



Project: WELD COUNTY, COLORADO
Site: SE NW SEC. 6 T3N R65W 6th P.M.
Well: VEGA 15N
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

| ANNOTATIONS | | | | | | | | | |
|-------------|----------|-------|--------|----------|---------|---------|-----------|---|--|
| TVD | MD | Inc | Azi | +N/-S | +E/-W | VSec | Departure | Annotation | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | SHL: 2209ft FNL & 2596ft FWL of Sec 6 | |
| 400.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | START NUDGE (2°/100ft BUR) | |
| 995.49 | 999.87 | 12.00 | 290.74 | 22.16 | -58.52 | -19.37 | 62.58 | EOB TO 12° INC | |
| 2460.31 | 2497.39 | 12.00 | 290.74 | 132.42 | -349.62 | -115.72 | 373.86 | END OF TANGENT | |
| 3055.80 | 3097.26 | 0.00 | 0.00 | 154.59 | -408.14 | -135.09 | 436.44 | EOD TO VERTICAL | |
| 6441.80 | 6483.26 | 0.00 | 0.00 | 154.59 | -408.14 | -135.09 | 436.44 | KOP (8°/100ft BUR) | |
| 7158.00 | 7608.26 | 90.00 | 180.21 | -561.60 | -410.77 | 580.42 | 1152.63 | *NEW*EP: 2530ft FSL & 2235ft FWL of Sec 6 | |
| 7158.00 | 7901.94 | 90.00 | 171.40 | -854.21 | -389.31 | 871.68 | 1446.31 | EOT TO 171.4° AZ | |
| 7158.00 | 7931.94 | 90.00 | 171.40 | -883.87 | -384.82 | 901.10 | 1476.31 | END OF TANGENT | |
| 7158.00 | 8225.66 | 90.00 | 180.21 | -1176.52 | -363.36 | 1192.40 | 1770.03 | EOT TO 180.21° AZ | |
| 7158.00 | 15264.73 | 90.00 | 180.21 | -8215.54 | -389.36 | 8224.76 | 8809.11 | BHL: 150ft FSL & 2235ft FWL of Sec 7 | |

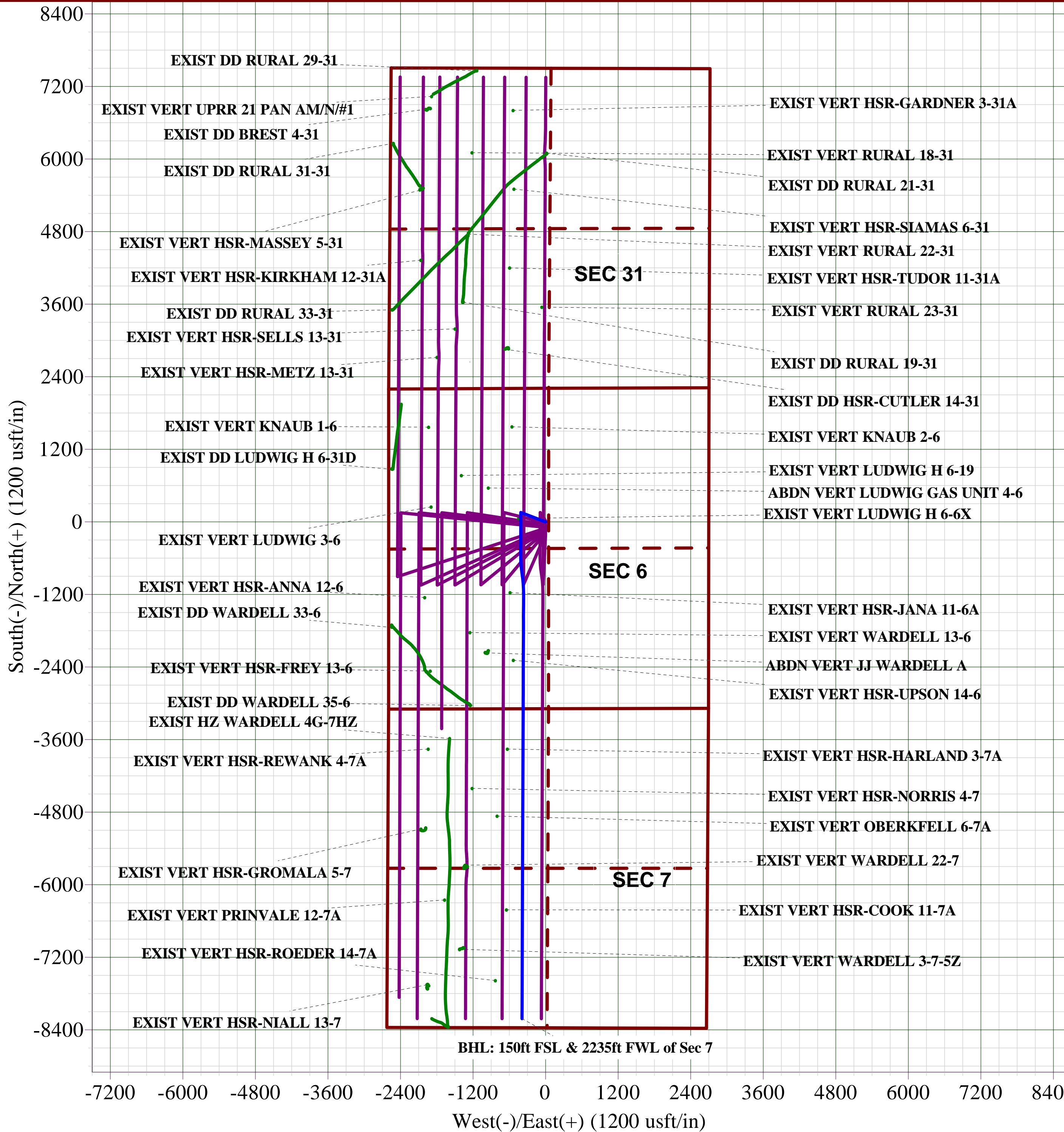
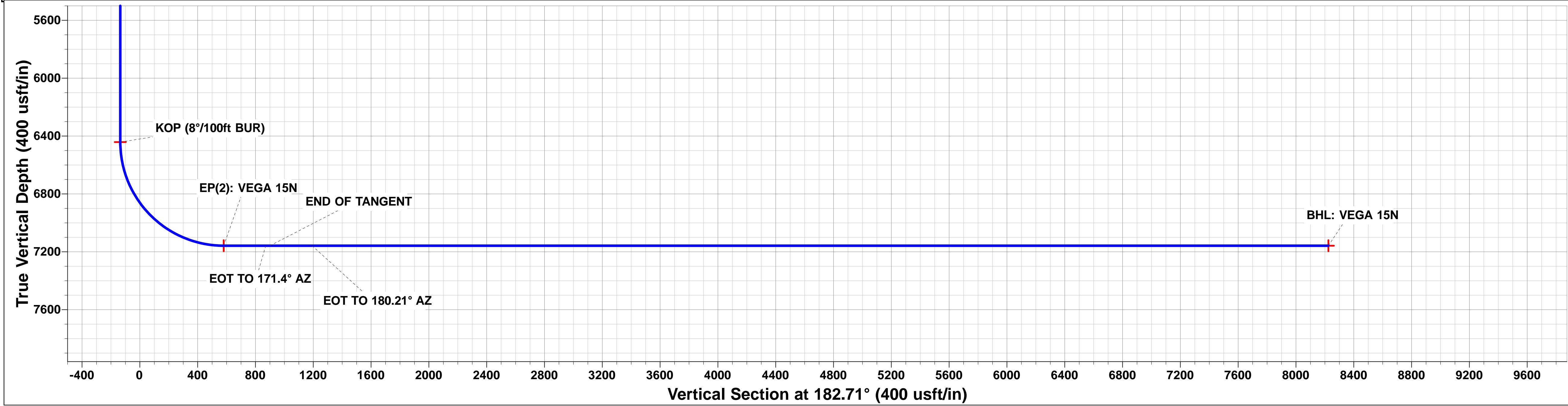
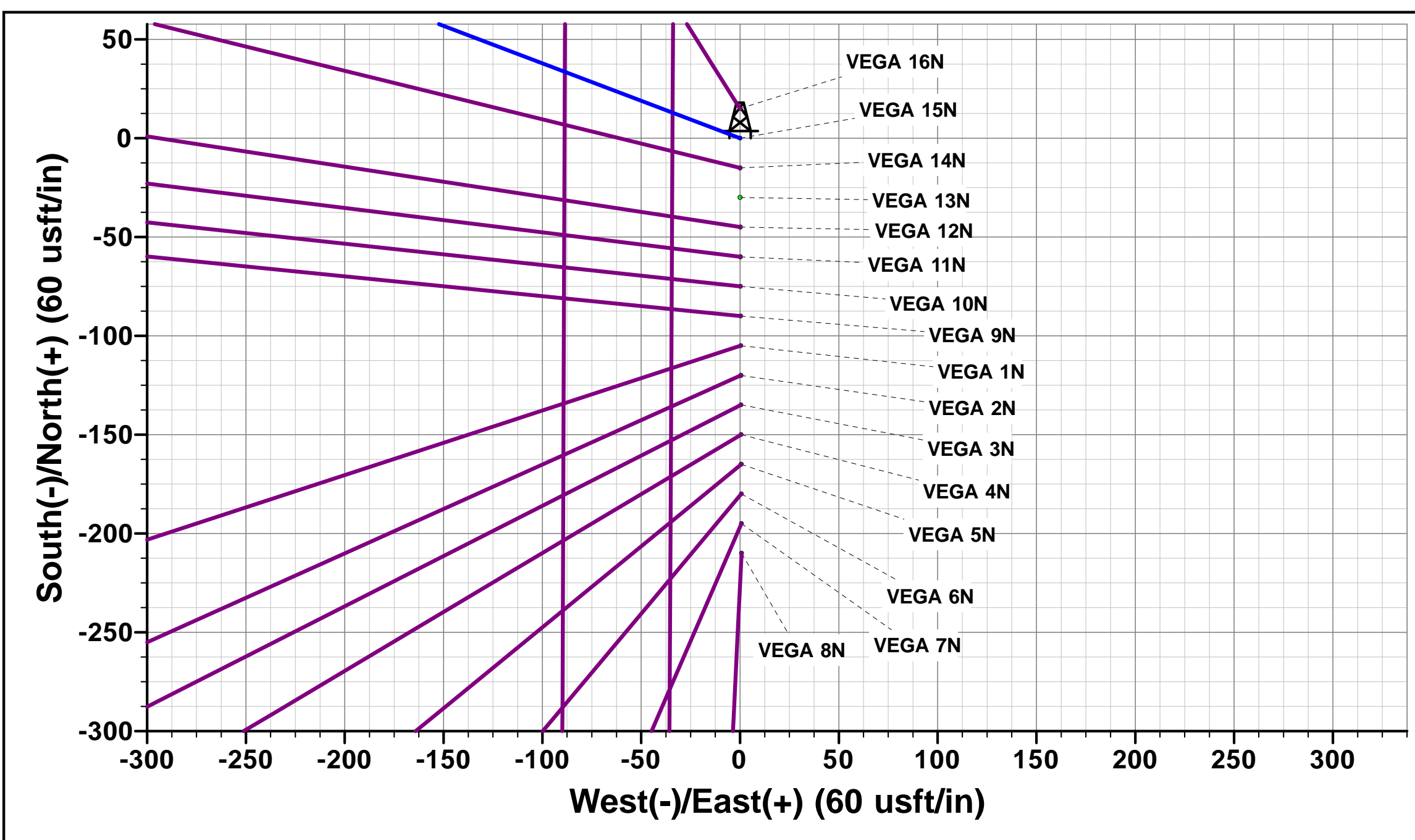
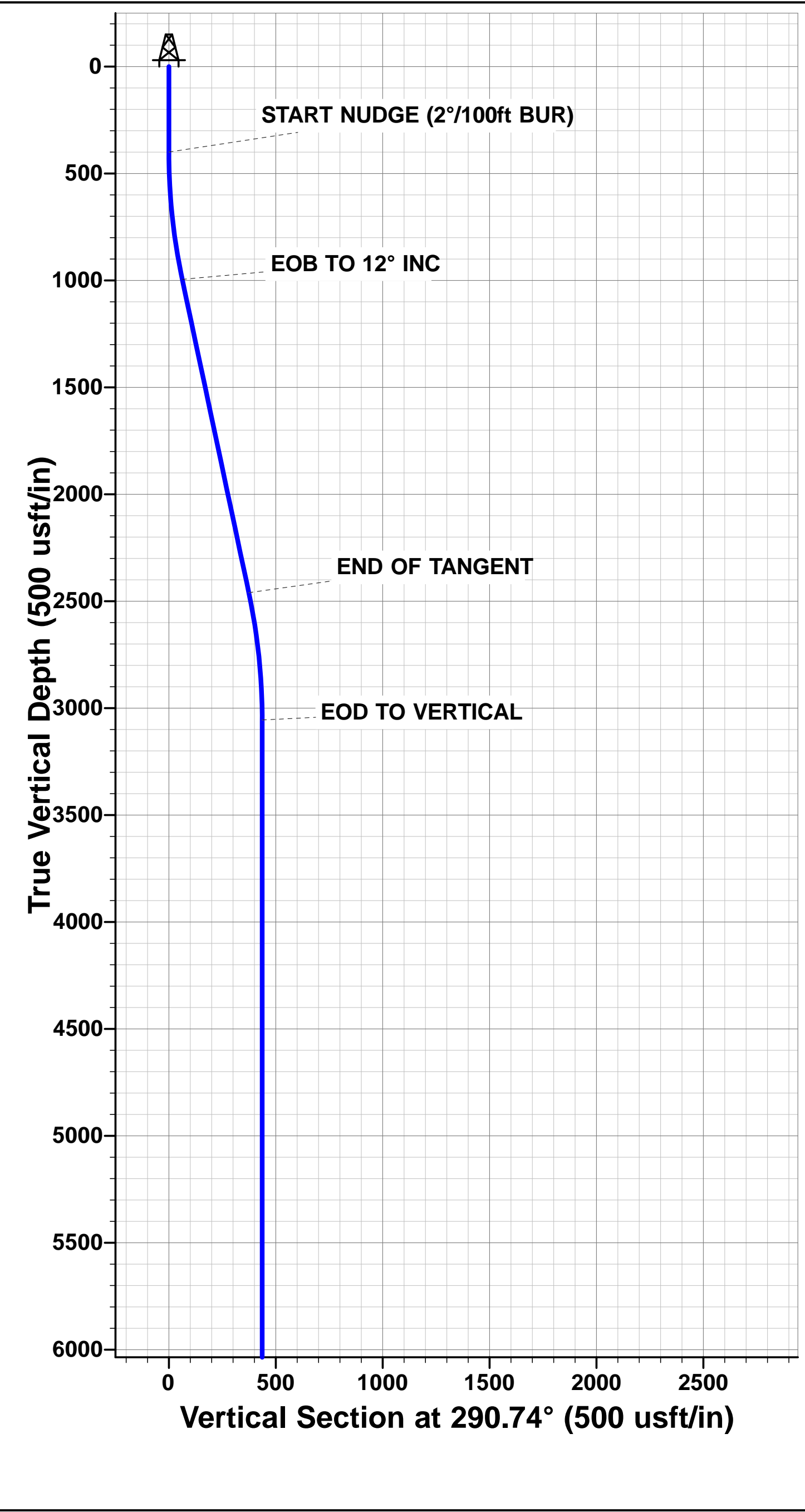
PROPOSED LOCAL COORDINATES:

SHL: 2209ft FNL & 2596ft FWL of Sec 6

*NEW*EP: 2530ft FSL & 2235ft FWL of Sec 6

BHL: 150ft FSL & 2235ft FWL of Sec 7

| WELLBORE TARGET DETAILS (LAT/LONG) | | | | | |
|------------------------------------|---------|----------|---------|-----------|-------------|
| Name | TVD | +N/-S | +E/-W | Latitude | Longitude |
| KOP: VEGA 15N | 6441.80 | 154.59 | -408.14 | 40.256036 | -104.707820 |
| EP(2): VEGA 15N | 7158.00 | -561.60 | -410.77 | 40.254070 | -104.707829 |
| BHL: VEGA 15N | 7158.00 | -8215.54 | -389.36 | 40.233060 | -104.707752 |



PDC ENERGY

**WELD COUNTY, COLORADO
SE NW SEC. 6 T3N R65W 6th P.M.
VEGA 15N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

24 January, 2018



Anticollision Report



| | | | |
|---------------------------|--------------------------------|-------------------------------------|---|
| Company: | PDC ENERGY | Local Co-ordinate Reference: | Well VEGA 15N |
| Project: | WELD COUNTY, COLORADO | TVD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Reference Site: | SE NW SEC. 6 T3N R65W 6th P.M. | MD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Site Error: | 0.00 usft | North Reference: | True |
| Reference Well: | VEGA 15N | Survey Calculation Method: | Minimum Curvature |
| Well Error: | 0.00 usft | Output errors are at | 2.00 sigma |
| Reference Wellbore | ORIGINAL WELLBORE | Database: | EDM 5000.1 Single User Db |
| Reference Design: | PROPOSAL #1 | Offset TVD Reference: | Offset Datum |

| | | | |
|-------------------------------------|---|-----------------------|---------------------|
| Reference | PROPOSAL #1 | | |
| Filter type: | NO GLOBAL FILTER: Using user defined selection & filtering criteria | | |
| Interpolation Method: | MD + Stations Interval 100.00usft | Error Model: | ISCWSA |
| Depth Range: | Unlimited | Scan Method: | Closest Approach 3D |
| Results Limited by: | Maximum center-center distance of 9,999.98 usft | Error Surface: | Elliptical Conic |
| Warning Levels Evaluated at: | 2.00 Sigma | Casing Method: | Not applied |

| | | | | |
|----------------------------|------------------|---------------------------------|------------------|--------------------|
| Survey Tool Program | Date | 22/01/2018 | | |
| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description |
| 0.00 | 15,264.73 | PROPOSAL #1 (ORIGINAL WELLBORE) | MWD | MWD - Standard |

| Summary | | | | | | |
|---|---------------------------------|------------------------------|---------------------------------|----------------------------------|-------------------|------------|
| Site Name | Reference Measured Depth (usft) | Offset Measured Depth (usft) | Distance Between Centres (usft) | Distance Between Ellipses (usft) | Separation Factor | Warning |
| Offset Well - Wellbore - Design | | | | | | |
| SE NW SEC. 6 T3N R65W 6th P.M. | | | | | | |
| ABDN VERT JJ WARDELL A - Wellbore #1 - Wellbore #1 | 9,211.47 | 7,144.26 | 617.60 | 572.34 | 13.644 | CC, ES |
| ABDN VERT JJ WARDELL A - Wellbore #1 - Wellbore #1 | 9,400.00 | 7,146.18 | 645.73 | 597.08 | 13.273 | SF |
| ABDN VERT LUDWIG GAS UNIT 4-6 - Wellbore #1 - De | 6,483.26 | 6,419.80 | 674.40 | 645.75 | 23.540 | CC, ES |
| ABDN VERT LUDWIG GAS UNIT 4-6 - Wellbore #1 - De | 6,550.00 | 6,486.45 | 676.26 | 647.42 | 23.448 | SF |
| EXIST DD BREST 4-31 - Wellbore #1 - Wellbore #1 | 5,374.61 | 5,163.70 | 6,833.33 | 6,818.36 | 456.422 | CC |
| EXIST DD BREST 4-31 - Wellbore #1 - Wellbore #1 | 5,400.00 | 5,182.43 | 6,833.35 | 6,818.33 | 454.883 | ES |
| EXIST DD BREST 4-31 - Wellbore #1 - Wellbore #1 | 10,000.00 | 7,000.00 | 9,905.42 | 9,845.31 | 164.802 | SF |
| EXIST DD HSR-CUTLER 14-31 - Wellbore #1 - Wellbore | 6,486.90 | 6,438.17 | 2,712.14 | 2,694.54 | 154.051 | CC, ES |
| EXIST DD HSR-CUTLER 14-31 - Wellbore #1 - Wellbore | 14,100.00 | 7,132.37 | 9,908.92 | 9,771.84 | 72.287 | SF |
| EXIST DD LUDWIG H 6-31D - Wellbore #1 - Wellbore #1 | 4,594.22 | 4,644.20 | 2,234.61 | 2,203.69 | 72.259 | CC |
| EXIST DD LUDWIG H 6-31D - Wellbore #1 - Wellbore #1 | 4,600.00 | 4,647.92 | 2,234.62 | 2,203.67 | 72.220 | ES |
| EXIST DD LUDWIG H 6-31D - Wellbore #1 - Wellbore #1 | 15,264.73 | 7,333.99 | 9,337.07 | 9,155.72 | 51.485 | SF |
| EXIST DD RURAL 19-31 - Wellbore #1 - Wellbore #1 | 6,089.99 | 6,088.84 | 3,601.79 | 3,571.25 | 117.936 | CC |
| EXIST DD RURAL 19-31 - Wellbore #1 - Wellbore #1 | 6,200.00 | 6,186.24 | 3,602.01 | 3,571.09 | 116.513 | ES |
| EXIST DD RURAL 19-31 - Wellbore #1 - Wellbore #1 | 13,300.00 | 7,212.37 | 9,932.12 | 9,787.85 | 68.843 | SF |
| EXIST DD RURAL 21-31 - Wellbore #1 - Wellbore #1 | 1,538.44 | 854.00 | 4,924.95 | 4,918.46 | 759.584 | CC |
| EXIST DD RURAL 21-31 - Wellbore #1 - Wellbore #1 | 1,600.00 | 885.86 | 4,925.15 | 4,918.30 | 719.546 | ES |
| EXIST DD RURAL 21-31 - Wellbore #1 - Wellbore #1 | 10,900.00 | 7,332.78 | 9,954.49 | 9,851.58 | 96.731 | SF |
| EXIST DD RURAL 29-31 - Wellbore #1 - Wellbore #1 | 2,721.73 | 2,175.18 | 7,136.83 | 7,123.67 | 542.287 | CC, ES |
| EXIST DD RURAL 29-31 - Wellbore #1 - Wellbore #1 | 9,500.00 | 7,312.00 | 9,937.21 | 9,872.52 | 153.622 | SF |
| EXIST DD RURAL 31-31 - Wellbore #1 - Wellbore #1 | 2,635.77 | 2,001.34 | 5,721.11 | 5,709.88 | 509.577 | CC, ES |
| EXIST DD RURAL 31-31 - Wellbore #1 - Wellbore #1 | 10,500.00 | 7,150.00 | 9,941.05 | 9,855.41 | 116.083 | SF |
| EXIST DD RURAL 33-31 - Wellbore #1 - Wellbore #1 | 5,591.23 | 5,764.92 | 3,965.67 | 3,919.20 | 85.342 | CC |
| EXIST DD RURAL 33-31 - Wellbore #1 - Wellbore #1 | 6,487.50 | 6,681.81 | 3,966.48 | 3,917.33 | 80.687 | ES |
| EXIST DD RURAL 33-31 - Wellbore #1 - Wellbore #1 | 13,300.00 | 7,433.19 | 9,994.54 | 9,846.32 | 67.427 | SF |
| EXIST DD WARDELL 33-6 - Wellbore #1 - Wellbore #1 | 8,790.74 | 7,291.01 | 2,178.99 | 2,123.63 | 39.362 | CC |
| EXIST DD WARDELL 33-6 - Wellbore #1 - Wellbore #1 | 8,800.00 | 7,291.47 | 2,179.01 | 2,123.49 | 39.250 | ES |
| EXIST DD WARDELL 33-6 - Wellbore #1 - Wellbore #1 | 10,400.00 | 7,352.74 | 2,707.97 | 2,623.51 | 32.060 | SF |
| EXIST DD WARDELL 35-6 - Wellbore #1 - Wellbore #1 | 10,090.00 | 7,215.16 | 872.06 | 794.92 | 11.305 | CC |
| EXIST DD WARDELL 35-6 - Wellbore #1 - Wellbore #1 | 10,100.00 | 7,215.15 | 872.12 | 794.80 | 11.279 | ES |
| EXIST DD WARDELL 35-6 - Wellbore #1 - Wellbore #1 | 10,300.00 | 7,214.89 | 896.99 | 815.96 | 11.070 | SF |
| EXIST HZ WARDELL 4G-7HZ - Wellbore #1 - Wellbore # | 15,264.73 | 7,245.33 | 1,233.58 | 1,060.92 | 7.145 | CC, ES, SF |
| EXIST VERT HSR-ANNA 12-6 - Wellbore #1 - Design #1 | 8,306.49 | 7,136.00 | 1,634.47 | 1,590.51 | 37.176 | CC, ES |
| EXIST VERT HSR-ANNA 12-6 - Wellbore #1 - Design #1 | 9,400.00 | 7,136.00 | 1,966.54 | 1,903.73 | 31.312 | SF |
| EXIST VERT HSR-COOK 11-7A - Wellbore #1 - Design # | 13,465.50 | 7,136.00 | 264.28 | 125.20 | 1.900 | CC, ES, SF |
| EXIST VERT HSR-FREY 13-6 - Wellbore #1 - Design #1 | 9,521.82 | 7,136.00 | 1,539.08 | 1,474.07 | 23.674 | CC, ES |
| EXIST VERT HSR-FREY 13-6 - Wellbore #1 - Design #1 | 10,200.00 | 7,136.00 | 1,681.87 | 1,604.40 | 21.709 | SF |

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

| | | | |
|---------------------------|--------------------------------|-------------------------------------|---|
| Company: | PDC ENERGY | Local Co-ordinate Reference: | Well VEGA 15N |
| Project: | WELD COUNTY, COLORADO | TVD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Reference Site: | SE NW SEC. 6 T3N R65W 6th P.M. | MD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Site Error: | 0.00 usft | North Reference: | True |
| Reference Well: | VEGA 15N | Survey Calculation Method: | Minimum Curvature |
| Well Error: | 0.00 usft | Output errors are at | 2.00 sigma |
| Reference Wellbore | ORIGINAL WELLBORE | Database: | EDM 5000.1 Single User Db |
| Reference Design: | PROPOSAL #1 | Offset TVD Reference: | Offset Datum |

Summary

| Site Name Offset Well - Wellbore - Design | Reference Measured Depth (usft) | Offset Measured Depth (usft) | Distance Between Centres (usft) | Distance Between Ellipses (usft) | Separation Factor | Warning |
|--|--|---------------------------------------|--|---|----------------------|---------------------|
| SE NW SEC. 6 T3N R65W 6th P.M. | | | | | | |
| EXIST VERT HSR-GARDNER 3-31A - Wellbore #1 - Des | 6,483.26 | 6,419.80 | 6,651.10 | 6,620.83 | 219.779 | CC, ES |
| EXIST VERT HSR-GARDNER 3-31A - Wellbore #1 - Des | 10,200.00 | 7,136.00 | 9,956.67 | 9,879.20 | 128.517 | SF |
| EXIST VERT HSR-GROMALA 5-7 - Wellbore #1 - Wellbo | 12,137.91 | 7,140.67 | 1,682.11 | 1,582.38 | 16.866 | CC |
| EXIST VERT HSR-GROMALA 5-7 - Wellbore #1 - Wellbo | 12,200.00 | 7,139.87 | 1,683.26 | 1,582.35 | 16.681 | ES |
| EXIST VERT HSR-GROMALA 5-7 - Wellbore #1 - Wellbo | 12,700.00 | 7,133.44 | 1,773.52 | 1,663.13 | 16.065 | SF |
| EXIST VERT HSR-HARLAND 3-7A - Wellbore #1 - Desig | 10,806.79 | 7,136.00 | 258.67 | 169.89 | 2.913 | CC, ES, SF |
| EXIST VERT HSR-MASSEY 5-31 - Wellbore #1 - Wellbo | 8,219.37 | 7,136.00 | 223.49 | 180.84 | 5.240 | CC |
| EXIST VERT HSR-JANA 11-6A - Wellbore #1 - Design #1 | 8,225.66 | 7,136.00 | 223.57 | 180.82 | 5.229 | ES, SF |
| EXIST VERT HSR-KIRKHAM 12-31A - Wellbore #1 - Des | 6,483.26 | 6,419.80 | 4,488.84 | 4,459.19 | 151.389 | CC, ES |
| EXIST VERT HSR-KIRKHAM 12-31A - Wellbore #1 - Des | 12,500.00 | 7,136.00 | 9,922.01 | 9,801.28 | 82.178 | SF |
| EXIST VERT HSR-MASSEY 5-31 - Wellbore #1 - Wellbo | 3,129.14 | 2,949.87 | 5,588.42 | 5,577.94 | 533.047 | CC |
| EXIST VERT HSR-MASSEY 5-31 - Wellbore #1 - Wellbo | 3,617.68 | 3,438.52 | 5,588.55 | 5,577.21 | 492.973 | ES |
| EXIST VERT HSR-MASSEY 5-31 - Wellbore #1 - Wellbo | 11,400.00 | 7,150.00 | 9,982.53 | 9,896.59 | 116.148 | SF |
| EXIST VERT HSR-METZ 13-31 - Wellbore #1 - Design # | 6,483.26 | 6,419.80 | 2,916.96 | 2,887.55 | 99.180 | CC, ES |
| EXIST VERT HSR-METZ 13-31 - Wellbore #1 - Design # | 14,200.00 | 7,136.00 | 9,971.64 | 9,818.57 | 65.143 | SF |
| EXIST VERT HSR-NIALL 13-7 - Wellbore #1 - Wellbore # | 14,709.87 | 7,134.04 | 1,574.90 | 1,426.12 | 10.586 | CC, ES |
| EXIST VERT HSR-NIALL 13-7 - Wellbore #1 - Wellbore # | 15,000.00 | 7,135.25 | 1,601.40 | 1,447.09 | 10.378 | SF |
| EXIST VERT HSR-NORRIS 4-7 - Wellbore #1 - Design # | 11,459.57 | 7,136.00 | 839.46 | 738.40 | 8.307 | CC, ES |
| EXIST VERT HSR-NORRIS 4-7 - Wellbore #1 - Design # | 11,600.00 | 7,136.00 | 851.13 | 747.42 | 8.207 | SF |
| EXIST VERT HSR-REWANK 4-7A - Wellbore #1 - Desig | 10,811.56 | 7,136.00 | 1,567.92 | 1,479.04 | 17.642 | CC, ES |
| EXIST VERT HSR-REWANK 4-7A - Wellbore #1 - Desig | 11,300.00 | 7,136.00 | 1,642.23 | 1,544.18 | 16.749 | SF |
| EXIST VERT HSR-ROEDER 14-7A - Wellbore #1 - Desig | 14,636.30 | 7,136.00 | 442.87 | 281.47 | 2.744 | CC, ES, SF |
| EXIST VERT HSR-SELLS 13-31 - Wellbore #1 - Design | 6,483.26 | 6,419.80 | 3,225.21 | 3,195.49 | 108.529 | CC, ES |
| EXIST VERT HSR-SELLS 13-31 - Wellbore #1 - Design | 13,700.00 | 7,136.00 | 9,904.15 | 9,760.60 | 68.995 | SF |
| EXIST VERT HSR-SIAMAS 6-31 - Wellbore #1 - Design | 6,483.26 | 6,419.80 | 5,350.52 | 5,320.26 | 176.818 | CC, ES |
| EXIST VERT HSR-SIAMAS 6-31 - Wellbore #1 - Design | 11,500.00 | 7,136.00 | 9,955.80 | 9,853.99 | 97.779 | SF |
| EXIST VERT HSR-TUDOR 11-31A - Wellbore #1 - Desig | 6,483.26 | 6,419.80 | 4,049.41 | 4,019.19 | 133.966 | CC, ES |
| EXIST VERT HSR-TUDOR 11-31A - Wellbore #1 - Desig | 12,800.00 | 7,136.00 | 9,952.83 | 9,826.40 | 78.720 | SF |
| EXIST VERT HSR-UPSON 14-6 - Wellbore #1 - Design # | 9,338.31 | 7,136.00 | 166.36 | 104.67 | 2.697 | CC, ES, SF |
| EXIST VERT KNAUB 1-6 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 2,079.03 | 2,050.24 | 72.210 | CC, ES |
| EXIST VERT KNAUB 1-6 - Wellbore #1 - Design #1 | 15,264.73 | 7,136.00 | 9,902.72 | 9,729.34 | 57.114 | SF |
| EXIST VERT KNAUB 2-6 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 1,426.16 | 1,396.02 | 47.311 | CC, ES |
| EXIST VERT KNAUB 2-6 - Wellbore #1 - Design #1 | 6,550.00 | 6,486.45 | 1,429.25 | 1,398.99 | 47.225 | SF |
| EXIST VERT LUDWIG 3-6 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 1,487.79 | 1,459.18 | 52.004 | CC |
| EXIST VERT LUDWIG 3-6 - Wellbore #1 - Design #1 | 6,550.00 | 6,486.45 | 1,487.98 | 1,459.12 | 51.561 | ES |
| EXIST VERT LUDWIG 3-6 - Wellbore #1 - Design #1 | 9,500.00 | 7,136.00 | 3,099.08 | 3,034.47 | 47.962 | SF |
| EXIST VERT LUDWIG H 6-19 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 1,159.32 | 1,130.77 | 40.604 | CC, ES |
| EXIST VERT LUDWIG H 6-19 - Wellbore #1 - Design #1 | 6,600.00 | 6,536.03 | 1,164.33 | 1,135.47 | 40.337 | SF |
| EXIST VERT LUDWIG H 6-6X - Wellbore #1 - Design #1 | 6,862.14 | 6,781.26 | 37.36 | 7.45 | 1.249 | Level 2, CC, ES, SF |
| EXIST VERT OBERKFELL 6-7A - Wellbore #1 - Design # | 11,914.89 | 7,136.00 | 424.91 | 315.25 | 3.875 | CC, ES, SF |
| EXIST VERT PRINVALE 12-7A - Wellbore #1 - Design # | 13,306.03 | 7,136.00 | 1,288.09 | 1,152.04 | 9.468 | CC, ES |
| EXIST VERT PRINVALE 12-7A - Wellbore #1 - Design # | 13,500.00 | 7,136.00 | 1,302.61 | 1,162.87 | 9.322 | SF |
| EXIST VERT RURAL 18-31 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 6,005.19 | 5,975.09 | 199.537 | CC, ES |
| EXIST VERT RURAL 18-31 - Wellbore #1 - Design #1 | 10,900.00 | 7,136.00 | 9,991.56 | 9,901.03 | 110.363 | SF |
| EXIST VERT RURAL 22-31 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 4,685.35 | 4,655.34 | 156.129 | CC, ES |
| EXIST VERT RURAL 22-31 - Wellbore #1 - Design #1 | 12,200.00 | 7,136.00 | 9,949.94 | 9,834.89 | 86.482 | SF |
| EXIST VERT RURAL 23-31 - Wellbore #1 - Design #1 | 6,483.26 | 6,419.80 | 3,414.21 | 3,383.82 | 112.335 | CC, ES |
| EXIST VERT RURAL 23-31 - Wellbore #1 - Design #1 | 13,400.00 | 7,136.00 | 9,907.22 | 9,769.38 | 71.876 | SF |
| EXIST VERT UPRR 21 PAN AM/N#1 - Wellbore #1 - De | 4,732.60 | 4,669.14 | 7,036.00 | 7,013.31 | 310.144 | CC, ES |
| EXIST VERT UPRR 21 PAN AM/N#1 - Wellbore #1 - De | 9,500.00 | 4,686.00 | 9,912.81 | 9,874.10 | 256.072 | SF |
| EXIST VERT WARDELL 13-6 - Wellbore #1 - Design #1 | 8,881.92 | 7,136.00 | 885.42 | 831.82 | 16.519 | CC |
| EXIST VERT WARDELL 13-6 - Wellbore #1 - Design #1 | 8,900.00 | 7,136.00 | 885.61 | 831.69 | 16.427 | ES |
| EXIST VERT WARDELL 13-6 - Wellbore #1 - Design #1 | 9,100.00 | 7,136.00 | 911.88 | 854.45 | 15.877 | SF |

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

Anticollision Report



| | | | |
|---------------------------|--------------------------------|-------------------------------------|---|
| Company: | PDC ENERGY | Local Co-ordinate Reference: | Well VEGA 15N |
| Project: | WELD COUNTY, COLORADO | TVD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Reference Site: | SE NW SEC. 6 T3N R65W 6th P.M. | MD Reference: | WELL @ 4998.00usft (Original Well Elev) |
| Site Error: | 0.00 usft | North Reference: | True |
| Reference Well: | VEGA 15N | Survey Calculation Method: | Minimum Curvature |
| Well Error: | 0.00 usft | Output errors are at | 2.00 sigma |
| Reference Wellbore | ORIGINAL WELLBORE | Database: | EDM 5000.1 Single User Db |
| Reference Design: | PROPOSAL #1 | Offset TVD Reference: | Offset Datum |

Summary

| Site Name | Reference Measured Depth (usft) | Offset Measured Depth (usft) | Distance Between Centres (usft) | Distance Between Ellipses (usft) | Separation Factor | Warning |
|--|---------------------------------|------------------------------|---------------------------------|----------------------------------|-------------------|---------------------|
| Offset Well - Wellbore - Design | | | | | | |
| SE NW SEC. 6 T3N R65W 6th P.M. | | | | | | |
| EXIST VERT WARDELL 22-7 - Wellbore #1 - Wellbore # | 12,735.64 | 7,164.21 | 954.90 | 843.84 | 8.598 | CC, ES |
| EXIST VERT WARDELL 22-7 - Wellbore #1 - Wellbore # | 12,900.00 | 7,156.68 | 968.91 | 854.71 | 8.484 | SF |
| EXIST VERT WARDELL 3-7-5Z - Wellbore #1 - Wellbore | 14,124.05 | 7,136.95 | 1,038.36 | 900.33 | 7.523 | CC, ES |
| EXIST VERT WARDELL 3-7-5Z - Wellbore #1 - Wellbore | 14,300.00 | 7,133.69 | 1,053.16 | 911.78 | 7.449 | SF |
| VEGA 10N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 74.97 | 73.45 | 49.271 | CC, ES |
| VEGA 10N - ORIGINAL WELLBORE - PROPOSAL #1 | 15,264.73 | 15,765.26 | 1,737.78 | 1,424.73 | 5.551 | SF |
| VEGA 11N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 60.00 | 58.48 | 39.431 | CC, ES |
| VEGA 11N - ORIGINAL WELLBORE - PROPOSAL #1 | 2,300.00 | 2,311.66 | 141.15 | 124.45 | 8.456 | SF |
| VEGA 12N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 44.96 | 43.43 | 29.543 | CC, ES |
| VEGA 12N - ORIGINAL WELLBORE - PROPOSAL #1 | 15,264.73 | 15,481.10 | 940.67 | 628.47 | 3.013 | SF |
| VEGA 14N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 15.01 | 13.49 | 9.864 | CC, ES |
| VEGA 14N - ORIGINAL WELLBORE - PROPOSAL #1 | 15,264.73 | 15,393.84 | 346.22 | 45.01 | 1.149 | Level 2, SF |
| VEGA 16N - ORIGINAL WELLBORE - PROPOSAL #1 | 300.00 | 300.00 | 15.01 | 13.94 | 14.000 | CC, ES |
| VEGA 16N - ORIGINAL WELLBORE - PROPOSAL #1 | 15,264.73 | 15,342.56 | 336.73 | 34.66 | 1.115 | Level 2, SF |
| VEGA 1N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 104.96 | 103.43 | 68.975 | CC, ES |
| VEGA 1N - ORIGINAL WELLBORE - PROPOSAL #1 | 2,200.00 | 2,163.74 | 329.54 | 314.22 | 21.506 | SF |
| VEGA 2N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 120.00 | 118.48 | 78.862 | CC, ES |
| VEGA 2N - ORIGINAL WELLBORE - PROPOSAL #1 | 2,200.00 | 2,147.84 | 365.10 | 350.41 | 24.848 | SF |
| VEGA 3N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 134.94 | 133.42 | 88.678 | CC, ES |
| VEGA 3N - ORIGINAL WELLBORE - PROPOSAL #1 | 2,497.39 | 2,424.51 | 474.82 | 457.08 | 26.762 | SF |
| VEGA 4N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 149.95 | 148.43 | 98.542 | CC, ES |
| VEGA 4N - ORIGINAL WELLBORE - PROPOSAL #1 | 8,500.00 | 7,200.00 | 1,263.95 | 1,208.51 | 22.800 | SF |
| VEGA 5N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 164.99 | 163.47 | 108.430 | CC, ES |
| VEGA 5N - ORIGINAL WELLBORE - PROPOSAL #1 | 7,800.00 | 7,379.06 | 671.94 | 630.81 | 16.338 | SF |
| VEGA 6N - ORIGINAL PROPOSAL - PROPOSAL #1 | 400.00 | 400.00 | 179.97 | 178.44 | 118.269 | CC, ES |
| VEGA 6N - ORIGINAL PROPOSAL - PROPOSAL #1 | 7,800.00 | 7,352.72 | 316.67 | 275.96 | 7.778 | SF |
| VEGA 7N - ORIGINAL WELLBORE - PROPOSAL #1 | 7,576.96 | 7,477.95 | 48.90 | 11.63 | 1.312 | Level 3, CC, ES, SF |
| VEGA 8N - ORIGINAL WELLBORE - PROPOSAL #1 | 300.00 | 300.00 | 209.95 | 208.88 | 195.823 | CC, ES |
| VEGA 8N - ORIGINAL WELLBORE - PROPOSAL #1 | 7,931.94 | 7,224.39 | 362.82 | 322.59 | 9.019 | SF |
| VEGA 9N - ORIGINAL WELLBORE - PROPOSAL #1 | 400.00 | 400.00 | 89.98 | 88.46 | 59.135 | CC, ES |
| VEGA 9N - ORIGINAL WELLBORE - PROPOSAL #1 | 15,200.00 | 15,441.40 | 2,053.17 | 1,745.22 | 6.667 | SF |

| Offset Design SE NW SEC. 6 T3N R65W 6th P.M. - ABDN VERT JJ WARDELL A - Wellbore #1 - Wellbore #1 | | | | | | | | | | | | | Offset Site Error: | 0.00 usft |
|---|-----------------------|-----------------------|-----------------------|------------------|---------------|-----------------------|------------------------|--------------|------------------------|-------------------------|---------------------------|-------------------|--------------------|-----------|
| Survey Program: 100-GYD_CT | | | | | | | | | | | | | Offset Well Error: | 0.00 usft |
| Reference | | Offset | | Semi Major Axis | | | Distance | | | | | | | Warning |
| Measured Depth (usft) | Vertical Depth (usft) | Measured Depth (usft) | Vertical Depth (usft) | Reference (usft) | Offset (usft) | Highside Toolface (°) | Offset Wellbore Centre | | Between Centres (usft) | Between Ellipses (usft) | Minimum Separation (usft) | Separation Factor | | |
| | | | | | | | +N/-S (usft) | +E/-W (usft) | | | | | | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -156.09 | -2,128.61 | -943.60 | 2,328.46 | | | | | |
| 100.00 | 100.00 | 82.11 | 82.11 | 0.09 | 0.09 | -156.09 | -2,128.54 | -943.71 | 2,328.36 | 2,328.19 | 0.17 | N/A | | |
| 200.00 | 200.00 | 189.61 | 189.61 | 0.31 | 0.21 | -156.08 | -2,128.21 | -943.95 | 2,328.17 | 2,327.65 | 0.52 | 4,463.252 | | |
| 257.06 | 257.06 | 238.08 | 238.07 | 0.44 | 0.23 | -156.08 | -2,128.04 | -944.04 | 2,328.04 | 2,327.37 | 0.67 | 3,464.495 | | |
| 300.00 | 300.00 | 272.49 | 272.49 | 0.54 | 0.24 | -156.07 | -2,128.06 | -944.16 | 2,328.12 | 2,327.34 | 0.78 | 2,994.645 | | |
| 400.00 | 400.00 | 361.32 | 361.32 | 0.76 | 0.30 | -156.07 | -2,128.50 | -944.65 | 2,328.79 | 2,327.73 | 1.06 | 2,198.981 | | |
| 500.00 | 499.98 | 479.97 | 479.96 | 0.98 | 0.36 | -86.84 | -2,128.97 | -945.45 | 2,329.36 | 2,328.03 | 1.33 | 1,751.747 | | |
| 600.00 | 599.84 | 575.76 | 575.74 | 1.20 | 0.41 | -86.95 | -2,128.69 | -946.08 | 2,329.08 | 2,327.49 | 1.60 | 1,458.860 | | |
| 659.14 | 658.79 | 628.96 | 628.95 | 1.34 | 0.44 | -87.05 | -2,128.67 | -946.58 | 2,329.04 | 2,327.28 | 1.76 | 1,320.316 | | |
| 700.00 | 699.45 | 666.11 | 666.10 | 1.44 | 0.46 | -87.13 | -2,128.76 | -946.87 | 2,329.06 | 2,327.18 | 1.88 | 1,239.576 | | |
| 800.00 | 798.70 | 759.80 | 759.78 | 1.71 | 0.50 | -87.40 | -2,129.32 | -947.38 | 2,329.24 | 2,327.04 | 2.19 | 1,061.555 | | |
| 900.00 | 897.47 | 861.09 | 861.07 | 2.03 | 0.55 | -87.79 | -2,130.16 | -947.62 | 2,329.44 | 2,326.89 | 2.55 | 912.559 | | |
| 999.87 | 995.49 | 963.67 | 963.65 | 2.39 | 0.59 | -88.28 | -2,130.93 | -947.45 | 2,329.42 | 2,326.46 | 2.96 | 786.776 | | |

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