

PETROLEUM DEVELOPMENT CORP Weld County CO

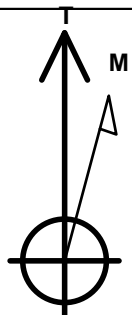
Well Name: **Ledford 22Y-401**

Surface Location: Ledford 22Y-HZ Pad Sec.22-T5N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4598.0

| +N/-S | +E/-W | Northing | Easting | Latitude | Longitude | Slot |
|---------------------------------------|-------|------------|------------|-----------|-------------|------|
| 0.0 | 0.0 | 1382221.50 | 3270979.07 | 40.378520 | -104.527330 | |
| RKB - 15' WELL @ 4613.0ft (RKB - 15') | | | | | | |

WELLBORE TARGET DETAILS

| Name | TVD | +N/-S | +E/-W | Shape |
|-----------------------|--------|--------|-------|-------|
| SHL 321'FSL & 268'FEL | 1.0 | 0.0 | 0.0 | Point |
| BHL 500'FNL & 146'FEL | 6736.0 | 4437.3 | 110.1 | Point |



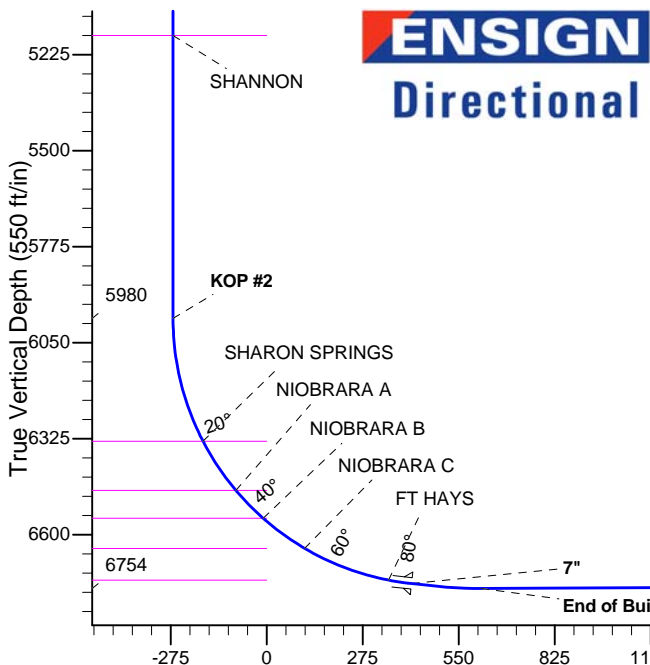
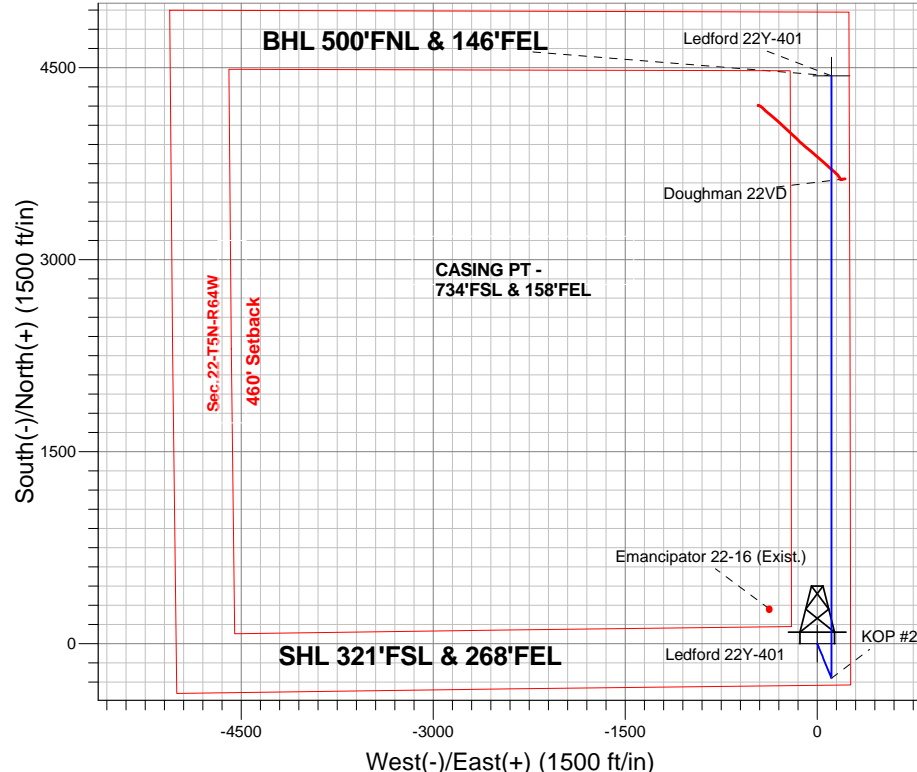
Azimuths to True North
Magnetic North: 8.32°

Magnetic Field
Strength: 52889.6srT
Dip Angle: 66.99°
Date: 2/25/2014
Model: IGRF200510

Ledford 22Y-HZ Pad Sec.22-T5N-R64W
Ledford 22Y-401
Plan #1 (2-25-14)
15:21, March 06 2014

ANNOTATIONS

| TVD | MD | Annotation |
|--------|--------|--------------|
| 2000.0 | 2000.0 | KOP |
| 5980.3 | 6002.2 | KOP #2 |
| 6754.0 | 7321.6 | End of Build |



SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSec | Target |
|-----|---------|-------|--------|--------|--------|-------|------|--------|--------|-----------------------|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 2 | 2000.0 | 0.00 | 0.00 | 2000.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 3 | 3011.8 | 10.12 | 157.89 | 3006.5 | -82.6 | 33.5 | 1.00 | 157.89 | -81.7 | |
| 4 | 3916.0 | 10.12 | 157.89 | 3896.7 | -229.7 | 93.3 | 0.00 | 0.00 | -227.3 | |
| 5 | 4421.9 | 0.00 | 0.00 | 4400.0 | -271.0 | 110.1 | 2.00 | 180.00 | -268.2 | |
| 6 | 6002.2 | 0.00 | 0.00 | 5980.3 | -271.0 | 110.1 | 0.00 | 0.00 | -268.2 | |
| 7 | 7122.2 | 84.00 | 0.00 | 6740.0 | 413.1 | 110.1 | 7.50 | 0.00 | 415.7 | |
| 8 | 7196.2 | 84.00 | 0.00 | 6747.8 | 486.7 | 110.1 | 0.00 | 0.00 | 489.3 | |
| 9 | 7321.6 | 90.27 | 0.00 | 6754.0 | 611.9 | 110.1 | 5.00 | 0.00 | 614.4 | |
| 10 | 11147.1 | 90.27 | 0.00 | 6736.0 | 4437.3 | 110.1 | 0.00 | 0.00 | 4438.7 | BHL 500'FNL & 146'FEL |



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

Ledford 22Y-HZ Pad Sec.22-T5N-R64W

Ledford 22Y-401

Wellbore #1

Plan: Plan #1 (2-25-14)

Standard Planning Report

06 March, 2014

| | | | |
|------------------|---|-------------------------------------|-----------------------------|
| Database: | landmark | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Project: | SEC.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | North Reference: | True |
| Well: | Ledford 22Y-401 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Wellbore #1 | | |
| Design: | Plan #1 (2-25-14) | | |

| | | | |
|--------------------|--|----------------------|-----------------------------|
| Project | SEC.22-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 | | | | | | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | | | | | | | | | | | |
| Site Position: | | | | | | Northing: | | | 1,382,151.62 ft | | | Latitude: | | | 40.378330 | | |
| From: | | | Lat/Long | | | Easting: | | | 3,270,918.54 ft | | | Longitude: | | | -104.527550 | | |
| Position Uncertainty: | | | 0.0 ft | | | Slot Radius: | | | " | | | Grid Convergence: | | | 0.63 ° | | |

| Well | Ledford 22Y-401 | | | | | |
|----------------------|-----------------|---------|---------------------|-----------------|---------------|-------------|
| Well Position | +N/-S | 69.2 ft | Northing: | 1,382,221.50 ft | Latitude: | 40.378520 |
| | +E/-W | 61.3 ft | Easting: | 3,270,979.07 ft | Longitude: | -104.527330 |
| Position Uncertainty | | 0.0 ft | Wellhead Elevation: | ft | Ground Level: | 4,598.0 ft |

| | | | | | |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| Wellbore | Wellbore #1 | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF200510 | 2/25/2014 | 8.32 | 66.99 | 52,890 |

| | | | | |
|--------------------------|------------------------------|-------------------|----------------------|----------------------|
| Design | Plan #1 (2-25-14) | | | |
| 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 | 1.42 |

| 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 | |
| 2,000.0 | 0.00 | 0.00 | 2,000.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3,011.8 | 10.12 | 157.89 | 3,006.5 | -82.6 | 33.5 | 1.00 | 1.00 | 0.00 | 157.89 | |
| 3,916.0 | 10.12 | 157.89 | 3,896.7 | -229.7 | 93.3 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4,421.9 | 0.00 | 0.00 | 4,400.0 | -271.0 | 110.1 | 2.00 | -2.00 | 0.00 | 180.00 | |
| 6,002.2 | 0.00 | 0.00 | 5,980.3 | -271.0 | 110.1 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,122.2 | 84.00 | 0.00 | 6,740.0 | 413.1 | 110.1 | 7.50 | 7.50 | 0.00 | 0.00 | |
| 7,196.2 | 84.00 | 0.00 | 6,747.8 | 486.7 | 110.1 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,321.6 | 90.27 | 0.00 | 6,754.0 | 611.9 | 110.1 | 5.00 | 5.00 | 0.00 | 0.00 | |
| 11,147.1 | 90.27 | 0.00 | 6,736.0 | 4,437.3 | 110.1 | 0.00 | 0.00 | 0.00 | 0.00 | BHL 500'FNL & 146 |

| | | | |
|------------------|---|-------------------------------------|-----------------------------|
| Database: | landmark | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Project: | SEC.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | North Reference: | True |
| Well: | Ledford 22Y-401 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Wellbore #1 | | |
| Design: | Plan #1 (2-25-14) | | |

| 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 321'FSL & 268'FEL | | | | | | | | | |
| 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 |
| 500.0 | 0.00 | 0.00 | 500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 600.0 | 0.00 | 0.00 | 600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 700.0 | 0.00 | 0.00 | 700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 800.0 | 0.00 | 0.00 | 800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 900.0 | 0.00 | 0.00 | 900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,000.0 | 0.00 | 0.00 | 1,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,100.0 | 0.00 | 0.00 | 1,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,200.0 | 0.00 | 0.00 | 1,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,400.0 | 0.00 | 0.00 | 1,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,500.0 | 0.00 | 0.00 | 1,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,600.0 | 0.00 | 0.00 | 1,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,700.0 | 0.00 | 0.00 | 1,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,800.0 | 0.00 | 0.00 | 1,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,900.0 | 0.00 | 0.00 | 1,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,000.0 | 0.00 | 0.00 | 2,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| KOP | | | | | | | | | |
| 2,100.0 | 1.00 | 157.89 | 2,100.0 | -0.8 | 0.3 | -0.8 | 1.00 | 1.00 | 0.00 |
| 2,200.0 | 2.00 | 157.89 | 2,200.0 | -3.2 | 1.3 | -3.2 | 1.00 | 1.00 | 0.00 |
| 2,300.0 | 3.00 | 157.89 | 2,299.9 | -7.3 | 3.0 | -7.2 | 1.00 | 1.00 | 0.00 |
| 2,400.0 | 4.00 | 157.89 | 2,399.7 | -12.9 | 5.3 | -12.8 | 1.00 | 1.00 | 0.00 |
| 2,500.0 | 5.00 | 157.89 | 2,499.4 | -20.2 | 8.2 | -20.0 | 1.00 | 1.00 | 0.00 |
| 2,600.0 | 6.00 | 157.89 | 2,598.9 | -29.1 | 11.8 | -28.8 | 1.00 | 1.00 | 0.00 |
| 2,700.0 | 7.00 | 157.89 | 2,698.3 | -39.6 | 16.1 | -39.2 | 1.00 | 1.00 | 0.00 |
| 2,800.0 | 8.00 | 157.89 | 2,797.4 | -51.7 | 21.0 | -51.1 | 1.00 | 1.00 | 0.00 |
| 2,900.0 | 9.00 | 157.89 | 2,896.3 | -65.4 | 26.6 | -64.7 | 1.00 | 1.00 | 0.00 |
| 3,000.0 | 10.00 | 157.89 | 2,994.9 | -80.6 | 32.8 | -79.8 | 1.00 | 1.00 | 0.00 |
| 3,011.8 | 10.12 | 157.89 | 3,006.5 | -82.6 | 33.5 | -81.7 | 1.00 | 1.00 | 0.00 |
| 3,100.0 | 10.12 | 157.89 | 3,093.4 | -96.9 | 39.4 | -95.9 | 0.00 | 0.00 | 0.00 |
| 3,200.0 | 10.12 | 157.89 | 3,191.8 | -113.2 | 46.0 | -112.0 | 0.00 | 0.00 | 0.00 |
| 3,300.0 | 10.12 | 157.89 | 3,290.3 | -129.5 | 52.6 | -128.1 | 0.00 | 0.00 | 0.00 |
| 3,400.0 | 10.12 | 157.89 | 3,388.7 | -145.7 | 59.2 | -144.2 | 0.00 | 0.00 | 0.00 |
| 3,411.5 | 10.12 | 157.89 | 3,400.0 | -147.6 | 60.0 | -146.1 | 0.00 | 0.00 | 0.00 |
| PARKMAN | | | | | | | | | |
| 3,500.0 | 10.12 | 157.89 | 3,487.2 | -162.0 | 65.8 | -160.3 | 0.00 | 0.00 | 0.00 |
| 3,600.0 | 10.12 | 157.89 | 3,585.6 | -178.3 | 72.4 | -176.4 | 0.00 | 0.00 | 0.00 |
| 3,700.0 | 10.12 | 157.89 | 3,684.0 | -194.6 | 79.0 | -192.5 | 0.00 | 0.00 | 0.00 |
| 3,800.0 | 10.12 | 157.89 | 3,782.5 | -210.8 | 85.7 | -208.6 | 0.00 | 0.00 | 0.00 |
| 3,900.0 | 10.12 | 157.89 | 3,880.9 | -227.1 | 92.3 | -224.8 | 0.00 | 0.00 | 0.00 |
| 3,916.0 | 10.12 | 157.89 | 3,896.7 | -229.7 | 93.3 | -227.3 | 0.00 | 0.00 | 0.00 |
| 4,000.0 | 8.44 | 157.89 | 3,979.6 | -242.3 | 98.4 | -239.7 | 2.00 | -2.00 | 0.00 |
| 4,100.0 | 6.44 | 157.89 | 4,078.7 | -254.3 | 103.3 | -251.6 | 2.00 | -2.00 | 0.00 |
| 4,200.0 | 4.44 | 157.89 | 4,178.3 | -263.0 | 106.9 | -260.3 | 2.00 | -2.00 | 0.00 |
| 4,271.9 | 3.00 | 157.89 | 4,250.0 | -267.4 | 108.6 | -264.6 | 2.00 | -2.00 | 0.00 |
| SUSSEX | | | | | | | | | |
| 4,300.0 | 2.44 | 157.89 | 4,278.1 | -268.6 | 109.1 | -265.8 | 2.00 | -2.00 | 0.00 |

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|------------------|---|-------------------------------------|-----------------------------|
| Database: | landmark | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Project: | SEC.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | North Reference: | True |
| Well: | Ledford 22Y-401 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Wellbore #1 | | |
| Design: | Plan #1 (2-25-14) | | |

| 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) |
| 4,400.0 | 0.44 | 157.89 | 4,378.1 | -270.9 | 110.1 | -268.1 | 2.00 | -2.00 | 0.00 |
| 4,421.9 | 0.00 | 0.00 | 4,400.0 | -271.0 | 110.1 | -268.2 | 2.00 | -2.00 | 0.00 |
| 4,500.0 | 0.00 | 0.00 | 4,478.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 4,600.0 | 0.00 | 0.00 | 4,578.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 4,700.0 | 0.00 | 0.00 | 4,678.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 4,800.0 | 0.00 | 0.00 | 4,778.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 4,900.0 | 0.00 | 0.00 | 4,878.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,000.0 | 0.00 | 0.00 | 4,978.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,100.0 | 0.00 | 0.00 | 5,078.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,191.9 | 0.00 | 0.00 | 5,170.0 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| SHANNON | | | | | | | | | |
| 5,200.0 | 0.00 | 0.00 | 5,178.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,300.0 | 0.00 | 0.00 | 5,278.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,400.0 | 0.00 | 0.00 | 5,378.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,500.0 | 0.00 | 0.00 | 5,478.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,600.0 | 0.00 | 0.00 | 5,578.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,700.0 | 0.00 | 0.00 | 5,678.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,800.0 | 0.00 | 0.00 | 5,778.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 5,900.0 | 0.00 | 0.00 | 5,878.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 6,000.0 | 0.00 | 0.00 | 5,978.1 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| 6,002.2 | 0.00 | 0.00 | 5,980.3 | -271.0 | 110.1 | -268.2 | 0.00 | 0.00 | 0.00 |
| KOP #2 | | | | | | | | | |
| 6,100.0 | 7.33 | 0.00 | 6,077.8 | -264.7 | 110.1 | -261.9 | 7.50 | 7.50 | 0.00 |
| 6,200.0 | 14.83 | 0.00 | 6,175.9 | -245.5 | 110.1 | -242.7 | 7.50 | 7.50 | 0.00 |
| 6,300.0 | 22.33 | 0.00 | 6,270.6 | -213.7 | 110.1 | -210.9 | 7.50 | 7.50 | 0.00 |
| 6,367.7 | 27.41 | 0.00 | 6,332.0 | -185.2 | 110.1 | -182.4 | 7.50 | 7.50 | 0.00 |
| SHARON SPRINGS | | | | | | | | | |
| 6,400.0 | 29.83 | 0.00 | 6,360.3 | -169.8 | 110.1 | -167.0 | 7.50 | 7.50 | 0.00 |
| 6,500.0 | 37.33 | 0.00 | 6,443.6 | -114.5 | 110.1 | -111.7 | 7.50 | 7.50 | 0.00 |
| 6,537.7 | 40.16 | 0.00 | 6,473.0 | -90.9 | 110.1 | -88.1 | 7.50 | 7.50 | 0.00 |
| NIOBRARA A | | | | | | | | | |
| 6,600.0 | 44.83 | 0.00 | 6,518.9 | -48.8 | 110.1 | -46.1 | 7.50 | 7.50 | 0.00 |
| 6,649.7 | 48.56 | 0.00 | 6,553.0 | -12.6 | 110.1 | -9.9 | 7.50 | 7.50 | 0.00 |
| NIOBRARA B | | | | | | | | | |
| 6,700.0 | 52.33 | 0.00 | 6,585.0 | 26.1 | 110.1 | 28.9 | 7.50 | 7.50 | 0.00 |
| 6,796.5 | 59.57 | 0.00 | 6,639.0 | 106.1 | 110.1 | 108.8 | 7.50 | 7.50 | 0.00 |
| NIOBRARA C | | | | | | | | | |
| 6,800.0 | 59.83 | 0.00 | 6,640.8 | 109.1 | 110.1 | 111.8 | 7.50 | 7.50 | 0.00 |
| 6,900.0 | 67.33 | 0.00 | 6,685.2 | 198.6 | 110.1 | 201.2 | 7.50 | 7.50 | 0.00 |
| 7,000.0 | 74.83 | 0.00 | 6,717.6 | 293.1 | 110.1 | 295.7 | 7.50 | 7.50 | 0.00 |
| 7,054.6 | 78.93 | 0.00 | 6,730.0 | 346.3 | 110.1 | 348.9 | 7.50 | 7.50 | 0.00 |
| FT HAYS | | | | | | | | | |
| 7,100.0 | 82.33 | 0.00 | 6,737.4 | 391.0 | 110.1 | 393.7 | 7.50 | 7.50 | 0.00 |
| 7,122.2 | 84.00 | 0.00 | 6,740.0 | 413.1 | 110.1 | 415.7 | 7.50 | 7.50 | 0.00 |
| 7" | | | | | | | | | |
| 7,196.2 | 84.00 | 0.00 | 6,747.8 | 486.7 | 110.1 | 489.3 | 0.00 | 0.00 | 0.00 |
| 7,200.0 | 84.19 | 0.00 | 6,748.2 | 490.5 | 110.1 | 493.0 | 5.00 | 5.00 | 0.00 |
| 7,300.0 | 89.19 | 0.00 | 6,753.9 | 590.3 | 110.1 | 592.8 | 5.00 | 5.00 | 0.00 |
| 7,321.6 | 90.27 | 0.00 | 6,754.0 | 611.9 | 110.1 | 614.4 | 5.00 | 5.00 | 0.00 |
| End of Build | | | | | | | | | |
| 7,400.0 | 90.27 | 0.00 | 6,753.7 | 690.3 | 110.1 | 692.8 | 0.00 | 0.00 | 0.00 |
| 7,500.0 | 90.27 | 0.00 | 6,753.2 | 790.3 | 110.1 | 792.7 | 0.00 | 0.00 | 0.00 |

| | | | |
|------------------|---|-------------------------------------|-----------------------------|
| Database: | landmark | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Project: | SEC.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | North Reference: | True |
| Well: | Ledford 22Y-401 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Wellbore #1 | | |
| Design: | Plan #1 (2-25-14) | | |

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) |
|-----------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---------------------|
| 7,600.0 | 90.27 | 0.00 | 6,752.7 | 890.3 | 110.1 | 892.7 | 0.00 | 0.00 | 0.00 |
| 7,700.0 | 90.27 | 0.00 | 6,752.2 | 990.3 | 110.1 | 992.7 | 0.00 | 0.00 | 0.00 |
| 7,800.0 | 90.27 | 0.00 | 6,751.8 | 1,090.3 | 110.1 | 1,092.6 | 0.00 | 0.00 | 0.00 |
| 7,900.0 | 90.27 | 0.00 | 6,751.3 | 1,190.3 | 110.1 | 1,192.6 | 0.00 | 0.00 | 0.00 |
| 8,000.0 | 90.27 | 0.00 | 6,750.8 | 1,290.3 | 110.1 | 1,292.6 | 0.00 | 0.00 | 0.00 |
| 8,100.0 | 90.27 | 0.00 | 6,750.4 | 1,390.3 | 110.1 | 1,392.6 | 0.00 | 0.00 | 0.00 |
| 8,200.0 | 90.27 | 0.00 | 6,749.9 | 1,490.2 | 110.1 | 1,492.5 | 0.00 | 0.00 | 0.00 |
| 8,300.0 | 90.27 | 0.00 | 6,749.4 | 1,590.2 | 110.1 | 1,592.5 | 0.00 | 0.00 | 0.00 |
| 8,400.0 | 90.27 | 0.00 | 6,748.9 | 1,690.2 | 110.1 | 1,692.5 | 0.00 | 0.00 | 0.00 |
| 8,500.0 | 90.27 | 0.00 | 6,748.5 | 1,790.2 | 110.1 | 1,792.4 | 0.00 | 0.00 | 0.00 |
| 8,600.0 | 90.27 | 0.00 | 6,748.0 | 1,890.2 | 110.1 | 1,892.4 | 0.00 | 0.00 | 0.00 |
| 8,700.0 | 90.27 | 0.00 | 6,747.5 | 1,990.2 | 110.1 | 1,992.4 | 0.00 | 0.00 | 0.00 |
| 8,800.0 | 90.27 | 0.00 | 6,747.1 | 2,090.2 | 110.1 | 2,092.3 | 0.00 | 0.00 | 0.00 |
| 8,900.0 | 90.27 | 0.00 | 6,746.6 | 2,190.2 | 110.1 | 2,192.3 | 0.00 | 0.00 | 0.00 |
| 9,000.0 | 90.27 | 0.00 | 6,746.1 | 2,290.2 | 110.1 | 2,292.3 | 0.00 | 0.00 | 0.00 |
| 9,100.0 | 90.27 | 0.00 | 6,745.6 | 2,390.2 | 110.1 | 2,392.2 | 0.00 | 0.00 | 0.00 |
| 9,200.0 | 90.27 | 0.00 | 6,745.2 | 2,490.2 | 110.1 | 2,492.2 | 0.00 | 0.00 | 0.00 |
| 9,300.0 | 90.27 | 0.00 | 6,744.7 | 2,590.2 | 110.1 | 2,592.2 | 0.00 | 0.00 | 0.00 |
| 9,400.0 | 90.27 | 0.00 | 6,744.2 | 2,690.2 | 110.1 | 2,692.1 | 0.00 | 0.00 | 0.00 |
| 9,500.0 | 90.27 | 0.00 | 6,743.8 | 2,790.2 | 110.1 | 2,792.1 | 0.00 | 0.00 | 0.00 |
| 9,600.0 | 90.27 | 0.00 | 6,743.3 | 2,890.2 | 110.1 | 2,892.1 | 0.00 | 0.00 | 0.00 |
| 9,700.0 | 90.27 | 0.00 | 6,742.8 | 2,990.2 | 110.1 | 2,992.0 | 0.00 | 0.00 | 0.00 |
| 9,800.0 | 90.27 | 0.00 | 6,742.3 | 3,090.2 | 110.1 | 3,092.0 | 0.00 | 0.00 | 0.00 |
| 9,900.0 | 90.27 | 0.00 | 6,741.9 | 3,190.2 | 110.1 | 3,192.0 | 0.00 | 0.00 | 0.00 |
| 10,000.0 | 90.27 | 0.00 | 6,741.4 | 3,290.2 | 110.1 | 3,291.9 | 0.00 | 0.00 | 0.00 |
| 10,100.0 | 90.27 | 0.00 | 6,740.9 | 3,390.2 | 110.1 | 3,391.9 | 0.00 | 0.00 | 0.00 |
| 10,200.0 | 90.27 | 0.00 | 6,740.5 | 3,490.2 | 110.1 | 3,491.9 | 0.00 | 0.00 | 0.00 |
| 10,300.0 | 90.27 | 0.00 | 6,740.0 | 3,590.2 | 110.1 | 3,591.9 | 0.00 | 0.00 | 0.00 |
| 10,400.0 | 90.27 | 0.00 | 6,739.5 | 3,690.2 | 110.1 | 3,691.8 | 0.00 | 0.00 | 0.00 |
| 10,500.0 | 90.27 | 0.00 | 6,739.0 | 3,790.2 | 110.1 | 3,791.8 | 0.00 | 0.00 | 0.00 |
| 10,600.0 | 90.27 | 0.00 | 6,738.6 | 3,890.2 | 110.1 | 3,891.8 | 0.00 | 0.00 | 0.00 |
| 10,700.0 | 90.27 | 0.00 | 6,738.1 | 3,990.2 | 110.1 | 3,991.7 | 0.00 | 0.00 | 0.00 |
| 10,800.0 | 90.27 | 0.00 | 6,737.6 | 4,090.2 | 110.1 | 4,091.7 | 0.00 | 0.00 | 0.00 |
| 10,900.0 | 90.27 | 0.00 | 6,737.2 | 4,190.2 | 110.1 | 4,191.7 | 0.00 | 0.00 | 0.00 |
| 11,000.0 | 90.27 | 0.00 | 6,736.7 | 4,290.2 | 110.1 | 4,291.6 | 0.00 | 0.00 | 0.00 |
| 11,100.0 | 90.27 | 0.00 | 6,736.2 | 4,390.2 | 110.1 | 4,391.6 | 0.00 | 0.00 | 0.00 |
| 11,147.1 | 90.27 | 0.00 | 6,736.0 | 4,437.3 | 110.1 | 4,438.7 | 0.00 | 0.00 | 0.00 |
| BHL 500'FNL & 146'FEL | | | | | | | | | |

Casing Points

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (") | Hole Diameter (") |
|---------------------|---------------------|------|---------------------|-------------------|
| 7,122.2 | 6,740.0 | 7" | 7 | 7-1/2 |

| | | | |
|------------------|---|-------------------------------------|-----------------------------|
| Database: | landmark | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Project: | SEC.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | North Reference: | True |
| Well: | Ledford 22Y-401 | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Wellbore #1 | | |
| Design: | Plan #1 (2-25-14) | | |

Formations

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---------------------|---------------------|----------------|-----------|---------|-------------------|
| 3,411.5 | 3,400.0 | PARKMAN | | 0.00 | |
| 4,271.9 | 4,250.0 | SUSSEX | | 0.00 | |
| 5,191.9 | 5,170.0 | SHANNON | | 0.00 | |
| 6,367.7 | 6,332.0 | SHARON SPRINGS | | 0.00 | |
| 6,537.7 | 6,473.0 | NIOBRARA A | | 0.00 | |
| 6,649.7 | 6,553.0 | NIOBRARA B | | 0.00 | |
| 6,796.5 | 6,639.0 | NIOBRARA C | | 0.00 | |
| 7,054.6 | 6,730.0 | FT HAYS | | 0.00 | |

Plan Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates | | Comment |
|---------------------|---------------------|-------------------|------------|--------------|
| | | +N/-S (ft) | +E/-W (ft) | |
| 2,000.0 | 2,000.0 | 0.0 | 0.0 | KOP |
| 6,002.2 | 5,980.3 | -271.0 | 110.1 | KOP #2 |
| 7,321.6 | 6,754.0 | 611.9 | 110.1 | End of Build |



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

Ledford 22Y-HZ Pad Sec.22-T5N-R64W

Ledford 22Y-401

Wellbore #1

Plan #1 (2-25-14)

Anticollision Report

06 March, 2014



| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| | | | |
|-------------------------------------|---|-----------------------|---------------------|
| Reference | Plan #1 (2-25-14) | | |
| 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 1,000.0ft | Error Surface: | Elliptical Conic |
| Warning Levels Evaluated at: | 2.00 Sigma | | |

| | | | | |
|----------------------------|----------------------|---------------------------------|------------------|--------------------|
| Survey Tool Program | Date 3/6/2014 | | | |
| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
| 0.0 | 11,147.1 | Plan #1 (2-25-14) (Wellbore #1) | MWD | MWD - Standard |

| | | | | | | |
|--|--------------------------------------|-----------------------------------|--------------------------------------|---------------------------------------|--------------------------|---------------------|
| Summary | | | | | | |
| Site Name | Reference Measured Depth (ft) | Offset Measured Depth (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Separation Factor | Warning |
| Offset Well - Wellbore - Design | | | | | | |
| Doughman 22VD Pad Sec.22-T5N-R64W | | | | | | |
| Doughman 22VD - Wellbore #1 - Wellbore #1 | 10,340.0 | 6,810.2 | 100.1 | 10.2 | 1.114 | Level 2, CC, ES, SF |
| Existing Wells Sec.22-T5N-R64W | | | | | | |
| Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1 | 2,000.0 | 1,987.0 | 464.9 | 420.8 | 10.536 | CC |
| Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1 | 6,979.3 | 6,698.9 | 486.2 | 336.5 | 3.247 | ES |
| Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1 | 7,000.0 | 6,704.6 | 486.6 | 336.6 | 3.244 | SF |
| Ledford 22Y-HZ Pad Sec.22-T5N-R64W | | | | | | |
| Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14) | 400.0 | 400.0 | 92.5 | 90.9 | 58.766 | CC, ES |
| Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14) | 11,147.1 | 11,113.6 | 927.3 | 752.2 | 5.295 | SF |
| Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14) | 1,000.0 | 1,000.0 | 61.4 | 57.1 | 14.367 | CC, ES |
| Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14) | 11,147.1 | 11,184.1 | 795.1 | 619.5 | 4.529 | SF |
| Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14) | 1,800.0 | 1,800.0 | 32.1 | 24.2 | 4.081 | CC, ES |
| Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14) | 11,147.1 | 10,993.3 | 318.4 | 169.7 | 2.142 | SF |

| Offset Design Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22VD - Wellbore #1 - Wellbore #1 | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|----------------|----------------|----------------|-----------------|--------|-------------------|------------------------|------------|-----------------|------------------|--------------------|---------------------------|---------|
| Survey Program: 671-MWD | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | |
| Measured Depth | Vertical Depth | Measured Depth | Vertical Depth | Reference | Offset | Highside Toolface | Offset Wellbore Centre | | Between Centres | Between Ellipses | Minimum Separation | Separation Factor | Warning |
| (ft) | (ft) | (ft) | (ft) | (ft) | (ft) | (°) | +N/-S (ft) | +E/-W (ft) | (ft) | (ft) | (ft) | | |
| 9,400.0 | 6,744.2 | 6,812.6 | 6,710.1 | 54.7 | 20.9 | 89.05 | 3,630.2 | 210.2 | 945.3 | 873.0 | 72.29 | 13.075 | |
| 9,500.0 | 6,743.8 | 6,812.4 | 6,709.9 | 56.5 | 20.9 | 88.90 | 3,630.2 | 210.2 | 845.9 | 771.8 | 74.15 | 11.408 | |
| 9,600.0 | 6,743.3 | 6,812.1 | 6,709.6 | 58.4 | 20.9 | 88.75 | 3,630.2 | 210.1 | 746.7 | 670.7 | 76.01 | 9.824 | |
| 9,700.0 | 6,742.8 | 6,811.9 | 6,709.4 | 60.3 | 20.9 | 88.60 | 3,630.2 | 210.1 | 647.7 | 569.9 | 77.87 | 8.318 | |
| 9,800.0 | 6,742.3 | 6,811.6 | 6,709.1 | 62.1 | 20.9 | 88.45 | 3,630.2 | 210.1 | 549.2 | 469.4 | 79.73 | 6.888 | |
| 9,900.0 | 6,741.9 | 6,811.3 | 6,708.8 | 64.0 | 20.9 | 88.30 | 3,630.2 | 210.1 | 451.2 | 369.6 | 81.60 | 5.530 | |
| 10,000.0 | 6,741.4 | 6,811.1 | 6,708.6 | 65.9 | 20.9 | 88.15 | 3,630.2 | 210.1 | 354.4 | 270.9 | 83.47 | 4.246 | |
| 10,100.0 | 6,740.9 | 6,810.8 | 6,708.3 | 67.7 | 20.9 | 88.01 | 3,630.2 | 210.1 | 260.0 | 174.7 | 85.34 | 3.047 | |
| 10,200.0 | 6,740.5 | 6,810.6 | 6,708.1 | 69.6 | 20.9 | 87.86 | 3,630.2 | 210.1 | 172.1 | 84.8 | 87.21 | 1.973 | |
| 10,300.0 | 6,740.0 | 6,810.3 | 6,707.8 | 71.5 | 20.9 | 87.71 | 3,630.2 | 210.1 | 107.7 | 18.7 | 89.09 | 1.209 Level 2 | |
| 10,340.0 | 6,739.8 | 6,810.2 | 6,707.7 | 72.2 | 20.9 | 87.66 | 3,630.2 | 210.1 | 100.1 | 10.2 | 89.84 | 1.114 Level 2, CC, ES, SF | |
| 10,400.0 | 6,739.5 | 6,810.1 | 6,707.6 | 73.4 | 20.9 | 87.57 | 3,630.2 | 210.1 | 116.7 | 25.7 | 90.96 | 1.283 Level 3 | |
| 10,500.0 | 6,739.0 | 6,809.8 | 6,707.3 | 75.3 | 20.9 | 87.43 | 3,630.2 | 210.1 | 188.7 | 95.9 | 92.84 | 2.033 | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| | | | | | | | | | | | | | |
|---|---------------------|---------------------|---------------------|-----------------|-------------|-----------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------------------|---------------------------|---------|
| Offset Design | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
| Survey Program: 671-MWD | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22VD - Wellbore #1 - Wellbore #1 | | | | | | | | | | | | | |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference (ft) | Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 10,600.0 | 6,738.6 | 6,809.6 | 6,707.1 | 77.1 | 20.9 | 87.29 | 3,630.2 | 210.0 | 278.6 | 183.9 | 94.72 | 2.941 | |
| 10,700.0 | 6,738.1 | 6,809.3 | 6,706.8 | 79.0 | 20.9 | 87.14 | 3,630.2 | 210.0 | 373.7 | 277.1 | 96.60 | 3.868 | |
| 10,800.0 | 6,737.6 | 6,809.1 | 6,706.6 | 80.9 | 20.9 | 87.00 | 3,630.2 | 210.0 | 470.8 | 372.3 | 98.48 | 4.781 | |
| 10,900.0 | 6,737.2 | 6,808.8 | 6,706.3 | 82.8 | 20.9 | 86.86 | 3,630.2 | 210.0 | 568.9 | 468.5 | 100.36 | 5.669 | |
| 11,000.0 | 6,736.7 | 6,808.6 | 6,706.1 | 84.7 | 20.9 | 86.72 | 3,630.2 | 210.0 | 667.6 | 565.3 | 102.24 | 6.529 | |
| 11,100.0 | 6,736.2 | 6,808.3 | 6,705.8 | 86.6 | 20.9 | 86.59 | 3,630.2 | 210.0 | 766.6 | 662.5 | 104.12 | 7.362 | |
| 11,147.1 | 6,736.0 | 6,808.2 | 6,705.7 | 87.5 | 20.9 | 86.52 | 3,630.2 | 210.0 | 813.3 | 708.3 | 105.01 | 7.745 | |

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1 | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|---------------------|---------------------|---------------------|----------------|-------------|---------------------------------------|-----------------------------------|------------|----------------------|-----------------------|-------------------------|-------------------|--------------------|--------|
| Survey Program: 6906-UNKNOWN | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference (ft) | Offset (ft) | Semi Major Axis Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -54.00 | 273.2 | -376.1 | 465.1 | | | | | |
| 100.0 | 100.0 | 87.0 | 87.0 | 0.1 | 1.7 | -54.00 | 273.2 | -376.1 | 464.9 | 463.0 | 1.85 | 250.943 | | |
| 200.0 | 200.0 | 187.0 | 187.0 | 0.3 | 3.7 | -54.00 | 273.2 | -376.1 | 464.9 | 460.8 | 4.08 | 114.018 | | |
| 300.0 | 300.0 | 287.0 | 287.0 | 0.6 | 5.7 | -54.00 | 273.2 | -376.1 | 464.9 | 458.6 | 6.30 | 73.768 | | |
| 400.0 | 400.0 | 387.0 | 387.0 | 0.8 | 7.7 | -54.00 | 273.2 | -376.1 | 464.9 | 456.4 | 8.53 | 54.521 | | |
| 500.0 | 500.0 | 487.0 | 487.0 | 1.0 | 9.7 | -54.00 | 273.2 | -376.1 | 464.9 | 454.1 | 10.75 | 43.239 | | |
| 600.0 | 600.0 | 587.0 | 587.0 | 1.2 | 11.7 | -54.00 | 273.2 | -376.1 | 464.9 | 451.9 | 12.98 | 35.826 | | |
| 700.0 | 700.0 | 687.0 | 687.0 | 1.5 | 13.7 | -54.00 | 273.2 | -376.1 | 464.9 | 449.7 | 15.20 | 30.583 | | |
| 800.0 | 800.0 | 787.0 | 787.0 | 1.7 | 15.7 | -54.00 | 273.2 | -376.1 | 464.9 | 447.5 | 17.43 | 26.678 | | |
| 900.0 | 900.0 | 887.0 | 887.0 | 1.9 | 17.7 | -54.00 | 273.2 | -376.1 | 464.9 | 445.2 | 19.65 | 23.658 | | |
| 1,000.0 | 1,000.0 | 987.0 | 987.0 | 2.1 | 19.7 | -54.00 | 273.2 | -376.1 | 464.9 | 443.0 | 21.88 | 21.252 | | |
| 1,100.0 | 1,100.0 | 1,087.0 | 1,087.0 | 2.4 | 21.7 | -54.00 | 273.2 | -376.1 | 464.9 | 440.8 | 24.10 | 19.290 | | |
| 1,200.0 | 1,200.0 | 1,187.0 | 1,187.0 | 2.6 | 23.7 | -54.00 | 273.2 | -376.1 | 464.9 | 438.6 | 26.32 | 17.660 | | |
| 1,300.0 | 1,300.0 | 1,287.0 | 1,287.0 | 2.8 | 25.7 | -54.00 | 273.2 | -376.1 | 464.9 | 436.3 | 28.55 | 16.284 | | |
| 1,400.0 | 1,400.0 | 1,387.0 | 1,387.0 | 3.0 | 27.7 | -54.00 | 273.2 | -376.1 | 464.9 | 434.1 | 30.77 | 15.106 | | |
| 1,500.0 | 1,500.0 | 1,487.0 | 1,487.0 | 3.3 | 29.7 | -54.00 | 273.2 | -376.1 | 464.9 | 431.9 | 33.00 | 14.088 | | |
| 1,600.0 | 1,600.0 | 1,587.0 | 1,587.0 | 3.5 | 31.7 | -54.00 | 273.2 | -376.1 | 464.9 | 429.7 | 35.22 | 13.198 | | |
| 1,700.0 | 1,700.0 | 1,687.0 | 1,687.0 | 3.7 | 33.7 | -54.00 | 273.2 | -376.1 | 464.9 | 427.4 | 37.45 | 12.414 | | |
| 1,800.0 | 1,800.0 | 1,787.0 | 1,787.0 | 3.9 | 35.7 | -54.00 | 273.2 | -376.1 | 464.9 | 425.2 | 39.67 | 11.718 | | |
| 1,900.0 | 1,900.0 | 1,887.0 | 1,887.0 | 4.2 | 37.7 | -54.00 | 273.2 | -376.1 | 464.9 | 423.0 | 41.90 | 11.096 | | |
| 2,000.0 | 2,000.0 | 1,987.0 | 1,987.0 | 4.4 | 39.7 | -54.00 | 273.2 | -376.1 | 464.9 | 420.8 | 44.12 | 10.536 CC | | |
| 2,100.0 | 2,100.0 | 2,087.0 | 2,087.0 | 4.6 | 41.7 | 148.16 | 273.2 | -376.1 | 465.6 | 419.3 | 46.31 | 10.054 | | |
| 2,200.0 | 2,200.0 | 2,187.0 | 2,187.0 | 4.8 | 43.7 | 148.32 | 273.2 | -376.1 | 467.9 | 419.4 | 48.47 | 9.653 | | |
| 2,300.0 | 2,299.9 | 2,286.9 | 2,286.9 | 4.9 | 45.7 | 148.58 | 273.2 | -376.1 | 471.6 | 421.0 | 50.61 | 9.317 | | |
| 2,400.0 | 2,399.7 | 2,386.7 | 2,386.7 | 5.1 | 47.7 | 148.93 | 273.2 | -376.1 | 476.8 | 424.0 | 52.75 | 9.039 | | |
| 2,500.0 | 2,499.4 | 2,486.4 | 2,486.4 | 5.3 | 49.7 | 149.38 | 273.2 | -376.1 | 483.5 | 428.7 | 54.87 | 8.813 | | |
| 2,600.0 | 2,598.9 | 2,585.9 | 2,585.9 | 5.5 | 51.7 | 149.90 | 273.2 | -376.1 | 491.8 | 434.8 | 56.97 | 8.633 | | |
| 2,700.0 | 2,698.3 | 2,685.3 | 2,685.3 | 5.7 | 53.7 | 150.50 | 273.2 | -376.1 | 501.7 | 442.6 | 59.06 | 8.494 | | |
| 2,800.0 | 2,797.4 | 2,784.4 | 2,784.4 | 5.9 | 55.7 | 151.16 | 273.2 | -376.1 | 513.1 | 452.0 | 61.12 | 8.394 | | |
| 2,900.0 | 2,896.3 | 2,883.3 | 2,883.3 | 6.2 | 57.7 | 151.88 | 273.2 | -376.1 | 526.1 | 462.9 | 63.16 | 8.329 | | |
| 3,000.0 | 2,994.9 | 2,981.9 | 2,981.9 | 6.5 | 59.6 | 152.63 | 273.2 | -376.1 | 540.8 | 475.6 | 65.18 | 8.297 | | |
| 3,100.0 | 3,093.4 | 3,080.4 | 3,080.4 | 6.7 | 61.6 | 153.45 | 273.2 | -376.1 | 556.5 | 489.1 | 67.31 | 8.267 | | |
| 3,200.0 | 3,191.8 | 3,178.8 | 3,178.8 | 7.0 | 63.6 | 154.23 | 273.2 | -376.1 | 572.3 | 502.8 | 69.47 | 8.238 | | |
| 3,300.0 | 3,290.3 | 3,277.3 | 3,277.3 | 7.3 | 65.5 | 154.98 | 273.2 | -376.1 | 588.2 | 516.6 | 71.63 | 8.211 | | |
| 3,400.0 | 3,388.7 | 3,375.7 | 3,375.7 | 7.6 | 67.5 | 155.68 | 273.2 | -376.1 | 604.2 | 530.4 | 73.80 | 8.187 | | |
| 3,500.0 | 3,487.2 | 3,474.2 | 3,474.2 | 8.0 | 69.5 | 156.35 | 273.2 | -376.1 | 620.3 | 544.3 | 75.96 | 8.166 | | |
| 3,600.0 | 3,585.6 | 3,572.6 | 3,572.6 | 8.3 | 71.5 | 156.98 | 273.2 | -376.1 | 636.5 | 558.3 | 78.13 | 8.146 | | |
| 3,700.0 | 3,684.0 | 3,671.0 | 3,671.0 | 8.6 | 73.4 | 157.58 | 273.2 | -376.1 | 652.7 | 572.4 | 80.30 | 8.128 | | |
| 3,800.0 | 3,782.5 | 3,769.5 | 3,769.5 | 9.0 | 75.4 | 158.15 | 273.2 | -376.1 | 669.0 | 586.5 | 82.48 | 8.111 | | |
| 3,900.0 | 3,880.9 | 3,867.9 | 3,867.9 | 9.3 | 77.4 | 158.70 | 273.2 | -376.1 | 685.4 | 600.7 | 84.65 | 8.096 | | |
| 4,000.0 | 3,979.6 | 3,966.6 | 3,966.6 | 9.7 | 79.3 | 159.27 | 273.2 | -376.1 | 700.7 | 613.5 | 87.17 | 8.038 | | |
| 4,100.0 | 4,078.7 | 4,065.7 | 4,065.7 | 9.9 | 81.3 | 159.73 | 273.2 | -376.1 | 712.8 | 623.1 | 89.69 | 7.948 | | |
| 4,200.0 | 4,178.3 | 4,165.3 | 4,165.3 | 10.2 | 83.3 | 160.05 | 273.2 | -376.1 | 721.7 | 629.6 | 92.13 | 7.833 | | |
| 4,300.0 | 4,278.1 | 4,265.1 | 4,265.1 | 10.4 | 85.3 | 160.25 | 273.2 | -376.1 | 727.4 | 632.9 | 94.49 | 7.697 | | |
| 4,400.0 | 4,378.1 | 4,365.1 | 4,365.1 | 10.6 | 87.3 | 160.33 | 273.2 | -376.1 | 729.7 | 633.0 | 96.76 | 7.542 | | |
| 4,500.0 | 4,478.1 | 4,465.1 | 4,465.1 | 10.8 | 89.3 | -41.78 | 273.2 | -376.1 | 729.8 | 630.8 | 98.95 | 7.375 | | |
| 4,600.0 | 4,578.1 | 4,565.1 | 4,565.1 | 11.0 | 91.3 | -41.78 | 273.2 | -376.1 | 729.8 | 628.6 | 101.16 | 7.214 | | |
| 4,700.0 | 4,678.1 | 4,665.1 | 4,665.1 | 11.1 | 93.3 | -41.78 | 273.2 | -376.1 | 729.8 | 626.4 | 103.36 | 7.060 | | |
| 4,800.0 | 4,778.1 | 4,765.1 | 4,765.1 | 11.3 | 95.3 | -41.78 | 273.2 | -376.1 | 729.8 | 624.2 | 105.57 | 6.913 | | |
| 4,900.0 | 4,878.1 | 4,865.1 | 4,865.1 | 11.5 | 97.3 | -41.78 | 273.2 | -376.1 | 729.8 | 622.0 | 107.78 | 6.771 | | |
| 5,000.0 | 4,978.1 | 4,965.1 | 4,965.1 | 11.7 | 99.3 | -41.78 | 273.2 | -376.1 | 729.8 | 619.8 | 109.98 | 6.635 | | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1 | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|---------------------|---------------------|---------------------|-----------|--------|-----------------|-----------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------------------|--------------------|---------|
| Survey Program: 6906-UNKNOWN | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 5,100.0 | 5,078.1 | 5,065.1 | 5,065.1 | 11.9 | 101.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 617.6 | 112.19 | 6.505 | |
| 5,200.0 | 5,178.1 | 5,165.1 | 5,165.1 | 12.1 | 103.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 615.4 | 114.40 | 6.379 | |
| 5,300.0 | 5,278.1 | 5,265.1 | 5,265.1 | 12.3 | 105.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 613.2 | 116.61 | 6.258 | |
| 5,400.0 | 5,378.1 | 5,365.1 | 5,365.1 | 12.5 | 107.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 611.0 | 118.82 | 6.142 | |
| 5,500.0 | 5,478.1 | 5,465.1 | 5,465.1 | 12.7 | 109.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 608.8 | 121.03 | 6.030 | |
| 5,600.0 | 5,578.1 | 5,565.1 | 5,565.1 | 12.9 | 111.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 606.6 | 123.24 | 5.922 | |
| 5,700.0 | 5,678.1 | 5,665.1 | 5,665.1 | 13.1 | 113.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 604.3 | 125.45 | 5.817 | |
| 5,800.0 | 5,778.1 | 5,765.1 | 5,765.1 | 13.3 | 115.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 602.1 | 127.67 | 5.716 | |
| 5,900.0 | 5,878.1 | 5,865.1 | 5,865.1 | 13.5 | 117.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 599.9 | 129.88 | 5.619 | |
| 6,000.0 | 5,978.1 | 5,965.1 | 5,965.1 | 13.7 | 119.3 | -41.78 | | 273.2 | -376.1 | 729.8 | 597.7 | 132.09 | 5.525 | |
| 6,100.0 | 6,077.8 | 6,064.8 | 6,064.8 | 13.8 | 121.3 | -42.34 | | 273.2 | -376.1 | 725.1 | 591.5 | 133.66 | 5.425 | |
| 6,200.0 | 6,175.9 | 6,162.9 | 6,162.9 | 13.9 | 123.3 | -44.11 | | 273.2 | -376.1 | 711.0 | 576.9 | 134.08 | 5.303 | |
| 6,300.0 | 6,270.6 | 6,257.6 | 6,257.6 | 14.0 | 125.2 | -47.19 | | 273.2 | -376.1 | 688.1 | 554.3 | 133.80 | 5.143 | |
| 6,400.0 | 6,360.3 | 6,347.3 | 6,347.3 | 14.0 | 126.9 | -51.68 | | 273.2 | -376.1 | 657.8 | 524.1 | 133.64 | 4.922 | |
| 6,500.0 | 6,443.6 | 6,430.6 | 6,430.6 | 14.0 | 128.6 | -57.62 | | 273.2 | -376.1 | 621.9 | 487.2 | 134.65 | 4.619 | |
| 6,600.0 | 6,518.9 | 6,505.9 | 6,505.9 | 14.1 | 130.1 | -64.84 | | 273.2 | -376.1 | 583.2 | 445.7 | 137.45 | 4.243 | |
| 6,700.0 | 6,585.0 | 6,572.0 | 6,572.0 | 14.3 | 131.4 | -72.75 | | 273.2 | -376.1 | 545.4 | 403.8 | 141.59 | 3.852 | |
| 6,800.0 | 6,640.8 | 6,627.8 | 6,627.8 | 14.6 | 132.6 | -80.37 | | 273.2 | -376.1 | 513.2 | 367.6 | 145.61 | 3.524 | |
| 6,900.0 | 6,685.2 | 6,672.2 | 6,672.2 | 15.2 | 133.4 | -86.61 | | 273.2 | -376.1 | 491.9 | 343.5 | 148.38 | 3.315 | |
| 6,979.3 | 6,711.9 | 6,698.9 | 6,698.9 | 15.8 | 134.0 | -90.00 | | 273.2 | -376.1 | 486.2 | 336.5 | 149.73 | 3.247 ES | |
| 7,000.0 | 6,717.6 | 6,704.6 | 6,704.6 | 15.9 | 134.1 | -90.61 | | 273.2 | -376.1 | 486.6 | 336.6 | 149.99 | 3.244 SF | |
| 7,100.0 | 6,737.4 | 6,724.4 | 6,724.4 | 16.8 | 134.5 | -91.85 | | 273.2 | -376.1 | 500.3 | 349.0 | 151.24 | 3.308 | |
| 7,200.0 | 6,748.2 | 6,735.2 | 6,735.2 | 17.9 | 134.7 | -92.59 | | 273.2 | -376.1 | 532.5 | 380.1 | 152.45 | 3.493 | |
| 7,300.0 | 6,753.9 | 6,740.9 | 6,740.9 | 19.1 | 134.8 | -90.53 | | 273.2 | -376.1 | 580.4 | 426.6 | 153.89 | 3.772 | |
| 7,400.0 | 6,753.7 | 6,740.7 | 6,740.7 | 20.4 | 134.8 | -89.77 | | 273.2 | -376.1 | 640.6 | 485.4 | 155.18 | 4.128 | |
| 7,500.0 | 6,753.2 | 6,740.2 | 6,740.2 | 21.8 | 134.8 | -89.71 | | 273.2 | -376.1 | 709.7 | 553.2 | 156.56 | 4.533 | |
| 7,600.0 | 6,752.7 | 6,739.7 | 6,739.7 | 23.3 | 134.8 | -89.66 | | 273.2 | -376.1 | 785.6 | 627.6 | 158.02 | 4.971 | |
| 7,700.0 | 6,752.2 | 6,739.2 | 6,739.2 | 24.8 | 134.8 | -89.60 | | 273.2 | -376.1 | 866.3 | 706.8 | 159.54 | 5.430 | |
| 7,800.0 | 6,751.8 | 6,738.8 | 6,738.8 | 26.4 | 134.8 | -89.55 | | 273.2 | -376.1 | 950.8 | 789.6 | 161.10 | 5.901 | |

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|--|---------------------|---------------------|---------------------|-----------|--------|-----------------|-----------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------------------|--------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -138.48 | -138.48 | -69.2 | -61.3 | 92.5 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -138.48 | -138.48 | -69.2 | -61.3 | 92.5 | 92.2 | 0.22 | 411.361 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -138.48 | -138.48 | -69.2 | -61.3 | 92.5 | 91.8 | 0.67 | 137.120 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | -138.48 | -138.48 | -69.2 | -61.3 | 92.5 | 91.3 | 1.12 | 82.272 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | -138.48 | -138.48 | -69.2 | -61.3 | 92.5 | 90.9 | 1.57 | 58.766 CC, ES | |
| 500.0 | 500.0 | 497.3 | 497.3 | 1.0 | 1.0 | -137.92 | -137.92 | -69.7 | -62.9 | 93.9 | 91.9 | 2.00 | 46.891 | |
| 600.0 | 600.0 | 594.4 | 594.3 | 1.2 | 1.2 | -136.36 | -136.36 | -71.0 | -67.7 | 98.2 | 95.8 | 2.43 | 40.427 | |
| 700.0 | 700.0 | 691.1 | 690.6 | 1.5 | 1.4 | -134.06 | -134.06 | -73.1 | -75.6 | 105.6 | 102.7 | 2.87 | 36.829 | |
| 800.0 | 800.0 | 787.1 | 785.9 | 1.7 | 1.7 | -131.34 | -131.34 | -76.1 | -86.5 | 116.0 | 112.7 | 3.31 | 35.071 | |
| 900.0 | 900.0 | 882.5 | 880.2 | 1.9 | 2.0 | -128.50 | -128.50 | -79.9 | -100.4 | 129.8 | 126.1 | 3.76 | 34.528 | |
| 1,000.0 | 1,000.0 | 981.1 | 977.5 | 2.1 | 2.3 | -125.92 | -125.92 | -84.2 | -116.2 | 145.2 | 141.0 | 4.21 | 34.475 | |
| 1,100.0 | 1,100.0 | 1,079.7 | 1,074.7 | 2.4 | 2.6 | -123.84 | -123.84 | -88.5 | -131.9 | 160.8 | 156.2 | 4.67 | 34.475 | |
| 1,200.0 | 1,200.0 | 1,178.3 | 1,172.0 | 2.6 | 3.0 | -122.13 | -122.13 | -92.7 | -147.7 | 176.6 | 171.5 | 5.12 | 34.468 | |
| 1,300.0 | 1,300.0 | 1,276.9 | 1,269.2 | 2.8 | 3.4 | -120.70 | -120.70 | -97.0 | -163.5 | 192.6 | 187.0 | 5.59 | 34.455 | |
| 1,400.0 | 1,400.0 | 1,375.6 | 1,366.5 | 3.0 | 3.7 | -119.48 | -119.48 | -101.3 | -179.2 | 208.6 | 202.5 | 6.06 | 34.435 | |
| 1,500.0 | 1,500.0 | 1,474.2 | 1,463.7 | 3.3 | 4.1 | -118.44 | -118.44 | -105.6 | -195.0 | 224.7 | 218.2 | 6.53 | 34.412 | |
| 1,600.0 | 1,600.0 | 1,572.8 | 1,561.0 | 3.5 | 4.5 | -117.54 | -117.54 | -109.9 | -210.8 | 240.9 | 233.9 | 7.01 | 34.385 | |
| 1,700.0 | 1,700.0 | 1,671.4 | 1,658.2 | 3.7 | 4.9 | -116.76 | -116.76 | -114.2 | -226.5 | 257.1 | 249.6 | 7.48 | 34.357 | |
| 1,800.0 | 1,800.0 | 1,770.0 | 1,755.5 | 3.9 | 5.2 | -116.06 | -116.06 | -118.5 | -242.3 | 273.4 | 265.4 | 7.96 | 34.327 | |
| 1,900.0 | 1,900.0 | 1,868.7 | 1,852.7 | 4.2 | 5.6 | -115.45 | -115.45 | -122.8 | -258.1 | 289.7 | 281.2 | 8.45 | 34.297 | |
| 2,000.0 | 2,000.0 | 1,967.3 | 1,950.0 | 4.4 | 6.0 | -114.90 | -114.90 | -127.1 | -273.8 | 306.0 | 297.1 | 8.93 | 34.267 | |
| 2,100.0 | 2,100.0 | 2,065.9 | 2,047.2 | 4.6 | 6.4 | 87.70 | 87.70 | -131.4 | -289.6 | 322.3 | 313.0 | 9.30 | 34.657 | |
| 2,200.0 | 2,200.0 | 2,164.4 | 2,144.4 | 4.8 | 6.8 | 88.42 | 88.42 | -135.7 | -305.3 | 338.6 | 328.9 | 9.71 | 34.870 | |
| 2,300.0 | 2,299.9 | 2,262.8 | 2,241.5 | 4.9 | 7.2 | 89.34 | 89.34 | -140.0 | -321.1 | 355.0 | 344.9 | 10.12 | 35.061 | |
| 2,400.0 | 2,399.7 | 2,361.1 | 2,338.4 | 5.1 | 7.5 | 90.44 | 90.44 | -144.2 | -336.8 | 371.5 | 360.9 | 10.54 | 35.234 | |
| 2,500.0 | 2,499.4 | 2,459.3 | 2,435.2 | 5.3 | 7.9 | 91.68 | 91.68 | -148.5 | -352.5 | 388.2 | 377.2 | 10.97 | 35.391 | |
| 2,600.0 | 2,598.9 | 2,557.3 | 2,531.8 | 5.5 | 8.3 | 93.05 | 93.05 | -152.8 | -368.2 | 405.2 | 393.8 | 11.40 | 35.533 | |
| 2,700.0 | 2,698.3 | 2,655.0 | 2,628.3 | 5.7 | 8.7 | 94.53 | 94.53 | -157.0 | -383.8 | 422.6 | 410.7 | 11.85 | 35.661 | |
| 2,800.0 | 2,797.4 | 2,752.5 | 2,724.4 | 5.9 | 9.1 | 96.09 | 96.09 | -161.3 | -399.4 | 440.5 | 428.2 | 12.31 | 35.774 | |
| 2,900.0 | 2,896.3 | 2,849.8 | 2,820.3 | 6.2 | 9.4 | 97.73 | 97.73 | -165.5 | -414.9 | 459.0 | 446.2 | 12.80 | 35.872 | |
| 3,000.0 | 2,994.9 | 2,946.7 | 2,915.9 | 6.5 | 9.8 | 99.41 | 99.41 | -169.7 | -430.4 | 478.2 | 464.9 | 13.30 | 35.958 | |
| 3,100.0 | 3,093.4 | 3,043.5 | 3,011.3 | 6.7 | 10.2 | 101.24 | 101.24 | -173.9 | -445.9 | 498.1 | 484.3 | 13.83 | 36.020 | |
| 3,200.0 | 3,191.8 | 3,140.2 | 3,106.7 | 7.0 | 10.6 | 102.96 | 102.96 | -178.1 | -461.3 | 518.5 | 504.1 | 14.38 | 36.066 | |
| 3,300.0 | 3,290.3 | 3,236.9 | 3,202.1 | 7.3 | 11.0 | 104.55 | 104.55 | -182.4 | -476.8 | 539.3 | 524.4 | 14.94 | 36.100 | |
| 3,400.0 | 3,388.7 | 3,333.7 | 3,297.5 | 7.6 | 11.3 | 106.02 | 106.02 | -186.6 | -492.3 | 560.5 | 545.0 | 15.51 | 36.126 | |
| 3,500.0 | 3,487.2 | 3,430.4 | 3,392.9 | 8.0 | 11.7 | 107.38 | 107.38 | -190.8 | -507.7 | 582.0 | 565.9 | 16.10 | 36.147 | |
| 3,600.0 | 3,585.6 | 3,527.1 | 3,488.3 | 8.3 | 12.1 | 108.65 | 108.65 | -195.0 | -523.2 | 603.8 | 587.1 | 16.70 | 36.165 | |
| 3,700.0 | 3,684.0 | 3,623.9 | 3,583.7 | 8.6 | 12.5 | 109.83 | 109.83 | -199.2 | -538.7 | 625.8 | 608.5 | 17.30 | 36.180 | |
| 3,800.0 | 3,782.5 | 3,720.6 | 3,679.1 | 9.0 | 12.9 | 110.93 | 110.93 | -203.4 | -554.1 | 648.1 | 630.2 | 17.91 | 36.195 | |
| 3,900.0 | 3,880.9 | 3,817.3 | 3,774.5 | 9.3 | 13.2 | 111.96 | 111.96 | -207.6 | -569.6 | 670.7 | 652.1 | 18.52 | 36.210 | |
| 4,000.0 | 3,979.6 | 3,914.3 | 3,870.1 | 9.7 | 13.6 | 113.19 | 113.19 | -211.8 | -585.1 | 692.9 | 673.8 | 19.15 | 36.188 | |
| 4,100.0 | 4,078.7 | 4,011.8 | 3,966.3 | 9.9 | 14.0 | 114.14 | 114.14 | -216.1 | -600.7 | 713.9 | 694.2 | 19.73 | 36.185 | |
| 4,200.0 | 4,178.3 | 4,109.8 | 4,062.9 | 10.2 | 14.4 | 114.78 | 114.78 | -220.3 | -616.4 | 733.6 | 713.3 | 20.29 | 36.164 | |
| 4,300.0 | 4,278.1 | 4,208.1 | 4,159.9 | 10.4 | 14.8 | 115.13 | 115.13 | -224.6 | -632.1 | 751.9 | 731.1 | 20.81 | 36.133 | |
| 4,400.0 | 4,378.1 | 4,306.7 | 4,257.0 | 10.6 | 15.2 | 115.22 | 115.22 | -228.9 | -647.8 | 768.7 | 747.4 | 21.29 | 36.096 | |
| 4,500.0 | 4,478.1 | 4,405.3 | 4,354.3 | 10.8 | 15.5 | -87.20 | -87.20 | -233.2 | -663.6 | 784.5 | 762.7 | 21.73 | 36.095 | |
| 4,600.0 | 4,578.1 | 4,503.9 | 4,451.6 | 11.0 | 15.9 | -87.57 | -87.57 | -237.5 | -679.4 | 800.2 | 778.1 | 22.17 | 36.100 | |
| 4,700.0 | 4,678.1 | 4,602.5 | 4,548.8 | 11.1 | 16.3 | -87.92 | -87.92 | -241.8 | -695.1 | 816.1 | 793.5 | 22.60 | 36.106 | |
| 4,800.0 | 4,778.1 | 4,701.1 | 4,646.1 | 11.3 | 16.7 | -88.26 | -88.26 | -246.1 | -710.9 | 831.9 | 808.9 | 23.04 | 36.111 | |
| 4,900.0 | 4,878.1 | 4,799.7 | 4,743.3 | 11.5 | 17.1 | -88.59 | -88.59 | -250.4 | -726.7 | 847.8 | 824.3 | 23.48 | 36.115 | |
| 5,000.0 | 4,978.1 | 4,898.4 | 4,840.6 | 11.7 | 17.5 | -88.90 | -88.90 | -254.7 | -742.4 | 863.7 | 839.8 | 23.91 | 36.119 | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|-----------------------|---------------------|---------------------|---------------------|-----------|--------|-----------------------|-----------------------------------|------------|----------------------|-----------------------|-------------------------|-------------------|--------------------|--------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Reference | | | | | | | | | | | | | | |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning | |
| 5,100.0 | 5,078.1 | 4,997.0 | 4,937.8 | 11.9 | 17.9 | -89.21 | -259.0 | -758.2 | 879.6 | 855.3 | 24.35 | 36.122 | | |
| 5,200.0 | 5,178.1 | 5,099.9 | 5,039.3 | 12.1 | 18.3 | -89.51 | -263.4 | -774.6 | 895.6 | 870.8 | 24.80 | 36.115 | | |
| 5,300.0 | 5,278.1 | 5,242.1 | 5,180.2 | 12.3 | 18.6 | -89.84 | -268.5 | -793.3 | 908.7 | 883.5 | 25.25 | 35.989 | | |
| 5,400.0 | 5,378.1 | 5,386.0 | 5,323.5 | 12.5 | 18.9 | -90.05 | -271.8 | -805.3 | 917.1 | 891.4 | 25.69 | 35.695 | | |
| 5,500.0 | 5,478.1 | 5,530.8 | 5,468.2 | 12.7 | 19.1 | -90.14 | -273.2 | -810.4 | 920.6 | 894.5 | 26.12 | 35.238 | | |
| 5,600.0 | 5,578.1 | 5,640.6 | 5,578.1 | 12.9 | 19.3 | -90.14 | -273.2 | -810.6 | 920.7 | 894.2 | 26.51 | 34.732 | | |
| 5,700.0 | 5,678.1 | 5,740.6 | 5,678.1 | 13.1 | 19.4 | -90.14 | -273.2 | -810.6 | 920.7 | 893.8 | 26.88 | 34.255 | | |
| 5,800.0 | 5,778.1 | 5,840.6 | 5,778.1 | 13.3 | 19.5 | -90.14 | -273.2 | -810.6 | 920.7 | 893.4 | 27.25 | 33.789 | | |
| 5,900.0 | 5,878.1 | 5,940.6 | 5,878.1 | 13.5 | 19.7 | -90.14 | -273.2 | -810.6 | 920.7 | 893.1 | 27.62 | 33.332 | | |
| 5,979.1 | 5,957.2 | 6,019.9 | 5,957.2 | 13.6 | 19.7 | -90.03 | -271.5 | -810.6 | 920.7 | 892.8 | 27.92 | 32.981 | | |
| 6,000.0 | 5,978.1 | 6,040.6 | 5,977.9 | 13.7 | 19.8 | -89.92 | -269.8 | -810.6 | 920.7 | 892.7 | 27.99 | 32.890 | | |
| 6,100.0 | 6,077.8 | 6,139.4 | 6,075.4 | 13.8 | 19.9 | -89.32 | -254.1 | -810.6 | 920.8 | 892.5 | 28.30 | 32.536 | | |
| 6,200.0 | 6,175.9 | 6,236.9 | 6,168.8 | 13.9 | 19.9 | -88.74 | -226.4 | -810.6 | 920.9 | 892.4 | 28.50 | 32.317 | | |
| 6,300.0 | 6,270.6 | 6,333.4 | 6,257.0 | 14.0 | 19.9 | -88.17 | -187.5 | -810.6 | 921.2 | 892.5 | 28.62 | 32.186 | | |
| 6,400.0 | 6,360.3 | 6,428.8 | 6,338.8 | 14.0 | 20.0 | -87.64 | -138.4 | -810.6 | 921.5 | 892.8 | 28.73 | 32.075 | | |
| 6,500.0 | 6,443.6 | 6,523.3 | 6,413.1 | 14.0 | 20.0 | -87.15 | -80.2 | -810.6 | 921.8 | 892.9 | 28.89 | 31.905 | | |
| 6,600.0 | 6,518.9 | 6,616.9 | 6,479.1 | 14.1 | 20.0 | -86.71 | -13.8 | -810.6 | 922.2 | 893.0 | 29.19 | 31.591 | | |
| 6,700.0 | 6,585.0 | 6,709.9 | 6,536.1 | 14.3 | 20.1 | -86.32 | 59.6 | -810.6 | 922.6 | 892.9 | 29.72 | 31.046 | | |
| 6,800.0 | 6,640.8 | 6,802.3 | 6,583.5 | 14.6 | 20.3 | -86.00 | 138.8 | -810.6 | 923.0 | 892.4 | 30.52 | 30.238 | | |
| 6,900.0 | 6,685.2 | 6,894.2 | 6,620.8 | 15.2 | 20.5 | -85.73 | 222.7 | -810.6 | 923.3 | 891.6 | 31.66 | 29.158 | | |
| 7,000.0 | 6,717.6 | 6,985.7 | 6,647.7 | 15.9 | 20.9 | -85.54 | 310.1 | -810.6 | 923.5 | 890.4 | 33.15 | 27.859 | | |
| 7,100.0 | 6,737.4 | 7,076.9 | 6,664.0 | 16.8 | 21.4 | -85.41 | 399.8 | -810.6 | 923.7 | 888.7 | 34.96 | 26.421 | | |
| 7,200.0 | 6,748.2 | 7,167.8 | 6,669.4 | 17.9 | 22.2 | -85.14 | 490.5 | -810.6 | 924.1 | 887.1 | 37.01 | 24.971 | | |
| 7,300.0 | 6,753.9 | 7,266.6 | 6,668.4 | 19.1 | 23.1 | -84.69 | 589.3 | -810.6 | 924.7 | 885.2 | 39.42 | 23.458 | | |
| 7,400.0 | 6,753.7 | 7,366.6 | 6,667.3 | 20.4 | 24.2 | -84.64 | 689.3 | -810.6 | 924.7 | 882.7 | 42.02 | 22.008 | | |
| 7,500.0 | 6,753.2 | 7,466.6 | 6,666.2 | 21.8 | 25.4 | -84.60 | 789.3 | -810.6 | 924.8 | 880.0 | 44.79 | 20.649 | | |
| 7,600.0 | 6,752.7 | 7,566.6 | 6,665.1 | 23.3 | 26.7 | -84.56 | 889.3 | -810.6 | 924.9 | 877.2 | 47.70 | 19.388 | | |
| 7,700.0 | 6,752.2 | 7,666.6 | 6,664.0 | 24.8 | 28.1 | -84.52 | 989.3 | -810.6 | 924.9 | 874.2 | 50.74 | 18.230 | | |
| 7,800.0 | 6,751.8 | 7,766.6 | 6,662.9 | 26.4 | 29.6 | -84.48 | 1,089.3 | -810.6 | 925.0 | 871.1 | 53.87 | 17.169 | | |
| 7,900.0 | 6,751.3 | 7,866.6 | 6,661.8 | 28.0 | 31.1 | -84.44 | 1,189.3 | -810.6 | 925.0 | 868.0 | 57.09 | 16.202 | | |
| 8,000.0 | 6,750.8 | 7,966.6 | 6,660.7 | 29.6 | 32.6 | -84.41 | 1,289.3 | -810.6 | 925.1 | 864.7 | 60.38 | 15.320 | | |
| 8,100.0 | 6,750.4 | 8,066.6 | 6,659.6 | 31.3 | 34.2 | -84.37 | 1,389.2 | -810.6 | 925.2 | 861.4 | 63.73 | 14.516 | | |
| 8,200.0 | 6,749.9 | 8,166.6 | 6,658.5 | 33.0 | 35.8 | -84.33 | 1,489.2 | -810.6 | 925.2 | 858.1 | 67.13 | 13.782 | | |
| 8,300.0 | 6,749.4 | 8,266.6 | 6,657.4 | 34.8 | 37.5 | -84.29 | 1,589.2 | -810.6 | 925.3 | 854.7 | 70.58 | 13.111 | | |
| 8,400.0 | 6,748.9 | 8,366.6 | 6,656.3 | 36.5 | 39.2 | -84.25 | 1,689.2 | -810.6 | 925.4 | 851.3 | 74.06 | 12.496 | | |
| 8,500.0 | 6,748.5 | 8,466.6 | 6,655.2 | 38.3 | 40.9 | -84.21 | 1,789.2 | -810.6 | 925.4 | 847.9 | 77.57 | 11.931 | | |
| 8,600.0 | 6,748.0 | 8,566.6 | 6,654.1 | 40.1 | 42.6 | -84.17 | 1,889.2 | -810.6 | 925.5 | 844.4 | 81.11 | 11.411 | | |
| 8,700.0 | 6,747.5 | 8,666.6 | 6,653.0 | 41.9 | 44.3 | -84.14 | 1,989.2 | -810.6 | 925.6 | 840.9 | 84.67 | 10.932 | | |
| 8,800.0 | 6,747.1 | 8,766.6 | 6,651.9 | 43.7 | 46.1 | -84.10 | 2,089.2 | -810.6 | 925.6 | 837.4 | 88.25 | 10.488 | | |
| 8,900.0 | 6,746.6 | 8,866.6 | 6,650.8 | 45.5 | 47.8 | -84.06 | 2,189.2 | -810.6 | 925.7 | 833.8 | 91.85 | 10.078 | | |
| 9,000.0 | 6,746.1 | 8,966.6 | 6,649.7 | 47.3 | 49.6 | -84.02 | 2,289.2 | -810.6 | 925.7 | 830.3 | 95.47 | 9.696 | | |
| 9,100.0 | 6,745.6 | 9,066.6 | 6,648.6 | 49.2 | 51.4 | -83.98 | 2,389.2 | -810.6 | 925.8 | 826.7 | 99.11 | 9.342 | | |
| 9,200.0 | 6,745.2 | 9,166.6 | 6,647.5 | 51.0 | 53.2 | -83.94 | 2,489.2 | -810.6 | 925.9 | 823.1 | 102.75 | 9.011 | | |
| 9,300.0 | 6,744.7 | 9,266.6 | 6,646.4 | 52.8 | 55.0 | -83.90 | 2,589.2 | -810.6 | 925.9 | 819.5 | 106.41 | 8.702 | | |
| 9,400.0 | 6,744.2 | 9,366.6 | 6,645.3 | 54.7 | 56.8 | -83.86 | 2,689.1 | -810.6 | 926.0 | 815.9 | 110.08 | 8.412 | | |
| 9,500.0 | 6,743.8 | 9,466.6 | 6,644.2 | 56.5 | 58.6 | -83.83 | 2,789.1 | -810.6 | 926.1 | 812.3 | 113.76 | 8.141 | | |
| 9,600.0 | 6,743.3 | 9,566.6 | 6,643.1 | 58.4 | 60.4 | -83.79 | 2,889.1 | -810.6 | 926.2 | 808.7 | 117.44 | 7.886 | | |
| 9,700.0 | 6,742.8 | 9,666.6 | 6,642.0 | 60.3 | 62.3 | -83.75 | 2,989.1 | -810.6 | 926.2 | 805.1 | 121.14 | 7.646 | | |
| 9,800.0 | 6,742.3 | 9,766.6 | 6,640.9 | 62.1 | 64.1 | -83.71 | 3,089.1 | -810.6 | 926.3 | 801.5 | 124.84 | 7.420 | | |
| 9,900.0 | 6,741.9 | 9,866.6 | 6,639.8 | 64.0 | 65.9 | -83.67 | 3,189.1 | -810.6 | 926.4 | 797.8 | 128.54 | 7.207 | | |
| 10,000.0 | 6,741.4 | 9,966.6 | 6,638.7 | 65.9 | 67.8 | -83.63 | 3,289.1 | -810.6 | 926.4 | 794.2 | 132.26 | 7.005 | | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|------------------------|------------------------|------------------------|-----------|--------|--|---|---------------|--|-----------------------------|-------------------------------|---------------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | +E/-W (ft) | Distance Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 10,100.0 | 6,740.9 | 10,066.6 | 6,637.6 | 67.7 | 69.6 | -83.59 | 3,389.1 | -810.6 | 926.5 | 790.5 | 135.97 | 6.814 | |
| 10,200.0 | 6,740.5 | 10,166.6 | 6,636.5 | 69.6 | 71.5 | -83.56 | 3,489.1 | -810.6 | 926.6 | 786.9 | 139.70 | 6.633 | |
| 10,300.0 | 6,740.0 | 10,266.6 | 6,635.4 | 71.5 | 73.3 | -83.52 | 3,589.1 | -810.6 | 926.6 | 783.2 | 143.42 | 6.461 | |
| 10,400.0 | 6,739.5 | 10,366.6 | 6,634.3 | 73.4 | 75.2 | -83.48 | 3,689.1 | -810.6 | 926.7 | 779.6 | 147.15 | 6.298 | |
| 10,500.0 | 6,739.0 | 10,466.6 | 6,633.2 | 75.3 | 77.1 | -83.44 | 3,789.1 | -810.6 | 926.8 | 775.9 | 150.88 | 6.142 | |
| 10,600.0 | 6,738.6 | 10,566.6 | 6,632.1 | 77.1 | 78.9 | -83.40 | 3,889.0 | -810.6 | 926.9 | 772.2 | 154.62 | 5.994 | |
| 10,700.0 | 6,738.1 | 10,666.6 | 6,631.0 | 79.0 | 80.8 | -83.36 | 3,989.0 | -810.6 | 926.9 | 768.6 | 158.36 | 5.853 | |
| 10,800.0 | 6,737.6 | 10,766.5 | 6,629.9 | 80.9 | 82.7 | -83.32 | 4,089.0 | -810.6 | 927.0 | 764.9 | 162.10 | 5.719 | |
| 10,900.0 | 6,737.2 | 10,866.5 | 6,628.8 | 82.8 | 84.5 | -83.29 | 4,189.0 | -810.6 | 927.1 | 761.2 | 165.85 | 5.590 | |
| 11,000.0 | 6,736.7 | 10,966.5 | 6,627.7 | 84.7 | 86.4 | -83.25 | 4,289.0 | -810.6 | 927.2 | 757.6 | 169.60 | 5.467 | |
| 11,100.0 | 6,736.2 | 11,066.5 | 6,626.6 | 86.6 | 88.3 | -83.21 | 4,389.0 | -810.6 | 927.2 | 753.9 | 173.34 | 5.349 | |
| 11,147.1 | 6,736.0 | 11,113.6 | 6,626.1 | 87.5 | 89.2 | -83.19 | 4,436.1 | -810.6 | 927.3 | 752.2 | 175.11 | 5.295 SF | |

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|--|---------------------|---------------------|---------------------|-----------|--------|-----------------|-----------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------------------|--------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 61.1 | 0.22 | 272.973 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 60.7 | 0.67 | 90.991 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 60.2 | 1.12 | 54.595 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 59.8 | 1.57 | 38.996 | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 59.3 | 2.02 | 30.330 | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 58.9 | 2.47 | 24.816 | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 58.4 | 2.92 | 20.998 | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 58.0 | 3.37 | 18.198 | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 57.5 | 3.82 | 16.057 | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | -140.53 | -140.53 | -47.4 | -39.0 | 61.4 | 57.1 | 4.27 | 14.367 CC, ES | |
| 1,100.0 | 1,100.0 | 1,099.1 | 1,099.1 | 2.4 | 2.3 | -140.12 | -140.12 | -47.6 | -39.8 | 62.1 | 57.4 | 4.70 | 13.213 | |
| 1,200.0 | 1,200.0 | 1,198.1 | 1,198.1 | 2.6 | 2.5 | -138.94 | -138.94 | -48.5 | -42.2 | 64.3 | 59.2 | 5.12 | 12.577 | |
| 1,300.0 | 1,300.0 | 1,297.0 | 1,296.9 | 2.8 | 2.7 | -137.16 | -137.16 | -49.9 | -46.3 | 68.1 | 62.6 | 5.54 | 12.305 | |
| 1,400.0 | 1,400.0 | 1,395.7 | 1,395.4 | 3.0 | 2.9 | -134.98 | -134.98 | -51.9 | -51.9 | 73.5 | 67.6 | 5.96 | 12.333 | |
| 1,500.0 | 1,500.0 | 1,494.2 | 1,493.6 | 3.3 | 3.2 | -132.62 | -132.62 | -54.4 | -59.1 | 80.6 | 74.2 | 6.39 | 12.612 | |
| 1,600.0 | 1,600.0 | 1,592.4 | 1,591.4 | 3.5 | 3.4 | -130.25 | -130.25 | -57.5 | -67.9 | 89.4 | 82.5 | 6.82 | 13.101 | |
| 1,700.0 | 1,700.0 | 1,690.3 | 1,688.6 | 3.7 | 3.6 | -127.99 | -127.99 | -61.1 | -78.2 | 99.9 | 92.6 | 7.26 | 13.765 | |
| 1,800.0 | 1,800.0 | 1,787.7 | 1,785.3 | 3.9 | 3.9 | -125.92 | -125.92 | -65.2 | -90.0 | 112.1 | 104.5 | 7.69 | 14.576 | |
| 1,900.0 | 1,900.0 | 1,884.7 | 1,881.2 | 4.2 | 4.2 | -124.06 | -124.06 | -69.9 | -103.4 | 126.2 | 118.0 | 8.14 | 15.507 | |
| 2,000.0 | 2,000.0 | 1,981.2 | 1,976.4 | 4.4 | 4.5 | -122.43 | -122.43 | -75.0 | -118.1 | 141.9 | 133.3 | 8.58 | 16.536 | |
| 2,100.0 | 2,100.0 | 2,079.0 | 2,072.7 | 4.6 | 4.8 | 81.25 | 81.25 | -80.7 | -134.2 | 158.8 | 149.8 | 9.01 | 17.634 | |
| 2,200.0 | 2,200.0 | 2,177.3 | 2,169.5 | 4.8 | 5.1 | 83.06 | 83.06 | -86.4 | -150.5 | 175.8 | 166.4 | 9.40 | 18.693 | |
| 2,300.0 | 2,299.9 | 2,275.7 | 2,266.3 | 4.9 | 5.5 | 85.05 | 85.05 | -92.1 | -166.8 | 192.7 | 182.9 | 9.80 | 19.658 | |
| 2,400.0 | 2,399.7 | 2,373.9 | 2,363.0 | 5.1 | 5.8 | 87.16 | 87.16 | -97.8 | -183.1 | 209.8 | 199.6 | 10.21 | 20.546 | |
| 2,500.0 | 2,499.4 | 2,471.9 | 2,459.6 | 5.3 | 6.2 | 89.36 | 89.36 | -103.4 | -199.3 | 227.1 | 216.5 | 10.63 | 21.371 | |
| 2,600.0 | 2,598.9 | 2,569.9 | 2,555.9 | 5.5 | 6.6 | 91.63 | 91.63 | -109.1 | -215.5 | 244.8 | 233.8 | 11.06 | 22.144 | |
| 2,700.0 | 2,698.3 | 2,667.6 | 2,652.1 | 5.7 | 6.9 | 93.95 | 93.95 | -114.8 | -231.7 | 263.0 | 251.5 | 11.50 | 22.873 | |
| 2,800.0 | 2,797.4 | 2,765.1 | 2,748.1 | 5.9 | 7.3 | 96.28 | 96.28 | -120.4 | -247.9 | 281.8 | 269.9 | 11.96 | 23.564 | |
| 2,900.0 | 2,896.3 | 2,862.3 | 2,843.9 | 6.2 | 7.7 | 98.62 | 98.62 | -126.1 | -264.0 | 301.4 | 288.9 | 12.44 | 24.221 | |
| 3,000.0 | 2,994.9 | 2,959.3 | 2,939.3 | 6.5 | 8.0 | 100.94 | 100.94 | -131.7 | -280.0 | 321.8 | 308.8 | 12.95 | 24.849 | |
| 3,100.0 | 3,093.4 | 3,056.0 | 3,034.6 | 6.7 | 8.4 | 103.31 | 103.31 | -137.3 | -296.1 | 342.9 | 329.4 | 13.48 | 25.439 | |
| 3,200.0 | 3,191.8 | 3,152.8 | 3,129.8 | 7.0 | 8.8 | 105.44 | 105.44 | -142.9 | -312.1 | 364.6 | 350.6 | 14.03 | 25.989 | |
| 3,300.0 | 3,290.3 | 3,249.6 | 3,225.1 | 7.3 | 9.2 | 107.32 | 107.32 | -148.5 | -328.1 | 386.7 | 372.1 | 14.59 | 26.502 | |
| 3,400.0 | 3,388.7 | 3,346.3 | 3,320.4 | 7.6 | 9.5 | 109.01 | 109.01 | -154.1 | -344.1 | 409.2 | 394.0 | 15.17 | 26.978 | |
| 3,500.0 | 3,487.2 | 3,443.1 | 3,415.6 | 8.0 | 9.9 | 110.52 | 110.52 | -159.7 | -360.2 | 431.9 | 416.2 | 15.75 | 27.422 | |
| 3,600.0 | 3,585.6 | 3,539.9 | 3,510.9 | 8.3 | 10.3 | 111.88 | 111.88 | -165.3 | -376.2 | 455.0 | 438.6 | 16.35 | 27.835 | |
| 3,700.0 | 3,684.0 | 3,636.6 | 3,606.2 | 8.6 | 10.7 | 113.11 | 113.11 | -170.9 | -392.2 | 478.2 | 461.3 | 16.95 | 28.219 | |
| 3,800.0 | 3,782.5 | 3,733.4 | 3,701.4 | 9.0 | 11.1 | 114.22 | 114.22 | -176.5 | -408.2 | 501.7 | 484.1 | 17.55 | 28.578 | |
| 3,900.0 | 3,880.9 | 3,830.1 | 3,796.7 | 9.3 | 11.5 | 115.24 | 115.24 | -182.1 | -424.3 | 525.3 | 507.1 | 18.17 | 28.914 | |
| 4,000.0 | 3,979.6 | 3,927.1 | 3,892.2 | 9.7 | 11.8 | 116.41 | 116.41 | -187.8 | -440.3 | 548.5 | 529.7 | 18.79 | 29.192 | |
| 4,100.0 | 4,078.7 | 4,024.6 | 3,988.2 | 9.9 | 12.2 | 117.24 | 117.24 | -193.4 | -456.5 | 570.3 | 550.9 | 19.37 | 29.443 | |
| 4,200.0 | 4,178.3 | 4,122.5 | 4,084.6 | 10.2 | 12.6 | 117.70 | 117.70 | -199.1 | -472.7 | 590.6 | 570.6 | 19.92 | 29.642 | |
| 4,300.0 | 4,278.1 | 4,220.8 | 4,181.2 | 10.4 | 13.0 | 117.83 | 117.83 | -204.8 | -488.9 | 609.2 | 588.8 | 20.44 | 29.799 | |
| 4,400.0 | 4,378.1 | 4,319.2 | 4,278.1 | 10.6 | 13.4 | 117.66 | 117.66 | -210.5 | -505.2 | 626.3 | 605.4 | 20.93 | 29.923 | |
| 4,500.0 | 4,478.1 | 4,417.6 | 4,375.0 | 10.8 | 13.8 | -85.04 | -85.04 | -216.2 | -521.5 | 642.3 | 621.0 | 21.37 | 30.052 | |
| 4,600.0 | 4,578.1 | 4,516.1 | 4,472.0 | 11.0 | 14.2 | -85.66 | -85.66 | -221.9 | -537.9 | 658.4 | 636.6 | 21.81 | 30.182 | |
| 4,700.0 | 4,678.1 | 4,614.5 | 4,568.9 | 11.1 | 14.6 | -86.26 | -86.26 | -227.6 | -554.2 | 674.6 | 652.3 | 22.26 | 30.311 | |
| 4,800.0 | 4,778.1 | 4,712.9 | 4,665.8 | 11.3 | 15.0 | -86.83 | -86.83 | -233.3 | -570.5 | 690.8 | 668.1 | 22.70 | 30.437 | |
| 4,900.0 | 4,878.1 | 4,811.4 | 4,762.7 | 11.5 | 15.4 | -87.37 | -87.37 | -239.0 | -586.8 | 707.1 | 683.9 | 23.14 | 30.561 | |
| 5,000.0 | 4,978.1 | 4,909.8 | 4,859.6 | 11.7 | 15.8 | -87.89 | -87.89 | -244.7 | -603.1 | 723.4 | 699.8 | 23.58 | 30.682 | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|---------------------|---------------------|---------------------|-----------|--------|-----------------|-----------------------|-----------------------------------|-----------------------------------|----------------------|-----------------------|-------------------------|--------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 5,100.0 | 5,078.1 | 5,008.3 | 4,956.6 | 11.9 | 16.2 | -88.38 | | -250.4 | -619.4 | 739.8 | 715.8 | 24.02 | 30.800 | |
| 5,200.0 | 5,178.1 | 5,106.7 | 5,053.5 | 12.1 | 16.6 | -88.86 | | -256.1 | -635.7 | 756.3 | 731.8 | 24.46 | 30.916 | |
| 5,300.0 | 5,278.1 | 5,223.5 | 5,168.6 | 12.3 | 17.0 | -89.37 | | -262.6 | -654.2 | 772.1 | 747.2 | 24.92 | 30.984 | |
| 5,400.0 | 5,378.1 | 5,356.8 | 5,300.8 | 12.5 | 17.3 | -89.79 | | -268.2 | -670.2 | 784.1 | 758.8 | 25.36 | 30.920 | |
| 5,500.0 | 5,478.1 | 5,491.5 | 5,435.0 | 12.7 | 17.6 | -90.06 | | -271.8 | -680.5 | 791.8 | 766.0 | 25.79 | 30.696 | |
| 5,600.0 | 5,578.1 | 5,626.8 | 5,570.3 | 12.9 | 17.8 | -90.17 | | -273.3 | -684.9 | 795.0 | 768.8 | 26.22 | 30.320 | |
| 5,700.0 | 5,678.1 | 5,734.6 | 5,678.1 | 13.1 | 18.0 | -90.17 | | -273.4 | -685.0 | 795.1 | 768.5 | 26.61 | 29.881 | |
| 5,800.0 | 5,778.1 | 5,834.6 | 5,778.1 | 13.3 | 18.1 | -90.17 | | -273.4 | -685.0 | 795.1 | 768.1 | 26.99 | 29.465 | |
| 5,900.0 | 5,878.1 | 5,934.6 | 5,878.1 | 13.5 | 18.3 | -90.17 | | -273.4 | -685.0 | 795.1 | 767.7 | 27.36 | 29.057 | |
| 6,000.0 | 5,978.1 | 6,034.6 | 5,978.1 | 13.7 | 18.4 | -90.17 | | -273.4 | -685.0 | 795.1 | 767.4 | 27.74 | 28.659 | |
| 6,100.0 | 6,077.8 | 6,134.9 | 6,078.1 | 13.8 | 18.5 | -90.17 | | -267.1 | -685.0 | 795.1 | 767.0 | 28.06 | 28.336 | |
| 6,200.0 | 6,175.9 | 6,235.2 | 6,176.4 | 13.9 | 18.6 | -90.16 | | -247.7 | -685.0 | 795.1 | 766.9 | 28.26 | 28.140 | |
| 6,300.0 | 6,270.6 | 6,335.5 | 6,271.4 | 14.0 | 18.6 | -90.16 | | -215.7 | -685.0 | 795.1 | 766.7 | 28.36 | 28.033 | |
| 6,400.0 | 6,360.3 | 6,435.8 | 6,361.4 | 14.0 | 18.7 | -90.15 | | -171.5 | -685.0 | 795.1 | 766.7 | 28.44 | 27.956 | |
| 6,500.0 | 6,443.6 | 6,536.1 | 6,444.7 | 14.0 | 18.7 | -90.14 | | -116.0 | -685.0 | 795.1 | 766.5 | 28.56 | 27.835 | |
| 6,600.0 | 6,518.9 | 6,636.3 | 6,520.1 | 14.1 | 18.7 | -90.12 | | -50.0 | -685.0 | 795.1 | 766.3 | 28.82 | 27.588 | |
| 6,700.0 | 6,585.0 | 6,736.5 | 6,586.1 | 14.3 | 18.7 | -90.10 | | 25.3 | -685.0 | 795.1 | 765.8 | 29.30 | 27.138 | |
| 6,800.0 | 6,640.8 | 6,836.7 | 6,641.8 | 14.6 | 18.8 | -90.09 | | 108.5 | -685.0 | 795.1 | 765.0 | 30.07 | 26.439 | |
| 6,900.0 | 6,685.2 | 6,936.8 | 6,686.1 | 15.2 | 19.1 | -90.07 | | 198.2 | -685.0 | 795.1 | 763.9 | 31.20 | 25.488 | |
| 7,000.0 | 6,717.6 | 7,036.9 | 6,718.2 | 15.9 | 19.5 | -90.05 | | 292.9 | -685.0 | 795.1 | 762.4 | 32.68 | 24.330 | |
| 7,100.0 | 6,737.4 | 7,137.0 | 6,737.7 | 16.8 | 20.1 | -90.02 | | 391.0 | -685.0 | 795.1 | 760.6 | 34.51 | 23.040 | |
| 7,200.0 | 6,748.2 | 7,237.0 | 6,748.4 | 17.9 | 20.9 | -90.02 | | 490.4 | -685.0 | 795.1 | 758.5 | 36.64 | 21.702 | |
| 7,300.0 | 6,753.9 | 7,337.0 | 6,754.0 | 19.1 | 21.9 | -90.00 | | 590.3 | -685.0 | 795.1 | 756.1 | 39.02 | 20.376 | |
| 7,341.8 | 6,754.4 | 7,378.8 | 6,753.9 | 19.6 | 22.4 | -89.97 | | 632.0 | -685.0 | 795.1 | 755.0 | 40.09 | 19.832 | |
| 7,400.0 | 6,753.7 | 7,437.0 | 6,753.7 | 20.4 | 23.1 | -90.00 | | 690.3 | -685.0 | 795.1 | 753.5 | 41.62 | 19.104 | |
| 7,500.0 | 6,753.2 | 7,537.0 | 6,753.2 | 21.8 | 24.3 | -90.00 | | 790.3 | -685.0 | 795.1 | 750.7 | 44.39 | 17.912 | |
| 7,600.0 | 6,752.7 | 7,637.0 | 6,752.7 | 23.3 | 25.7 | -90.00 | | 890.3 | -685.0 | 795.1 | 747.8 | 47.31 | 16.806 | |
| 7,700.0 | 6,752.2 | 7,737.0 | 6,752.2 | 24.8 | 27.1 | -90.00 | | 990.3 | -685.0 | 795.1 | 744.8 | 50.35 | 15.790 | |
| 7,800.0 | 6,751.8 | 7,837.0 | 6,751.8 | 26.4 | 28.6 | -90.00 | | 1,090.3 | -685.0 | 795.1 | 741.6 | 53.50 | 14.861 | |
| 7,900.0 | 6,751.3 | 7,937.0 | 6,751.3 | 28.0 | 30.2 | -90.00 | | 1,190.3 | -685.0 | 795.1 | 738.4 | 56.73 | 14.015 | |
| 8,000.0 | 6,750.8 | 8,037.0 | 6,750.8 | 29.6 | 31.7 | -90.00 | | 1,290.3 | -685.0 | 795.1 | 735.1 | 60.04 | 13.243 | |
| 8,100.0 | 6,750.4 | 8,137.0 | 6,750.4 | 31.3 | 33.4 | -90.00 | | 1,390.3 | -685.0 | 795.1 | 731.7 | 63.40 | 12.540 | |
| 8,200.0 | 6,749.9 | 8,237.0 | 6,749.9 | 33.0 | 35.0 | -90.00 | | 1,490.2 | -685.0 | 795.1 | 728.3 | 66.82 | 11.899 | |
| 8,300.0 | 6,749.4 | 8,337.0 | 6,749.4 | 34.8 | 36.7 | -90.00 | | 1,590.2 | -685.0 | 795.1 | 724.8 | 70.28 | 11.313 | |
| 8,400.0 | 6,748.9 | 8,437.0 | 6,748.9 | 36.5 | 38.4 | -90.00 | | 1,690.2 | -685.0 | 795.1 | 721.3 | 73.78 | 10.777 | |
| 8,500.0 | 6,748.5 | 8,537.0 | 6,748.5 | 38.3 | 40.1 | -90.00 | | 1,790.2 | -685.0 | 795.1 | 717.8 | 77.31 | 10.285 | |
| 8,600.0 | 6,748.0 | 8,637.0 | 6,748.0 | 40.1 | 41.8 | -90.00 | | 1,890.2 | -685.0 | 795.1 | 714.2 | 80.87 | 9.832 | |
| 8,700.0 | 6,747.5 | 8,737.0 | 6,747.5 | 41.9 | 43.6 | -90.00 | | 1,990.2 | -685.0 | 795.1 | 710.7 | 84.45 | 9.415 | |
| 8,800.0 | 6,747.1 | 8,837.0 | 6,747.1 | 43.7 | 45.4 | -90.00 | | 2,090.2 | -685.0 | 795.1 | 707.0 | 88.06 | 9.029 | |
| 8,900.0 | 6,746.6 | 8,937.0 | 6,746.6 | 45.5 | 47.1 | -90.00 | | 2,190.2 | -685.0 | 795.1 | 703.4 | 91.68 | 8.672 | |
| 9,000.0 | 6,746.1 | 9,037.0 | 6,746.1 | 47.3 | 48.9 | -90.00 | | 2,290.2 | -685.0 | 795.1 | 699.8 | 95.32 | 8.341 | |
| 9,100.0 | 6,745.6 | 9,137.0 | 6,745.6 | 49.2 | 50.7 | -90.00 | | 2,390.2 | -685.0 | 795.1 | 696.1 | 98.98 | 8.033 | |
| 9,200.0 | 6,745.2 | 9,237.0 | 6,745.2 | 51.0 | 52.5 | -90.00 | | 2,490.2 | -685.0 | 795.1 | 692.5 | 102.65 | 7.746 | |
| 9,300.0 | 6,744.7 | 9,337.0 | 6,744.7 | 52.8 | 54.3 | -90.00 | | 2,590.2 | -685.0 | 795.1 | 688.8 | 106.33 | 7.478 | |
| 9,400.0 | 6,744.2 | 9,437.0 | 6,744.2 | 54.7 | 56.1 | -90.00 | | 2,690.2 | -685.0 | 795.1 | 685.1 | 110.03 | 7.227 | |
| 9,500.0 | 6,743.8 | 9,537.0 | 6,743.8 | 56.5 | 58.0 | -90.00 | | 2,790.2 | -685.0 | 795.1 | 681.4 | 113.73 | 6.991 | |
| 9,600.0 | 6,743.3 | 9,637.0 | 6,743.3 | 58.4 | 59.8 | -90.00 | | 2,890.2 | -685.0 | 795.1 | 677.7 | 117.44 | 6.770 | |
| 9,700.0 | 6,742.8 | 9,737.0 | 6,742.8 | 60.3 | 61.6 | -90.00 | | 2,990.2 | -685.0 | 795.1 | 673.9 | 121.16 | 6.562 | |
| 9,800.0 | 6,742.3 | 9,837.0 | 6,742.3 | 62.1 | 63.5 | -90.00 | | 3,090.2 | -685.0 | 795.1 | 670.2 | 124.89 | 6.367 | |
| 9,900.0 | 6,741.9 | 9,937.0 | 6,741.9 | 64.0 | 65.3 | -90.00 | | 3,190.2 | -685.0 | 795.1 | 666.5 | 128.62 | 6.182 | |
| 10,000.0 | 6,741.4 | 10,037.0 | 6,741.4 | 65.9 | 67.2 | -90.00 | | 3,290.2 | -685.0 | 795.1 | 662.7 | 132.36 | 6.007 | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|------------------------|------------------------|------------------------|-----------|--------|-----------------------------|---|---|----------------------------|-----------------------------|-------------------------------|---------------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 10,100.0 | 6,740.9 | 10,137.0 | 6,740.9 | 67.7 | 69.0 | -90.00 | 3,390.2 | -685.0 | 795.1 | 659.0 | 136.11 | 5.842 | |
| 10,200.0 | 6,740.5 | 10,237.0 | 6,740.5 | 69.6 | 70.9 | -90.00 | 3,490.2 | -685.0 | 795.1 | 655.2 | 139.86 | 5.685 | |
| 10,300.0 | 6,740.0 | 10,337.0 | 6,740.0 | 71.5 | 72.8 | -90.00 | 3,590.2 | -685.0 | 795.1 | 651.5 | 143.61 | 5.536 | |
| 10,400.0 | 6,739.5 | 10,437.0 | 6,739.5 | 73.4 | 74.6 | -90.00 | 3,690.2 | -685.0 | 795.1 | 647.7 | 147.37 | 5.395 | |
| 10,500.0 | 6,739.0 | 10,537.0 | 6,739.0 | 75.3 | 76.5 | -90.00 | 3,790.2 | -685.0 | 795.1 | 644.0 | 151.14 | 5.261 | |
| 10,600.0 | 6,738.6 | 10,637.0 | 6,738.6 | 77.1 | 78.4 | -90.00 | 3,890.2 | -685.0 | 795.1 | 640.2 | 154.90 | 5.133 | |
| 10,700.0 | 6,738.1 | 10,737.0 | 6,738.1 | 79.0 | 80.2 | -90.00 | 3,990.2 | -685.0 | 795.1 | 636.4 | 158.68 | 5.011 | |
| 10,800.0 | 6,737.6 | 10,837.0 | 6,737.6 | 80.9 | 82.1 | -90.00 | 4,090.2 | -685.0 | 795.1 | 632.7 | 162.45 | 4.894 | |
| 10,900.0 | 6,737.2 | 10,937.0 | 6,737.2 | 82.8 | 84.0 | -90.00 | 4,190.2 | -685.0 | 795.1 | 628.9 | 166.23 | 4.783 | |
| 11,000.0 | 6,736.7 | 11,037.0 | 6,736.7 | 84.7 | 85.9 | -90.00 | 4,290.2 | -685.0 | 795.1 | 625.1 | 170.01 | 4.677 | |
| 11,100.0 | 6,736.2 | 11,137.0 | 6,736.2 | 86.6 | 87.7 | -90.00 | 4,390.2 | -685.0 | 795.1 | 621.3 | 173.79 | 4.575 | |
| 11,147.1 | 6,736.0 | 11,184.1 | 6,736.0 | 87.5 | 88.6 | -90.00 | 4,437.3 | -685.0 | 795.1 | 619.5 | 175.57 | 4.529 SF | |

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|-----------------------|---------------------|---------------------|---------------------|--------------------------------|-------------|-----------------------|-----------------------------------|------------|----------------------|-----------------------|-------------------------|-------------------|--------------------|--------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Reference | | | | | | | | | | | | | | |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Semi Major Axis Reference (ft) | Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -142.59 | -25.5 | -19.5 | 32.1 | | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -142.59 | -25.5 | -19.5 | 32.1 | 31.9 | 0.22 | 142.835 | | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -142.59 | -25.5 | -19.5 | 32.1 | 31.4 | 0.67 | 47.612 | | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | -142.59 | -25.5 | -19.5 | 32.1 | 31.0 | 1.12 | 28.567 | | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | -142.59 | -25.5 | -19.5 | 32.1 | 30.5 | 1.57 | 20.405 | | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | -142.59 | -25.5 | -19.5 | 32.1 | 30.1 | 2.02 | 15.871 | | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | -142.59 | -25.5 | -19.5 | 32.1 | 29.6 | 2.47 | 12.985 | | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | -142.59 | -25.5 | -19.5 | 32.1 | 29.2 | 2.92 | 10.987 | | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | -142.59 | -25.5 | -19.5 | 32.1 | 28.7 | 3.37 | 9.522 | | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | -142.59 | -25.5 | -19.5 | 32.1 | 28.3 | 3.82 | 8.402 | | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | -142.59 | -25.5 | -19.5 | 32.1 | 27.8 | 4.27 | 7.518 | | |
| 1,100.0 | 1,100.0 | 1,100.0 | 1,100.0 | 2.4 | 2.4 | -142.59 | -25.5 | -19.5 | 32.1 | 27.4 | 4.72 | 6.802 | | |
| 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2.6 | 2.6 | -142.59 | -25.5 | -19.5 | 32.1 | 26.9 | 5.17 | 6.210 | | |
| 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2.8 | 2.8 | -142.59 | -25.5 | -19.5 | 32.1 | 26.5 | 5.62 | 5.713 | | |
| 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 3.0 | 3.0 | -142.59 | -25.5 | -19.5 | 32.1 | 26.0 | 6.07 | 5.290 | | |
| 1,500.0 | 1,500.0 | 1,500.0 | 1,500.0 | 3.3 | 3.3 | -142.59 | -25.5 | -19.5 | 32.1 | 25.6 | 6.52 | 4.925 | | |
| 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 3.5 | 3.5 | -142.59 | -25.5 | -19.5 | 32.1 | 25.1 | 6.97 | 4.608 | | |
| 1,700.0 | 1,700.0 | 1,700.0 | 1,700.0 | 3.7 | 3.7 | -142.59 | -25.5 | -19.5 | 32.1 | 24.7 | 7.42 | 4.328 | | |
| 1,800.0 | 1,800.0 | 1,800.0 | 1,800.0 | 3.9 | 3.9 | -142.59 | -25.5 | -19.5 | 32.1 | 24.2 | 7.87 | 4.081 CC, ES | | |
| 1,900.0 | 1,900.0 | 1,899.4 | 1,899.4 | 4.2 | 4.1 | -142.84 | -26.3 | -19.9 | 33.0 | 24.7 | 8.29 | 3.977 | | |
| 2,000.0 | 2,000.0 | 1,998.8 | 1,998.8 | 4.4 | 4.3 | -143.53 | -28.6 | -21.1 | 35.5 | 26.8 | 8.69 | 4.091 | | |
| 2,100.0 | 2,100.0 | 2,098.1 | 2,098.0 | 4.6 | 4.5 | 58.67 | -32.4 | -23.1 | 39.4 | 30.3 | 9.06 | 4.344 | | |
| 2,200.0 | 2,200.0 | 2,197.3 | 2,197.0 | 4.8 | 4.7 | 60.32 | -37.7 | -25.9 | 44.0 | 34.6 | 9.41 | 4.676 | | |
| 2,300.0 | 2,299.9 | 2,296.3 | 2,295.7 | 4.9 | 4.9 | 62.99 | -44.5 | -29.5 | 49.6 | 39.8 | 9.77 | 5.072 | | |
| 2,400.0 | 2,399.7 | 2,395.2 | 2,394.1 | 5.1 | 5.1 | 66.23 | -52.8 | -33.9 | 56.2 | 46.0 | 10.15 | 5.535 | | |
| 2,500.0 | 2,499.4 | 2,493.8 | 2,492.1 | 5.3 | 5.3 | 69.70 | -62.6 | -39.0 | 63.9 | 53.4 | 10.53 | 6.068 | | |
| 2,600.0 | 2,598.9 | 2,592.2 | 2,589.7 | 5.5 | 5.5 | 73.17 | -73.9 | -44.9 | 72.9 | 62.0 | 10.93 | 6.668 | | |
| 2,700.0 | 2,698.3 | 2,690.4 | 2,686.8 | 5.7 | 5.7 | 76.46 | -86.6 | -51.6 | 83.2 | 71.9 | 11.36 | 7.330 | | |
| 2,800.0 | 2,797.4 | 2,788.8 | 2,784.0 | 5.9 | 6.0 | 79.58 | -100.7 | -59.0 | 94.8 | 83.0 | 11.81 | 8.030 | | |
| 2,900.0 | 2,896.3 | 2,888.0 | 2,881.8 | 6.2 | 6.3 | 82.85 | -115.1 | -66.6 | 106.6 | 94.3 | 12.29 | 8.677 | | |
| 3,000.0 | 2,994.9 | 2,987.0 | 2,979.4 | 6.5 | 6.6 | 86.28 | -129.5 | -74.2 | 118.6 | 105.8 | 12.80 | 9.263 | | |
| 3,100.0 | 3,093.4 | 3,086.0 | 3,077.1 | 6.7 | 6.9 | 89.63 | -143.9 | -81.7 | 130.9 | 117.6 | 13.35 | 9.808 | | |
| 3,200.0 | 3,191.8 | 3,184.9 | 3,174.7 | 7.0 | 7.2 | 92.41 | -158.3 | -89.3 | 143.6 | 129.7 | 13.92 | 10.321 | | |
| 3,300.0 | 3,290.3 | 3,283.9 | 3,272.3 | 7.3 | 7.5 | 94.73 | -172.7 | -96.9 | 156.6 | 142.1 | 14.50 | 10.799 | | |
| 3,400.0 | 3,388.7 | 3,382.9 | 3,369.9 | 7.6 | 7.8 | 96.70 | -187.1 | -104.4 | 169.8 | 154.7 | 15.11 | 11.242 | | |
| 3,500.0 | 3,487.2 | 3,481.9 | 3,467.6 | 8.0 | 8.1 | 98.38 | -201.5 | -112.0 | 183.2 | 167.5 | 15.72 | 11.652 | | |
| 3,600.0 | 3,585.6 | 3,580.8 | 3,565.2 | 8.3 | 8.5 | 99.84 | -215.8 | -119.6 | 196.7 | 180.4 | 16.35 | 12.030 | | |
| 3,700.0 | 3,684.0 | 3,679.8 | 3,662.8 | 8.6 | 8.8 | 101.10 | -230.2 | -127.1 | 210.3 | 193.3 | 16.99 | 12.378 | | |
| 3,800.0 | 3,782.5 | 3,780.3 | 3,762.0 | 9.0 | 9.1 | 102.27 | -244.7 | -134.7 | 223.9 | 206.3 | 17.64 | 12.696 | | |
| 3,900.0 | 3,880.9 | 3,884.3 | 3,865.0 | 9.3 | 9.4 | 103.91 | -257.1 | -141.3 | 236.0 | 217.7 | 18.26 | 12.924 | | |
| 4,000.0 | 3,979.6 | 3,988.4 | 3,968.7 | 9.7 | 9.7 | 105.98 | -266.2 | -146.0 | 245.9 | 227.0 | 18.85 | 13.048 | | |
| 4,100.0 | 4,078.7 | 4,092.8 | 4,072.8 | 9.9 | 9.9 | 107.84 | -272.0 | -149.1 | 253.1 | 233.7 | 19.36 | 13.072 | | |
| 4,200.0 | 4,178.3 | 4,197.3 | 4,177.3 | 10.2 | 10.1 | 109.51 | -274.4 | -150.4 | 257.5 | 237.7 | 19.83 | 12.986 | | |
| 4,300.0 | 4,278.1 | 4,298.1 | 4,278.1 | 10.4 | 10.3 | 110.79 | -274.5 | -150.4 | 259.6 | 239.3 | 20.25 | 12.822 | | |
| 4,400.0 | 4,378.1 | 4,398.1 | 4,378.1 | 10.6 | 10.5 | 111.32 | -274.5 | -150.4 | 260.5 | 239.9 | 20.63 | 12.624 | | |
| 4,500.0 | 4,478.1 | 4,498.1 | 4,478.1 | 10.8 | 10.7 | -90.77 | -274.5 | -150.4 | 260.5 | 239.5 | 21.01 | 12.403 | | |
| 4,600.0 | 4,578.1 | 4,598.1 | 4,578.1 | 11.0 | 10.8 | -90.77 | -274.5 | -150.4 | 260.5 | 239.1 | 21.38 | 12.186 | | |
| 4,700.0 | 4,678.1 | 4,698.1 | 4,678.1 | 11.1 | 11.0 | -90.77 | -274.5 | -150.4 | 260.5 | 238.8 | 21.76 | 11.974 | | |
| 4,800.0 | 4,778.1 | 4,798.1 | 4,778.1 | 11.3 | 11.2 | -90.77 | -274.5 | -150.4 | 260.5 | 238.4 | 22.14 | 11.769 | | |
| 4,900.0 | 4,878.1 | 4,898.1 | 4,878.1 | 11.5 | 11.4 | -90.77 | -274.5 | -150.4 | 260.5 | 238.0 | 22.52 | 11.569 | | |
| 5,000.0 | 4,978.1 | 4,998.1 | 4,978.1 | 11.7 | 11.6 | -90.77 | -274.5 | -150.4 | 260.5 | 237.6 | 22.90 | 11.375 | | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design | | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|-----------------------|---------------------|---------------------|---------------------|-----------|--------|-----------------|-----------------------|-----------------------------------|-----------------------------------|-------------------------------|--------------------------------|-------------------------|--------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Reference | | | | | | | | | | | | | | |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Semi Major Axis | 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 | 5,078.1 | 5,098.1 | 5,078.1 | 11.9 | 11.8 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 237.2 | 23.29 | 11.185 | |
| 5,200.0 | 5,178.1 | 5,198.1 | 5,178.1 | 12.1 | 12.0 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 236.8 | 23.68 | 11.002 | |
| 5,300.0 | 5,278.1 | 5,298.1 | 5,278.1 | 12.3 | 12.2 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 236.5 | 24.07 | 10.823 | |
| 5,400.0 | 5,378.1 | 5,398.1 | 5,378.1 | 12.5 | 12.4 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 236.1 | 24.47 | 10.649 | |
| 5,500.0 | 5,478.1 | 5,498.1 | 5,478.1 | 12.7 | 12.6 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 235.7 | 24.86 | 10.479 | |
| 5,600.0 | 5,578.1 | 5,598.1 | 5,578.1 | 12.9 | 12.8 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 235.3 | 25.26 | 10.314 | |
| 5,700.0 | 5,678.1 | 5,698.1 | 5,678.1 | 13.1 | 13.0 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 234.9 | 25.66 | 10.154 | |
| 5,800.0 | 5,778.1 | 5,798.1 | 5,778.1 | 13.3 | 13.2 | -90.77 | -90.77 | -274.5 | -150.4 | 260.5 | 234.5 | 26.06 | 9.998 | |
| 5,900.0 | 5,878.1 | 5,898.3 | 5,878.2 | 13.5 | 13.4 | -90.39 | -90.39 | -272.8 | -150.4 | 260.5 | 234.1 | 26.45 | 9.849 | |
| 5,921.9 | 5,899.9 | 5,920.1 | 5,899.9 | 13.5 | 13.4 | -90.00 | -90.00 | -271.0 | -150.4 | 260.5 | 234.0 | 26.53 | 9.820 | |
| 6,000.0 | 5,978.1 | 5,996.8 | 5,975.8 | 13.7 | 13.5 | -87.55 | -87.55 | -259.8 | -150.4 | 260.8 | 234.0 | 26.78 | 9.736 | |
| 6,100.0 | 6,077.8 | 6,092.3 | 6,068.0 | 13.8 | 13.6 | -83.36 | -83.36 | -235.4 | -150.4 | 262.3 | 235.3 | 27.01 | 9.714 | |
| 6,200.0 | 6,175.9 | 6,185.6 | 6,154.6 | 13.9 | 13.6 | -79.39 | -79.39 | -200.7 | -150.4 | 265.2 | 238.1 | 27.10 | 9.785 | |
| 6,300.0 | 6,270.6 | 6,277.0 | 6,234.6 | 14.0 | 13.6 | -75.69 | -75.69 | -156.6 | -150.4 | 269.1 | 242.0 | 27.10 | 9.930 | |
| 6,400.0 | 6,360.3 | 6,366.7 | 6,307.5 | 14.0 | 13.7 | -72.33 | -72.33 | -104.4 | -150.4 | 273.7 | 246.7 | 27.03 | 10.125 | |
| 6,500.0 | 6,443.6 | 6,454.9 | 6,372.7 | 14.0 | 13.7 | -69.36 | -69.36 | -45.1 | -150.4 | 278.7 | 251.8 | 26.95 | 10.342 | |
| 6,600.0 | 6,518.9 | 6,541.9 | 6,429.9 | 14.1 | 13.9 | -66.77 | -66.77 | 20.4 | -150.4 | 283.8 | 256.9 | 26.93 | 10.542 | |
| 6,700.0 | 6,585.0 | 6,627.9 | 6,478.8 | 14.3 | 14.2 | -64.59 | -64.59 | 91.1 | -150.4 | 288.7 | 261.7 | 27.03 | 10.682 | |
| 6,800.0 | 6,640.8 | 6,712.9 | 6,519.0 | 14.6 | 14.7 | -62.80 | -62.80 | 166.0 | -150.4 | 293.1 | 265.8 | 27.34 | 10.722 | |
| 6,900.0 | 6,685.2 | 6,800.0 | 6,551.3 | 15.2 | 15.3 | -61.38 | -61.38 | 246.8 | -150.4 | 296.9 | 268.9 | 27.94 | 10.624 | |
| 7,000.0 | 6,717.6 | 6,881.2 | 6,572.9 | 15.9 | 16.0 | -60.40 | -60.40 | 325.0 | -150.4 | 299.7 | 270.8 | 28.87 | 10.381 | |
| 7,100.0 | 6,737.4 | 6,964.7 | 6,586.4 | 16.8 | 16.9 | -59.77 | -59.77 | 407.4 | -150.4 | 301.5 | 271.4 | 30.17 | 9.995 | |
| 7,200.0 | 6,748.2 | 7,047.8 | 6,590.9 | 17.9 | 17.8 | -59.01 | -59.01 | 490.3 | -150.4 | 304.3 | 272.6 | 31.72 | 9.593 | |
| 7,300.0 | 6,753.9 | 7,146.2 | 6,589.9 | 19.1 | 19.0 | -57.82 | -57.82 | 588.7 | -150.4 | 307.8 | 274.3 | 33.50 | 9.190 | |
| 7,400.0 | 6,753.7 | 7,246.2 | 6,589.0 | 20.4 | 20.3 | -57.70 | -57.70 | 688.7 | -150.4 | 308.2 | 272.5 | 35.74 | 8.622 | |
| 7,500.0 | 6,753.2 | 7,346.2 | 6,588.0 | 21.8 | 21.8 | -57.62 | -57.62 | 788.7 | -150.4 | 308.5 | 270.3 | 38.15 | 8.085 | |
| 7,600.0 | 6,752.7 | 7,446.2 | 6,587.1 | 23.3 | 23.3 | -57.55 | -57.55 | 888.7 | -150.4 | 308.7 | 268.0 | 40.69 | 7.587 | |
| 7,700.0 | 6,752.2 | 7,546.2 | 6,586.1 | 24.8 | 24.8 | -57.47 | -57.47 | 988.7 | -150.4 | 309.0 | 265.7 | 43.33 | 7.132 | |
| 7,800.0 | 6,751.8 | 7,646.2 | 6,585.1 | 26.4 | 26.4 | -57.40 | -57.40 | 1,088.7 | -150.4 | 309.2 | 263.2 | 46.05 | 6.716 | |
| 7,900.0 | 6,751.3 | 7,746.2 | 6,584.2 | 28.0 | 28.0 | -57.32 | -57.32 | 1,188.6 | -150.4 | 309.5 | 260.7 | 48.84 | 6.338 | |
| 8,000.0 | 6,750.8 | 7,846.2 | 6,583.2 | 29.6 | 29.7 | -57.24 | -57.24 | 1,288.6 | -150.4 | 309.8 | 258.1 | 51.68 | 5.994 | |
| 8,100.0 | 6,750.4 | 7,946.2 | 6,582.3 | 31.3 | 31.4 | -57.17 | -57.17 | 1,388.6 | -150.4 | 310.0 | 255.5 | 54.57 | 5.681 | |
| 8,200.0 | 6,749.9 | 8,046.2 | 6,581.3 | 33.0 | 33.1 | -57.09 | -57.09 | 1,488.6 | -150.4 | 310.3 | 252.8 | 57.50 | 5.396 | |
| 8,300.0 | 6,749.4 | 8,146.2 | 6,580.3 | 34.8 | 34.9 | -57.02 | -57.02 | 1,588.6 | -150.4 | 310.6 | 250.1 | 60.47 | 5.136 | |
| 8,400.0 | 6,748.9 | 8,246.2 | 6,579.4 | 36.5 | 36.7 | -56.94 | -56.94 | 1,688.6 | -150.4 | 310.8 | 247.4 | 63.46 | 4.898 | |
| 8,500.0 | 6,748.5 | 8,346.2 | 6,578.4 | 38.3 | 38.4 | -56.86 | -56.86 | 1,788.6 | -150.4 | 311.1 | 244.6 | 66.47 | 4.680 | |
| 8,600.0 | 6,748.0 | 8,446.2 | 6,577.5 | 40.1 | 40.2 | -56.79 | -56.79 | 1,888.6 | -150.4 | 311.4 | 241.9 | 69.51 | 4.480 | |
| 8,700.0 | 6,747.5 | 8,546.2 | 6,576.5 | 41.9 | 42.0 | -56.71 | -56.71 | 1,988.6 | -150.4 | 311.6 | 239.1 | 72.56 | 4.295 | |
| 8,800.0 | 6,747.1 | 8,646.2 | 6,575.5 | 43.7 | 43.8 | -56.64 | -56.64 | 2,088.6 | -150.4 | 311.9 | 236.3 | 75.62 | 4.125 | |
| 8,900.0 | 6,746.6 | 8,746.2 | 6,574.6 | 45.5 | 45.7 | -56.56 | -56.56 | 2,188.6 | -150.4 | 312.2 | 233.5 | 78.70 | 3.967 | |
| 9,000.0 | 6,746.1 | 8,846.2 | 6,573.6 | 47.3 | 47.5 | -56.49 | -56.49 | 2,288.6 | -150.4 | 312.4 | 230.7 | 81.78 | 3.821 | |
| 9,100.0 | 6,745.6 | 8,946.2 | 6,572.7 | 49.2 | 49.3 | -56.42 | -56.42 | 2,388.6 | -150.4 | 312.7 | 227.8 | 84.87 | 3.685 | |
| 9,200.0 | 6,745.2 | 9,046.2 | 6,571.7 | 51.0 | 51.2 | -56.34 | -56.34 | 2,488.6 | -150.4 | 313.0 | 225.0 | 87.97 | 3.558 | |
| 9,300.0 | 6,744.7 | 9,146.2 | 6,570.7 | 52.8 | 53.0 | -56.27 | -56.27 | 2,588.6 | -150.4 | 313.3 | 222.2 | 91.08 | 3.440 | |
| 9,400.0 | 6,744.2 | 9,246.2 | 6,569.8 | 54.7 | 54.9 | -56.19 | -56.19 | 2,688.6 | -150.4 | 313.5 | 219.3 | 94.19 | 3.329 | |
| 9,500.0 | 6,743.8 | 9,346.2 | 6,568.8 | 56.5 | 56.7 | -56.12 | -56.12 | 2,788.6 | -150.4 | 313.8 | 216.5 | 97.30 | 3.225 | |
| 9,600.0 | 6,743.3 | 9,446.2 | 6,567.9 | 58.4 | 58.6 | -56.04 | -56.04 | 2,888.5 | -150.4 | 314.1 | 213.7 | 100.42 | 3.128 | |
| 9,700.0 | 6,742.8 | 9,546.2 | 6,566.9 | 60.3 | 60.5 | -55.97 | -55.97 | 2,988.5 | -150.4 | 314.4 | 210.8 | 103.53 | 3.036 | |
| 9,800.0 | 6,742.3 | 9,646.2 | 6,565.9 | 62.1 | 62.3 | -55.90 | -55.90 | 3,088.5 | -150.4 | 314.6 | 208.0 | 106.65 | 2.950 | |
| 9,900.0 | 6,741.9 | 9,746.2 | 6,565.0 | 64.0 | 64.2 | -55.82 | -55.82 | 3,188.5 | -150.4 | 314.9 | 205.1 | 109.77 | 2.869 | |
| 10,000.0 | 6,741.4 | 9,846.2 | 6,564.0 | 65.9 | 66.1 | -55.75 | -55.75 | 3,288.5 | -150.4 | 315.2 | 202.3 | 112.90 | 2.792 | |

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

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

| Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14) | | | | | | | | | | | | Offset Site Error: | 0.0 ft |
|---|------------------------|------------------------|------------------------|-----------|--------|-----------------------------|---|---------------|----------------------------|-----------------------------|-------------------------------|---------------------------|---------|
| Survey Program: 0-MWD | | | | | | | | | | | | Offset Well Error: | 0.0 ft |
| Measured Depth (ft) | Vertical Depth (ft) | Measured Depth (ft) | Vertical Depth (ft) | Reference | Offset | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | +E/-W (ft) | Between Centres (ft) | Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
| 10,100.0 | 6,740.9 | 9,946.2 | 6,563.1 | 67.7 | 67.9 | -55.68 | 3,388.5 | -150.4 | 315.5 | 199.4 | 116.02 | 2.719 | |
| 10,200.0 | 6,740.5 | 10,046.2 | 6,562.1 | 69.6 | 69.8 | -55.60 | 3,488.5 | -150.4 | 315.7 | 196.6 | 119.14 | 2.650 | |
| 10,300.0 | 6,740.0 | 10,146.2 | 6,561.1 | 71.5 | 71.7 | -55.53 | 3,588.5 | -150.4 | 316.0 | 193.7 | 122.26 | 2.585 | |
| 10,400.0 | 6,739.5 | 10,246.2 | 6,560.2 | 73.4 | 73.6 | -55.46 | 3,688.5 | -150.4 | 316.3 | 190.9 | 125.38 | 2.523 | |
| 10,500.0 | 6,739.0 | 10,346.2 | 6,559.2 | 75.3 | 75.5 | -55.38 | 3,788.5 | -150.4 | 316.6 | 188.1 | 128.50 | 2.464 | |
| 10,600.0 | 6,738.6 | 10,446.2 | 6,558.3 | 77.1 | 77.4 | -55.31 | 3,888.5 | -150.4 | 316.8 | 185.2 | 131.61 | 2.407 | |
| 10,700.0 | 6,738.1 | 10,546.2 | 6,557.3 | 79.0 | 79.3 | -55.24 | 3,988.5 | -150.4 | 317.1 | 182.4 | 134.73 | 2.354 | |
| 10,800.0 | 6,737.6 | 10,646.2 | 6,556.3 | 80.9 | 81.1 | -55.17 | 4,088.5 | -150.4 | 317.4 | 179.6 | 137.84 | 2.303 | |
| 10,900.0 | 6,737.2 | 10,746.2 | 6,555.4 | 82.8 | 83.0 | -55.09 | 4,188.5 | -150.4 | 317.7 | 176.7 | 140.96 | 2.254 | |
| 11,000.0 | 6,736.7 | 10,846.2 | 6,554.4 | 84.7 | 84.9 | -55.02 | 4,288.5 | -150.4 | 318.0 | 173.9 | 144.06 | 2.207 | |
| 11,100.0 | 6,736.2 | 10,946.2 | 6,553.5 | 86.6 | 86.8 | -54.95 | 4,388.5 | -150.4 | 318.2 | 171.1 | 147.17 | 2.162 | |
| 11,147.1 | 6,736.0 | 10,993.3 | 6,553.0 | 87.5 | 87.7 | -54.92 | 4,435.6 | -150.4 | 318.4 | 169.7 | 148.63 | 2.142 SF | |

| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22Y-401

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°



| | | | |
|---------------------------|---|-------------------------------------|-----------------------------|
| Company: | PETROLEUM DEVELOPMENT CORP Weld County CO | Local Co-ordinate Reference: | Well Ledford 22Y-401 |
| Project: | SEC.22-T5N-R64W | TVD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Reference Site: | Ledford 22Y-HZ Pad Sec.22-T5N-R64W | MD Reference: | WELL @ 4613.0ft (RKB - 15') |
| Site Error: | 0.0ft | North Reference: | True |
| Reference Well: | Ledford 22Y-401 | 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 (2-25-14) | Offset TVD Reference: | Offset Datum |

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22Y-401

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°

