 492.2 | 50.33 | 10.779 | |
| 2,300.0 | 2,268.3 | 2,250.3 | 2,250.3 | 8.0 | 45.0 | 74.86 | -415.3 | 562.8 | 536.7 | 483.9 | 52.78 | 10.169 | |
| 2,400.0 | 2,366.2 | 2,348.2 | 2,348.2 | 8.5 | 47.0 | 76.94 | -415.3 | 562.8 | 531.6 | 476.4 | 55.23 | 9.626 | |
| 2,500.0 | 2,464.1 | 2,446.1 | 2,446.1 | 8.9 | 48.9 | 79.06 | -415.3 | 562.8 | 527.3 | 469.6 | 57.68 | 9.142 | |
| 2,600.0 | 2,562.0 | 2,544.0 | 2,544.0 | 9.4 | 50.9 | 81.20 | -415.3 | 562.8 | 523.7 | 463.6 | 60.13 | 8.710 | |
| 2,700.0 | 2,659.9 | 2,641.9 | 2,641.9 | 9.8 | 52.8 | 83.37 | -415.3 | 562.8 | 520.9 | 458.4 | 62.57 | 8.325 | |
| 2,800.0 | 2,757.8 | 2,739.8 | 2,739.8 | 10.3 | 54.8 | 85.57 | -415.3 | 562.8 | 518.9 | 453.9 | 65.01 | 7.982 | |
| 2,900.0 | 2,855.7 | 2,837.7 | 2,837.7 | 10.7 | 56.8 | 87.77 | -415.3 | 562.8 | 517.7 | 450.3 | 67.44 | 7.676 | |
| 3,000.0 | 2,953.6 | 2,935.6 | 2,935.6 | 11.2 | 58.7 | 89.98 | -415.3 | 562.8 | 517.3 | 447.4 | 69.86 | 7.404 | |
| 3,000.9 | 2,954.4 | 2,936.4 | 2,936.4 | 11.2 | 58.7 | 90.00 | -415.3 | 562.8 | 517.3 | 447.4 | 69.88 | 7.402 | |
| 3,100.0 | 3,051.5 | 3,033.5 | 3,033.5 | 11.6 | 60.7 | 92.19 | -415.3 | 562.8 | 517.7 | 445.4 | 72.27 | 7.163 | |
| 3,200.0 | 3,149.4 | 3,131.4 | 3,131.4 | 12.1 | 62.6 | 94.40 | -415.3 | 562.8 | 518.9 | 444.2 | 74.67 | 6.950 | |
| 3,300.0 | 3,247.3 | 3,229.3 | 3,229.3 | 12.5 | 64.6 | 96.59 | -415.3 | 562.8 | 520.9 | 443.8 | 77.04 | 6.761 | |
| 3,400.0 | 3,345.2 | 3,327.2 | 3,327.2 | 13.0 | 66.5 | 98.76 | -415.3 | 562.8 | 523.7 | 444.3 | 79.41 | 6.595 | |
| 3,500.0 | 3,443.1 | 3,425.1 | 3,425.1 | 13.4 | 68.5 | 100.91 | -415.3 | 562.8 | 527.2 | 445.5 | 81.75 | 6.449 | |
| 3,600.0 | 3,540.9 | 3,522.9 | 3,522.9 | 13.9 | 70.5 | 103.02 | -415.3 | 562.8 | 531.5 | 447.5 | 84.08 | 6.322 | |
| 3,700.0 | 3,638.8 | 3,620.8 | 3,620.8 | 14.3 | 72.4 | 105.10 | -415.3 | 562.8 | 536.6 | 450.2 | 86.39 | 6.212 | |
| 3,800.0 | 3,736.7 | 3,718.7 | 3,718.7 | 14.8 | 74.4 | 107.15 | -415.3 | 562.8 | 542.4 | 453.7 | 88.68 | 6.116 | |
| 3,900.0 | 3,834.6 | 3,816.6 | 3,816.6 | 15.2 | 76.3 | 109.14 | -415.3 | 562.8 | 548.9 | 457.9 | 90.95 | 6.035 | |
| 4,000.0 | 3,932.5 | 3,914.5 | 3,914.5 | 15.7 | 78.3 | 111.09 | -415.3 | 562.8 | 556.0 | 462.8 | 93.21 | 5.965 | |
| 4,100.0 | 4,030.4 | 4,012.4 | 4,012.4 | 16.1 | 80.2 | 112.99 | -415.3 | 562.8 | 563.8 | 468.4 | 95.45 | 5.907 | |
| 4,200.0 | 4,128.3 | 4,110.3 | 4,110.3 | 16.6 | 82.2 | 114.84 | -415.3 | 562.8 | 572.2 | 474.6 | 97.67 | 5.859 | |
| 4,300.0 | 4,226.2 | 4,208.2 | 4,208.2 | 17.0 | 84.2 | 116.64 | -415.3 | 562.8 | 581.2 | 481.4 | 99.88 | 5.819 | |
| 4,400.0 | 4,324.1 | 4,306.1 | 4,306.1 | 17.5 | 86.1 | 118.38 | -415.3 | 562.8 | 590.8 | 488.7 | 102.08 | 5.788 | |
| 4,500.0 | 4,422.0 | 4,404.0 | 4,404.0 | 17.9 | 88.1 | 120.06 | -415.3 | 562.8 | 600.9 | 496.7 | 104.26 | 5.764 | |
| 4,600.0 | 4,519.9 | 4,501.9 | 4,501.9 | 18.4 | 90.0 | 121.69 | -415.3 | 562.8 | 611.6 | 505.2 | 106.43 | 5.746 | |
| 4,700.0 | 4,617.8 | 4,599.8 | 4,599.8 | 18.8 | 92.0 | 123.26 | -415.3 | 562.8 | 622.7 | 514.1 | 108.59 | 5.734 | |
| 4,800.0 | 4,715.7 | 4,697.7 | 4,697.7 | 19.3 | 94.0 | 124.78 | -415.3 | 562.8 | 634.3 | 523.5 | 110.74 | 5.728 | |
| 4,900.0 | 4,813.6 | 4,795.6 | 4,795.6 | 19.7 | 95.9 | 126.25 | -415.3 | 562.8 | 646.3 | 533.4 | 112.89 | 5.725 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-6B (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,000.0 | 4,911.5 | 4,893.5 | 4,893.5 | 20.2 | 97.9 | 127.66 | -415.3 | 562.8 | 658.7 | 543.7 | 115.02 | 5.727 | |
| 5,100.0 | 5,009.4 | 4,991.4 | 4,991.4 | 20.6 | 99.8 | 129.02 | -415.3 | 562.8 | 671.6 | 554.4 | 117.15 | 5.732 | |
| 5,200.0 | 5,107.3 | 5,089.3 | 5,089.3 | 21.1 | 101.8 | 130.33 | -415.3 | 562.8 | 684.7 | 565.5 | 119.28 | 5.741 | |
| 5,300.0 | 5,205.2 | 5,187.2 | 5,187.2 | 21.5 | 103.7 | 131.59 | -415.3 | 562.8 | 698.3 | 576.9 | 121.39 | 5.752 | |
| 5,400.0 | 5,303.1 | 5,285.1 | 5,285.1 | 22.0 | 105.7 | 132.81 | -415.3 | 562.8 | 712.1 | 588.6 | 123.51 | 5.766 | |
| 5,500.0 | 5,401.2 | 5,383.2 | 5,383.2 | 22.4 | 107.7 | 134.07 | -415.3 | 562.8 | 725.4 | 599.6 | 125.85 | 5.764 | |
| 5,600.0 | 5,500.0 | 5,482.0 | 5,482.0 | 22.6 | 109.6 | 135.10 | -415.3 | 562.8 | 736.5 | 608.3 | 128.17 | 5.746 | |
| 5,700.0 | 5,599.2 | 5,581.2 | 5,581.2 | 22.9 | 111.6 | 135.88 | -415.3 | 562.8 | 745.2 | 614.8 | 130.47 | 5.712 | |
| 5,800.0 | 5,698.9 | 5,680.9 | 5,680.9 | 23.1 | 113.6 | 136.43 | -415.3 | 562.8 | 751.6 | 618.9 | 132.71 | 5.663 | |
| 5,900.0 | 5,798.7 | 5,780.7 | 5,780.7 | 23.2 | 115.6 | 136.76 | -415.3 | 562.8 | 755.4 | 620.5 | 134.90 | 5.600 | |
| 6,000.0 | 5,898.7 | 5,880.7 | 5,880.7 | 23.4 | 117.6 | 136.87 | -415.3 | 562.8 | 756.7 | 619.7 | 137.02 | 5.523 | |
| 6,100.0 | 5,998.7 | 5,980.7 | 5,980.7 | 23.5 | 119.6 | -144.40 | -415.3 | 562.8 | 756.7 | 617.6 | 139.15 | 5.438 | |
| 6,200.0 | 6,098.6 | 6,080.6 | 6,080.6 | 23.6 | 121.6 | 35.76 | -415.3 | 562.8 | 755.1 | 614.2 | 140.95 | 5.357 | |
| 6,300.0 | 6,197.6 | 6,179.6 | 6,179.6 | 23.7 | 123.6 | 36.87 | -415.3 | 562.8 | 744.0 | 602.9 | 141.13 | 5.272 | |
| 6,400.0 | 6,294.0 | 6,276.0 | 6,276.0 | 23.7 | 125.5 | 39.13 | -415.3 | 562.8 | 722.9 | 583.0 | 139.85 | 5.169 | |
| 6,500.0 | 6,386.1 | 6,368.1 | 6,368.1 | 23.7 | 127.4 | 42.68 | -415.3 | 562.8 | 692.5 | 554.7 | 137.78 | 5.026 | |
| 6,600.0 | 6,472.3 | 6,454.3 | 6,454.3 | 23.8 | 129.1 | 47.72 | -415.3 | 562.8 | 654.3 | 518.2 | 136.09 | 4.808 | |
| 6,700.0 | 6,551.2 | 6,533.2 | 6,533.2 | 23.8 | 130.7 | 54.36 | -415.3 | 562.8 | 610.3 | 474.1 | 136.26 | 4.479 | |
| 6,800.0 | 6,621.4 | 6,603.4 | 6,603.4 | 23.9 | 132.1 | 62.44 | -415.3 | 562.8 | 563.4 | 424.2 | 139.22 | 4.047 | |
| 6,900.0 | 6,681.7 | 6,663.7 | 6,663.7 | 24.0 | 133.3 | 71.26 | -415.3 | 562.8 | 517.5 | 373.3 | 144.20 | 3.589 | |
| 7,000.0 | 6,731.1 | 6,713.1 | 6,713.1 | 24.3 | 134.3 | 79.63 | -415.3 | 562.8 | 477.7 | 328.7 | 149.02 | 3.206 | |
| 7,100.0 | 6,768.7 | 6,750.7 | 6,750.7 | 24.6 | 135.0 | 86.22 | -415.3 | 562.8 | 450.0 | 297.9 | 152.15 | 2.958 | |
| 7,195.4 | 6,793.1 | 6,775.1 | 6,775.1 | 25.0 | 135.5 | 90.00 | -415.3 | 562.8 | 440.5 | 286.7 | 153.82 | 2.864 | CC |
| 7,200.0 | 6,793.9 | 6,775.9 | 6,775.9 | 25.0 | 135.5 | 90.11 | -415.3 | 562.8 | 440.5 | 286.6 | 153.88 | 2.863 | ES, SF |
| 7,300.0 | 6,807.1 | 6,789.1 | 6,789.1 | 25.6 | 135.8 | 91.41 | -415.3 | 562.8 | 452.5 | 297.4 | 155.14 | 2.917 | |
| 7,400.0 | 6,816.0 | 6,798.0 | 6,798.0 | 26.4 | 136.0 | 91.36 | -415.3 | 562.8 | 485.1 | 328.7 | 156.44 | 3.101 | |
| 7,500.0 | 6,817.4 | 6,799.4 | 6,799.4 | 27.3 | 136.0 | 89.92 | -415.3 | 562.8 | 534.7 | 377.1 | 157.65 | 3.392 | |
| 7,600.0 | 6,817.2 | 6,799.2 | 6,799.2 | 28.3 | 136.0 | 89.90 | -415.3 | 562.8 | 597.1 | 438.2 | 158.96 | 3.756 | |
| 7,700.0 | 6,817.0 | 6,799.0 | 6,799.0 | 29.3 | 136.0 | 89.87 | -415.3 | 562.8 | 668.7 | 508.4 | 160.35 | 4.170 | |
| 7,800.0 | 6,816.9 | 6,798.9 | 6,798.9 | 30.5 | 136.0 | 89.85 | -415.3 | 562.8 | 746.9 | 585.1 | 161.81 | 4.616 | |
| 7,900.0 | 6,816.7 | 6,798.7 | 6,798.7 | 31.8 | 136.0 | 89.82 | -415.3 | 562.8 | 829.7 | 666.4 | 163.32 | 5.080 | |
| 8,000.0 | 6,816.5 | 6,798.5 | 6,798.5 | 33.1 | 136.0 | 89.80 | -415.3 | 562.8 | 916.0 | 751.1 | 164.89 | 5.555 | |
| 8,100.0 | 6,816.3 | 6,798.3 | 6,798.3 | 34.5 | 136.0 | 89.77 | -415.3 | 562.8 | 1,004.8 | 838.3 | 166.49 | 6.036 | |
| 8,200.0 | 6,816.1 | 6,798.1 | 6,798.1 | 36.0 | 136.0 | 89.75 | -415.3 | 562.8 | 1,095.6 | 927.5 | 168.12 | 6.517 | |
| 8,300.0 | 6,815.9 | 6,797.9 | 6,797.9 | 37.5 | 136.0 | 89.72 | -415.3 | 562.8 | 1,187.8 | 1,018.0 | 169.79 | 6.996 | |
| 8,400.0 | 6,815.7 | 6,797.7 | 6,797.7 | 39.0 | 136.0 | 89.70 | -415.3 | 562.8 | 1,281.2 | 1,109.8 | 171.48 | 7.472 | |
| 8,500.0 | 6,815.5 | 6,797.5 | 6,797.5 | 40.6 | 136.0 | 89.67 | -415.3 | 562.8 | 1,375.6 | 1,202.4 | 173.19 | 7.942 | |
| 8,600.0 | 6,815.3 | 6,797.3 | 6,797.3 | 42.2 | 135.9 | 89.65 | -415.3 | 562.8 | 1,470.7 | 1,295.7 | 174.92 | 8.407 | |
| 8,700.0 | 6,815.1 | 6,797.1 | 6,797.1 | 43.8 | 135.9 | 89.62 | -415.3 | 562.8 | 1,566.3 | 1,389.7 | 176.67 | 8.866 | |
| 8,800.0 | 6,814.9 | 6,796.9 | 6,796.9 | 45.5 | 135.9 | 89.60 | -415.3 | 562.8 | 1,662.6 | 1,484.1 | 178.44 | 9.317 | |
| 8,900.0 | 6,814.7 | 6,796.7 | 6,796.7 | 47.1 | 135.9 | 89.57 | -415.3 | 562.8 | 1,759.2 | 1,579.0 | 180.21 | 9.762 | |
| 9,000.0 | 6,814.5 | 6,796.5 | 6,796.5 | 48.8 | 135.9 | 89.55 | -415.3 | 562.8 | 1,856.2 | 1,674.2 | 182.00 | 10.199 | |
| 9,100.0 | 6,814.4 | 6,796.4 | 6,796.4 | 50.5 | 135.9 | 89.52 | -415.3 | 562.8 | 1,953.4 | 1,769.7 | 183.79 | 10.629 | |
| 9,200.0 | 6,814.2 | 6,796.2 | 6,796.2 | 52.2 | 135.9 | 89.50 | -415.3 | 562.8 | 2,051.0 | 1,865.4 | 185.60 | 11.051 | |
| 9,300.0 | 6,814.0 | 6,796.0 | 6,796.0 | 54.0 | 135.9 | 89.47 | -415.3 | 562.8 | 2,148.8 | 1,961.4 | 187.41 | 11.466 | |
| 9,400.0 | 6,813.8 | 6,795.8 | 6,795.8 | 55.7 | 135.9 | 89.45 | -415.3 | 562.8 | 2,246.7 | 2,057.5 | 189.23 | 11.873 | |
| 9,500.0 | 6,813.6 | 6,795.6 | 6,795.6 | 57.5 | 135.9 | 89.42 | -415.3 | 562.8 | 2,344.9 | 2,153.8 | 191.06 | 12.273 | |
| 9,600.0 | 6,813.4 | 6,795.4 | 6,795.4 | 59.3 | 135.9 | 89.40 | -415.3 | 562.8 | 2,443.2 | 2,250.3 | 192.89 | 12.666 | |
| 9,700.0 | 6,813.2 | 6,795.2 | 6,795.2 | 61.0 | 135.9 | 89.37 | -415.3 | 562.8 | 2,541.6 | 2,346.9 | 194.73 | 13.052 | |
| 9,800.0 | 6,813.0 | 6,795.0 | 6,795.0 | 62.8 | 135.9 | 89.35 | -415.3 | 562.8 | 2,640.1 | 2,443.6 | 196.57 | 13.431 | |
| 9,900.0 | 6,812.8 | 6,794.8 | 6,794.8 | 64.6 | 135.9 | 89.33 | -415.3 | 562.8 | 2,738.8 | 2,540.4 | 198.42 | 13.803 | |

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

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-6B (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,000.0 | 6,812.6 | 6,794.6 | 6,794.6 | 66.4 | 135.9 | 89.30 | -415.3 | 562.8 | 2,837.5 | 2,637.3 | 200.27 | 14.169 | |
| 10,100.0 | 6,812.4 | 6,794.4 | 6,794.4 | 68.2 | 135.9 | 89.28 | -415.3 | 562.8 | 2,936.4 | 2,734.2 | 202.12 | 14.528 | |
| 10,200.0 | 6,812.2 | 6,794.2 | 6,794.2 | 70.0 | 135.9 | 89.25 | -415.3 | 562.8 | 3,035.3 | 2,831.3 | 203.98 | 14.880 | |
| 10,300.0 | 6,812.1 | 6,794.1 | 6,794.1 | 71.9 | 135.9 | 89.23 | -415.3 | 562.8 | 3,134.2 | 2,928.4 | 205.84 | 15.227 | |
| 10,400.0 | 6,811.9 | 6,793.9 | 6,793.9 | 73.7 | 135.9 | 89.20 | -415.3 | 562.8 | 3,233.3 | 3,025.6 | 207.70 | 15.567 | |
| 10,500.0 | 6,811.7 | 6,793.7 | 6,793.7 | 75.5 | 135.9 | 89.18 | -415.3 | 562.8 | 3,332.4 | 3,122.8 | 209.57 | 15.901 | |
| 10,600.0 | 6,811.5 | 6,793.5 | 6,793.5 | 77.3 | 135.9 | 89.15 | -415.3 | 562.8 | 3,431.5 | 3,220.1 | 211.44 | 16.229 | |
| 10,700.0 | 6,811.3 | 6,793.3 | 6,793.3 | 79.2 | 135.9 | 89.13 | -415.3 | 562.8 | 3,530.7 | 3,317.4 | 213.31 | 16.552 | |
| 10,800.0 | 6,811.1 | 6,793.1 | 6,793.1 | 81.0 | 135.9 | 89.10 | -415.3 | 562.8 | 3,630.0 | 3,414.8 | 215.18 | 16.869 | |
| 10,900.0 | 6,810.9 | 6,792.9 | 6,792.9 | 82.9 | 135.9 | 89.08 | -415.3 | 562.8 | 3,729.2 | 3,512.2 | 217.06 | 17.181 | |
| 11,000.0 | 6,810.7 | 6,792.7 | 6,792.7 | 84.7 | 135.9 | 89.05 | -415.3 | 562.8 | 3,828.6 | 3,609.6 | 218.93 | 17.487 | |
| 11,100.0 | 6,810.5 | 6,792.5 | 6,792.5 | 86.6 | 135.9 | 89.03 | -415.3 | 562.8 | 3,927.9 | 3,707.1 | 220.81 | 17.789 | |
| 11,200.0 | 6,810.3 | 6,792.3 | 6,792.3 | 88.4 | 135.8 | 89.00 | -415.3 | 562.8 | 4,027.3 | 3,804.6 | 222.69 | 18.085 | |
| 11,300.0 | 6,810.1 | 6,792.1 | 6,792.1 | 90.3 | 135.8 | 88.98 | -415.3 | 562.8 | 4,126.7 | 3,902.1 | 224.57 | 18.376 | |
| 11,400.0 | 6,809.9 | 6,791.9 | 6,791.9 | 92.1 | 135.8 | 88.95 | -415.3 | 562.8 | 4,226.1 | 3,999.7 | 226.45 | 18.663 | |
| 11,500.0 | 6,809.7 | 6,791.7 | 6,791.7 | 94.0 | 135.8 | 88.93 | -415.3 | 562.8 | 4,325.6 | 4,097.3 | 228.33 | 18.944 | |
| 11,600.0 | 6,809.6 | 6,791.6 | 6,791.6 | 95.9 | 135.8 | 88.90 | -415.3 | 562.8 | 4,425.1 | 4,194.9 | 230.22 | 19.221 | |
| 11,700.0 | 6,809.4 | 6,791.4 | 6,791.4 | 97.7 | 135.8 | 88.88 | -415.3 | 562.8 | 4,524.6 | 4,292.5 | 232.10 | 19.494 | |
| 11,800.0 | 6,809.2 | 6,791.2 | 6,791.2 | 99.6 | 135.8 | 88.85 | -415.3 | 562.8 | 4,624.2 | 4,390.2 | 233.99 | 19.762 | |
| 11,900.0 | 6,809.0 | 6,791.0 | 6,791.0 | 101.5 | 135.8 | 88.83 | -415.3 | 562.8 | 4,723.7 | 4,487.8 | 235.88 | 20.026 | |
| 12,000.0 | 6,808.8 | 6,790.8 | 6,790.8 | 103.3 | 135.8 | 88.80 | -415.3 | 562.8 | 4,823.3 | 4,585.5 | 237.77 | 20.286 | |
| 12,100.0 | 6,808.6 | 6,790.6 | 6,790.6 | 105.2 | 135.8 | 88.78 | -415.3 | 562.8 | 4,922.9 | 4,683.2 | 239.66 | 20.541 | |
| 12,200.0 | 6,808.4 | 6,790.4 | 6,790.4 | 107.1 | 135.8 | 88.75 | -415.3 | 562.8 | 5,022.5 | 4,780.9 | 241.55 | 20.793 | |
| 12,300.0 | 6,808.2 | 6,790.2 | 6,790.2 | 109.0 | 135.8 | 88.73 | -415.3 | 562.8 | 5,122.1 | 4,878.7 | 243.44 | 21.041 | |
| 12,400.0 | 6,808.0 | 6,790.0 | 6,790.0 | 110.8 | 135.8 | 88.70 | -415.3 | 562.8 | 5,221.7 | 4,976.4 | 245.33 | 21.285 | |
| 12,500.0 | 6,807.8 | 6,789.8 | 6,789.8 | 112.7 | 135.8 | 88.68 | -415.3 | 562.8 | 5,321.4 | 5,074.2 | 247.22 | 21.525 | |
| 12,600.0 | 6,807.6 | 6,789.6 | 6,789.6 | 114.6 | 135.8 | 88.65 | -415.3 | 562.8 | 5,421.1 | 5,171.9 | 249.11 | 21.761 | |
| 12,700.0 | 6,807.4 | 6,789.4 | 6,789.4 | 116.5 | 135.8 | 88.63 | -415.3 | 562.8 | 5,520.7 | 5,269.7 | 251.01 | 21.994 | |
| 12,800.0 | 6,807.3 | 6,789.3 | 6,789.3 | 118.4 | 135.8 | 88.60 | -415.3 | 562.8 | 5,620.4 | 5,367.5 | 252.90 | 22.224 | |
| 12,900.0 | 6,807.1 | 6,789.1 | 6,789.1 | 120.3 | 135.8 | 88.58 | -415.3 | 562.8 | 5,720.1 | 5,465.3 | 254.80 | 22.450 | |
| 13,000.0 | 6,806.9 | 6,788.9 | 6,788.9 | 122.1 | 135.8 | 88.55 | -415.3 | 562.8 | 5,819.8 | 5,563.1 | 256.69 | 22.672 | |
| 13,100.0 | 6,806.7 | 6,788.7 | 6,788.7 | 124.0 | 135.8 | 88.53 | -415.3 | 562.8 | 5,919.5 | 5,661.0 | 258.59 | 22.892 | |
| 13,200.0 | 6,806.5 | 6,788.5 | 6,788.5 | 125.9 | 135.8 | 88.50 | -415.3 | 562.8 | 6,019.3 | 5,758.8 | 260.48 | 23.108 | |
| 13,300.0 | 6,806.3 | 6,788.3 | 6,788.3 | 127.8 | 135.8 | 88.48 | -415.3 | 562.8 | 6,119.0 | 5,856.6 | 262.38 | 23.321 | |
| 13,400.0 | 6,806.1 | 6,788.1 | 6,788.1 | 129.7 | 135.8 | 88.45 | -415.3 | 562.8 | 6,218.7 | 5,954.5 | 264.28 | 23.531 | |
| 13,500.0 | 6,805.9 | 6,787.9 | 6,787.9 | 131.6 | 135.8 | 88.43 | -415.3 | 562.8 | 6,318.5 | 6,052.3 | 266.17 | 23.738 | |
| 13,600.0 | 6,805.7 | 6,787.7 | 6,787.7 | 133.5 | 135.8 | 88.40 | -415.3 | 562.8 | 6,418.3 | 6,150.2 | 268.07 | 23.942 | |
| 13,700.0 | 6,805.5 | 6,787.5 | 6,787.5 | 135.4 | 135.8 | 88.38 | -415.3 | 562.8 | 6,518.0 | 6,248.1 | 269.97 | 24.144 | |
| 13,800.0 | 6,805.3 | 6,787.3 | 6,787.3 | 137.3 | 135.7 | 88.35 | -415.3 | 562.8 | 6,617.8 | 6,345.9 | 271.87 | 24.342 | |
| 13,900.0 | 6,805.1 | 6,787.1 | 6,787.1 | 139.2 | 135.7 | 88.33 | -415.3 | 562.8 | 6,717.6 | 6,443.8 | 273.77 | 24.538 | |
| 13,973.0 | 6,805.0 | 6,787.0 | 6,787.0 | 140.6 | 135.7 | 88.31 | -415.3 | 562.8 | 6,790.4 | 6,515.3 | 275.15 | 24.679 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-7I (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 126.83 | -444.4 | 593.5 | 741.7 | | | | |
| 100.0 | 100.0 | 82.0 | 82.0 | 0.1 | 1.6 | 126.83 | -444.4 | 593.5 | 741.4 | 739.7 | 1.75 | 423.057 | |
| 200.0 | 200.0 | 182.0 | 182.0 | 0.3 | 3.6 | 126.83 | -444.4 | 593.5 | 741.4 | 737.5 | 3.98 | 186.416 | |
| 300.0 | 300.0 | 282.0 | 282.0 | 0.6 | 5.6 | 126.83 | -444.4 | 593.5 | 741.4 | 735.2 | 6.20 | 119.547 | |
| 400.0 | 400.0 | 382.0 | 382.0 | 0.8 | 7.6 | 126.83 | -444.4 | 593.5 | 741.4 | 733.0 | 8.43 | 87.985 | |
| 500.0 | 500.0 | 482.0 | 482.0 | 1.0 | 9.6 | 48.22 | -444.4 | 593.5 | 740.3 | 729.6 | 10.64 | 69.582 | |
| 600.0 | 599.8 | 581.8 | 581.8 | 1.2 | 11.6 | 48.58 | -444.4 | 593.5 | 736.8 | 724.0 | 12.84 | 57.386 | |
| 700.0 | 699.5 | 681.5 | 681.5 | 1.5 | 13.6 | 49.17 | -444.4 | 593.5 | 731.1 | 716.0 | 15.04 | 48.611 | |
| 800.0 | 798.7 | 780.7 | 780.7 | 1.7 | 15.6 | 50.02 | -444.4 | 593.5 | 723.1 | 705.9 | 17.24 | 41.945 | |
| 900.0 | 897.5 | 879.5 | 879.5 | 2.0 | 17.6 | 51.14 | -444.4 | 593.5 | 713.1 | 693.7 | 19.45 | 36.666 | |
| 1,000.0 | 995.6 | 977.6 | 977.6 | 2.4 | 19.6 | 52.50 | -444.4 | 593.5 | 701.2 | 679.5 | 21.68 | 32.342 | |
| 1,100.0 | 1,093.5 | 1,075.5 | 1,075.5 | 2.8 | 21.5 | 53.83 | -444.4 | 593.5 | 688.8 | 664.8 | 23.98 | 28.720 | |
| 1,200.0 | 1,191.4 | 1,173.4 | 1,173.4 | 3.2 | 23.5 | 55.20 | -444.4 | 593.5 | 676.8 | 650.5 | 26.31 | 25.727 | |
| 1,300.0 | 1,289.3 | 1,271.3 | 1,271.3 | 3.6 | 25.4 | 56.63 | -444.4 | 593.5 | 665.2 | 636.5 | 28.65 | 23.219 | |
| 1,400.0 | 1,387.2 | 1,369.2 | 1,369.2 | 4.1 | 27.4 | 58.10 | -444.4 | 593.5 | 654.0 | 623.0 | 31.01 | 21.093 | |
| 1,500.0 | 1,485.1 | 1,467.1 | 1,467.1 | 4.5 | 29.3 | 59.62 | -444.4 | 593.5 | 643.3 | 609.9 | 33.38 | 19.273 | |
| 1,600.0 | 1,583.0 | 1,565.0 | 1,565.0 | 4.9 | 31.3 | 61.18 | -444.4 | 593.5 | 633.1 | 597.3 | 35.76 | 17.702 | |
| 1,700.0 | 1,680.9 | 1,662.9 | 1,662.9 | 5.4 | 33.3 | 62.80 | -444.4 | 593.5 | 623.3 | 585.2 | 38.16 | 16.334 | |
| 1,800.0 | 1,778.8 | 1,760.8 | 1,760.8 | 5.8 | 35.2 | 64.46 | -444.4 | 593.5 | 614.1 | 573.5 | 40.57 | 15.138 | |
| 1,900.0 | 1,876.7 | 1,858.7 | 1,858.7 | 6.2 | 37.2 | 66.17 | -444.4 | 593.5 | 605.4 | 562.5 | 42.99 | 14.084 | |
| 2,000.0 | 1,974.6 | 1,956.6 | 1,956.6 | 6.7 | 39.1 | 67.93 | -444.4 | 593.5 | 597.3 | 551.9 | 45.41 | 13.153 | |
| 2,100.0 | 2,072.5 | 2,054.5 | 2,054.5 | 7.1 | 41.1 | 69.74 | -444.4 | 593.5 | 589.8 | 542.0 | 47.85 | 12.327 | |
| 2,200.0 | 2,170.4 | 2,152.4 | 2,152.4 | 7.6 | 43.0 | 71.58 | -444.4 | 593.5 | 582.9 | 532.7 | 50.29 | 11.592 | |
| 2,300.0 | 2,268.3 | 2,250.3 | 2,250.3 | 8.0 | 45.0 | 73.47 | -444.4 | 593.5 | 576.7 | 524.0 | 52.73 | 10.936 | |
| 2,400.0 | 2,366.2 | 2,348.2 | 2,348.2 | 8.5 | 47.0 | 75.39 | -444.4 | 593.5 | 571.1 | 515.9 | 55.18 | 10.349 | |
| 2,500.0 | 2,464.1 | 2,446.1 | 2,446.1 | 8.9 | 48.9 | 77.35 | -444.4 | 593.5 | 566.2 | 508.6 | 57.63 | 9.824 | |
| 2,600.0 | 2,562.0 | 2,544.0 | 2,544.0 | 9.4 | 50.9 | 79.34 | -444.4 | 593.5 | 562.0 | 501.9 | 60.08 | 9.354 | |
| 2,700.0 | 2,659.9 | 2,641.9 | 2,641.9 | 9.8 | 52.8 | 81.35 | -444.4 | 593.5 | 558.5 | 496.0 | 62.53 | 8.931 | |
| 2,800.0 | 2,757.8 | 2,739.8 | 2,739.8 | 10.3 | 54.8 | 83.39 | -444.4 | 593.5 | 555.7 | 490.8 | 64.98 | 8.553 | |
| 2,900.0 | 2,855.7 | 2,837.7 | 2,837.7 | 10.7 | 56.8 | 85.44 | -444.4 | 593.5 | 553.7 | 486.3 | 67.42 | 8.213 | |
| 3,000.0 | 2,953.6 | 2,935.6 | 2,935.6 | 11.2 | 58.7 | 87.51 | -444.4 | 593.5 | 552.4 | 482.6 | 69.85 | 7.909 | |
| 3,100.0 | 3,051.5 | 3,033.5 | 3,033.5 | 11.6 | 60.7 | 89.58 | -444.4 | 593.5 | 551.9 | 479.6 | 72.27 | 7.637 | |
| 3,120.3 | 3,071.3 | 3,053.3 | 3,053.3 | 11.7 | 61.1 | 90.00 | -444.4 | 593.5 | 551.9 | 479.1 | 72.76 | 7.585 | |
| 3,200.0 | 3,149.4 | 3,131.4 | 3,131.4 | 12.1 | 62.6 | 91.65 | -444.4 | 593.5 | 552.1 | 477.5 | 74.68 | 7.393 | |
| 3,300.0 | 3,247.3 | 3,229.3 | 3,229.3 | 12.5 | 64.6 | 93.72 | -444.4 | 593.5 | 553.1 | 476.0 | 77.08 | 7.176 | |
| 3,400.0 | 3,345.2 | 3,327.2 | 3,327.2 | 13.0 | 66.5 | 95.78 | -444.4 | 593.5 | 554.8 | 475.4 | 79.46 | 6.982 | |
| 3,500.0 | 3,443.1 | 3,425.1 | 3,425.1 | 13.4 | 68.5 | 97.82 | -444.4 | 593.5 | 557.3 | 475.5 | 81.83 | 6.810 | |
| 3,600.0 | 3,540.9 | 3,522.9 | 3,522.9 | 13.9 | 70.5 | 99.85 | -444.4 | 593.5 | 560.5 | 476.3 | 84.19 | 6.658 | |
| 3,700.0 | 3,638.8 | 3,620.8 | 3,620.8 | 14.3 | 72.4 | 101.85 | -444.4 | 593.5 | 564.4 | 477.9 | 86.52 | 6.523 | |
| 3,800.0 | 3,736.7 | 3,718.7 | 3,718.7 | 14.8 | 74.4 | 103.82 | -444.4 | 593.5 | 569.0 | 480.2 | 88.84 | 6.405 | |
| 3,900.0 | 3,834.6 | 3,816.6 | 3,816.6 | 15.2 | 76.3 | 105.76 | -444.4 | 593.5 | 574.4 | 483.2 | 91.15 | 6.301 | |
| 4,000.0 | 3,932.5 | 3,914.5 | 3,914.5 | 15.7 | 78.3 | 107.66 | -444.4 | 593.5 | 580.3 | 486.9 | 93.44 | 6.211 | |
| 4,100.0 | 4,030.4 | 4,012.4 | 4,012.4 | 16.1 | 80.2 | 109.52 | -444.4 | 593.5 | 587.0 | 491.3 | 95.71 | 6.133 | |
| 4,200.0 | 4,128.3 | 4,110.3 | 4,110.3 | 16.6 | 82.2 | 111.34 | -444.4 | 593.5 | 594.2 | 496.3 | 97.96 | 6.066 | |
| 4,300.0 | 4,226.2 | 4,208.2 | 4,208.2 | 17.0 | 84.2 | 113.12 | -444.4 | 593.5 | 602.1 | 501.9 | 100.20 | 6.009 | |
| 4,400.0 | 4,324.1 | 4,306.1 | 4,306.1 | 17.5 | 86.1 | 114.85 | -444.4 | 593.5 | 610.5 | 508.1 | 102.43 | 5.961 | |
| 4,500.0 | 4,422.0 | 4,404.0 | 4,404.0 | 17.9 | 88.1 | 116.53 | -444.4 | 593.5 | 619.5 | 514.9 | 104.64 | 5.921 | |
| 4,600.0 | 4,519.9 | 4,501.9 | 4,501.9 | 18.4 | 90.0 | 118.17 | -444.4 | 593.5 | 629.1 | 522.2 | 106.84 | 5.888 | |
| 4,700.0 | 4,617.8 | 4,599.8 | 4,599.8 | 18.8 | 92.0 | 119.76 | -444.4 | 593.5 | 639.1 | 530.1 | 109.02 | 5.862 | |
| 4,800.0 | 4,715.7 | 4,697.7 | 4,697.7 | 19.3 | 94.0 | 121.29 | -444.4 | 593.5 | 649.6 | 538.4 | 111.20 | 5.842 | |
| 4,900.0 | 4,813.6 | 4,795.6 | 4,795.6 | 19.7 | 95.9 | 122.78 | -444.4 | 593.5 | 660.6 | 547.2 | 113.36 | 5.827 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-7I (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,000.0 | 4,911.5 | 4,893.5 | 4,893.5 | 20.2 | 97.9 | 124.22 | -444.4 | 593.5 | 672.0 | 556.5 | 115.52 | 5.818 | |
| 5,100.0 | 5,009.4 | 4,991.4 | 4,991.4 | 20.6 | 99.8 | 125.62 | -444.4 | 593.5 | 683.9 | 566.2 | 117.67 | 5.812 | |
| 5,200.0 | 5,107.3 | 5,089.3 | 5,089.3 | 21.1 | 101.8 | 126.97 | -444.4 | 593.5 | 696.1 | 576.3 | 119.81 | 5.810 | |
| 5,300.0 | 5,205.2 | 5,187.2 | 5,187.2 | 21.5 | 103.7 | 128.27 | -444.4 | 593.5 | 708.7 | 586.8 | 121.94 | 5.812 | |
| 5,400.0 | 5,303.1 | 5,285.1 | 5,285.1 | 22.0 | 105.7 | 129.52 | -444.4 | 593.5 | 721.7 | 597.6 | 124.07 | 5.817 | |
| 5,500.0 | 5,401.2 | 5,383.2 | 5,383.2 | 22.4 | 107.7 | 130.82 | -444.4 | 593.5 | 734.2 | 607.8 | 126.39 | 5.809 | |
| 5,600.0 | 5,500.0 | 5,482.0 | 5,482.0 | 22.6 | 109.6 | 131.89 | -444.4 | 593.5 | 744.6 | 615.9 | 128.68 | 5.786 | |
| 5,700.0 | 5,599.2 | 5,581.2 | 5,581.2 | 22.9 | 111.6 | 132.70 | -444.4 | 593.5 | 752.9 | 621.9 | 130.95 | 5.749 | |
| 5,800.0 | 5,698.9 | 5,680.9 | 5,680.9 | 23.1 | 113.6 | 133.27 | -444.4 | 593.5 | 758.9 | 625.7 | 133.19 | 5.698 | |
| 5,900.0 | 5,798.7 | 5,780.7 | 5,780.7 | 23.2 | 115.6 | 133.61 | -444.4 | 593.5 | 762.5 | 627.1 | 135.36 | 5.633 | |
| 6,000.0 | 5,898.7 | 5,880.7 | 5,880.7 | 23.4 | 117.6 | 133.73 | -444.4 | 593.5 | 763.7 | 626.2 | 137.48 | 5.555 | |
| 6,100.0 | 5,998.7 | 5,980.7 | 5,980.7 | 23.5 | 119.6 | -147.54 | -444.4 | 593.5 | 763.7 | 624.1 | 139.61 | 5.470 | |
| 6,200.0 | 6,098.6 | 6,080.6 | 6,080.6 | 23.6 | 121.6 | 32.60 | -444.4 | 593.5 | 762.1 | 620.7 | 141.39 | 5.390 | |
| 6,300.0 | 6,197.6 | 6,179.6 | 6,179.6 | 23.7 | 123.6 | 33.64 | -444.4 | 593.5 | 750.6 | 609.1 | 141.45 | 5.306 | |
| 6,400.0 | 6,294.0 | 6,276.0 | 6,276.0 | 23.7 | 125.5 | 35.76 | -444.4 | 593.5 | 728.5 | 588.6 | 139.89 | 5.208 | |
| 6,500.0 | 6,386.1 | 6,368.1 | 6,368.1 | 23.7 | 127.4 | 39.13 | -444.4 | 593.5 | 696.7 | 559.4 | 137.33 | 5.074 | |
| 6,600.0 | 6,472.3 | 6,454.3 | 6,454.3 | 23.8 | 129.1 | 43.99 | -444.4 | 593.5 | 656.6 | 521.6 | 134.94 | 4.866 | |
| 6,700.0 | 6,551.2 | 6,533.2 | 6,533.2 | 23.8 | 130.7 | 50.52 | -444.4 | 593.5 | 609.8 | 475.5 | 134.36 | 4.539 | |
| 6,800.0 | 6,621.4 | 6,603.4 | 6,603.4 | 23.9 | 132.1 | 58.72 | -444.4 | 593.5 | 559.2 | 422.3 | 136.95 | 4.084 | |
| 6,900.0 | 6,681.7 | 6,663.7 | 6,663.7 | 24.0 | 133.3 | 68.01 | -444.4 | 593.5 | 508.4 | 366.1 | 142.29 | 3.573 | |
| 7,000.0 | 6,731.1 | 6,713.1 | 6,713.1 | 24.3 | 134.3 | 77.17 | -444.4 | 593.5 | 462.3 | 314.3 | 147.97 | 3.124 | |
| 7,100.0 | 6,768.7 | 6,750.7 | 6,750.7 | 24.6 | 135.0 | 84.67 | -444.4 | 593.5 | 427.4 | 275.6 | 151.83 | 2.815 | |
| 7,200.0 | 6,793.9 | 6,775.9 | 6,775.9 | 25.0 | 135.5 | 89.35 | -444.4 | 593.5 | 410.6 | 256.8 | 153.84 | 2.669 | |
| 7,225.0 | 6,798.4 | 6,780.4 | 6,780.4 | 25.2 | 135.6 | 90.00 | -444.4 | 593.5 | 409.8 | 255.6 | 154.21 | 2.658 | CC, ES, SF |
| 7,300.0 | 6,807.1 | 6,789.1 | 6,789.1 | 25.6 | 135.8 | 91.09 | -444.4 | 593.5 | 416.5 | 261.4 | 155.14 | 2.685 | |
| 7,400.0 | 6,816.0 | 6,798.0 | 6,798.0 | 26.4 | 136.0 | 91.25 | -444.4 | 593.5 | 445.3 | 288.8 | 156.44 | 2.846 | |
| 7,500.0 | 6,817.4 | 6,799.4 | 6,799.4 | 27.3 | 136.0 | 89.93 | -444.4 | 593.5 | 493.0 | 335.3 | 157.65 | 3.127 | |
| 7,600.0 | 6,817.2 | 6,799.2 | 6,799.2 | 28.3 | 136.0 | 89.90 | -444.4 | 593.5 | 554.8 | 395.9 | 158.96 | 3.490 | |
| 7,700.0 | 6,817.0 | 6,799.0 | 6,799.0 | 29.3 | 136.0 | 89.87 | -444.4 | 593.5 | 626.6 | 466.3 | 160.35 | 3.908 | |
| 7,800.0 | 6,816.9 | 6,798.9 | 6,798.9 | 30.5 | 136.0 | 89.85 | -444.4 | 593.5 | 705.3 | 543.5 | 161.81 | 4.359 | |
| 7,900.0 | 6,816.7 | 6,798.7 | 6,798.7 | 31.8 | 136.0 | 89.82 | -444.4 | 593.5 | 788.8 | 625.5 | 163.32 | 4.830 | |
| 8,000.0 | 6,816.5 | 6,798.5 | 6,798.5 | 33.1 | 136.0 | 89.79 | -444.4 | 593.5 | 875.8 | 710.9 | 164.88 | 5.312 | |
| 8,100.0 | 6,816.3 | 6,798.3 | 6,798.3 | 34.5 | 136.0 | 89.77 | -444.4 | 593.5 | 965.3 | 798.8 | 166.49 | 5.798 | |
| 8,200.0 | 6,816.1 | 6,798.1 | 6,798.1 | 36.0 | 136.0 | 89.74 | -444.4 | 593.5 | 1,056.7 | 888.6 | 168.12 | 6.285 | |
| 8,300.0 | 6,815.9 | 6,797.9 | 6,797.9 | 37.5 | 136.0 | 89.71 | -444.4 | 593.5 | 1,149.5 | 979.7 | 169.79 | 6.770 | |
| 8,400.0 | 6,815.7 | 6,797.7 | 6,797.7 | 39.0 | 136.0 | 89.68 | -444.4 | 593.5 | 1,243.5 | 1,072.0 | 171.48 | 7.251 | |
| 8,500.0 | 6,815.5 | 6,797.5 | 6,797.5 | 40.6 | 136.0 | 89.66 | -444.4 | 593.5 | 1,338.3 | 1,165.1 | 173.19 | 7.727 | |
| 8,600.0 | 6,815.3 | 6,797.3 | 6,797.3 | 42.2 | 135.9 | 89.63 | -444.4 | 593.5 | 1,433.8 | 1,258.9 | 174.92 | 8.197 | |
| 8,700.0 | 6,815.1 | 6,797.1 | 6,797.1 | 43.8 | 135.9 | 89.60 | -444.4 | 593.5 | 1,529.9 | 1,353.2 | 176.67 | 8.660 | |
| 8,800.0 | 6,814.9 | 6,796.9 | 6,796.9 | 45.5 | 135.9 | 89.58 | -444.4 | 593.5 | 1,626.5 | 1,448.0 | 178.43 | 9.115 | |
| 8,900.0 | 6,814.7 | 6,796.7 | 6,796.7 | 47.1 | 135.9 | 89.55 | -444.4 | 593.5 | 1,723.4 | 1,543.2 | 180.21 | 9.563 | |
| 9,000.0 | 6,814.5 | 6,796.5 | 6,796.5 | 48.8 | 135.9 | 89.52 | -444.4 | 593.5 | 1,820.7 | 1,638.7 | 181.99 | 10.004 | |
| 9,100.0 | 6,814.4 | 6,796.4 | 6,796.4 | 50.5 | 135.9 | 89.50 | -444.4 | 593.5 | 1,918.3 | 1,734.5 | 183.79 | 10.437 | |
| 9,200.0 | 6,814.2 | 6,796.2 | 6,796.2 | 52.2 | 135.9 | 89.47 | -444.4 | 593.5 | 2,016.1 | 1,830.5 | 185.60 | 10.863 | |
| 9,300.0 | 6,814.0 | 6,796.0 | 6,796.0 | 54.0 | 135.9 | 89.44 | -444.4 | 593.5 | 2,114.1 | 1,926.7 | 187.41 | 11.281 | |
| 9,400.0 | 6,813.8 | 6,795.8 | 6,795.8 | 55.7 | 135.9 | 89.42 | -444.4 | 593.5 | 2,212.3 | 2,023.0 | 189.23 | 11.691 | |
| 9,500.0 | 6,813.6 | 6,795.6 | 6,795.6 | 57.5 | 135.9 | 89.39 | -444.4 | 593.5 | 2,310.6 | 2,119.6 | 191.05 | 12.094 | |
| 9,600.0 | 6,813.4 | 6,795.4 | 6,795.4 | 59.3 | 135.9 | 89.36 | -444.4 | 593.5 | 2,409.1 | 2,216.2 | 192.89 | 12.490 | |
| 9,700.0 | 6,813.2 | 6,795.2 | 6,795.2 | 61.0 | 135.9 | 89.34 | -444.4 | 593.5 | 2,507.7 | 2,313.0 | 194.72 | 12.878 | |
| 9,800.0 | 6,813.0 | 6,795.0 | 6,795.0 | 62.8 | 135.9 | 89.31 | -444.4 | 593.5 | 2,606.4 | 2,409.8 | 196.57 | 13.260 | |
| 9,900.0 | 6,812.8 | 6,794.8 | 6,794.8 | 64.6 | 135.9 | 89.28 | -444.4 | 593.5 | 2,705.2 | 2,506.8 | 198.41 | 13.634 | |

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

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 2-7I (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,000.0 | 6,812.6 | 6,794.6 | 6,794.6 | 66.4 | 135.9 | 89.26 | -444.4 | 593.5 | 2,804.1 | 2,603.8 | 200.26 | 14.002 | |
| 10,100.0 | 6,812.4 | 6,794.4 | 6,794.4 | 68.2 | 135.9 | 89.23 | -444.4 | 593.5 | 2,903.1 | 2,700.9 | 202.12 | 14.363 | |
| 10,200.0 | 6,812.2 | 6,794.2 | 6,794.2 | 70.0 | 135.9 | 89.20 | -444.4 | 593.5 | 3,002.1 | 2,798.1 | 203.97 | 14.718 | |
| 10,300.0 | 6,812.1 | 6,794.1 | 6,794.1 | 71.9 | 135.9 | 89.18 | -444.4 | 593.5 | 3,101.2 | 2,895.3 | 205.83 | 15.066 | |
| 10,400.0 | 6,811.9 | 6,793.9 | 6,793.9 | 73.7 | 135.9 | 89.15 | -444.4 | 593.5 | 3,200.3 | 2,992.6 | 207.70 | 15.409 | |
| 10,500.0 | 6,811.7 | 6,793.7 | 6,793.7 | 75.5 | 135.9 | 89.12 | -444.4 | 593.5 | 3,299.5 | 3,090.0 | 209.56 | 15.745 | |
| 10,600.0 | 6,811.5 | 6,793.5 | 6,793.5 | 77.3 | 135.9 | 89.09 | -444.4 | 593.5 | 3,398.8 | 3,187.3 | 211.43 | 16.075 | |
| 10,700.0 | 6,811.3 | 6,793.3 | 6,793.3 | 79.2 | 135.9 | 89.07 | -444.4 | 593.5 | 3,498.1 | 3,284.8 | 213.30 | 16.400 | |
| 10,800.0 | 6,811.1 | 6,793.1 | 6,793.1 | 81.0 | 135.9 | 89.04 | -444.4 | 593.5 | 3,597.4 | 3,382.2 | 215.17 | 16.719 | |
| 10,900.0 | 6,810.9 | 6,792.9 | 6,792.9 | 82.9 | 135.9 | 89.01 | -444.4 | 593.5 | 3,696.8 | 3,479.7 | 217.05 | 17.032 | |
| 11,000.0 | 6,810.7 | 6,792.7 | 6,792.7 | 84.7 | 135.9 | 88.99 | -444.4 | 593.5 | 3,796.2 | 3,577.2 | 218.92 | 17.340 | |
| 11,100.0 | 6,810.5 | 6,792.5 | 6,792.5 | 86.6 | 135.9 | 88.96 | -444.4 | 593.5 | 3,895.6 | 3,674.8 | 220.80 | 17.643 | |
| 11,200.0 | 6,810.3 | 6,792.3 | 6,792.3 | 88.4 | 135.8 | 88.93 | -444.4 | 593.5 | 3,995.1 | 3,772.4 | 222.68 | 17.941 | |
| 11,300.0 | 6,810.1 | 6,792.1 | 6,792.1 | 90.3 | 135.8 | 88.91 | -444.4 | 593.5 | 4,094.5 | 3,870.0 | 224.56 | 18.234 | |
| 11,400.0 | 6,809.9 | 6,791.9 | 6,791.9 | 92.1 | 135.8 | 88.88 | -444.4 | 593.5 | 4,194.0 | 3,967.6 | 226.44 | 18.521 | |
| 11,500.0 | 6,809.7 | 6,791.7 | 6,791.7 | 94.0 | 135.8 | 88.85 | -444.4 | 593.5 | 4,293.6 | 4,065.3 | 228.33 | 18.805 | |
| 11,600.0 | 6,809.6 | 6,791.6 | 6,791.6 | 95.9 | 135.8 | 88.83 | -444.4 | 593.5 | 4,393.1 | 4,162.9 | 230.21 | 19.083 | |
| 11,700.0 | 6,809.4 | 6,791.4 | 6,791.4 | 97.7 | 135.8 | 88.80 | -444.4 | 593.5 | 4,492.7 | 4,260.6 | 232.09 | 19.357 | |
| 11,800.0 | 6,809.2 | 6,791.2 | 6,791.2 | 99.6 | 135.8 | 88.77 | -444.4 | 593.5 | 4,592.3 | 4,358.3 | 233.98 | 19.627 | |
| 11,900.0 | 6,809.0 | 6,791.0 | 6,791.0 | 101.5 | 135.8 | 88.75 | -444.4 | 593.5 | 4,691.9 | 4,456.0 | 235.87 | 19.892 | |
| 12,000.0 | 6,808.8 | 6,790.8 | 6,790.8 | 103.3 | 135.8 | 88.72 | -444.4 | 593.5 | 4,791.5 | 4,553.8 | 237.76 | 20.153 | |
| 12,100.0 | 6,808.6 | 6,790.6 | 6,790.6 | 105.2 | 135.8 | 88.69 | -444.4 | 593.5 | 4,891.2 | 4,651.5 | 239.64 | 20.410 | |
| 12,200.0 | 6,808.4 | 6,790.4 | 6,790.4 | 107.1 | 135.8 | 88.67 | -444.4 | 593.5 | 4,990.8 | 4,749.3 | 241.53 | 20.663 | |
| 12,300.0 | 6,808.2 | 6,790.2 | 6,790.2 | 109.0 | 135.8 | 88.64 | -444.4 | 593.5 | 5,090.5 | 4,847.1 | 243.43 | 20.912 | |
| 12,400.0 | 6,808.0 | 6,790.0 | 6,790.0 | 110.8 | 135.8 | 88.61 | -444.4 | 593.5 | 5,190.2 | 4,944.9 | 245.32 | 21.157 | |
| 12,500.0 | 6,807.8 | 6,789.8 | 6,789.8 | 112.7 | 135.8 | 88.58 | -444.4 | 593.5 | 5,289.9 | 5,042.7 | 247.21 | 21.398 | |
| 12,600.0 | 6,807.6 | 6,789.6 | 6,789.6 | 114.6 | 135.8 | 88.56 | -444.4 | 593.5 | 5,389.6 | 5,140.5 | 249.10 | 21.636 | |
| 12,700.0 | 6,807.4 | 6,789.4 | 6,789.4 | 116.5 | 135.8 | 88.53 | -444.4 | 593.5 | 5,489.3 | 5,238.3 | 250.99 | 21.870 | |
| 12,800.0 | 6,807.3 | 6,789.3 | 6,789.3 | 118.4 | 135.8 | 88.50 | -444.4 | 593.5 | 5,589.0 | 5,336.1 | 252.89 | 22.101 | |
| 12,900.0 | 6,807.1 | 6,789.1 | 6,789.1 | 120.3 | 135.8 | 88.48 | -444.4 | 593.5 | 5,688.8 | 5,434.0 | 254.78 | 22.328 | |
| 13,000.0 | 6,806.9 | 6,788.9 | 6,788.9 | 122.1 | 135.8 | 88.45 | -444.4 | 593.5 | 5,788.5 | 5,531.8 | 256.68 | 22.552 | |
| 13,100.0 | 6,806.7 | 6,788.7 | 6,788.7 | 124.0 | 135.8 | 88.42 | -444.4 | 593.5 | 5,888.3 | 5,629.7 | 258.57 | 22.772 | |
| 13,200.0 | 6,806.5 | 6,788.5 | 6,788.5 | 125.9 | 135.8 | 88.40 | -444.4 | 593.5 | 5,988.0 | 5,727.5 | 260.47 | 22.990 | |
| 13,300.0 | 6,806.3 | 6,788.3 | 6,788.3 | 127.8 | 135.8 | 88.37 | -444.4 | 593.5 | 6,087.8 | 5,825.4 | 262.36 | 23.204 | |
| 13,400.0 | 6,806.1 | 6,788.1 | 6,788.1 | 129.7 | 135.8 | 88.34 | -444.4 | 593.5 | 6,187.6 | 5,923.3 | 264.26 | 23.415 | |
| 13,500.0 | 6,805.9 | 6,787.9 | 6,787.9 | 131.6 | 135.8 | 88.32 | -444.4 | 593.5 | 6,287.3 | 6,021.2 | 266.15 | 23.623 | |
| 13,600.0 | 6,805.7 | 6,787.7 | 6,787.7 | 133.5 | 135.8 | 88.29 | -444.4 | 593.5 | 6,387.1 | 6,119.1 | 268.05 | 23.828 | |
| 13,700.0 | 6,805.5 | 6,787.5 | 6,787.5 | 135.4 | 135.8 | 88.26 | -444.4 | 593.5 | 6,486.9 | 6,217.0 | 269.95 | 24.030 | |
| 13,800.0 | 6,805.3 | 6,787.3 | 6,787.3 | 137.3 | 135.7 | 88.24 | -444.4 | 593.5 | 6,586.7 | 6,314.9 | 271.85 | 24.230 | |
| 13,900.0 | 6,805.1 | 6,787.1 | 6,787.1 | 139.2 | 135.7 | 88.21 | -444.4 | 593.5 | 6,686.5 | 6,412.8 | 273.74 | 24.426 | |
| 13,973.0 | 6,805.0 | 6,787.0 | 6,787.0 | 140.6 | 135.7 | 88.19 | -444.4 | 593.5 | 6,759.4 | 6,484.3 | 275.13 | 24.568 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-1 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Offset Well Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

| 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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 3.0 | 3.0 | 0.0 | 0.1 | 162.57 | -1,792.4 | 562.8 | 1,878.7 | 1,878.6 | 0.06 | N/A | |
| 100.0 | 100.0 | 103.0 | 103.0 | 0.1 | 2.1 | 162.57 | -1,792.4 | 562.8 | 1,878.7 | 1,876.5 | 2.17 | 864.723 | |
| 200.0 | 200.0 | 203.0 | 203.0 | 0.3 | 4.1 | 162.57 | -1,792.4 | 562.8 | 1,878.7 | 1,874.3 | 4.40 | 427.231 | |
| 300.0 | 300.0 | 303.0 | 303.0 | 0.6 | 6.1 | 162.57 | -1,792.4 | 562.8 | 1,878.7 | 1,872.1 | 6.62 | 283.698 | |
| 400.0 | 400.0 | 403.0 | 403.0 | 0.8 | 8.1 | 162.57 | -1,792.4 | 562.8 | 1,878.7 | 1,869.8 | 8.85 | 212.355 | |
| 500.0 | 500.0 | 503.0 | 503.0 | 1.0 | 10.1 | 83.90 | -1,792.4 | 562.8 | 1,878.5 | 1,867.4 | 11.06 | 169.818 | |
| 600.0 | 599.8 | 602.8 | 602.8 | 1.2 | 12.1 | 84.07 | -1,792.4 | 562.8 | 1,877.9 | 1,864.7 | 13.28 | 141.458 | |
| 700.0 | 699.5 | 702.5 | 702.5 | 1.5 | 14.0 | 84.35 | -1,792.4 | 562.8 | 1,877.1 | 1,861.6 | 15.51 | 121.058 | |
| 800.0 | 798.7 | 801.7 | 801.7 | 1.7 | 16.0 | 84.74 | -1,792.4 | 562.8 | 1,875.9 | 1,858.1 | 17.76 | 105.632 | |
| 900.0 | 897.5 | 900.5 | 900.5 | 2.0 | 18.0 | 85.24 | -1,792.4 | 562.8 | 1,874.5 | 1,854.5 | 20.04 | 93.523 | |
| 1,000.0 | 995.6 | 998.6 | 998.6 | 2.4 | 20.0 | 85.83 | -1,792.4 | 562.8 | 1,873.0 | 1,850.6 | 22.37 | 83.741 | |
| 1,100.0 | 1,093.5 | 1,096.5 | 1,096.5 | 2.8 | 21.9 | 86.44 | -1,792.4 | 562.8 | 1,871.6 | 1,846.9 | 24.72 | 75.712 | |
| 1,200.0 | 1,191.4 | 1,194.4 | 1,194.4 | 3.2 | 23.9 | 87.05 | -1,792.4 | 562.8 | 1,870.4 | 1,843.3 | 27.09 | 69.048 | |
| 1,300.0 | 1,289.3 | 1,292.3 | 1,292.3 | 3.6 | 25.8 | 87.66 | -1,792.4 | 562.8 | 1,869.5 | 1,840.0 | 29.47 | 63.441 | |
| 1,400.0 | 1,387.2 | 1,390.2 | 1,390.2 | 4.1 | 27.8 | 88.28 | -1,792.4 | 562.8 | 1,868.7 | 1,836.9 | 31.85 | 58.666 | |
| 1,500.0 | 1,485.1 | 1,488.1 | 1,488.1 | 4.5 | 29.8 | 88.89 | -1,792.4 | 562.8 | 1,868.2 | 1,834.0 | 34.24 | 54.555 | |
| 1,600.0 | 1,583.0 | 1,586.0 | 1,586.0 | 4.9 | 31.7 | 89.50 | -1,792.4 | 562.8 | 1,867.9 | 1,831.3 | 36.64 | 50.982 | |
| 1,681.4 | 1,662.7 | 1,665.7 | 1,665.7 | 5.3 | 33.3 | 90.00 | -1,792.4 | 562.8 | 1,867.8 | 1,829.2 | 38.59 | 48.402 | |
| 1,700.0 | 1,680.9 | 1,683.9 | 1,683.9 | 5.4 | 33.7 | 90.11 | -1,792.4 | 562.8 | 1,867.8 | 1,828.8 | 39.04 | 47.849 | |
| 1,800.0 | 1,778.8 | 1,781.8 | 1,781.8 | 5.8 | 35.6 | 90.73 | -1,792.4 | 562.8 | 1,868.0 | 1,826.6 | 41.43 | 45.083 | |
| 1,900.0 | 1,876.7 | 1,879.7 | 1,879.7 | 6.2 | 37.6 | 91.34 | -1,792.4 | 562.8 | 1,868.4 | 1,824.5 | 43.83 | 42.623 | |
| 2,000.0 | 1,974.6 | 1,977.6 | 1,977.6 | 6.7 | 39.6 | 91.95 | -1,792.4 | 562.8 | 1,869.0 | 1,822.7 | 46.24 | 40.423 | |
| 2,100.0 | 2,072.5 | 2,075.5 | 2,075.5 | 7.1 | 41.5 | 92.56 | -1,792.4 | 562.8 | 1,869.8 | 1,821.1 | 48.64 | 38.444 | |
| 2,200.0 | 2,170.4 | 2,173.4 | 2,173.4 | 7.6 | 43.5 | 93.17 | -1,792.4 | 562.8 | 1,870.8 | 1,819.8 | 51.04 | 36.655 | |
| 2,300.0 | 2,268.3 | 2,271.3 | 2,271.3 | 8.0 | 45.4 | 93.78 | -1,792.4 | 562.8 | 1,872.1 | 1,818.7 | 53.44 | 35.032 | |
| 2,400.0 | 2,366.2 | 2,369.2 | 2,369.2 | 8.5 | 47.4 | 94.39 | -1,792.4 | 562.8 | 1,873.6 | 1,817.7 | 55.84 | 33.553 | |
| 2,500.0 | 2,464.1 | 2,467.1 | 2,467.1 | 8.9 | 49.3 | 95.00 | -1,792.4 | 562.8 | 1,875.3 | 1,817.0 | 58.24 | 32.199 | |
| 2,600.0 | 2,562.0 | 2,565.0 | 2,565.0 | 9.4 | 51.3 | 95.61 | -1,792.4 | 562.8 | 1,877.2 | 1,816.6 | 60.64 | 30.957 | |
| 2,700.0 | 2,659.9 | 2,662.9 | 2,662.9 | 9.8 | 53.3 | 96.22 | -1,792.4 | 562.8 | 1,879.4 | 1,816.3 | 63.04 | 29.813 | |
| 2,800.0 | 2,757.8 | 2,760.8 | 2,760.8 | 10.3 | 55.2 | 96.82 | -1,792.4 | 562.8 | 1,881.7 | 1,816.3 | 65.43 | 28.757 | |
| 2,900.0 | 2,855.7 | 2,858.7 | 2,858.7 | 10.7 | 57.2 | 97.42 | -1,792.4 | 562.8 | 1,884.3 | 1,816.5 | 67.83 | 27.780 | |
| 3,000.0 | 2,953.6 | 2,956.6 | 2,956.6 | 11.2 | 59.1 | 98.03 | -1,792.4 | 562.8 | 1,887.1 | 1,816.9 | 70.22 | 26.873 | |
| 3,100.0 | 3,051.5 | 3,054.5 | 3,054.5 | 11.6 | 61.1 | 98.63 | -1,792.4 | 562.8 | 1,890.1 | 1,817.5 | 72.62 | 26.029 | |
| 3,200.0 | 3,149.4 | 3,152.4 | 3,152.4 | 12.1 | 63.0 | 99.22 | -1,792.4 | 562.8 | 1,893.4 | 1,818.3 | 75.01 | 25.242 | |
| 3,300.0 | 3,247.3 | 3,250.3 | 3,250.3 | 12.5 | 65.0 | 99.82 | -1,792.4 | 562.8 | 1,896.8 | 1,819.4 | 77.40 | 24.508 | |
| 3,400.0 | 3,345.2 | 3,348.2 | 3,348.2 | 13.0 | 67.0 | 100.41 | -1,792.4 | 562.8 | 1,900.5 | 1,820.7 | 79.78 | 23.820 | |
| 3,500.0 | 3,443.1 | 3,446.1 | 3,446.1 | 13.4 | 68.9 | 101.00 | -1,792.4 | 562.8 | 1,904.3 | 1,822.2 | 82.17 | 23.176 | |
| 3,600.0 | 3,540.9 | 3,543.9 | 3,543.9 | 13.9 | 70.9 | 101.59 | -1,792.4 | 562.8 | 1,908.4 | 1,823.9 | 84.55 | 22.571 | |
| 3,700.0 | 3,638.8 | 3,641.8 | 3,641.8 | 14.3 | 72.8 | 102.18 | -1,792.4 | 562.8 | 1,912.7 | 1,825.8 | 86.93 | 22.002 | |
| 3,800.0 | 3,736.7 | 3,739.7 | 3,739.7 | 14.8 | 74.8 | 102.76 | -1,792.4 | 562.8 | 1,917.2 | 1,827.9 | 89.31 | 21.467 | |
| 3,900.0 | 3,834.6 | 3,837.6 | 3,837.6 | 15.2 | 76.8 | 103.35 | -1,792.4 | 562.8 | 1,921.9 | 1,830.2 | 91.68 | 20.962 | |
| 4,000.0 | 3,932.5 | 3,935.5 | 3,935.5 | 15.7 | 78.7 | 103.92 | -1,792.4 | 562.8 | 1,926.8 | 1,832.7 | 94.06 | 20.485 | |
| 4,100.0 | 4,030.4 | 4,033.4 | 4,033.4 | 16.1 | 80.7 | 104.50 | -1,792.4 | 562.8 | 1,931.9 | 1,835.5 | 96.43 | 20.035 | |
| 4,200.0 | 4,128.3 | 4,131.3 | 4,131.3 | 16.6 | 82.6 | 105.07 | -1,792.4 | 562.8 | 1,937.2 | 1,838.4 | 98.80 | 19.608 | |
| 4,300.0 | 4,226.2 | 4,229.2 | 4,229.2 | 17.0 | 84.6 | 105.64 | -1,792.4 | 562.8 | 1,942.7 | 1,841.6 | 101.16 | 19.204 | |
| 4,400.0 | 4,324.1 | 4,327.1 | 4,327.1 | 17.5 | 86.5 | 106.21 | -1,792.4 | 562.8 | 1,948.4 | 1,844.9 | 103.52 | 18.821 | |
| 4,500.0 | 4,422.0 | 4,425.0 | 4,425.0 | 17.9 | 88.5 | 106.77 | -1,792.4 | 562.8 | 1,954.3 | 1,848.5 | 105.88 | 18.458 | |
| 4,600.0 | 4,519.9 | 4,522.9 | 4,522.9 | 18.4 | 90.5 | 107.33 | -1,792.4 | 562.8 | 1,960.4 | 1,852.2 | 108.24 | 18.112 | |
| 4,700.0 | 4,617.8 | 4,620.8 | 4,620.8 | 18.8 | 92.4 | 107.89 | -1,792.4 | 562.8 | 1,966.7 | 1,856.1 | 110.59 | 17.784 | |
| 4,800.0 | 4,715.7 | 4,718.7 | 4,718.7 | 19.3 | 94.4 | 108.44 | -1,792.4 | 562.8 | 1,973.2 | 1,860.3 | 112.94 | 17.471 | |
| 4,900.0 | 4,813.6 | 4,816.6 | 4,816.6 | 19.7 | 96.3 | 108.99 | -1,792.4 | 562.8 | 1,979.9 | 1,864.6 | 115.29 | 17.173 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-1 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,000.0 | 4,911.5 | 4,914.5 | 4,914.5 | 20.2 | 98.3 | 109.54 | -1,792.4 | 562.8 | 1,986.7 | 1,869.1 | 117.63 | 16.889 | |
| 5,100.0 | 5,009.4 | 5,012.4 | 5,012.4 | 20.6 | 100.2 | 110.08 | -1,792.4 | 562.8 | 1,993.8 | 1,873.8 | 119.97 | 16.619 | |
| 5,200.0 | 5,107.3 | 5,110.3 | 5,110.3 | 21.1 | 102.2 | 110.62 | -1,792.4 | 562.8 | 2,001.0 | 1,878.7 | 122.31 | 16.360 | |
| 5,300.0 | 5,205.2 | 5,208.2 | 5,208.2 | 21.5 | 104.2 | 111.15 | -1,792.4 | 562.8 | 2,008.4 | 1,883.8 | 124.65 | 16.113 | |
| 5,400.0 | 5,303.1 | 5,306.1 | 5,306.1 | 22.0 | 106.1 | 111.68 | -1,792.4 | 562.8 | 2,016.0 | 1,889.0 | 126.98 | 15.877 | |
| 5,500.0 | 5,401.2 | 5,404.2 | 5,404.2 | 22.4 | 108.1 | 112.29 | -1,792.4 | 562.8 | 2,023.3 | 1,893.9 | 129.33 | 15.644 | |
| 5,600.0 | 5,500.0 | 5,503.0 | 5,503.0 | 22.6 | 110.1 | 112.81 | -1,792.4 | 562.8 | 2,029.4 | 1,897.8 | 131.60 | 15.420 | |
| 5,700.0 | 5,599.2 | 5,602.2 | 5,602.2 | 22.9 | 112.0 | 113.22 | -1,792.4 | 562.8 | 2,034.2 | 1,900.3 | 133.85 | 15.198 | |
| 5,800.0 | 5,698.9 | 5,701.9 | 5,701.9 | 23.1 | 114.0 | 113.51 | -1,792.4 | 562.8 | 2,037.7 | 1,901.6 | 136.05 | 14.977 | |
| 5,900.0 | 5,798.7 | 5,801.7 | 5,801.7 | 23.2 | 116.0 | 113.68 | -1,792.4 | 562.8 | 2,039.8 | 1,901.6 | 138.22 | 14.758 | |
| 6,000.0 | 5,898.7 | 5,901.7 | 5,901.7 | 23.4 | 118.0 | 113.74 | -1,792.4 | 562.8 | 2,040.5 | 1,900.2 | 140.34 | 14.540 | |
| 6,100.0 | 5,998.7 | 6,001.7 | 6,001.7 | 23.5 | 120.0 | -167.53 | -1,792.4 | 562.8 | 2,040.5 | 1,898.0 | 142.45 | 14.324 | |
| 6,200.0 | 6,098.6 | 6,101.6 | 6,101.6 | 23.6 | 122.0 | 12.51 | -1,792.4 | 562.8 | 2,038.6 | 1,894.4 | 144.16 | 14.141 | |
| 6,300.0 | 6,197.6 | 6,200.6 | 6,200.6 | 23.7 | 124.0 | 12.82 | -1,792.4 | 562.8 | 2,025.2 | 1,881.5 | 143.67 | 14.096 | |
| 6,400.0 | 6,294.0 | 6,297.0 | 6,297.0 | 23.7 | 125.9 | 13.44 | -1,792.4 | 562.8 | 1,999.4 | 1,858.6 | 140.76 | 14.204 | |
| 6,500.0 | 6,386.1 | 6,389.1 | 6,389.1 | 23.7 | 127.8 | 14.45 | -1,792.4 | 562.8 | 1,961.5 | 1,826.0 | 135.48 | 14.478 | |
| 6,600.0 | 6,472.3 | 6,475.3 | 6,475.3 | 23.8 | 129.5 | 15.96 | -1,792.4 | 562.8 | 1,912.3 | 1,784.2 | 128.12 | 14.926 | |
| 6,700.0 | 6,551.2 | 6,554.2 | 6,554.2 | 23.8 | 131.1 | 18.13 | -1,792.4 | 562.8 | 1,852.6 | 1,733.4 | 119.22 | 15.539 | |
| 6,800.0 | 6,621.4 | 6,624.4 | 6,624.4 | 23.9 | 132.5 | 21.28 | -1,792.4 | 562.8 | 1,783.6 | 1,673.7 | 109.96 | 16.220 | |
| 6,900.0 | 6,681.7 | 6,684.7 | 6,684.7 | 24.0 | 133.7 | 25.90 | -1,792.4 | 562.8 | 1,706.6 | 1,603.9 | 102.69 | 16.619 | |
| 7,000.0 | 6,731.1 | 6,734.1 | 6,734.1 | 24.3 | 134.7 | 32.87 | -1,792.4 | 562.8 | 1,622.8 | 1,521.2 | 101.63 | 15.968 | |
| 7,100.0 | 6,768.7 | 6,771.7 | 6,771.7 | 24.6 | 135.4 | 43.56 | -1,792.4 | 562.8 | 1,533.9 | 1,422.0 | 111.90 | 13.707 | |
| 7,200.0 | 6,793.9 | 6,796.9 | 6,796.9 | 25.0 | 135.9 | 59.54 | -1,792.4 | 562.8 | 1,441.5 | 1,308.1 | 133.45 | 10.802 | |
| 7,300.0 | 6,807.1 | 6,810.1 | 6,810.1 | 25.6 | 136.2 | 73.18 | -1,792.4 | 562.8 | 1,347.5 | 1,199.1 | 148.40 | 9.081 | |
| 7,400.0 | 6,816.0 | 6,819.0 | 6,819.0 | 26.4 | 136.4 | 82.18 | -1,792.4 | 562.8 | 1,253.8 | 1,098.8 | 155.00 | 8.089 | |
| 7,500.0 | 6,817.4 | 6,820.4 | 6,820.4 | 27.3 | 136.4 | 90.27 | -1,792.4 | 562.8 | 1,160.8 | 1,002.7 | 158.09 | 7.342 | |
| 7,600.0 | 6,817.2 | 6,820.2 | 6,820.2 | 28.3 | 136.4 | 90.24 | -1,792.4 | 562.8 | 1,068.9 | 909.5 | 159.40 | 6.706 | |
| 7,700.0 | 6,817.0 | 6,820.0 | 6,820.0 | 29.3 | 136.4 | 90.22 | -1,792.4 | 562.8 | 978.7 | 817.9 | 160.79 | 6.087 | |
| 7,800.0 | 6,816.9 | 6,819.9 | 6,819.9 | 30.5 | 136.4 | 90.19 | -1,792.4 | 562.8 | 890.5 | 728.3 | 162.25 | 5.489 | |
| 7,900.0 | 6,816.7 | 6,819.7 | 6,819.7 | 31.8 | 136.4 | 90.17 | -1,792.4 | 562.8 | 805.1 | 641.4 | 163.77 | 4.916 | |
| 8,000.0 | 6,816.5 | 6,819.5 | 6,819.5 | 33.1 | 136.4 | 90.14 | -1,792.4 | 562.8 | 723.5 | 558.2 | 165.33 | 4.376 | |
| 8,100.0 | 6,816.3 | 6,819.3 | 6,819.3 | 34.5 | 136.4 | 90.12 | -1,792.4 | 562.8 | 647.0 | 480.1 | 166.93 | 3.876 | |
| 8,200.0 | 6,816.1 | 6,819.1 | 6,819.1 | 36.0 | 136.4 | 90.09 | -1,792.4 | 562.8 | 577.8 | 409.2 | 168.57 | 3.428 | |
| 8,300.0 | 6,815.9 | 6,818.9 | 6,818.9 | 37.5 | 136.4 | 90.07 | -1,792.4 | 562.8 | 518.7 | 348.5 | 170.23 | 3.047 | |
| 8,400.0 | 6,815.7 | 6,818.7 | 6,818.7 | 39.0 | 136.4 | 90.04 | -1,792.4 | 562.8 | 473.6 | 301.6 | 171.92 | 2.755 | |
| 8,500.0 | 6,815.5 | 6,818.5 | 6,818.5 | 40.6 | 136.4 | 90.02 | -1,792.4 | 562.8 | 446.6 | 273.0 | 173.64 | 2.572 | |
| 8,574.0 | 6,815.4 | 6,818.4 | 6,818.4 | 41.8 | 136.4 | 90.00 | -1,792.4 | 562.8 | 440.5 | 265.5 | 174.92 | 2.518 | CC, ES |
| 8,600.0 | 6,815.3 | 6,818.3 | 6,818.3 | 42.2 | 136.4 | 89.99 | -1,792.4 | 562.8 | 441.2 | 265.9 | 175.37 | 2.516 | SF |
| 8,700.0 | 6,815.1 | 6,818.1 | 6,818.1 | 43.8 | 136.4 | 89.97 | -1,792.4 | 562.8 | 458.1 | 281.0 | 177.12 | 2.587 | |
| 8,800.0 | 6,814.9 | 6,817.9 | 6,817.9 | 45.5 | 136.4 | 89.94 | -1,792.4 | 562.8 | 495.1 | 316.2 | 178.88 | 2.768 | |
| 8,900.0 | 6,814.7 | 6,817.7 | 6,817.7 | 47.1 | 136.4 | 89.92 | -1,792.4 | 562.8 | 548.0 | 367.4 | 180.66 | 3.033 | |
| 9,000.0 | 6,814.5 | 6,817.5 | 6,817.5 | 48.8 | 136.4 | 89.89 | -1,792.4 | 562.8 | 612.8 | 430.4 | 182.44 | 3.359 | |
| 9,100.0 | 6,814.4 | 6,817.4 | 6,817.4 | 50.5 | 136.3 | 89.87 | -1,792.4 | 562.8 | 686.1 | 501.9 | 184.24 | 3.724 | |
| 9,200.0 | 6,814.2 | 6,817.2 | 6,817.2 | 52.2 | 136.3 | 89.84 | -1,792.4 | 562.8 | 765.5 | 579.4 | 186.04 | 4.114 | |
| 9,300.0 | 6,814.0 | 6,817.0 | 6,817.0 | 54.0 | 136.3 | 89.82 | -1,792.4 | 562.8 | 849.2 | 661.3 | 187.86 | 4.520 | |
| 9,400.0 | 6,813.8 | 6,816.8 | 6,816.8 | 55.7 | 136.3 | 89.79 | -1,792.4 | 562.8 | 936.1 | 746.5 | 189.68 | 4.935 | |
| 9,500.0 | 6,813.6 | 6,816.6 | 6,816.6 | 57.5 | 136.3 | 89.77 | -1,792.4 | 562.8 | 1,025.5 | 833.9 | 191.51 | 5.355 | |
| 9,600.0 | 6,813.4 | 6,816.4 | 6,816.4 | 59.3 | 136.3 | 89.74 | -1,792.4 | 562.8 | 1,116.6 | 923.2 | 193.34 | 5.775 | |
| 9,700.0 | 6,813.2 | 6,816.2 | 6,816.2 | 61.0 | 136.3 | 89.72 | -1,792.4 | 562.8 | 1,209.1 | 1,013.9 | 195.18 | 6.195 | |
| 9,800.0 | 6,813.0 | 6,816.0 | 6,816.0 | 62.8 | 136.3 | 89.69 | -1,792.4 | 562.8 | 1,302.8 | 1,105.7 | 197.02 | 6.612 | |
| 9,900.0 | 6,812.8 | 6,815.8 | 6,815.8 | 64.6 | 136.3 | 89.67 | -1,792.4 | 562.8 | 1,397.3 | 1,198.4 | 198.87 | 7.026 | |

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

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-1 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Offset Well Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

| 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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,000.0 | 6,812.6 | 6,815.6 | 6,815.6 | 66.4 | 136.3 | 89.64 | -1,792.4 | 562.8 | 1,492.5 | 1,291.8 | 200.72 | 7.436 | |
| 10,100.0 | 6,812.4 | 6,815.4 | 6,815.4 | 68.2 | 136.3 | 89.62 | -1,792.4 | 562.8 | 1,588.3 | 1,385.8 | 202.57 | 7.841 | |
| 10,200.0 | 6,812.2 | 6,815.2 | 6,815.2 | 70.0 | 136.3 | 89.59 | -1,792.4 | 562.8 | 1,684.6 | 1,480.2 | 204.43 | 8.241 | |
| 10,300.0 | 6,812.1 | 6,815.1 | 6,815.1 | 71.9 | 136.3 | 89.57 | -1,792.4 | 562.8 | 1,781.4 | 1,575.1 | 206.29 | 8.635 | |
| 10,400.0 | 6,811.9 | 6,814.9 | 6,814.9 | 73.7 | 136.3 | 89.54 | -1,792.4 | 562.8 | 1,878.4 | 1,670.3 | 208.16 | 9.024 | |
| 10,500.0 | 6,811.7 | 6,814.7 | 6,814.7 | 75.5 | 136.3 | 89.52 | -1,792.4 | 562.8 | 1,975.8 | 1,765.7 | 210.02 | 9.407 | |
| 10,600.0 | 6,811.5 | 6,814.5 | 6,814.5 | 77.3 | 136.3 | 89.49 | -1,792.4 | 562.8 | 2,073.4 | 1,861.5 | 211.89 | 9.785 | |
| 10,700.0 | 6,811.3 | 6,814.3 | 6,814.3 | 79.2 | 136.3 | 89.47 | -1,792.4 | 562.8 | 2,171.2 | 1,957.4 | 213.76 | 10.157 | |
| 10,800.0 | 6,811.1 | 6,814.1 | 6,814.1 | 81.0 | 136.3 | 89.44 | -1,792.4 | 562.8 | 2,269.2 | 2,053.6 | 215.64 | 10.523 | |
| 10,900.0 | 6,810.9 | 6,813.9 | 6,813.9 | 82.9 | 136.3 | 89.42 | -1,792.4 | 562.8 | 2,367.4 | 2,149.9 | 217.51 | 10.884 | |
| 11,000.0 | 6,810.7 | 6,813.7 | 6,813.7 | 84.7 | 136.3 | 89.39 | -1,792.4 | 562.8 | 2,465.7 | 2,246.3 | 219.39 | 11.239 | |
| 11,100.0 | 6,810.5 | 6,813.5 | 6,813.5 | 86.6 | 136.3 | 89.37 | -1,792.4 | 562.8 | 2,564.2 | 2,342.9 | 221.27 | 11.589 | |
| 11,200.0 | 6,810.3 | 6,813.3 | 6,813.3 | 88.4 | 136.3 | 89.34 | -1,792.4 | 562.8 | 2,662.7 | 2,439.6 | 223.15 | 11.933 | |
| 11,300.0 | 6,810.1 | 6,813.1 | 6,813.1 | 90.3 | 136.3 | 89.32 | -1,792.4 | 562.8 | 2,761.4 | 2,536.4 | 225.03 | 12.271 | |
| 11,400.0 | 6,809.9 | 6,812.9 | 6,812.9 | 92.1 | 136.3 | 89.29 | -1,792.4 | 562.8 | 2,860.2 | 2,633.2 | 226.91 | 12.605 | |
| 11,500.0 | 6,809.7 | 6,812.7 | 6,812.7 | 94.0 | 136.3 | 89.27 | -1,792.4 | 562.8 | 2,959.0 | 2,730.2 | 228.79 | 12.933 | |
| 11,600.0 | 6,809.6 | 6,812.6 | 6,812.6 | 95.9 | 136.3 | 89.24 | -1,792.4 | 562.8 | 3,057.9 | 2,827.2 | 230.68 | 13.256 | |
| 11,700.0 | 6,809.4 | 6,812.4 | 6,812.4 | 97.7 | 136.2 | 89.22 | -1,792.4 | 562.8 | 3,156.9 | 2,924.3 | 232.57 | 13.574 | |
| 11,800.0 | 6,809.2 | 6,812.2 | 6,812.2 | 99.6 | 136.2 | 89.19 | -1,792.4 | 562.8 | 3,256.0 | 3,021.5 | 234.45 | 13.888 | |
| 11,900.0 | 6,809.0 | 6,812.0 | 6,812.0 | 101.5 | 136.2 | 89.17 | -1,792.4 | 562.8 | 3,355.1 | 3,118.7 | 236.34 | 14.196 | |
| 12,000.0 | 6,808.8 | 6,811.8 | 6,811.8 | 103.3 | 136.2 | 89.14 | -1,792.4 | 562.8 | 3,454.2 | 3,216.0 | 238.23 | 14.500 | |
| 12,100.0 | 6,808.6 | 6,811.6 | 6,811.6 | 105.2 | 136.2 | 89.12 | -1,792.4 | 562.8 | 3,553.4 | 3,313.3 | 240.12 | 14.799 | |
| 12,200.0 | 6,808.4 | 6,811.4 | 6,811.4 | 107.1 | 136.2 | 89.09 | -1,792.4 | 562.8 | 3,652.7 | 3,410.7 | 242.01 | 15.093 | |
| 12,300.0 | 6,808.2 | 6,811.2 | 6,811.2 | 109.0 | 136.2 | 89.07 | -1,792.4 | 562.8 | 3,752.0 | 3,508.1 | 243.90 | 15.383 | |
| 12,400.0 | 6,808.0 | 6,811.0 | 6,811.0 | 110.8 | 136.2 | 89.04 | -1,792.4 | 562.8 | 3,851.3 | 3,605.5 | 245.80 | 15.669 | |
| 12,500.0 | 6,807.8 | 6,810.8 | 6,810.8 | 112.7 | 136.2 | 89.02 | -1,792.4 | 562.8 | 3,950.7 | 3,703.0 | 247.69 | 15.950 | |
| 12,600.0 | 6,807.6 | 6,810.6 | 6,810.6 | 114.6 | 136.2 | 88.99 | -1,792.4 | 562.8 | 4,050.1 | 3,800.5 | 249.58 | 16.227 | |
| 12,700.0 | 6,807.4 | 6,810.4 | 6,810.4 | 116.5 | 136.2 | 88.97 | -1,792.4 | 562.8 | 4,149.5 | 3,898.0 | 251.48 | 16.500 | |
| 12,800.0 | 6,807.3 | 6,810.3 | 6,810.3 | 118.4 | 136.2 | 88.94 | -1,792.4 | 562.8 | 4,248.9 | 3,995.6 | 253.37 | 16.770 | |
| 12,900.0 | 6,807.1 | 6,810.1 | 6,810.1 | 120.3 | 136.2 | 88.92 | -1,792.4 | 562.8 | 4,348.4 | 4,093.1 | 255.27 | 17.035 | |
| 13,000.0 | 6,806.9 | 6,809.9 | 6,809.9 | 122.1 | 136.2 | 88.89 | -1,792.4 | 562.8 | 4,447.9 | 4,190.7 | 257.16 | 17.296 | |
| 13,100.0 | 6,806.7 | 6,809.7 | 6,809.7 | 124.0 | 136.2 | 88.87 | -1,792.4 | 562.8 | 4,547.4 | 4,288.4 | 259.06 | 17.554 | |
| 13,200.0 | 6,806.5 | 6,809.5 | 6,809.5 | 125.9 | 136.2 | 88.84 | -1,792.4 | 562.8 | 4,647.0 | 4,386.0 | 260.96 | 17.807 | |
| 13,300.0 | 6,806.3 | 6,809.3 | 6,809.3 | 127.8 | 136.2 | 88.82 | -1,792.4 | 562.8 | 4,746.5 | 4,483.7 | 262.85 | 18.058 | |
| 13,400.0 | 6,806.1 | 6,809.1 | 6,809.1 | 129.7 | 136.2 | 88.79 | -1,792.4 | 562.8 | 4,846.1 | 4,581.3 | 264.75 | 18.304 | |
| 13,500.0 | 6,805.9 | 6,808.9 | 6,808.9 | 131.6 | 136.2 | 88.77 | -1,792.4 | 562.8 | 4,945.7 | 4,679.0 | 266.65 | 18.548 | |
| 13,600.0 | 6,805.7 | 6,808.7 | 6,808.7 | 133.5 | 136.2 | 88.75 | -1,792.4 | 562.8 | 5,045.3 | 4,776.7 | 268.55 | 18.787 | |
| 13,700.0 | 6,805.5 | 6,808.5 | 6,808.5 | 135.4 | 136.2 | 88.72 | -1,792.4 | 562.8 | 5,144.9 | 4,874.5 | 270.45 | 19.024 | |
| 13,800.0 | 6,805.3 | 6,808.3 | 6,808.3 | 137.3 | 136.2 | 88.70 | -1,792.4 | 562.8 | 5,244.6 | 4,972.2 | 272.34 | 19.257 | |
| 13,900.0 | 6,805.1 | 6,808.1 | 6,808.1 | 139.2 | 136.2 | 88.67 | -1,792.4 | 562.8 | 5,344.2 | 5,070.0 | 274.24 | 19.487 | |
| 13,973.0 | 6,805.0 | 6,808.0 | 6,808.0 | 140.6 | 136.2 | 88.65 | -1,792.4 | 562.8 | 5,417.0 | 5,141.4 | 275.63 | 19.653 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-2 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 128.30 | -444.4 | 562.8 | 717.4 | | | | |
| 100.0 | 100.0 | 82.0 | 82.0 | 0.1 | 1.6 | 128.30 | -444.4 | 562.8 | 717.1 | 715.4 | 1.75 | 409.189 | |
| 200.0 | 200.0 | 182.0 | 182.0 | 0.3 | 3.6 | 128.30 | -444.4 | 562.8 | 717.1 | 713.2 | 3.98 | 180.306 | |
| 300.0 | 300.0 | 282.0 | 282.0 | 0.6 | 5.6 | 128.30 | -444.4 | 562.8 | 717.1 | 710.9 | 6.20 | 115.628 | |
| 400.0 | 400.0 | 382.0 | 382.0 | 0.8 | 7.6 | 128.30 | -444.4 | 562.8 | 717.1 | 708.7 | 8.43 | 85.101 | |
| 500.0 | 500.0 | 482.0 | 482.0 | 1.0 | 9.6 | 49.69 | -444.4 | 562.8 | 716.0 | 705.4 | 10.64 | 67.300 | |
| 600.0 | 599.8 | 581.8 | 581.8 | 1.2 | 11.6 | 50.07 | -444.4 | 562.8 | 712.6 | 699.8 | 12.84 | 55.500 | |
| 700.0 | 699.5 | 681.5 | 681.5 | 1.5 | 13.6 | 50.69 | -444.4 | 562.8 | 707.1 | 692.0 | 15.04 | 47.007 | |
| 800.0 | 798.7 | 780.7 | 780.7 | 1.7 | 15.6 | 51.58 | -444.4 | 562.8 | 699.4 | 682.1 | 17.25 | 40.553 | |
| 900.0 | 897.5 | 879.5 | 879.5 | 2.0 | 17.6 | 52.75 | -444.4 | 562.8 | 689.7 | 670.2 | 19.46 | 35.441 | |
| 1,000.0 | 995.6 | 977.6 | 977.6 | 2.4 | 19.6 | 54.18 | -444.4 | 562.8 | 678.2 | 656.5 | 21.70 | 31.254 | |
| 1,100.0 | 1,093.5 | 1,075.5 | 1,075.5 | 2.8 | 21.5 | 55.58 | -444.4 | 562.8 | 666.3 | 642.3 | 24.01 | 27.753 | |
| 1,200.0 | 1,191.4 | 1,173.4 | 1,173.4 | 3.2 | 23.5 | 57.03 | -444.4 | 562.8 | 654.8 | 628.5 | 26.34 | 24.862 | |
| 1,300.0 | 1,289.3 | 1,271.3 | 1,271.3 | 3.6 | 25.4 | 58.53 | -444.4 | 562.8 | 643.8 | 615.1 | 28.69 | 22.442 | |
| 1,400.0 | 1,387.2 | 1,369.2 | 1,369.2 | 4.1 | 27.4 | 60.08 | -444.4 | 562.8 | 633.2 | 602.2 | 31.05 | 20.392 | |
| 1,500.0 | 1,485.1 | 1,467.1 | 1,467.1 | 4.5 | 29.3 | 61.68 | -444.4 | 562.8 | 623.1 | 589.7 | 33.43 | 18.639 | |
| 1,600.0 | 1,583.0 | 1,565.0 | 1,565.0 | 4.9 | 31.3 | 63.33 | -444.4 | 562.8 | 613.5 | 577.7 | 35.82 | 17.128 | |
| 1,700.0 | 1,680.9 | 1,662.9 | 1,662.9 | 5.4 | 33.3 | 65.03 | -444.4 | 562.8 | 604.5 | 566.3 | 38.23 | 15.814 | |
| 1,800.0 | 1,778.8 | 1,760.8 | 1,760.8 | 5.8 | 35.2 | 66.77 | -444.4 | 562.8 | 596.0 | 555.4 | 40.64 | 14.667 | |
| 1,900.0 | 1,876.7 | 1,858.7 | 1,858.7 | 6.2 | 37.2 | 68.57 | -444.4 | 562.8 | 588.1 | 545.1 | 43.06 | 13.658 | |
| 2,000.0 | 1,974.6 | 1,956.6 | 1,956.6 | 6.7 | 39.1 | 70.41 | -444.4 | 562.8 | 580.9 | 535.4 | 45.49 | 12.768 | |
| 2,100.0 | 2,072.5 | 2,054.5 | 2,054.5 | 7.1 | 41.1 | 72.29 | -444.4 | 562.8 | 574.2 | 526.3 | 47.93 | 11.980 | |
| 2,200.0 | 2,170.4 | 2,152.4 | 2,152.4 | 7.6 | 43.0 | 74.21 | -444.4 | 562.8 | 568.2 | 517.8 | 50.37 | 11.281 | |
| 2,300.0 | 2,268.3 | 2,250.3 | 2,250.3 | 8.0 | 45.0 | 76.17 | -444.4 | 562.8 | 562.9 | 510.1 | 52.81 | 10.658 | |
| 2,400.0 | 2,366.2 | 2,348.2 | 2,348.2 | 8.5 | 47.0 | 78.16 | -444.4 | 562.8 | 558.3 | 503.0 | 55.26 | 10.102 | |
| 2,500.0 | 2,464.1 | 2,446.1 | 2,446.1 | 8.9 | 48.9 | 80.18 | -444.4 | 562.8 | 554.3 | 496.6 | 57.71 | 9.606 | |
| 2,600.0 | 2,562.0 | 2,544.0 | 2,544.0 | 9.4 | 50.9 | 82.23 | -444.4 | 562.8 | 551.2 | 491.0 | 60.15 | 9.163 | |
| 2,700.0 | 2,659.9 | 2,641.9 | 2,641.9 | 9.8 | 52.8 | 84.30 | -444.4 | 562.8 | 548.7 | 486.1 | 62.59 | 8.767 | |
| 2,800.0 | 2,757.8 | 2,739.8 | 2,739.8 | 10.3 | 54.8 | 86.38 | -444.4 | 562.8 | 547.0 | 482.0 | 65.02 | 8.413 | |
| 2,900.0 | 2,855.7 | 2,837.7 | 2,837.7 | 10.7 | 56.8 | 88.47 | -444.4 | 562.8 | 546.1 | 478.6 | 67.45 | 8.096 | |
| 2,972.9 | 2,927.1 | 2,909.1 | 2,909.1 | 11.0 | 58.2 | 90.00 | -444.4 | 562.8 | 545.9 | 476.7 | 69.21 | 7.887 | |
| 3,000.0 | 2,953.6 | 2,935.6 | 2,935.6 | 11.2 | 58.7 | 90.57 | -444.4 | 562.8 | 545.9 | 476.1 | 69.87 | 7.814 | |
| 3,100.0 | 3,051.5 | 3,033.5 | 3,033.5 | 11.6 | 60.7 | 92.66 | -444.4 | 562.8 | 546.5 | 474.2 | 72.27 | 7.562 | |
| 3,200.0 | 3,149.4 | 3,131.4 | 3,131.4 | 12.1 | 62.6 | 94.75 | -444.4 | 562.8 | 547.8 | 473.2 | 74.66 | 7.338 | |
| 3,300.0 | 3,247.3 | 3,229.3 | 3,229.3 | 12.5 | 64.6 | 96.82 | -444.4 | 562.8 | 550.0 | 472.9 | 77.04 | 7.138 | |
| 3,400.0 | 3,345.2 | 3,327.2 | 3,327.2 | 13.0 | 66.5 | 98.88 | -444.4 | 562.8 | 552.8 | 473.4 | 79.40 | 6.962 | |
| 3,500.0 | 3,443.1 | 3,425.1 | 3,425.1 | 13.4 | 68.5 | 100.91 | -444.4 | 562.8 | 556.4 | 474.6 | 81.75 | 6.806 | |
| 3,600.0 | 3,540.9 | 3,522.9 | 3,522.9 | 13.9 | 70.5 | 102.92 | -444.4 | 562.8 | 560.7 | 476.6 | 84.08 | 6.668 | |
| 3,700.0 | 3,638.8 | 3,620.8 | 3,620.8 | 14.3 | 72.4 | 104.90 | -444.4 | 562.8 | 565.7 | 479.3 | 86.40 | 6.547 | |
| 3,800.0 | 3,736.7 | 3,718.7 | 3,718.7 | 14.8 | 74.4 | 106.83 | -444.4 | 562.8 | 571.4 | 482.7 | 88.70 | 6.442 | |
| 3,900.0 | 3,834.6 | 3,816.6 | 3,816.6 | 15.2 | 76.3 | 108.74 | -444.4 | 562.8 | 577.7 | 486.7 | 90.98 | 6.350 | |
| 4,000.0 | 3,932.5 | 3,914.5 | 3,914.5 | 15.7 | 78.3 | 110.59 | -444.4 | 562.8 | 584.7 | 491.5 | 93.24 | 6.271 | |
| 4,100.0 | 4,030.4 | 4,012.4 | 4,012.4 | 16.1 | 80.2 | 112.41 | -444.4 | 562.8 | 592.3 | 496.8 | 95.49 | 6.203 | |
| 4,200.0 | 4,128.3 | 4,110.3 | 4,110.3 | 16.6 | 82.2 | 114.18 | -444.4 | 562.8 | 600.5 | 502.8 | 97.73 | 6.145 | |
| 4,300.0 | 4,226.2 | 4,208.2 | 4,208.2 | 17.0 | 84.2 | 115.90 | -444.4 | 562.8 | 609.3 | 509.4 | 99.95 | 6.096 | |
| 4,400.0 | 4,324.1 | 4,306.1 | 4,306.1 | 17.5 | 86.1 | 117.57 | -444.4 | 562.8 | 618.7 | 516.5 | 102.16 | 6.056 | |
| 4,500.0 | 4,422.0 | 4,404.0 | 4,404.0 | 17.9 | 88.1 | 119.19 | -444.4 | 562.8 | 628.5 | 524.2 | 104.36 | 6.023 | |
| 4,600.0 | 4,519.9 | 4,501.9 | 4,501.9 | 18.4 | 90.0 | 120.76 | -444.4 | 562.8 | 638.9 | 532.3 | 106.54 | 5.997 | |
| 4,700.0 | 4,617.8 | 4,599.8 | 4,599.8 | 18.8 | 92.0 | 122.29 | -444.4 | 562.8 | 649.7 | 541.0 | 108.71 | 5.976 | |
| 4,800.0 | 4,715.7 | 4,697.7 | 4,697.7 | 19.3 | 94.0 | 123.76 | -444.4 | 562.8 | 661.0 | 550.1 | 110.88 | 5.961 | |
| 4,900.0 | 4,813.6 | 4,795.6 | 4,795.6 | 19.7 | 95.9 | 125.18 | -444.4 | 562.8 | 672.7 | 559.7 | 113.04 | 5.951 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-2 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,000.0 | 4,911.5 | 4,893.5 | 4,893.5 | 20.2 | 97.9 | 126.56 | -444.4 | 562.8 | 684.8 | 569.7 | 115.18 | 5.946 | |
| 5,100.0 | 5,009.4 | 4,991.4 | 4,991.4 | 20.6 | 99.8 | 127.89 | -444.4 | 562.8 | 697.3 | 580.0 | 117.33 | 5.944 | |
| 5,200.0 | 5,107.3 | 5,089.3 | 5,089.3 | 21.1 | 101.8 | 129.17 | -444.4 | 562.8 | 710.2 | 590.8 | 119.46 | 5.945 | |
| 5,300.0 | 5,205.2 | 5,187.2 | 5,187.2 | 21.5 | 103.7 | 130.41 | -444.4 | 562.8 | 723.4 | 601.8 | 121.59 | 5.950 | |
| 5,400.0 | 5,303.1 | 5,285.1 | 5,285.1 | 22.0 | 105.7 | 131.60 | -444.4 | 562.8 | 737.0 | 613.3 | 123.72 | 5.957 | |
| 5,500.0 | 5,401.2 | 5,383.2 | 5,383.2 | 22.4 | 107.7 | 132.85 | -444.4 | 562.8 | 750.0 | 623.9 | 126.06 | 5.949 | |
| 5,600.0 | 5,500.0 | 5,482.0 | 5,482.0 | 22.6 | 109.6 | 133.87 | -444.4 | 562.8 | 760.8 | 632.4 | 128.37 | 5.926 | |
| 5,700.0 | 5,599.2 | 5,581.2 | 5,581.2 | 22.9 | 111.6 | 134.64 | -444.4 | 562.8 | 769.4 | 638.7 | 130.66 | 5.888 | |
| 5,800.0 | 5,698.9 | 5,680.9 | 5,680.9 | 23.1 | 113.6 | 135.19 | -444.4 | 562.8 | 775.6 | 642.7 | 132.90 | 5.836 | |
| 5,900.0 | 5,798.7 | 5,780.7 | 5,780.7 | 23.2 | 115.6 | 135.52 | -444.4 | 562.8 | 779.3 | 644.2 | 135.08 | 5.769 | |
| 6,000.0 | 5,898.7 | 5,880.7 | 5,880.7 | 23.4 | 117.6 | 135.63 | -444.4 | 562.8 | 780.6 | 643.4 | 137.21 | 5.689 | |
| 6,100.0 | 5,998.7 | 5,980.7 | 5,980.7 | 23.5 | 119.6 | -145.65 | -444.4 | 562.8 | 780.6 | 641.3 | 139.34 | 5.602 | |
| 6,200.0 | 6,098.6 | 6,080.6 | 6,080.6 | 23.6 | 121.6 | 34.51 | -444.4 | 562.8 | 779.0 | 637.8 | 141.12 | 5.520 | |
| 6,300.0 | 6,197.6 | 6,179.6 | 6,179.6 | 23.7 | 123.6 | 35.57 | -444.4 | 562.8 | 767.7 | 626.5 | 141.26 | 5.435 | |
| 6,400.0 | 6,294.0 | 6,276.0 | 6,276.0 | 23.7 | 125.5 | 37.74 | -444.4 | 562.8 | 746.2 | 606.3 | 139.86 | 5.335 | |
| 6,500.0 | 6,386.1 | 6,368.1 | 6,368.1 | 23.7 | 127.4 | 41.17 | -444.4 | 562.8 | 715.2 | 577.6 | 137.59 | 5.198 | |
| 6,600.0 | 6,472.3 | 6,454.3 | 6,454.3 | 23.8 | 129.1 | 46.05 | -444.4 | 562.8 | 676.1 | 540.5 | 135.58 | 4.987 | |
| 6,700.0 | 6,551.2 | 6,533.2 | 6,533.2 | 23.8 | 130.7 | 52.54 | -444.4 | 562.8 | 630.8 | 495.5 | 135.37 | 4.660 | |
| 6,800.0 | 6,621.4 | 6,603.4 | 6,603.4 | 23.9 | 132.1 | 60.52 | -444.4 | 562.8 | 582.1 | 444.0 | 138.08 | 4.215 | |
| 6,900.0 | 6,681.7 | 6,663.7 | 6,663.7 | 24.0 | 133.3 | 69.41 | -444.4 | 562.8 | 533.4 | 390.2 | 143.15 | 3.726 | |
| 7,000.0 | 6,731.1 | 6,713.1 | 6,713.1 | 24.3 | 134.3 | 78.03 | -444.4 | 562.8 | 489.7 | 341.3 | 148.36 | 3.301 | |
| 7,100.0 | 6,768.7 | 6,750.7 | 6,750.7 | 24.6 | 135.0 | 85.04 | -444.4 | 562.8 | 456.9 | 305.0 | 151.91 | 3.008 | |
| 7,200.0 | 6,793.9 | 6,775.9 | 6,775.9 | 25.0 | 135.5 | 89.39 | -444.4 | 562.8 | 441.2 | 287.3 | 153.84 | 2.868 | |
| 7,225.0 | 6,798.4 | 6,780.4 | 6,780.4 | 25.2 | 135.6 | 90.00 | -444.4 | 562.8 | 440.5 | 286.3 | 154.21 | 2.857 | CC, ES, SF |
| 7,300.0 | 6,807.1 | 6,789.1 | 6,789.1 | 25.6 | 135.8 | 91.01 | -444.4 | 562.8 | 446.7 | 291.6 | 155.14 | 2.880 | |
| 7,400.0 | 6,816.0 | 6,798.0 | 6,798.0 | 26.4 | 136.0 | 91.17 | -444.4 | 562.8 | 473.6 | 317.2 | 156.44 | 3.028 | |
| 7,500.0 | 6,817.4 | 6,799.4 | 6,799.4 | 27.3 | 136.0 | 89.93 | -444.4 | 562.8 | 518.8 | 361.1 | 157.65 | 3.290 | |
| 7,600.0 | 6,817.2 | 6,799.2 | 6,799.2 | 28.3 | 136.0 | 89.91 | -444.4 | 562.8 | 577.8 | 418.9 | 158.96 | 3.635 | |
| 7,700.0 | 6,817.0 | 6,799.0 | 6,799.0 | 29.3 | 136.0 | 89.88 | -444.4 | 562.8 | 647.1 | 486.7 | 160.35 | 4.035 | |
| 7,800.0 | 6,816.9 | 6,798.9 | 6,798.9 | 30.5 | 136.0 | 89.86 | -444.4 | 562.8 | 723.5 | 561.7 | 161.81 | 4.472 | |
| 7,900.0 | 6,816.7 | 6,798.7 | 6,798.7 | 31.8 | 136.0 | 89.83 | -444.4 | 562.8 | 805.2 | 641.8 | 163.32 | 4.930 | |
| 8,000.0 | 6,816.5 | 6,798.5 | 6,798.5 | 33.1 | 136.0 | 89.81 | -444.4 | 562.8 | 890.6 | 725.7 | 164.89 | 5.401 | |
| 8,100.0 | 6,816.3 | 6,798.3 | 6,798.3 | 34.5 | 136.0 | 89.78 | -444.4 | 562.8 | 978.7 | 812.2 | 166.49 | 5.879 | |
| 8,200.0 | 6,816.1 | 6,798.1 | 6,798.1 | 36.0 | 136.0 | 89.76 | -444.4 | 562.8 | 1,069.0 | 900.8 | 168.12 | 6.358 | |
| 8,300.0 | 6,815.9 | 6,797.9 | 6,797.9 | 37.5 | 136.0 | 89.73 | -444.4 | 562.8 | 1,160.8 | 991.0 | 169.79 | 6.837 | |
| 8,400.0 | 6,815.7 | 6,797.7 | 6,797.7 | 39.0 | 136.0 | 89.71 | -444.4 | 562.8 | 1,253.9 | 1,082.4 | 171.48 | 7.312 | |
| 8,500.0 | 6,815.5 | 6,797.5 | 6,797.5 | 40.6 | 136.0 | 89.68 | -444.4 | 562.8 | 1,348.0 | 1,174.8 | 173.19 | 7.783 | |
| 8,600.0 | 6,815.3 | 6,797.3 | 6,797.3 | 42.2 | 135.9 | 89.66 | -444.4 | 562.8 | 1,442.9 | 1,267.9 | 174.93 | 8.249 | |
| 8,700.0 | 6,815.1 | 6,797.1 | 6,797.1 | 43.8 | 135.9 | 89.63 | -444.4 | 562.8 | 1,538.4 | 1,361.7 | 176.67 | 8.708 | |
| 8,800.0 | 6,814.9 | 6,796.9 | 6,796.9 | 45.5 | 135.9 | 89.61 | -444.4 | 562.8 | 1,634.5 | 1,456.0 | 178.44 | 9.160 | |
| 8,900.0 | 6,814.7 | 6,796.7 | 6,796.7 | 47.1 | 135.9 | 89.58 | -444.4 | 562.8 | 1,731.0 | 1,550.8 | 180.21 | 9.605 | |
| 9,000.0 | 6,814.5 | 6,796.5 | 6,796.5 | 48.8 | 135.9 | 89.56 | -444.4 | 562.8 | 1,827.9 | 1,645.9 | 182.00 | 10.043 | |
| 9,100.0 | 6,814.4 | 6,796.4 | 6,796.4 | 50.5 | 135.9 | 89.53 | -444.4 | 562.8 | 1,925.1 | 1,741.3 | 183.79 | 10.474 | |
| 9,200.0 | 6,814.2 | 6,796.2 | 6,796.2 | 52.2 | 135.9 | 89.51 | -444.4 | 562.8 | 2,022.5 | 1,836.9 | 185.60 | 10.897 | |
| 9,300.0 | 6,814.0 | 6,796.0 | 6,796.0 | 54.0 | 135.9 | 89.48 | -444.4 | 562.8 | 2,120.3 | 1,932.8 | 187.41 | 11.313 | |
| 9,400.0 | 6,813.8 | 6,795.8 | 6,795.8 | 55.7 | 135.9 | 89.46 | -444.4 | 562.8 | 2,218.2 | 2,028.9 | 189.23 | 11.722 | |
| 9,500.0 | 6,813.6 | 6,795.6 | 6,795.6 | 57.5 | 135.9 | 89.43 | -444.4 | 562.8 | 2,316.3 | 2,125.2 | 191.06 | 12.123 | |
| 9,600.0 | 6,813.4 | 6,795.4 | 6,795.4 | 59.3 | 135.9 | 89.41 | -444.4 | 562.8 | 2,414.5 | 2,221.6 | 192.89 | 12.517 | |
| 9,700.0 | 6,813.2 | 6,795.2 | 6,795.2 | 61.0 | 135.9 | 89.38 | -444.4 | 562.8 | 2,512.9 | 2,318.2 | 194.73 | 12.905 | |
| 9,800.0 | 6,813.0 | 6,795.0 | 6,795.0 | 62.8 | 135.9 | 89.36 | -444.4 | 562.8 | 2,611.4 | 2,414.8 | 196.57 | 13.285 | |
| 9,900.0 | 6,812.8 | 6,794.8 | 6,794.8 | 64.6 | 135.9 | 89.33 | -444.4 | 562.8 | 2,710.0 | 2,511.6 | 198.42 | 13.658 | |

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

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Churchill 28-2 (Exist) - Wellbore #1 - Wellbore #

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,000.0 | 6,812.6 | 6,794.6 | 6,794.6 | 66.4 | 135.9 | 89.31 | -444.4 | 562.8 | 2,808.7 | 2,608.5 | 200.27 | 14.025 | |
| 10,100.0 | 6,812.4 | 6,794.4 | 6,794.4 | 68.2 | 135.9 | 89.28 | -444.4 | 562.8 | 2,907.5 | 2,705.4 | 202.12 | 14.385 | |
| 10,200.0 | 6,812.2 | 6,794.2 | 6,794.2 | 70.0 | 135.9 | 89.26 | -444.4 | 562.8 | 3,006.4 | 2,802.5 | 203.98 | 14.739 | |
| 10,300.0 | 6,812.1 | 6,794.1 | 6,794.1 | 71.9 | 135.9 | 89.23 | -444.4 | 562.8 | 3,105.4 | 2,899.5 | 205.84 | 15.086 | |
| 10,400.0 | 6,811.9 | 6,793.9 | 6,793.9 | 73.7 | 135.9 | 89.21 | -444.4 | 562.8 | 3,204.4 | 2,996.7 | 207.70 | 15.428 | |
| 10,500.0 | 6,811.7 | 6,793.7 | 6,793.7 | 75.5 | 135.9 | 89.18 | -444.4 | 562.8 | 3,303.5 | 3,093.9 | 209.57 | 15.763 | |
| 10,600.0 | 6,811.5 | 6,793.5 | 6,793.5 | 77.3 | 135.9 | 89.16 | -444.4 | 562.8 | 3,402.6 | 3,191.2 | 211.44 | 16.093 | |
| 10,700.0 | 6,811.3 | 6,793.3 | 6,793.3 | 79.2 | 135.9 | 89.13 | -444.4 | 562.8 | 3,501.8 | 3,288.5 | 213.31 | 16.417 | |
| 10,800.0 | 6,811.1 | 6,793.1 | 6,793.1 | 81.0 | 135.9 | 89.11 | -444.4 | 562.8 | 3,601.0 | 3,385.8 | 215.18 | 16.735 | |
| 10,900.0 | 6,810.9 | 6,792.9 | 6,792.9 | 82.9 | 135.9 | 89.08 | -444.4 | 562.8 | 3,700.3 | 3,483.2 | 217.06 | 17.048 | |
| 11,000.0 | 6,810.7 | 6,792.7 | 6,792.7 | 84.7 | 135.9 | 89.06 | -444.4 | 562.8 | 3,799.6 | 3,580.7 | 218.93 | 17.355 | |
| 11,100.0 | 6,810.5 | 6,792.5 | 6,792.5 | 86.6 | 135.9 | 89.03 | -444.4 | 562.8 | 3,898.9 | 3,678.1 | 220.81 | 17.657 | |
| 11,200.0 | 6,810.3 | 6,792.3 | 6,792.3 | 88.4 | 135.8 | 89.01 | -444.4 | 562.8 | 3,998.3 | 3,775.6 | 222.69 | 17.955 | |
| 11,300.0 | 6,810.1 | 6,792.1 | 6,792.1 | 90.3 | 135.8 | 88.98 | -444.4 | 562.8 | 4,097.7 | 3,873.2 | 224.57 | 18.247 | |
| 11,400.0 | 6,809.9 | 6,791.9 | 6,791.9 | 92.1 | 135.8 | 88.96 | -444.4 | 562.8 | 4,197.2 | 3,970.7 | 226.45 | 18.534 | |
| 11,500.0 | 6,809.7 | 6,791.7 | 6,791.7 | 94.0 | 135.8 | 88.93 | -444.4 | 562.8 | 4,296.6 | 4,068.3 | 228.34 | 18.817 | |
| 11,600.0 | 6,809.6 | 6,791.6 | 6,791.6 | 95.9 | 135.8 | 88.91 | -444.4 | 562.8 | 4,396.1 | 4,165.9 | 230.22 | 19.095 | |
| 11,700.0 | 6,809.4 | 6,791.4 | 6,791.4 | 97.7 | 135.8 | 88.88 | -444.4 | 562.8 | 4,495.6 | 4,263.5 | 232.11 | 19.369 | |
| 11,800.0 | 6,809.2 | 6,791.2 | 6,791.2 | 99.6 | 135.8 | 88.86 | -444.4 | 562.8 | 4,595.1 | 4,361.2 | 233.99 | 19.638 | |
| 11,900.0 | 6,809.0 | 6,791.0 | 6,791.0 | 101.5 | 135.8 | 88.83 | -444.4 | 562.8 | 4,694.7 | 4,458.8 | 235.88 | 19.903 | |
| 12,000.0 | 6,808.8 | 6,790.8 | 6,790.8 | 103.3 | 135.8 | 88.81 | -444.4 | 562.8 | 4,794.3 | 4,556.5 | 237.77 | 20.164 | |
| 12,100.0 | 6,808.6 | 6,790.6 | 6,790.6 | 105.2 | 135.8 | 88.78 | -444.4 | 562.8 | 4,893.8 | 4,654.2 | 239.66 | 20.420 | |
| 12,200.0 | 6,808.4 | 6,790.4 | 6,790.4 | 107.1 | 135.8 | 88.76 | -444.4 | 562.8 | 4,993.5 | 4,751.9 | 241.55 | 20.673 | |
| 12,300.0 | 6,808.2 | 6,790.2 | 6,790.2 | 109.0 | 135.8 | 88.73 | -444.4 | 562.8 | 5,093.1 | 4,849.6 | 243.44 | 20.921 | |
| 12,400.0 | 6,808.0 | 6,790.0 | 6,790.0 | 110.8 | 135.8 | 88.71 | -444.4 | 562.8 | 5,192.7 | 4,947.4 | 245.33 | 21.166 | |
| 12,500.0 | 6,807.8 | 6,789.8 | 6,789.8 | 112.7 | 135.8 | 88.68 | -444.4 | 562.8 | 5,292.3 | 5,045.1 | 247.22 | 21.407 | |
| 12,600.0 | 6,807.6 | 6,789.6 | 6,789.6 | 114.6 | 135.8 | 88.66 | -444.4 | 562.8 | 5,392.0 | 5,142.9 | 249.12 | 21.645 | |
| 12,700.0 | 6,807.4 | 6,789.4 | 6,789.4 | 116.5 | 135.8 | 88.63 | -444.4 | 562.8 | 5,491.7 | 5,240.7 | 251.01 | 21.878 | |
| 12,800.0 | 6,807.3 | 6,789.3 | 6,789.3 | 118.4 | 135.8 | 88.61 | -444.4 | 562.8 | 5,591.4 | 5,338.5 | 252.90 | 22.109 | |
| 12,900.0 | 6,807.1 | 6,789.1 | 6,789.1 | 120.3 | 135.8 | 88.58 | -444.4 | 562.8 | 5,691.1 | 5,436.3 | 254.80 | 22.336 | |
| 13,000.0 | 6,806.9 | 6,788.9 | 6,788.9 | 122.1 | 135.8 | 88.56 | -444.4 | 562.8 | 5,790.8 | 5,534.1 | 256.69 | 22.559 | |
| 13,100.0 | 6,806.7 | 6,788.7 | 6,788.7 | 124.0 | 135.8 | 88.53 | -444.4 | 562.8 | 5,890.5 | 5,631.9 | 258.59 | 22.779 | |
| 13,200.0 | 6,806.5 | 6,788.5 | 6,788.5 | 125.9 | 135.8 | 88.51 | -444.4 | 562.8 | 5,990.2 | 5,729.7 | 260.48 | 22.996 | |
| 13,300.0 | 6,806.3 | 6,788.3 | 6,788.3 | 127.8 | 135.8 | 88.48 | -444.4 | 562.8 | 6,089.9 | 5,827.6 | 262.38 | 23.210 | |
| 13,400.0 | 6,806.1 | 6,788.1 | 6,788.1 | 129.7 | 135.8 | 88.46 | -444.4 | 562.8 | 6,189.7 | 5,925.4 | 264.28 | 23.421 | |
| 13,500.0 | 6,805.9 | 6,787.9 | 6,787.9 | 131.6 | 135.8 | 88.43 | -444.4 | 562.8 | 6,289.4 | 6,023.3 | 266.17 | 23.629 | |
| 13,600.0 | 6,805.7 | 6,787.7 | 6,787.7 | 133.5 | 135.8 | 88.41 | -444.4 | 562.8 | 6,389.2 | 6,121.1 | 268.07 | 23.834 | |
| 13,700.0 | 6,805.5 | 6,787.5 | 6,787.5 | 135.4 | 135.8 | 88.38 | -444.4 | 562.8 | 6,488.9 | 6,219.0 | 269.97 | 24.036 | |
| 13,800.0 | 6,805.3 | 6,787.3 | 6,787.3 | 137.3 | 135.7 | 88.36 | -444.4 | 562.8 | 6,588.7 | 6,316.9 | 271.87 | 24.235 | |
| 13,900.0 | 6,805.1 | 6,787.1 | 6,787.1 | 139.2 | 135.7 | 88.33 | -444.4 | 562.8 | 6,688.5 | 6,414.7 | 273.77 | 24.431 | |
| 13,973.0 | 6,805.0 | 6,787.0 | 6,787.0 | 140.6 | 135.7 | 88.32 | -444.4 | 562.8 | 6,761.4 | 6,486.2 | 275.15 | 24.573 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Welsh 1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 1.0 | 1.0 | 0.0 | 0.0 | 172.10 | -4,400.8 | 610.3 | 4,443.0 | | | | |
| 100.0 | 100.0 | 101.0 | 101.0 | 0.1 | 2.0 | 172.10 | -4,400.8 | 610.3 | 4,443.0 | 4,440.8 | 2.13 | 2,083.371 | |
| 200.0 | 200.0 | 201.0 | 201.0 | 0.3 | 4.0 | 172.10 | -4,400.8 | 610.3 | 4,443.0 | 4,438.6 | 4.36 | 1,019.648 | |
| 300.0 | 300.0 | 301.0 | 301.0 | 0.6 | 6.0 | 172.10 | -4,400.8 | 610.3 | 4,443.0 | 4,436.4 | 6.58 | 675.005 | |
| 400.0 | 400.0 | 401.0 | 401.0 | 0.8 | 8.0 | 172.10 | -4,400.8 | 610.3 | 4,443.0 | 4,434.1 | 8.81 | 504.488 | |
| 500.0 | 500.0 | 501.0 | 501.0 | 1.0 | 10.0 | 93.40 | -4,400.8 | 610.3 | 4,443.1 | 4,432.0 | 11.02 | 403.109 | |
| 600.0 | 599.8 | 600.8 | 600.8 | 1.2 | 12.0 | 93.46 | -4,400.8 | 610.3 | 4,443.4 | 4,430.1 | 13.24 | 335.693 | |
| 700.0 | 699.5 | 700.5 | 700.5 | 1.5 | 14.0 | 93.56 | -4,400.8 | 610.3 | 4,443.9 | 4,428.4 | 15.47 | 287.310 | |
| 800.0 | 798.7 | 799.7 | 799.7 | 1.7 | 16.0 | 93.70 | -4,400.8 | 610.3 | 4,444.7 | 4,427.0 | 17.72 | 250.803 | |
| 900.0 | 897.5 | 898.5 | 898.5 | 2.0 | 18.0 | 93.88 | -4,400.8 | 610.3 | 4,445.7 | 4,425.7 | 20.01 | 222.202 | |
| 1,000.0 | 995.6 | 996.6 | 996.6 | 2.4 | 19.9 | 94.10 | -4,400.8 | 610.3 | 4,447.1 | 4,424.8 | 22.33 | 199.143 | |
| 1,100.0 | 1,093.5 | 1,094.5 | 1,094.5 | 2.8 | 21.9 | 94.35 | -4,400.8 | 610.3 | 4,448.6 | 4,423.9 | 24.68 | 180.225 | |
| 1,200.0 | 1,191.4 | 1,192.4 | 1,192.4 | 3.2 | 23.8 | 94.61 | -4,400.8 | 610.3 | 4,450.2 | 4,423.2 | 27.05 | 164.514 | |
| 1,300.0 | 1,289.3 | 1,290.3 | 1,290.3 | 3.6 | 25.8 | 94.86 | -4,400.8 | 610.3 | 4,452.0 | 4,422.5 | 29.43 | 151.284 | |
| 1,400.0 | 1,387.2 | 1,388.2 | 1,388.2 | 4.1 | 27.8 | 95.12 | -4,400.8 | 610.3 | 4,453.8 | 4,422.0 | 31.81 | 140.007 | |
| 1,500.0 | 1,485.1 | 1,486.1 | 1,486.1 | 4.5 | 29.7 | 95.38 | -4,400.8 | 610.3 | 4,455.7 | 4,421.5 | 34.20 | 130.286 | |
| 1,600.0 | 1,583.0 | 1,584.0 | 1,584.0 | 4.9 | 31.7 | 95.63 | -4,400.8 | 610.3 | 4,457.7 | 4,421.1 | 36.59 | 121.826 | |
| 1,700.0 | 1,680.9 | 1,681.9 | 1,681.9 | 5.4 | 33.6 | 95.89 | -4,400.8 | 610.3 | 4,459.8 | 4,420.8 | 38.98 | 114.400 | |
| 1,800.0 | 1,778.8 | 1,779.8 | 1,779.8 | 5.8 | 35.6 | 96.14 | -4,400.8 | 610.3 | 4,462.0 | 4,420.6 | 41.38 | 107.830 | |
| 1,900.0 | 1,876.7 | 1,877.7 | 1,877.7 | 6.2 | 37.6 | 96.40 | -4,400.8 | 610.3 | 4,464.2 | 4,420.5 | 43.78 | 101.979 | |
| 2,000.0 | 1,974.6 | 1,975.6 | 1,975.6 | 6.7 | 39.5 | 96.65 | -4,400.8 | 610.3 | 4,466.6 | 4,420.4 | 46.17 | 96.735 | |
| 2,100.0 | 2,072.5 | 2,073.5 | 2,073.5 | 7.1 | 41.5 | 96.91 | -4,400.8 | 610.3 | 4,469.1 | 4,420.5 | 48.57 | 92.009 | |
| 2,200.0 | 2,170.4 | 2,171.4 | 2,171.4 | 7.6 | 43.4 | 97.16 | -4,400.8 | 610.3 | 4,471.6 | 4,420.6 | 50.97 | 87.729 | |
| 2,300.0 | 2,268.3 | 2,269.3 | 2,269.3 | 8.0 | 45.4 | 97.42 | -4,400.8 | 610.3 | 4,474.3 | 4,420.9 | 53.37 | 83.835 | |
| 2,400.0 | 2,366.2 | 2,367.2 | 2,367.2 | 8.5 | 47.3 | 97.67 | -4,400.8 | 610.3 | 4,477.0 | 4,421.2 | 55.77 | 80.278 | |
| 2,500.0 | 2,464.1 | 2,465.1 | 2,465.1 | 8.9 | 49.3 | 97.92 | -4,400.8 | 610.3 | 4,479.8 | 4,421.6 | 58.17 | 77.015 | |
| 2,600.0 | 2,562.0 | 2,563.0 | 2,563.0 | 9.4 | 51.3 | 98.17 | -4,400.8 | 610.3 | 4,482.7 | 4,422.2 | 60.57 | 74.013 | |
| 2,700.0 | 2,659.9 | 2,660.9 | 2,660.9 | 9.8 | 53.2 | 98.43 | -4,400.8 | 610.3 | 4,485.7 | 4,422.8 | 62.97 | 71.241 | |
| 2,800.0 | 2,757.8 | 2,758.8 | 2,758.8 | 10.3 | 55.2 | 98.68 | -4,400.8 | 610.3 | 4,488.8 | 4,423.5 | 65.36 | 68.674 | |
| 2,900.0 | 2,855.7 | 2,856.7 | 2,856.7 | 10.7 | 57.1 | 98.93 | -4,400.8 | 610.3 | 4,492.0 | 4,424.3 | 67.76 | 66.290 | |
| 3,000.0 | 2,953.6 | 2,954.6 | 2,954.6 | 11.2 | 59.1 | 99.18 | -4,400.8 | 610.3 | 4,495.3 | 4,425.1 | 70.16 | 64.071 | |
| 3,100.0 | 3,051.5 | 3,052.5 | 3,052.5 | 11.6 | 61.0 | 99.43 | -4,400.8 | 610.3 | 4,498.7 | 4,426.1 | 72.56 | 62.000 | |
| 3,200.0 | 3,149.4 | 3,150.4 | 3,150.4 | 12.1 | 63.0 | 99.69 | -4,400.8 | 610.3 | 4,502.1 | 4,427.2 | 74.96 | 60.063 | |
| 3,300.0 | 3,247.3 | 3,248.3 | 3,248.3 | 12.5 | 65.0 | 99.94 | -4,400.8 | 610.3 | 4,505.7 | 4,428.3 | 77.35 | 58.248 | |
| 3,400.0 | 3,345.2 | 3,346.2 | 3,346.2 | 13.0 | 66.9 | 100.19 | -4,400.8 | 610.3 | 4,509.3 | 4,429.6 | 79.75 | 56.543 | |
| 3,500.0 | 3,443.1 | 3,444.1 | 3,444.1 | 13.4 | 68.9 | 100.44 | -4,400.8 | 610.3 | 4,513.0 | 4,430.9 | 82.15 | 54.940 | |
| 3,600.0 | 3,540.9 | 3,541.9 | 3,541.9 | 13.9 | 70.8 | 100.69 | -4,400.8 | 610.3 | 4,516.9 | 4,432.3 | 84.54 | 53.428 | |
| 3,700.0 | 3,638.8 | 3,639.8 | 3,639.8 | 14.3 | 72.8 | 100.93 | -4,400.8 | 610.3 | 4,520.8 | 4,433.8 | 86.94 | 52.002 | |
| 3,800.0 | 3,736.7 | 3,737.7 | 3,737.7 | 14.8 | 74.8 | 101.18 | -4,400.8 | 610.3 | 4,524.8 | 4,435.4 | 89.33 | 50.653 | |
| 3,900.0 | 3,834.6 | 3,835.6 | 3,835.6 | 15.2 | 76.7 | 101.43 | -4,400.8 | 610.3 | 4,528.8 | 4,437.1 | 91.72 | 49.375 | |
| 4,000.0 | 3,932.5 | 3,933.5 | 3,933.5 | 15.7 | 78.7 | 101.68 | -4,400.8 | 610.3 | 4,533.0 | 4,438.9 | 94.12 | 48.165 | |
| 4,100.0 | 4,030.4 | 4,031.4 | 4,031.4 | 16.1 | 80.6 | 101.93 | -4,400.8 | 610.3 | 4,537.3 | 4,440.8 | 96.51 | 47.015 | |
| 4,200.0 | 4,128.3 | 4,129.3 | 4,129.3 | 16.6 | 82.6 | 102.17 | -4,400.8 | 610.3 | 4,541.6 | 4,442.7 | 98.90 | 45.922 | |
| 4,300.0 | 4,226.2 | 4,227.2 | 4,227.2 | 17.0 | 84.5 | 102.42 | -4,400.8 | 610.3 | 4,546.1 | 4,444.8 | 101.29 | 44.882 | |
| 4,400.0 | 4,324.1 | 4,325.1 | 4,325.1 | 17.5 | 86.5 | 102.66 | -4,400.8 | 610.3 | 4,550.6 | 4,446.9 | 103.68 | 43.891 | |
| 4,500.0 | 4,422.0 | 4,423.0 | 4,423.0 | 17.9 | 88.5 | 102.91 | -4,400.8 | 610.3 | 4,555.2 | 4,449.1 | 106.07 | 42.946 | |
| 4,600.0 | 4,519.9 | 4,520.9 | 4,520.9 | 18.4 | 90.4 | 103.15 | -4,400.8 | 610.3 | 4,559.9 | 4,451.4 | 108.46 | 42.044 | |
| 4,700.0 | 4,617.8 | 4,618.8 | 4,618.8 | 18.8 | 92.4 | 103.40 | -4,400.8 | 610.3 | 4,564.7 | 4,453.8 | 110.84 | 41.181 | |
| 4,800.0 | 4,715.7 | 4,716.7 | 4,716.7 | 19.3 | 94.3 | 103.64 | -4,400.8 | 610.3 | 4,569.5 | 4,456.3 | 113.23 | 40.357 | |
| 4,900.0 | 4,813.6 | 4,814.6 | 4,814.6 | 19.7 | 96.3 | 103.89 | -4,400.8 | 610.3 | 4,574.5 | 4,458.9 | 115.61 | 39.567 | |
| 5,000.0 | 4,911.5 | 4,912.5 | 4,912.5 | 20.2 | 98.3 | 104.13 | -4,400.8 | 610.3 | 4,579.5 | 4,461.5 | 118.00 | 38.810 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Welsh 1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,009.4 | 5,010.4 | 5,010.4 | 20.6 | 100.2 | 104.37 | -4,400.8 | 610.3 | 4,584.6 | 4,464.2 | 120.38 | 38.084 | |
| 5,200.0 | 5,107.3 | 5,108.3 | 5,108.3 | 21.1 | 102.2 | 104.61 | -4,400.8 | 610.3 | 4,589.8 | 4,467.1 | 122.77 | 37.387 | |
| 5,300.0 | 5,205.2 | 5,206.2 | 5,206.2 | 21.5 | 104.1 | 104.85 | -4,400.8 | 610.3 | 4,595.1 | 4,470.0 | 125.15 | 36.718 | |
| 5,400.0 | 5,303.1 | 5,304.1 | 5,304.1 | 22.0 | 106.1 | 105.10 | -4,400.8 | 610.3 | 4,600.5 | 4,473.0 | 127.53 | 36.074 | |
| 5,500.0 | 5,401.2 | 5,402.2 | 5,402.2 | 22.4 | 108.0 | 105.41 | -4,400.8 | 610.3 | 4,605.6 | 4,475.7 | 129.89 | 35.459 | |
| 5,600.0 | 5,500.0 | 5,501.0 | 5,501.0 | 22.6 | 110.0 | 105.67 | -4,400.8 | 610.3 | 4,609.9 | 4,477.7 | 132.16 | 34.881 | |
| 5,700.0 | 5,599.2 | 5,600.2 | 5,600.2 | 22.9 | 112.0 | 105.88 | -4,400.8 | 610.3 | 4,613.2 | 4,478.8 | 134.40 | 34.324 | |
| 5,800.0 | 5,698.9 | 5,699.9 | 5,699.9 | 23.1 | 114.0 | 106.03 | -4,400.8 | 610.3 | 4,615.6 | 4,479.0 | 136.60 | 33.789 | |
| 5,900.0 | 5,798.7 | 5,799.7 | 5,799.7 | 23.2 | 116.0 | 106.13 | -4,400.8 | 610.3 | 4,617.1 | 4,478.3 | 138.76 | 33.273 | |
| 6,000.0 | 5,898.7 | 5,899.7 | 5,899.7 | 23.4 | 118.0 | 106.16 | -4,400.8 | 610.3 | 4,617.6 | 4,476.7 | 140.88 | 32.776 | |
| 6,100.0 | 5,998.7 | 5,999.7 | 5,999.7 | 23.5 | 120.0 | -175.12 | -4,400.8 | 610.3 | 4,617.6 | 4,474.6 | 143.00 | 32.292 | |
| 6,200.0 | 6,098.6 | 6,099.6 | 6,099.6 | 23.6 | 122.0 | 4.90 | -4,400.8 | 610.3 | 4,615.6 | 4,470.9 | 144.71 | 31.897 | |
| 6,300.0 | 6,197.6 | 6,198.6 | 6,198.6 | 23.7 | 124.0 | 5.00 | -4,400.8 | 610.3 | 4,602.0 | 4,457.9 | 144.14 | 31.928 | |
| 6,400.0 | 6,294.0 | 6,295.0 | 6,295.0 | 23.7 | 125.9 | 5.21 | -4,400.8 | 610.3 | 4,575.6 | 4,434.6 | 141.00 | 32.450 | |
| 6,500.0 | 6,386.1 | 6,387.1 | 6,387.1 | 23.7 | 127.7 | 5.56 | -4,400.8 | 610.3 | 4,536.9 | 4,401.6 | 135.30 | 33.533 | |
| 6,600.0 | 6,472.3 | 6,473.3 | 6,473.3 | 23.8 | 129.5 | 6.06 | -4,400.8 | 610.3 | 4,486.6 | 4,359.5 | 127.09 | 35.302 | |
| 6,700.0 | 6,551.2 | 6,552.2 | 6,552.2 | 23.8 | 131.0 | 6.80 | -4,400.8 | 610.3 | 4,425.5 | 4,308.9 | 116.56 | 37.966 | |
| 6,800.0 | 6,621.4 | 6,622.4 | 6,622.4 | 23.9 | 132.4 | 7.88 | -4,400.8 | 610.3 | 4,354.6 | 4,250.6 | 104.06 | 41.849 | |
| 6,900.0 | 6,681.7 | 6,682.7 | 6,682.7 | 24.0 | 133.7 | 9.53 | -4,400.8 | 610.3 | 4,275.3 | 4,185.0 | 90.25 | 47.374 | |
| 7,000.0 | 6,731.1 | 6,732.1 | 6,732.1 | 24.3 | 134.6 | 12.19 | -4,400.8 | 610.3 | 4,188.8 | 4,112.1 | 76.70 | 54.616 | |
| 7,100.0 | 6,768.7 | 6,769.7 | 6,769.7 | 24.6 | 135.4 | 17.00 | -4,400.8 | 610.3 | 4,096.7 | 4,028.7 | 67.96 | 60.279 | |
| 7,200.0 | 6,793.9 | 6,794.9 | 6,794.9 | 25.0 | 135.9 | 27.62 | -4,400.8 | 610.3 | 4,000.4 | 3,922.7 | 77.77 | 51.440 | |
| 7,300.0 | 6,807.1 | 6,808.1 | 6,808.1 | 25.6 | 136.2 | 44.09 | -4,400.8 | 610.3 | 3,901.8 | 3,793.2 | 108.60 | 35.927 | |
| 7,400.0 | 6,816.0 | 6,817.0 | 6,817.0 | 26.4 | 136.3 | 63.64 | -4,400.8 | 610.3 | 3,802.8 | 3,663.1 | 139.66 | 27.228 | |
| 7,500.0 | 6,817.4 | 6,818.4 | 6,818.4 | 27.3 | 136.4 | 91.03 | -4,400.8 | 610.3 | 3,703.3 | 3,545.3 | 158.08 | 23.427 | |
| 7,600.0 | 6,817.2 | 6,818.2 | 6,818.2 | 28.3 | 136.4 | 91.00 | -4,400.8 | 610.3 | 3,603.9 | 3,444.5 | 159.39 | 22.611 | |
| 7,700.0 | 6,817.0 | 6,818.0 | 6,818.0 | 29.3 | 136.4 | 90.97 | -4,400.8 | 610.3 | 3,504.5 | 3,343.7 | 160.78 | 21.797 | |
| 7,800.0 | 6,816.9 | 6,817.9 | 6,817.9 | 30.5 | 136.4 | 90.95 | -4,400.8 | 610.3 | 3,405.2 | 3,242.9 | 162.24 | 20.989 | |
| 7,900.0 | 6,816.7 | 6,817.7 | 6,817.7 | 31.8 | 136.4 | 90.92 | -4,400.8 | 610.3 | 3,305.9 | 3,142.1 | 163.75 | 20.188 | |
| 8,000.0 | 6,816.5 | 6,817.5 | 6,817.5 | 33.1 | 136.3 | 90.89 | -4,400.8 | 610.3 | 3,206.6 | 3,041.3 | 165.32 | 19.397 | |
| 8,100.0 | 6,816.3 | 6,817.3 | 6,817.3 | 34.5 | 136.3 | 90.86 | -4,400.8 | 610.3 | 3,107.4 | 2,940.5 | 166.92 | 18.616 | |
| 8,200.0 | 6,816.1 | 6,817.1 | 6,817.1 | 36.0 | 136.3 | 90.83 | -4,400.8 | 610.3 | 3,008.2 | 2,839.6 | 168.56 | 17.847 | |
| 8,300.0 | 6,815.9 | 6,816.9 | 6,816.9 | 37.5 | 136.3 | 90.81 | -4,400.8 | 610.3 | 2,909.1 | 2,738.9 | 170.22 | 17.090 | |
| 8,400.0 | 6,815.7 | 6,816.7 | 6,816.7 | 39.0 | 136.3 | 90.78 | -4,400.8 | 610.3 | 2,810.0 | 2,638.1 | 171.91 | 16.346 | |
| 8,500.0 | 6,815.5 | 6,816.5 | 6,816.5 | 40.6 | 136.3 | 90.75 | -4,400.8 | 610.3 | 2,711.1 | 2,537.4 | 173.63 | 15.614 | |
| 8,600.0 | 6,815.3 | 6,816.3 | 6,816.3 | 42.2 | 136.3 | 90.72 | -4,400.8 | 610.3 | 2,612.2 | 2,436.8 | 175.36 | 14.896 | |
| 8,700.0 | 6,815.1 | 6,816.1 | 6,816.1 | 43.8 | 136.3 | 90.69 | -4,400.8 | 610.3 | 2,513.3 | 2,336.2 | 177.11 | 14.191 | |
| 8,800.0 | 6,814.9 | 6,815.9 | 6,815.9 | 45.5 | 136.3 | 90.67 | -4,400.8 | 610.3 | 2,414.6 | 2,235.7 | 178.87 | 13.499 | |
| 8,900.0 | 6,814.7 | 6,815.7 | 6,815.7 | 47.1 | 136.3 | 90.64 | -4,400.8 | 610.3 | 2,316.0 | 2,135.4 | 180.65 | 12.821 | |
| 9,000.0 | 6,814.5 | 6,815.5 | 6,815.5 | 48.8 | 136.3 | 90.61 | -4,400.8 | 610.3 | 2,217.5 | 2,035.1 | 182.44 | 12.155 | |
| 9,100.0 | 6,814.4 | 6,815.4 | 6,815.4 | 50.5 | 136.3 | 90.58 | -4,400.8 | 610.3 | 2,119.2 | 1,935.0 | 184.23 | 11.503 | |
| 9,200.0 | 6,814.2 | 6,815.2 | 6,815.2 | 52.2 | 136.3 | 90.55 | -4,400.8 | 610.3 | 2,021.0 | 1,835.0 | 186.04 | 10.863 | |
| 9,300.0 | 6,814.0 | 6,815.0 | 6,815.0 | 54.0 | 136.3 | 90.53 | -4,400.8 | 610.3 | 1,923.0 | 1,735.2 | 187.85 | 10.237 | |
| 9,400.0 | 6,813.8 | 6,814.8 | 6,814.8 | 55.7 | 136.3 | 90.50 | -4,400.8 | 610.3 | 1,825.2 | 1,635.6 | 189.68 | 9.623 | |
| 9,500.0 | 6,813.6 | 6,814.6 | 6,814.6 | 57.5 | 136.3 | 90.47 | -4,400.8 | 610.3 | 1,727.7 | 1,536.2 | 191.50 | 9.022 | |
| 9,600.0 | 6,813.4 | 6,814.4 | 6,814.4 | 59.3 | 136.3 | 90.44 | -4,400.8 | 610.3 | 1,630.5 | 1,437.2 | 193.34 | 8.433 | |
| 9,700.0 | 6,813.2 | 6,814.2 | 6,814.2 | 61.0 | 136.3 | 90.41 | -4,400.8 | 610.3 | 1,533.6 | 1,338.5 | 195.18 | 7.858 | |
| 9,800.0 | 6,813.0 | 6,814.0 | 6,814.0 | 62.8 | 136.3 | 90.39 | -4,400.8 | 610.3 | 1,437.2 | 1,240.2 | 197.02 | 7.295 | |
| 9,900.0 | 6,812.8 | 6,813.8 | 6,813.8 | 64.6 | 136.3 | 90.36 | -4,400.8 | 610.3 | 1,341.3 | 1,142.4 | 198.87 | 6.745 | |
| 10,000.0 | 6,812.6 | 6,813.6 | 6,813.6 | 66.4 | 136.3 | 90.33 | -4,400.8 | 610.3 | 1,246.0 | 1,045.3 | 200.72 | 6.208 | |
| 10,100.0 | 6,812.4 | 6,813.4 | 6,813.4 | 68.2 | 136.3 | 90.30 | -4,400.8 | 610.3 | 1,151.6 | 949.0 | 202.57 | 5.685 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Welsh 1 (Exist) - Wellbore #1 - Wellbore #1

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,200.0 | 6,812.2 | 6,813.2 | 6,813.2 | 70.0 | 136.3 | 90.27 | -4,400.8 | 610.3 | 1,058.1 | 853.7 | 204.43 | 5.176 | |
| 10,300.0 | 6,812.1 | 6,813.1 | 6,813.1 | 71.9 | 136.3 | 90.25 | -4,400.8 | 610.3 | 966.0 | 759.7 | 206.29 | 4.683 | |
| 10,400.0 | 6,811.9 | 6,812.9 | 6,812.9 | 73.7 | 136.3 | 90.22 | -4,400.8 | 610.3 | 875.6 | 667.4 | 208.16 | 4.206 | |
| 10,500.0 | 6,811.7 | 6,812.7 | 6,812.7 | 75.5 | 136.3 | 90.19 | -4,400.8 | 610.3 | 787.5 | 577.5 | 210.03 | 3.750 | |
| 10,600.0 | 6,811.5 | 6,812.5 | 6,812.5 | 77.3 | 136.2 | 90.16 | -4,400.8 | 610.3 | 702.6 | 490.7 | 211.90 | 3.316 | |
| 10,700.0 | 6,811.3 | 6,812.3 | 6,812.3 | 79.2 | 136.2 | 90.14 | -4,400.8 | 610.3 | 622.3 | 408.5 | 213.77 | 2.911 | |
| 10,800.0 | 6,811.1 | 6,812.1 | 6,812.1 | 81.0 | 136.2 | 90.11 | -4,400.8 | 610.3 | 548.4 | 332.7 | 215.64 | 2.543 | |
| 10,900.0 | 6,810.9 | 6,811.9 | 6,811.9 | 82.9 | 136.2 | 90.08 | -4,400.8 | 610.3 | 484.0 | 266.5 | 217.52 | 2.225 | |
| 11,000.0 | 6,810.7 | 6,811.7 | 6,811.7 | 84.7 | 136.2 | 90.05 | -4,400.8 | 610.3 | 433.3 | 213.9 | 219.40 | 1.975 | |
| 11,100.0 | 6,810.5 | 6,811.5 | 6,811.5 | 86.6 | 136.2 | 90.02 | -4,400.8 | 610.3 | 401.6 | 180.3 | 221.28 | 1.815 | |
| 11,182.4 | 6,810.4 | 6,811.4 | 6,811.4 | 88.1 | 136.2 | 90.00 | -4,400.8 | 610.3 | 393.0 | 170.2 | 222.83 | 1.764 | CC, ES |
| 11,200.0 | 6,810.3 | 6,811.3 | 6,811.3 | 88.4 | 136.2 | 90.00 | -4,400.8 | 610.3 | 393.4 | 170.3 | 223.16 | 1.763 | SF |
| 11,300.0 | 6,810.1 | 6,811.1 | 6,811.1 | 90.3 | 136.2 | 89.97 | -4,400.8 | 610.3 | 410.2 | 185.2 | 225.04 | 1.823 | |
| 11,400.0 | 6,809.9 | 6,810.9 | 6,810.9 | 92.1 | 136.2 | 89.94 | -4,400.8 | 610.3 | 449.2 | 222.3 | 226.92 | 1.980 | |
| 11,500.0 | 6,809.7 | 6,810.7 | 6,810.7 | 94.0 | 136.2 | 89.91 | -4,400.8 | 610.3 | 505.3 | 276.5 | 228.81 | 2.208 | |
| 11,600.0 | 6,809.6 | 6,810.6 | 6,810.6 | 95.9 | 136.2 | 89.88 | -4,400.8 | 610.3 | 573.5 | 342.8 | 230.69 | 2.486 | |
| 11,700.0 | 6,809.4 | 6,810.4 | 6,810.4 | 97.7 | 136.2 | 89.86 | -4,400.8 | 610.3 | 649.9 | 417.3 | 232.58 | 2.794 | |
| 11,800.0 | 6,809.2 | 6,810.2 | 6,810.2 | 99.6 | 136.2 | 89.83 | -4,400.8 | 610.3 | 732.0 | 497.6 | 234.47 | 3.122 | |
| 11,900.0 | 6,809.0 | 6,810.0 | 6,810.0 | 101.5 | 136.2 | 89.80 | -4,400.8 | 610.3 | 818.2 | 581.8 | 236.36 | 3.462 | |
| 12,000.0 | 6,808.8 | 6,809.8 | 6,809.8 | 103.3 | 136.2 | 89.77 | -4,400.8 | 610.3 | 907.1 | 668.9 | 238.25 | 3.808 | |
| 12,100.0 | 6,808.6 | 6,809.6 | 6,809.6 | 105.2 | 136.2 | 89.74 | -4,400.8 | 610.3 | 998.2 | 758.1 | 240.14 | 4.157 | |
| 12,200.0 | 6,808.4 | 6,809.4 | 6,809.4 | 107.1 | 136.2 | 89.72 | -4,400.8 | 610.3 | 1,090.8 | 848.8 | 242.03 | 4.507 | |
| 12,300.0 | 6,808.2 | 6,809.2 | 6,809.2 | 109.0 | 136.2 | 89.69 | -4,400.8 | 610.3 | 1,184.7 | 940.7 | 243.92 | 4.857 | |
| 12,400.0 | 6,808.0 | 6,809.0 | 6,809.0 | 110.8 | 136.2 | 89.66 | -4,400.8 | 610.3 | 1,279.4 | 1,033.6 | 245.82 | 5.205 | |
| 12,500.0 | 6,807.8 | 6,808.8 | 6,808.8 | 112.7 | 136.2 | 89.63 | -4,400.8 | 610.3 | 1,374.9 | 1,127.2 | 247.71 | 5.551 | |
| 12,600.0 | 6,807.6 | 6,808.6 | 6,808.6 | 114.6 | 136.2 | 89.60 | -4,400.8 | 610.3 | 1,471.1 | 1,221.4 | 249.61 | 5.894 | |
| 12,700.0 | 6,807.4 | 6,808.4 | 6,808.4 | 116.5 | 136.2 | 89.58 | -4,400.8 | 610.3 | 1,567.6 | 1,316.1 | 251.50 | 6.233 | |
| 12,800.0 | 6,807.3 | 6,808.3 | 6,808.3 | 118.4 | 136.2 | 89.55 | -4,400.8 | 610.3 | 1,664.6 | 1,411.2 | 253.40 | 6.569 | |
| 12,900.0 | 6,807.1 | 6,808.1 | 6,808.1 | 120.3 | 136.2 | 89.52 | -4,400.8 | 610.3 | 1,762.0 | 1,506.7 | 255.29 | 6.902 | |
| 13,000.0 | 6,806.9 | 6,807.9 | 6,807.9 | 122.1 | 136.2 | 89.49 | -4,400.8 | 610.3 | 1,859.6 | 1,602.4 | 257.19 | 7.230 | |
| 13,100.0 | 6,806.7 | 6,807.7 | 6,807.7 | 124.0 | 136.2 | 89.46 | -4,400.8 | 610.3 | 1,957.4 | 1,698.4 | 259.09 | 7.555 | |
| 13,200.0 | 6,806.5 | 6,807.5 | 6,807.5 | 125.9 | 136.1 | 89.44 | -4,400.8 | 610.3 | 2,055.5 | 1,794.5 | 260.98 | 7.876 | |
| 13,300.0 | 6,806.3 | 6,807.3 | 6,807.3 | 127.8 | 136.1 | 89.41 | -4,400.8 | 610.3 | 2,153.7 | 1,890.9 | 262.88 | 8.193 | |
| 13,400.0 | 6,806.1 | 6,807.1 | 6,807.1 | 129.7 | 136.1 | 89.38 | -4,400.8 | 610.3 | 2,252.1 | 1,987.4 | 264.78 | 8.506 | |
| 13,500.0 | 6,805.9 | 6,806.9 | 6,806.9 | 131.6 | 136.1 | 89.35 | -4,400.8 | 610.3 | 2,350.7 | 2,084.0 | 266.68 | 8.815 | |
| 13,600.0 | 6,805.7 | 6,806.7 | 6,806.7 | 133.5 | 136.1 | 89.32 | -4,400.8 | 610.3 | 2,449.3 | 2,180.7 | 268.58 | 9.119 | |
| 13,700.0 | 6,805.5 | 6,806.5 | 6,806.5 | 135.4 | 136.1 | 89.30 | -4,400.8 | 610.3 | 2,548.1 | 2,277.6 | 270.48 | 9.421 | |
| 13,800.0 | 6,805.3 | 6,806.3 | 6,806.3 | 137.3 | 136.1 | 89.27 | -4,400.8 | 610.3 | 2,646.9 | 2,374.5 | 272.38 | 9.718 | |
| 13,900.0 | 6,805.1 | 6,806.1 | 6,806.1 | 139.2 | 136.1 | 89.24 | -4,400.8 | 610.3 | 2,745.8 | 2,471.6 | 274.28 | 10.011 | |
| 13,973.0 | 6,805.0 | 6,806.0 | 6,806.0 | 140.6 | 136.1 | 89.22 | -4,400.8 | 610.3 | 2,818.1 | 2,542.5 | 275.67 | 10.223 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Wonenberg B33-3 (Exist) - Wellbore #1 - Wellbo

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 17.0 | 17.0 | 0.0 | 0.3 | 173.87 | -5,712.4 | 613.1 | 5,745.2 | 5,744.8 | 0.34 | N/A | |
| 100.0 | 100.0 | 117.0 | 117.0 | 0.1 | 2.3 | 173.87 | -5,712.4 | 613.1 | 5,745.2 | 5,742.7 | 2.45 | 2,342.499 | |
| 200.0 | 200.0 | 217.0 | 217.0 | 0.3 | 4.3 | 173.87 | -5,712.4 | 613.1 | 5,745.2 | 5,740.5 | 4.68 | 1,228.297 | |
| 300.0 | 300.0 | 317.0 | 317.0 | 0.6 | 6.3 | 173.87 | -5,712.4 | 613.1 | 5,745.2 | 5,738.3 | 6.90 | 832.378 | |
| 400.0 | 400.0 | 417.0 | 417.0 | 0.8 | 8.3 | 173.87 | -5,712.4 | 613.1 | 5,745.2 | 5,736.0 | 9.13 | 629.478 | |
| 500.0 | 500.0 | 517.0 | 517.0 | 1.0 | 10.3 | 95.16 | -5,712.4 | 613.1 | 5,745.3 | 5,734.0 | 11.34 | 506.554 | |
| 600.0 | 599.8 | 616.8 | 616.8 | 1.2 | 12.3 | 95.20 | -5,712.4 | 613.1 | 5,745.8 | 5,732.2 | 13.56 | 423.845 | |
| 700.0 | 699.5 | 716.5 | 716.5 | 1.5 | 14.3 | 95.27 | -5,712.4 | 613.1 | 5,746.6 | 5,730.8 | 15.79 | 364.007 | |
| 800.0 | 798.7 | 815.7 | 815.7 | 1.7 | 16.3 | 95.37 | -5,712.4 | 613.1 | 5,747.7 | 5,729.7 | 18.04 | 318.590 | |
| 900.0 | 897.5 | 914.5 | 914.5 | 2.0 | 18.3 | 95.50 | -5,712.4 | 613.1 | 5,749.2 | 5,728.9 | 20.33 | 282.848 | |
| 1,000.0 | 995.6 | 1,012.6 | 1,012.6 | 2.4 | 20.3 | 95.65 | -5,712.4 | 613.1 | 5,751.1 | 5,728.5 | 22.65 | 253.927 | |
| 1,100.0 | 1,093.5 | 1,110.5 | 1,110.5 | 2.8 | 22.2 | 95.85 | -5,712.4 | 613.1 | 5,753.2 | 5,728.2 | 25.00 | 230.122 | |
| 1,200.0 | 1,191.4 | 1,208.4 | 1,208.4 | 3.2 | 24.2 | 96.04 | -5,712.4 | 613.1 | 5,755.4 | 5,728.0 | 27.37 | 210.301 | |
| 1,300.0 | 1,289.3 | 1,306.3 | 1,306.3 | 3.6 | 26.1 | 96.24 | -5,712.4 | 613.1 | 5,757.6 | 5,727.8 | 29.74 | 193.575 | |
| 1,400.0 | 1,387.2 | 1,404.2 | 1,404.2 | 4.1 | 28.1 | 96.44 | -5,712.4 | 613.1 | 5,759.9 | 5,727.8 | 32.13 | 179.290 | |
| 1,500.0 | 1,485.1 | 1,502.1 | 1,502.1 | 4.5 | 30.0 | 96.64 | -5,712.4 | 613.1 | 5,762.3 | 5,727.7 | 34.51 | 166.957 | |
| 1,600.0 | 1,583.0 | 1,600.0 | 1,600.0 | 4.9 | 32.0 | 96.83 | -5,712.4 | 613.1 | 5,764.7 | 5,727.8 | 36.90 | 156.208 | |
| 1,700.0 | 1,680.9 | 1,697.9 | 1,697.9 | 5.4 | 34.0 | 97.03 | -5,712.4 | 613.1 | 5,767.2 | 5,727.9 | 39.30 | 146.760 | |
| 1,800.0 | 1,778.8 | 1,795.8 | 1,795.8 | 5.8 | 35.9 | 97.23 | -5,712.4 | 613.1 | 5,769.8 | 5,728.1 | 41.69 | 138.392 | |
| 1,900.0 | 1,876.7 | 1,893.7 | 1,893.7 | 6.2 | 37.9 | 97.42 | -5,712.4 | 613.1 | 5,772.5 | 5,728.4 | 44.09 | 130.931 | |
| 2,000.0 | 1,974.6 | 1,991.6 | 1,991.6 | 6.7 | 39.8 | 97.62 | -5,712.4 | 613.1 | 5,775.2 | 5,728.7 | 46.48 | 124.238 | |
| 2,100.0 | 2,072.5 | 2,089.5 | 2,089.5 | 7.1 | 41.8 | 97.82 | -5,712.4 | 613.1 | 5,778.0 | 5,729.1 | 48.88 | 118.201 | |
| 2,200.0 | 2,170.4 | 2,187.4 | 2,187.4 | 7.6 | 43.7 | 98.01 | -5,712.4 | 613.1 | 5,780.9 | 5,729.6 | 51.28 | 112.729 | |
| 2,300.0 | 2,268.3 | 2,285.3 | 2,285.3 | 8.0 | 45.7 | 98.21 | -5,712.4 | 613.1 | 5,783.8 | 5,730.1 | 53.68 | 107.746 | |
| 2,400.0 | 2,366.2 | 2,383.2 | 2,383.2 | 8.5 | 47.7 | 98.41 | -5,712.4 | 613.1 | 5,786.8 | 5,730.7 | 56.08 | 103.191 | |
| 2,500.0 | 2,464.1 | 2,481.1 | 2,481.1 | 8.9 | 49.6 | 98.60 | -5,712.4 | 613.1 | 5,789.9 | 5,731.4 | 58.48 | 99.010 | |
| 2,600.0 | 2,562.0 | 2,579.0 | 2,579.0 | 9.4 | 51.6 | 98.80 | -5,712.4 | 613.1 | 5,793.0 | 5,732.2 | 60.88 | 95.160 | |
| 2,700.0 | 2,659.9 | 2,676.9 | 2,676.9 | 9.8 | 53.5 | 98.99 | -5,712.4 | 613.1 | 5,796.3 | 5,733.0 | 63.28 | 91.603 | |
| 2,800.0 | 2,757.8 | 2,774.8 | 2,774.8 | 10.3 | 55.5 | 99.19 | -5,712.4 | 613.1 | 5,799.5 | 5,733.9 | 65.68 | 88.306 | |
| 2,900.0 | 2,855.7 | 2,872.7 | 2,872.7 | 10.7 | 57.5 | 99.38 | -5,712.4 | 613.1 | 5,802.9 | 5,734.8 | 68.07 | 85.244 | |
| 3,000.0 | 2,953.6 | 2,970.6 | 2,970.6 | 11.2 | 59.4 | 99.58 | -5,712.4 | 613.1 | 5,806.3 | 5,735.9 | 70.47 | 82.391 | |
| 3,100.0 | 3,051.5 | 3,068.5 | 3,068.5 | 11.6 | 61.4 | 99.77 | -5,712.4 | 613.1 | 5,809.8 | 5,737.0 | 72.87 | 79.727 | |
| 3,200.0 | 3,149.4 | 3,166.4 | 3,166.4 | 12.1 | 63.3 | 99.96 | -5,712.4 | 613.1 | 5,813.4 | 5,738.1 | 75.27 | 77.235 | |
| 3,300.0 | 3,247.3 | 3,264.3 | 3,264.3 | 12.5 | 65.3 | 100.16 | -5,712.4 | 613.1 | 5,817.0 | 5,739.4 | 77.67 | 74.897 | |
| 3,400.0 | 3,345.2 | 3,362.2 | 3,362.2 | 13.0 | 67.2 | 100.35 | -5,712.4 | 613.1 | 5,820.7 | 5,740.7 | 80.06 | 72.700 | |
| 3,500.0 | 3,443.1 | 3,460.1 | 3,460.1 | 13.4 | 69.2 | 100.55 | -5,712.4 | 613.1 | 5,824.5 | 5,742.1 | 82.46 | 70.633 | |
| 3,600.0 | 3,540.9 | 3,557.9 | 3,557.9 | 13.9 | 71.2 | 100.74 | -5,712.4 | 613.1 | 5,828.4 | 5,743.5 | 84.86 | 68.683 | |
| 3,700.0 | 3,638.8 | 3,655.8 | 3,655.8 | 14.3 | 73.1 | 100.93 | -5,712.4 | 613.1 | 5,832.3 | 5,745.0 | 87.26 | 66.842 | |
| 3,800.0 | 3,736.7 | 3,753.7 | 3,753.7 | 14.8 | 75.1 | 101.12 | -5,712.4 | 613.1 | 5,836.3 | 5,746.6 | 89.65 | 65.100 | |
| 3,900.0 | 3,834.6 | 3,851.6 | 3,851.6 | 15.2 | 77.0 | 101.32 | -5,712.4 | 613.1 | 5,840.3 | 5,748.3 | 92.05 | 63.450 | |
| 4,000.0 | 3,932.5 | 3,949.5 | 3,949.5 | 15.7 | 79.0 | 101.51 | -5,712.4 | 613.1 | 5,844.4 | 5,750.0 | 94.44 | 61.884 | |
| 4,100.0 | 4,030.4 | 4,047.4 | 4,047.4 | 16.1 | 80.9 | 101.70 | -5,712.4 | 613.1 | 5,848.6 | 5,751.8 | 96.84 | 60.397 | |
| 4,200.0 | 4,128.3 | 4,145.3 | 4,145.3 | 16.6 | 82.9 | 101.89 | -5,712.4 | 613.1 | 5,852.9 | 5,753.7 | 99.23 | 58.983 | |
| 4,300.0 | 4,226.2 | 4,243.2 | 4,243.2 | 17.0 | 84.9 | 102.08 | -5,712.4 | 613.1 | 5,857.2 | 5,755.6 | 101.62 | 57.636 | |
| 4,400.0 | 4,324.1 | 4,341.1 | 4,341.1 | 17.5 | 86.8 | 102.27 | -5,712.4 | 613.1 | 5,861.6 | 5,757.6 | 104.02 | 56.353 | |
| 4,500.0 | 4,422.0 | 4,439.0 | 4,439.0 | 17.9 | 88.8 | 102.47 | -5,712.4 | 613.1 | 5,866.1 | 5,759.6 | 106.41 | 55.127 | |
| 4,600.0 | 4,519.9 | 4,536.9 | 4,536.9 | 18.4 | 90.7 | 102.66 | -5,712.4 | 613.1 | 5,870.6 | 5,761.8 | 108.80 | 53.957 | |
| 4,700.0 | 4,617.8 | 4,634.8 | 4,634.8 | 18.8 | 92.7 | 102.85 | -5,712.4 | 613.1 | 5,875.2 | 5,764.0 | 111.19 | 52.838 | |
| 4,800.0 | 4,715.7 | 4,732.7 | 4,732.7 | 19.3 | 94.7 | 103.04 | -5,712.4 | 613.1 | 5,879.8 | 5,766.3 | 113.58 | 51.767 | |
| 4,900.0 | 4,813.6 | 4,830.6 | 4,830.6 | 19.7 | 96.6 | 103.23 | -5,712.4 | 613.1 | 5,884.6 | 5,768.6 | 115.97 | 50.741 | |
| 5,000.0 | 4,911.5 | 4,928.5 | 4,928.5 | 20.2 | 98.6 | 103.41 | -5,712.4 | 613.1 | 5,889.4 | 5,771.0 | 118.36 | 49.757 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Wonenberg B33-3 (Exist) - Wellbore #1 - Wellbo

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,009.4 | 5,026.4 | 5,026.4 | 20.6 | 100.5 | 103.60 | -5,712.4 | 613.1 | 5,894.2 | 5,773.5 | 120.75 | 48.813 | |
| 5,200.0 | 5,107.3 | 5,124.3 | 5,124.3 | 21.1 | 102.5 | 103.79 | -5,712.4 | 613.1 | 5,899.2 | 5,776.0 | 123.14 | 47.906 | |
| 5,300.0 | 5,205.2 | 5,222.2 | 5,222.2 | 21.5 | 104.4 | 103.98 | -5,712.4 | 613.1 | 5,904.2 | 5,778.6 | 125.53 | 47.035 | |
| 5,400.0 | 5,303.1 | 5,320.1 | 5,320.1 | 22.0 | 106.4 | 104.17 | -5,712.4 | 613.1 | 5,909.2 | 5,781.3 | 127.91 | 46.197 | |
| 5,500.0 | 5,401.2 | 5,418.2 | 5,418.2 | 22.4 | 108.4 | 104.43 | -5,712.4 | 613.1 | 5,914.0 | 5,783.7 | 130.27 | 45.397 | |
| 5,600.0 | 5,500.0 | 5,517.0 | 5,517.0 | 22.6 | 110.3 | 104.65 | -5,712.4 | 613.1 | 5,918.0 | 5,785.4 | 132.55 | 44.648 | |
| 5,700.0 | 5,599.2 | 5,616.2 | 5,616.2 | 22.9 | 112.3 | 104.82 | -5,712.4 | 613.1 | 5,921.1 | 5,786.3 | 134.79 | 43.929 | |
| 5,800.0 | 5,698.9 | 5,715.9 | 5,715.9 | 23.1 | 114.3 | 104.95 | -5,712.4 | 613.1 | 5,923.4 | 5,786.4 | 136.99 | 43.240 | |
| 5,900.0 | 5,798.7 | 5,815.7 | 5,815.7 | 23.2 | 116.3 | 105.02 | -5,712.4 | 613.1 | 5,924.8 | 5,785.6 | 139.15 | 42.578 | |
| 6,000.0 | 5,898.7 | 5,915.7 | 5,915.7 | 23.4 | 118.3 | 105.05 | -5,712.4 | 613.1 | 5,925.2 | 5,784.0 | 141.27 | 41.942 | |
| 6,100.0 | 5,998.7 | 6,015.7 | 6,015.7 | 23.5 | 120.3 | -176.22 | -5,712.4 | 613.1 | 5,925.2 | 5,781.8 | 143.38 | 41.325 | |
| 6,200.0 | 6,098.6 | 6,115.6 | 6,115.6 | 23.6 | 122.3 | 3.79 | -5,712.4 | 613.1 | 5,923.2 | 5,778.2 | 145.09 | 40.824 | |
| 6,300.0 | 6,197.6 | 6,214.6 | 6,214.6 | 23.7 | 124.3 | 3.87 | -5,712.4 | 613.1 | 5,909.6 | 5,765.1 | 144.51 | 40.894 | |
| 6,400.0 | 6,294.0 | 6,311.0 | 6,311.0 | 23.7 | 126.2 | 4.02 | -5,712.4 | 613.1 | 5,883.2 | 5,741.8 | 141.35 | 41.621 | |
| 6,500.0 | 6,386.1 | 6,403.1 | 6,403.1 | 23.7 | 128.1 | 4.28 | -5,712.4 | 613.1 | 5,844.4 | 5,708.8 | 135.60 | 43.101 | |
| 6,600.0 | 6,472.3 | 6,489.3 | 6,489.3 | 23.8 | 129.8 | 4.66 | -5,712.4 | 613.1 | 5,794.0 | 5,666.7 | 127.31 | 45.511 | |
| 6,700.0 | 6,551.2 | 6,568.2 | 6,568.2 | 23.8 | 131.4 | 5.21 | -5,712.4 | 613.1 | 5,732.8 | 5,616.1 | 116.64 | 49.149 | |
| 6,800.0 | 6,621.4 | 6,638.4 | 6,638.4 | 23.9 | 132.8 | 6.03 | -5,712.4 | 613.1 | 5,661.8 | 5,558.0 | 103.87 | 54.509 | |
| 6,900.0 | 6,681.7 | 6,698.7 | 6,698.7 | 24.0 | 134.0 | 7.26 | -5,712.4 | 613.1 | 5,582.4 | 5,492.8 | 89.51 | 62.366 | |
| 7,000.0 | 6,731.1 | 6,748.1 | 6,748.1 | 24.3 | 135.0 | 9.26 | -5,712.4 | 613.1 | 5,495.7 | 5,421.1 | 74.65 | 73.618 | |
| 7,100.0 | 6,768.7 | 6,785.7 | 6,785.7 | 24.6 | 135.7 | 12.93 | -5,712.4 | 613.1 | 5,403.4 | 5,340.8 | 62.53 | 86.408 | |
| 7,200.0 | 6,793.9 | 6,810.9 | 6,810.9 | 25.0 | 136.2 | 21.34 | -5,712.4 | 613.1 | 5,306.9 | 5,241.8 | 65.16 | 81.448 | |
| 7,300.0 | 6,807.1 | 6,824.1 | 6,824.1 | 25.6 | 136.5 | 35.71 | -5,712.4 | 613.1 | 5,208.1 | 5,115.8 | 92.31 | 56.423 | |
| 7,400.0 | 6,816.0 | 6,833.0 | 6,833.0 | 26.4 | 136.7 | 56.09 | -5,712.4 | 613.1 | 5,108.8 | 4,979.2 | 129.60 | 39.419 | |
| 7,500.0 | 6,817.4 | 6,834.4 | 6,834.4 | 27.3 | 136.7 | 91.41 | -5,712.4 | 613.1 | 5,009.2 | 4,850.8 | 158.40 | 31.623 | |
| 7,600.0 | 6,817.2 | 6,834.2 | 6,834.2 | 28.3 | 136.7 | 91.38 | -5,712.4 | 613.1 | 4,909.5 | 4,749.8 | 159.71 | 30.740 | |
| 7,700.0 | 6,817.0 | 6,834.0 | 6,834.0 | 29.3 | 136.7 | 91.35 | -5,712.4 | 613.1 | 4,809.8 | 4,648.7 | 161.10 | 29.855 | |
| 7,800.0 | 6,816.9 | 6,833.9 | 6,833.9 | 30.5 | 136.7 | 91.32 | -5,712.4 | 613.1 | 4,710.1 | 4,547.6 | 162.56 | 28.974 | |
| 7,900.0 | 6,816.7 | 6,833.7 | 6,833.7 | 31.8 | 136.7 | 91.29 | -5,712.4 | 613.1 | 4,610.5 | 4,446.4 | 164.08 | 28.100 | |
| 8,000.0 | 6,816.5 | 6,833.5 | 6,833.5 | 33.1 | 136.7 | 91.27 | -5,712.4 | 613.1 | 4,510.8 | 4,345.2 | 165.64 | 27.233 | |
| 8,100.0 | 6,816.3 | 6,833.3 | 6,833.3 | 34.5 | 136.7 | 91.24 | -5,712.4 | 613.1 | 4,411.2 | 4,244.0 | 167.24 | 26.376 | |
| 8,200.0 | 6,816.1 | 6,833.1 | 6,833.1 | 36.0 | 136.7 | 91.21 | -5,712.4 | 613.1 | 4,311.6 | 4,142.7 | 168.88 | 25.531 | |
| 8,300.0 | 6,815.9 | 6,832.9 | 6,832.9 | 37.5 | 136.7 | 91.18 | -5,712.4 | 613.1 | 4,212.0 | 4,041.5 | 170.55 | 24.697 | |
| 8,400.0 | 6,815.7 | 6,832.7 | 6,832.7 | 39.0 | 136.7 | 91.15 | -5,712.4 | 613.1 | 4,112.5 | 3,940.2 | 172.24 | 23.877 | |
| 8,500.0 | 6,815.5 | 6,832.5 | 6,832.5 | 40.6 | 136.7 | 91.13 | -5,712.4 | 613.1 | 4,012.9 | 3,839.0 | 173.95 | 23.069 | |
| 8,600.0 | 6,815.3 | 6,832.3 | 6,832.3 | 42.2 | 136.6 | 91.10 | -5,712.4 | 613.1 | 3,913.4 | 3,737.7 | 175.69 | 22.275 | |
| 8,700.0 | 6,815.1 | 6,832.1 | 6,832.1 | 43.8 | 136.6 | 91.07 | -5,712.4 | 613.1 | 3,813.9 | 3,636.5 | 177.43 | 21.495 | |
| 8,800.0 | 6,814.9 | 6,831.9 | 6,831.9 | 45.5 | 136.6 | 91.04 | -5,712.4 | 613.1 | 3,714.5 | 3,535.3 | 179.20 | 20.728 | |
| 8,900.0 | 6,814.7 | 6,831.7 | 6,831.7 | 47.1 | 136.6 | 91.01 | -5,712.4 | 613.1 | 3,615.1 | 3,434.1 | 180.97 | 19.975 | |
| 9,000.0 | 6,814.5 | 6,831.5 | 6,831.5 | 48.8 | 136.6 | 90.98 | -5,712.4 | 613.1 | 3,515.7 | 3,332.9 | 182.76 | 19.236 | |
| 9,100.0 | 6,814.4 | 6,831.4 | 6,831.4 | 50.5 | 136.6 | 90.96 | -5,712.4 | 613.1 | 3,416.3 | 3,231.7 | 184.56 | 18.510 | |
| 9,200.0 | 6,814.2 | 6,831.2 | 6,831.2 | 52.2 | 136.6 | 90.93 | -5,712.4 | 613.1 | 3,317.0 | 3,130.6 | 186.37 | 17.798 | |
| 9,300.0 | 6,814.0 | 6,831.0 | 6,831.0 | 54.0 | 136.6 | 90.90 | -5,712.4 | 613.1 | 3,217.7 | 3,029.5 | 188.18 | 17.099 | |
| 9,400.0 | 6,813.8 | 6,830.8 | 6,830.8 | 55.7 | 136.6 | 90.87 | -5,712.4 | 613.1 | 3,118.4 | 2,928.4 | 190.00 | 16.413 | |
| 9,500.0 | 6,813.6 | 6,830.6 | 6,830.6 | 57.5 | 136.6 | 90.84 | -5,712.4 | 613.1 | 3,019.3 | 2,827.4 | 191.83 | 15.739 | |
| 9,600.0 | 6,813.4 | 6,830.4 | 6,830.4 | 59.3 | 136.6 | 90.82 | -5,712.4 | 613.1 | 2,920.1 | 2,726.5 | 193.66 | 15.078 | |
| 9,700.0 | 6,813.2 | 6,830.2 | 6,830.2 | 61.0 | 136.6 | 90.79 | -5,712.4 | 613.1 | 2,821.1 | 2,625.5 | 195.50 | 14.430 | |
| 9,800.0 | 6,813.0 | 6,830.0 | 6,830.0 | 62.8 | 136.6 | 90.76 | -5,712.4 | 613.1 | 2,722.0 | 2,524.7 | 197.35 | 13.793 | |
| 9,900.0 | 6,812.8 | 6,829.8 | 6,829.8 | 64.6 | 136.6 | 90.73 | -5,712.4 | 613.1 | 2,623.1 | 2,423.9 | 199.20 | 13.169 | |
| 10,000.0 | 6,812.6 | 6,829.6 | 6,829.6 | 66.4 | 136.6 | 90.70 | -5,712.4 | 613.1 | 2,524.3 | 2,323.2 | 201.05 | 12.556 | |
| 10,100.0 | 6,812.4 | 6,829.4 | 6,829.4 | 68.2 | 136.6 | 90.67 | -5,712.4 | 613.1 | 2,425.5 | 2,222.6 | 202.90 | 11.954 | |

| | | | |
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Existing Wells - Churchill 28J-HZ Sec.28-T5N-R64W - Wonenberg B33-3 (Exist) - Wellbore #1 - Wellbo

**Offset Site Error:** 0.0 ft

**Survey Program:** 7600-UNKNOWN

**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) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,200.0 | 6,812.2 | 6,829.2 | 6,829.2 | 70.0 | 136.6 | 90.65 | -5,712.4 | 613.1 | 2,326.9 | 2,122.1 | 204.76 | 11.364 | |
| 10,300.0 | 6,812.1 | 6,829.1 | 6,829.1 | 71.9 | 136.6 | 90.62 | -5,712.4 | 613.1 | 2,228.4 | 2,021.7 | 206.63 | 10.785 | |
| 10,400.0 | 6,811.9 | 6,828.9 | 6,828.9 | 73.7 | 136.6 | 90.59 | -5,712.4 | 613.1 | 2,130.0 | 1,921.5 | 208.49 | 10.216 | |
| 10,500.0 | 6,811.7 | 6,828.7 | 6,828.7 | 75.5 | 136.6 | 90.56 | -5,712.4 | 613.1 | 2,031.8 | 1,821.4 | 210.36 | 9.659 | |
| 10,600.0 | 6,811.5 | 6,828.5 | 6,828.5 | 77.3 | 136.6 | 90.53 | -5,712.4 | 613.1 | 1,933.7 | 1,721.5 | 212.23 | 9.111 | |
| 10,700.0 | 6,811.3 | 6,828.3 | 6,828.3 | 79.2 | 136.6 | 90.51 | -5,712.4 | 613.1 | 1,835.9 | 1,621.8 | 214.10 | 8.575 | |
| 10,800.0 | 6,811.1 | 6,828.1 | 6,828.1 | 81.0 | 136.6 | 90.48 | -5,712.4 | 613.1 | 1,738.3 | 1,522.3 | 215.98 | 8.049 | |
| 10,900.0 | 6,810.9 | 6,827.9 | 6,827.9 | 82.9 | 136.6 | 90.45 | -5,712.4 | 613.1 | 1,641.0 | 1,423.2 | 217.85 | 7.533 | |
| 11,000.0 | 6,810.7 | 6,827.7 | 6,827.7 | 84.7 | 136.6 | 90.42 | -5,712.4 | 613.1 | 1,544.1 | 1,324.3 | 219.73 | 7.027 | |
| 11,100.0 | 6,810.5 | 6,827.5 | 6,827.5 | 86.6 | 136.6 | 90.39 | -5,712.4 | 613.1 | 1,447.5 | 1,225.9 | 221.61 | 6.532 | |
| 11,200.0 | 6,810.3 | 6,827.3 | 6,827.3 | 88.4 | 136.5 | 90.36 | -5,712.4 | 613.1 | 1,351.5 | 1,128.0 | 223.49 | 6.047 | |
| 11,300.0 | 6,810.1 | 6,827.1 | 6,827.1 | 90.3 | 136.5 | 90.34 | -5,712.4 | 613.1 | 1,256.1 | 1,030.7 | 225.38 | 5.573 | |
| 11,400.0 | 6,809.9 | 6,826.9 | 6,826.9 | 92.1 | 136.5 | 90.31 | -5,712.4 | 613.1 | 1,161.4 | 934.2 | 227.26 | 5.111 | |
| 11,500.0 | 6,809.7 | 6,826.7 | 6,826.7 | 94.0 | 136.5 | 90.28 | -5,712.4 | 613.1 | 1,067.8 | 838.6 | 229.15 | 4.660 | |
| 11,600.0 | 6,809.6 | 6,826.6 | 6,826.6 | 95.9 | 136.5 | 90.25 | -5,712.4 | 613.1 | 975.4 | 744.4 | 231.03 | 4.222 | |
| 11,700.0 | 6,809.4 | 6,826.4 | 6,826.4 | 97.7 | 136.5 | 90.22 | -5,712.4 | 613.1 | 884.6 | 651.7 | 232.92 | 3.798 | |
| 11,800.0 | 6,809.2 | 6,826.2 | 6,826.2 | 99.6 | 136.5 | 90.20 | -5,712.4 | 613.1 | 796.1 | 561.3 | 234.81 | 3.391 | |
| 11,900.0 | 6,809.0 | 6,826.0 | 6,826.0 | 101.5 | 136.5 | 90.17 | -5,712.4 | 613.1 | 710.7 | 474.0 | 236.70 | 3.002 | |
| 12,000.0 | 6,808.8 | 6,825.8 | 6,825.8 | 103.3 | 136.5 | 90.14 | -5,712.4 | 613.1 | 629.5 | 390.9 | 238.59 | 2.638 | |
| 12,100.0 | 6,808.6 | 6,825.6 | 6,825.6 | 105.2 | 136.5 | 90.11 | -5,712.4 | 613.1 | 554.5 | 314.0 | 240.48 | 2.306 | |
| 12,200.0 | 6,808.4 | 6,825.4 | 6,825.4 | 107.1 | 136.5 | 90.08 | -5,712.4 | 613.1 | 488.5 | 246.2 | 242.37 | 2.016 | |
| 12,300.0 | 6,808.2 | 6,825.2 | 6,825.2 | 109.0 | 136.5 | 90.05 | -5,712.4 | 613.1 | 435.8 | 191.5 | 244.27 | 1.784 | |
| 12,400.0 | 6,808.0 | 6,825.0 | 6,825.0 | 110.8 | 136.5 | 90.03 | -5,712.4 | 613.1 | 401.4 | 155.2 | 246.16 | 1.630 | |
| 12,493.9 | 6,807.8 | 6,824.8 | 6,824.8 | 112.6 | 136.5 | 90.00 | -5,712.4 | 613.1 | 390.2 | 142.3 | 247.94 | 1.574 | CC |
| 12,500.0 | 6,807.8 | 6,824.8 | 6,824.8 | 112.7 | 136.5 | 90.00 | -5,712.4 | 613.1 | 390.3 | 142.2 | 248.06 | 1.573 | ES, SF |
| 12,600.0 | 6,807.6 | 6,824.6 | 6,824.6 | 114.6 | 136.5 | 89.97 | -5,712.4 | 613.1 | 404.4 | 154.4 | 249.95 | 1.618 | |
| 12,700.0 | 6,807.4 | 6,824.4 | 6,824.4 | 116.5 | 136.5 | 89.94 | -5,712.4 | 613.1 | 441.3 | 189.4 | 251.85 | 1.752 | |
| 12,800.0 | 6,807.3 | 6,824.3 | 6,824.3 | 118.4 | 136.5 | 89.91 | -5,712.4 | 613.1 | 495.9 | 242.2 | 253.74 | 1.954 | |
| 12,900.0 | 6,807.1 | 6,824.1 | 6,824.1 | 120.3 | 136.5 | 89.89 | -5,712.4 | 613.1 | 563.2 | 307.5 | 255.64 | 2.203 | |
| 13,000.0 | 6,806.9 | 6,823.9 | 6,823.9 | 122.1 | 136.5 | 89.86 | -5,712.4 | 613.1 | 639.0 | 381.5 | 257.54 | 2.481 | |
| 13,100.0 | 6,806.7 | 6,823.7 | 6,823.7 | 124.0 | 136.5 | 89.83 | -5,712.4 | 613.1 | 720.8 | 461.4 | 259.44 | 2.778 | |
| 13,200.0 | 6,806.5 | 6,823.5 | 6,823.5 | 125.9 | 136.5 | 89.80 | -5,712.4 | 613.1 | 806.7 | 545.4 | 261.34 | 3.087 | |
| 13,300.0 | 6,806.3 | 6,823.3 | 6,823.3 | 127.8 | 136.5 | 89.77 | -5,712.4 | 613.1 | 895.5 | 632.3 | 263.23 | 3.402 | |
| 13,400.0 | 6,806.1 | 6,823.1 | 6,823.1 | 129.7 | 136.5 | 89.74 | -5,712.4 | 613.1 | 986.5 | 721.4 | 265.13 | 3.721 | |
| 13,500.0 | 6,805.9 | 6,822.9 | 6,822.9 | 131.6 | 136.5 | 89.72 | -5,712.4 | 613.1 | 1,079.1 | 812.1 | 267.03 | 4.041 | |
| 13,600.0 | 6,805.7 | 6,822.7 | 6,822.7 | 133.5 | 136.5 | 89.69 | -5,712.4 | 613.1 | 1,172.9 | 903.9 | 268.93 | 4.361 | |
| 13,700.0 | 6,805.5 | 6,822.5 | 6,822.5 | 135.4 | 136.5 | 89.66 | -5,712.4 | 613.1 | 1,267.6 | 996.8 | 270.83 | 4.680 | |
| 13,800.0 | 6,805.3 | 6,822.3 | 6,822.3 | 137.3 | 136.4 | 89.63 | -5,712.4 | 613.1 | 1,363.1 | 1,090.4 | 272.74 | 4.998 | |
| 13,900.0 | 6,805.1 | 6,822.1 | 6,822.1 | 139.2 | 136.4 | 89.60 | -5,712.4 | 613.1 | 1,459.2 | 1,184.6 | 274.64 | 5.313 | |
| 13,973.0 | 6,805.0 | 6,822.0 | 6,822.0 | 140.6 | 136.4 | 89.58 | -5,712.4 | 613.1 | 1,529.7 | 1,253.7 | 276.02 | 5.542 | |

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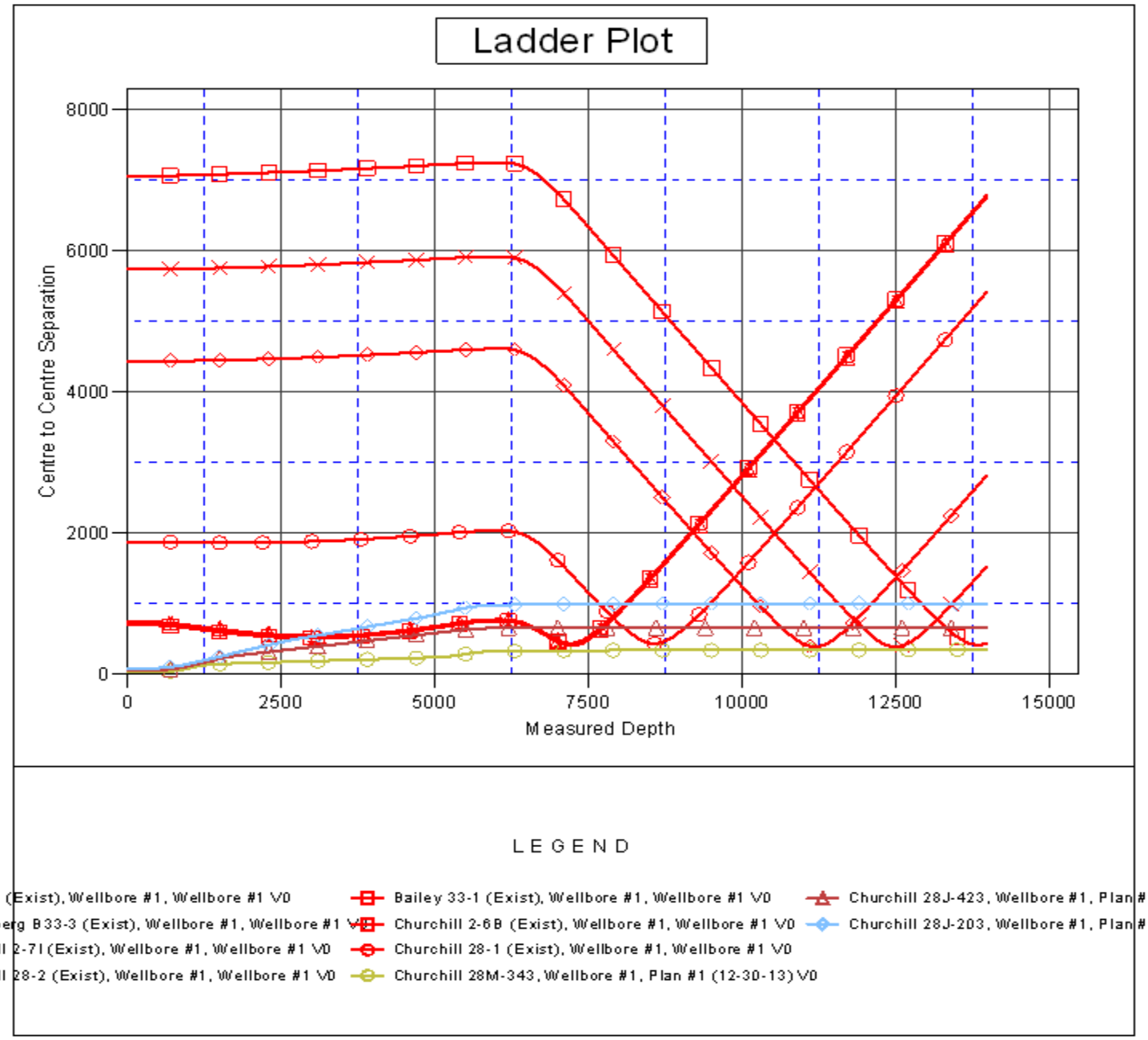
|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

Reference Depths are relative to WELL @ 4647.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Churchill 28M-443
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.61°



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|---|---|---|---|
| **Company:** | PETROLEUM DEVELOPMENT CORP Weld County CO | **Local Co-ordinate Reference:** | Well Churchill 28M-443 |
| **Project:** | SEC.28-T5N-R64W | **TVD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Reference Site:** | Churchill 28J-HZ Pad Sec.28-T5N-R64W | **MD Reference:** | WELL @ 4647.0ft (RKB - 15') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Churchill 28M-443 | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (12-30-13) | **Offset TVD Reference:** | Offset Datum |

| | |
|---|---|
| Reference Depths are relative to WELL @ 4647.0ft (RKB - 15') | Coordinates are relative to: Churchill 28M-443 |
| Offset Depths are relative to Offset Datum | Coordinate System is US State Plane 1983, Colorado Northern Zone |
| Central Meridian is -105.500000 ° | Grid Convergence at Surface is: 0.61° |