# Vanguard Natural Resources

**Garfield County, CO**
**MPD 25**
**CSF 41C-4-791**
**Wellbore #1**

**Design: Actual**

# End of Well Report

**07 February, 2018**

| | | | |
|---|---|---|---|
| **Company:** | Vanguard Natural Resources | **Local Co-ordinate Reference:** | Well CSF 41C-4-791 |
| **Project:** | Garfield County, CO | **TVD Reference:** | CSF 41C-4-791 @ 6557.4usft (Capstar 321) |
| **Site:** | MPD 25 | **MD Reference:** | CSF 41C-4-791 @ 6557.4usft (Capstar 321) |
| **Well:** | CSF 41C-4-791 | **North Reference:** | Grid |
| **Wellbore:** | Wellbore #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | Actual | **Database:** | EDM 5000.1 Single User Db |

**Project** Garfield County, CO

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

**Site** MPD 25

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,606,032.98 usft | **Latitude:** | 39° 28' 45.253 N |
| **From:** | Lat/Long | **Easting:** | 2,418,598.16 usft | **Longitude:** | 107° 33' 35.748 W |
| **Position Uncertainty:** | 0.0 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | -1.30 ° |

**Well** CSF 41C-4-791

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|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 usft | **Northing:** | 1,606,057.00 usft | **Latitude:** | 39° 28' 45.489 N |
| | **+E/-W** | 0.0 usft | **Easting:** | 2,418,593.10 usft | **Longitude:** | 107° 33' 35.819 W |
| **Position Uncertainty** | | 0.0 usft | **Wellhead Elevation:** | 6,557.4 usft | **Ground Level:** | 6,540.4 usft |

**Wellbore** Wellbore #1

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2015 | 2/7/2018 | 9.43 | 65.64 | 51,499 |

**Design** Actual

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | 1.0 | **Phase:** | ACTUAL | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 117.95 |

**Survey Program** **Date** 2/7/2018

| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 136.4 | 8,350.0 | Surface (Wellbore #1) | MWD | MWD v3:standard declination |

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| **Well:** | CSF 41C-4-791 | **North Reference:** | Grid |
| **Wellbore:** | Wellbore #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | Actual | **Database:** | EDM 5000.1 Single User Db |

**Survey**

| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | DLeg (°/100usft) | Build (°/100usft) | Turn (°/100usft) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 136.4 | 0.48 | 7.64 | 136.4 | -0.2 | 0.6 | 0.1 | 0.35 | 0.35 | 0.00 |
| 166.4 | 0.44 | 55.17 | 166.4 | -0.2 | 0.8 | 0.2 | 1.24 | -0.13 | 158.43 |
| 196.4 | 0.62 | 76.15 | 196.4 | 0.0 | 0.9 | 0.4 | 0.87 | 0.60 | 69.93 |
| 226.4 | 1.41 | 90.43 | 226.4 | 0.4 | 0.9 | 1.0 | 2.74 | 2.63 | 47.60 |
| 256.4 | 2.15 | 103.66 | 256.4 | 1.3 | 0.8 | 1.9 | 2.81 | 2.47 | 44.10 |
| 287.4 | 3.08 | 105.29 | 287.3 | 2.7 | 0.4 | 3.3 | 3.01 | 3.00 | 5.26 |
| 317.4 | 4.48 | 108.58 | 317.3 | 4.6 | -0.2 | 5.1 | 4.72 | 4.67 | 10.97 |
| 347.4 | 5.89 | 111.22 | 347.2 | 7.3 | -1.1 | 7.7 | 4.77 | 4.70 | 8.80 |
| 378.4 | 7.43 | 113.90 | 377.9 | 10.9 | -2.5 | 11.0 | 5.07 | 4.97 | 8.65 |
| 408.4 | 8.75 | 114.56 | 407.6 | 15.1 | -4.2 | 14.8 | 4.41 | 4.40 | 2.20 |
| 438.4 | 9.98 | 117.33 | 437.2 | 20.0 | -6.4 | 19.2 | 4.37 | 4.10 | 9.23 |
| 469.4 | 11.25 | 118.34 | 467.7 | 25.7 | -9.0 | 24.3 | 4.14 | 4.10 | 3.26 |
| 498.4 | 12.24 | 118.77 | 496.1 | 31.6 | -11.9 | 29.5 | 3.43 | 3.41 | 1.48 |
| 528.4 | 12.88 | 118.03 | 525.4 | 38.1 | -15.0 | 35.2 | 2.20 | 2.13 | -2.47 |
| 558.4 | 13.80 | 118.36 | 554.6 | 45.0 | -18.2 | 41.3 | 3.08 | 3.07 | 1.10 |
| 588.4 | 14.68 | 118.03 | 583.7 | 52.4 | -21.7 | 47.8 | 2.95 | 2.93 | -1.10 |
| 618.4 | 15.73 | 118.47 | 612.6 | 60.3 | -25.5 | 54.7 | 3.52 | 3.50 | 1.47 |
| 648.4 | 16.79 | 119.83 | 641.4 | 68.7 | -29.5 | 62.1 | 3.75 | 3.53 | 4.53 |
| 678.4 | 17.97 | 119.70 | 670.0 | 77.6 | -34.0 | 69.9 | 3.94 | 3.93 | -0.43 |
| 707.4 | 18.72 | 120.24 | 697.6 | 86.8 | -38.6 | 77.8 | 2.65 | 2.59 | 1.86 |
| 737.4 | 19.91 | 120.32 | 725.9 | 96.7 | -43.6 | 86.3 | 3.97 | 3.97 | 0.27 |
| 767.4 | 21.17 | 120.02 | 754.0 | 107.2 | -48.8 | 95.4 | 4.21 | 4.20 | -1.00 |
| 798.4 | 22.28 | 119.70 | 782.8 | 118.7 | -54.6 | 105.4 | 3.60 | 3.58 | -1.03 |
| 829.4 | 23.51 | 120.05 | 811.3 | 130.7 | -60.6 | 115.8 | 3.99 | 3.97 | 1.13 |
| **Last Payzone Surface Survey** | | | | | | | | | |
| 895.0 | 25.31 | 120.23 | 871.1 | 157.8 | -74.2 | 139.3 | 2.75 | 2.74 | 0.27 |

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| **Site:** | MPD 25 | **MD Reference:** | CSF 41C-4-791 @ 6557.4usft (Capstar 321) |
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| **Wellbore:** | Wellbore #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | Actual | **Database:** | EDM 5000.1 Single User Db |

**Survey**

| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | DLeg (°/100usft) | Build (°/100usft) | Turn (°/100usft) |
|---|---|---|---|---|---|---|---|---|---|
| 937.0 | 25.18 | 119.79 | 909.0 | 175.7 | -83.1 | 154.8 | 0.54 | -0.31 | -1.05 |
| 979.0 | 26.32 | 120.40 | 946.9 | 193.9 | -92.3 | 170.6 | 2.79 | 2.71 | 1.45 |
| 1,022.0 | 27.51 | 119.17 | 985.2 | 213.4 | -102.0 | 187.5 | 3.06 | 2.77 | -2.86 |
| 1,064.0 | 29.27 | 118.43 | 1,022.2 | 233.4 | -111.6 | 205.0 | 4.27 | 4.19 | -1.76 |
| 1,106.0 | 31.25 | 118.65 | 1,058.4 | 254.5 | -121.7 | 223.6 | 4.72 | 4.71 | 0.52 |
| 1,190.0 | 33.88 | 117.90 | 1,129.2 | 299.7 | -143.1 | 263.4 | 3.17 | 3.13 | -0.89 |
| 1,274.0 | 34.32 | 118.25 | 1,198.8 | 346.8 | -165.3 | 304.9 | 0.57 | 0.52 | 0.42 |
| 1,361.0 | 33.79 | 121.37 | 1,270.9 | 395.5 | -189.5 | 347.2 | 2.10 | -0.61 | 3.59 |
| 1,445.0 | 34.32 | 119.09 | 1,340.5 | 442.5 | -213.1 | 387.8 | 1.65 | 0.63 | -2.71 |
| 1,531.0 | 33.87 | 119.30 | 1,411.7 | 490.7 | -236.6 | 429.9 | 0.54 | -0.52 | 0.24 |
| 1,618.0 | 34.15 | 117.28 | 1,483.8 | 539.3 | -259.7 | 472.8 | 1.34 | 0.32 | -2.32 |
| 1,704.0 | 34.45 | 117.50 | 1,554.8 | 587.8 | -282.0 | 515.8 | 0.38 | 0.35 | 0.26 |
| 1,788.0 | 33.62 | 115.09 | 1,624.5 | 634.8 | -302.8 | 557.9 | 1.89 | -0.99 | -2.87 |
| 1,872.0 | 33.13 | 114.38 | 1,694.6 | 680.9 | -322.2 | 599.9 | 0.75 | -0.58 | -0.85 |
| 1,957.0 | 32.12 | 115.35 | 1,766.2 | 726.7 | -341.4 | 641.5 | 1.34 | -1.19 | 1.14 |
| 2,041.0 | 32.28 | 114.48 | 1,837.3 | 771.4 | -360.3 | 682.1 | 0.58 | 0.19 | -1.04 |
| 2,125.0 | 31.98 | 117.12 | 1,908.4 | 816.0 | -379.7 | 722.3 | 1.71 | -0.36 | 3.14 |
| 2,209.0 | 31.86 | 116.80 | 1,979.7 | 860.4 | -399.9 | 761.9 | 0.25 | -0.14 | -0.38 |
| 2,294.0 | 30.63 | 118.73 | 2,052.4 | 904.5 | -420.4 | 800.9 | 1.87 | -1.45 | 2.27 |
| 2,380.0 | 30.11 | 118.60 | 2,126.6 | 948.0 | -441.2 | 839.0 | 0.61 | -0.60 | -0.15 |
| 2,466.0 | 29.31 | 117.72 | 2,201.3 | 990.6 | -461.4 | 876.6 | 1.06 | -0.93 | -1.02 |
| 2,550.0 | 30.50 | 118.03 | 2,274.1 | 1,032.5 | -480.9 | 913.6 | 1.43 | 1.42 | 0.37 |
| 2,635.0 | 31.77 | 118.03 | 2,346.8 | 1,076.4 | -501.6 | 952.4 | 1.49 | 1.49 | 0.00 |
| 2,720.0 | 31.38 | 118.34 | 2,419.3 | 1,120.9 | -522.6 | 991.7 | 0.50 | -0.46 | 0.36 |
| 2,805.0 | 33.05 | 118.60 | 2,491.2 | 1,166.3 | -544.2 | 1,031.5 | 1.97 | 1.96 | 0.31 |
| 2,889.0 | 32.65 | 118.78 | 2,561.7 | 1,211.8 | -566.1 | 1,071.5 | 0.49 | -0.48 | 0.21 |
| 2,974.0 | 33.71 | 118.69 | 2,632.9 | 1,258.3 | -588.5 | 1,112.3 | 1.25 | 1.25 | -0.11 |

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| **Wellbore:** | Wellbore #1 | **Survey Calculation Method:** | Minimum Curvature |
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**Survey**

| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | DLeg (°/100usft) | Build (°/100usft) | Turn (°/100usft) |
|---|---|---|---|---|---|---|---|---|---|
| 3,061.0 | 33.43 | 118.07 | 2,705.4 | 1,306.4 | -611.3 | 1,154.6 | 0.51 | -0.32 | -0.71 |
| 3,149.0 | 32.96 | 119.35 | 2,779.0 | 1,354.6 | -634.5 | 1,196.8 | 0.96 | -0.53 | 1.45 |
| 3,235.0 | 33.40 | 118.69 | 2,851.0 | 1,401.7 | -657.3 | 1,238.0 | 0.66 | 0.51 | -0.77 |
| 3,319.0 | 32.56 | 117.81 | 2,921.5 | 1,447.4 | -678.9 | 1,278.3 | 1.15 | -1.00 | -1.05 |
| 3,404.0 | 32.26 | 118.21 | 2,993.2 | 1,492.9 | -700.3 | 1,318.5 | 0.43 | -0.35 | 0.47 |
| 3,488.0 | 31.60 | 117.50 | 3,064.5 | 1,537.4 | -721.1 | 1,357.8 | 0.90 | -0.79 | -0.85 |
| 3,574.0 | 33.31 | 117.46 | 3,137.1 | 1,583.5 | -742.4 | 1,398.7 | 1.99 | 1.99 | -0.05 |
| 3,661.0 | 33.27 | 115.66 | 3,209.8 | 1,631.2 | -763.7 | 1,441.4 | 1.14 | -0.05 | -2.07 |
| 3,745.0 | 32.83 | 118.20 | 3,280.2 | 1,677.0 | -784.5 | 1,482.3 | 1.73 | -0.52 | 3.02 |
| 3,829.0 | 32.50 | 115.50 | 3,350.9 | 1,722.4 | -805.0 | 1,522.7 | 1.78 | -0.39 | -3.21 |
| 3,914.0 | 31.33 | 115.00 | 3,423.1 | 1,767.2 | -824.1 | 1,563.3 | 1.41 | -1.38 | -0.59 |
| 3,998.0 | 33.09 | 116.98 | 3,494.1 | 1,812.0 | -843.8 | 1,603.6 | 2.44 | 2.10 | 2.36 |
| 4,082.0 | 33.00 | 117.50 | 3,564.6 | 1,857.8 | -864.7 | 1,644.3 | 0.35 | -0.11 | 0.62 |
| 4,168.0 | 32.83 | 117.85 | 3,636.8 | 1,904.5 | -886.4 | 1,685.7 | 0.30 | -0.20 | 0.41 |
| 4,255.0 | 31.95 | 116.58 | 3,710.2 | 1,951.1 | -907.7 | 1,727.1 | 1.28 | -1.01 | -1.46 |
| 4,343.0 | 31.73 | 118.38 | 3,785.0 | 1,997.5 | -929.2 | 1,768.3 | 1.11 | -0.25 | 2.05 |
| 4,428.0 | 32.34 | 117.46 | 3,857.0 | 2,042.6 | -950.3 | 1,808.1 | 0.92 | 0.72 | -1.08 |
| 4,512.0 | 31.42 | 117.33 | 3,928.4 | 2,087.0 | -970.7 | 1,847.5 | 1.10 | -1.10 | -0.15 |
| 4,596.0 | 31.60 | 117.42 | 4,000.0 | 2,130.9 | -990.9 | 1,886.5 | 0.22 | 0.21 | 0.11 |
| 4,681.0 | 32.56 | 117.33 | 4,072.0 | 2,176.0 | -1,011.6 | 1,926.6 | 1.13 | 1.13 | -0.11 |
| 4,765.0 | 32.56 | 115.97 | 4,142.8 | 2,221.2 | -1,031.9 | 1,967.0 | 0.87 | 0.00 | -1.62 |
| 4,849.0 | 30.89 | 116.36 | 4,214.2 | 2,265.4 | -1,051.4 | 2,006.6 | 2.00 | -1.99 | 0.46 |
| 4,935.0 | 29.93 | 115.70 | 4,288.4 | 2,308.9 | -1,070.5 | 2,045.8 | 1.18 | -1.12 | -0.77 |
| 5,021.0 | 27.81 | 115.16 | 4,363.7 | 2,350.3 | -1,088.3 | 2,083.3 | 2.48 | -2.47 | -0.63 |
| 5,106.0 | 26.10 | 118.07 | 4,439.5 | 2,388.9 | -1,105.5 | 2,117.7 | 2.54 | -2.01 | 3.42 |
| 5,192.0 | 23.77 | 116.71 | 4,517.5 | 2,425.1 | -1,122.2 | 2,149.9 | 2.79 | -2.71 | -1.58 |
| 5,276.0 | 20.79 | 118.21 | 4,595.2 | 2,456.9 | -1,136.9 | 2,178.1 | 3.61 | -3.55 | 1.79 |

| | | | |
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| **Wellbore:** | Wellbore #1 | **Survey Calculation Method:** | Minimum Curvature |
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**Survey**

| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | V. Sec (usft) | N/S (usft) | E/W (usft) | DLeg (°/100usft) | Build (°/100usft) | Turn (°/100usft) |
|---|---|---|---|---|---|---|---|---|---|
| 5,362.0 | 17.31 | 118.25 | 4,676.5 | 2,485.0 | -1,150.2 | 2,202.9 | 4.05 | -4.05 | 0.05 |
| 5,446.0 | 15.12 | 120.18 | 4,757.1 | 2,508.5 | -1,161.6 | 2,223.4 | 2.68 | -2.61 | 2.30 |
| 5,530.0 | 13.54 | 120.01 | 4,838.5 | 2,529.2 | -1,172.0 | 2,241.3 | 1.88 | -1.88 | -0.20 |
| 5,614.0 | 11.07 | 123.48 | 4,920.6 | 2,547.1 | -1,181.4 | 2,256.6 | 3.07 | -2.94 | 4.13 |
| 5,701.0 | 8.70 | 128.14 | 5,006.3 | 2,561.9 | -1,190.1 | 2,268.7 | 2.87 | -2.72 | 5.36 |
| 5,786.0 | 6.42 | 125.37 | 5,090.5 | 2,572.9 | -1,196.8 | 2,277.7 | 2.72 | -2.68 | -3.26 |
| 5,870.0 | 4.61 | 126.64 | 5,174.1 | 2,580.9 | -1,201.5 | 2,284.2 | 2.16 | -2.15 | 1.51 |
| 5,946.4 | 2.29 | 97.81 | 5,250.4 | 2,585.4 | -1,203.6 | 2,288.2 | 3.70 | -3.04 | -37.73 |
| **41C-4-791 TGT** | | | | | | | | | |
| 5,957.0 | 2.07 | 89.25 | 5,261.0 | 2,585.8 | -1,203.6 | 2,288.6 | 3.70 | -2.07 | -80.79 |
| 6,041.0 | 1.39 | 68.99 | 5,344.9 | 2,587.8 | -1,203.2 | 2,291.0 | 1.08 | -0.81 | -24.12 |
| 6,125.0 | 1.10 | 79.49 | 5,428.9 | 2,589.1 | -1,202.7 | 2,292.8 | 0.44 | -0.35 | 12.50 |
| 6,209.0 | 0.88 | 106.30 | 5,512.9 | 2,590.3 | -1,202.7 | 2,294.2 | 0.60 | -0.26 | 31.92 |
| 6,296.0 | 0.57 | 151.91 | 5,599.9 | 2,591.3 | -1,203.3 | 2,295.0 | 0.72 | -0.36 | 52.43 |
| 6,382.0 | 1.14 | 193.00 | 5,685.9 | 2,591.9 | -1,204.5 | 2,295.1 | 0.93 | 0.66 | 47.78 |
| 6,469.0 | 1.57 | 196.58 | 5,772.9 | 2,592.4 | -1,206.5 | 2,294.5 | 0.50 | 0.49 | 4.11 |
| 6,555.0 | 0.92 | 149.06 | 5,858.9 | 2,593.2 | -1,208.2 | 2,294.5 | 1.36 | -0.76 | -55.26 |
| 6,641.0 | 1.05 | 103.75 | 5,944.8 | 2,594.5 | -1,209.0 | 2,295.7 | 0.89 | 0.15 | -52.69 |
| 6,725.0 | 1.14 | 76.02 | 6,028.8 | 2,595.9 | -1,209.0 | 2,297.2 | 0.63 | 0.11 | -33.01 |
| 6,810.0 | 0.94 | 65.29 | 6,113.8 | 2,597.0 | -1,208.5 | 2,298.7 | 0.33 | -0.24 | -12.62 |
| 6,894.0 | 0.26 | 137.32 | 6,197.8 | 2,597.6 | -1,208.3 | 2,299.4 | 1.07 | -0.81 | 85.75 |
| 6,978.0 | 0.22 | 149.80 | 6,281.8 | 2,597.9 | -1,208.6 | 2,299.6 | 0.08 | -0.05 | 14.86 |
| 7,062.0 | 0.70 | 29.94 | 6,365.8 | 2,598.0 | -1,208.3 | 2,300.0 | 0.99 | 0.57 | -142.69 |
| 7,146.0 | 1.27 | 23.15 | 6,449.8 | 2,598.0 | -1,207.0 | 2,300.6 | 0.69 | 0.68 | -8.08 |
| 7,231.0 | 1.14 | 51.98 | 6,534.8 | 2,598.2 | -1,205.6 | 2,301.6 | 0.72 | -0.15 | 33.92 |
| 7,315.0 | 0.40 | 57.25 | 6,618.8 | 2,598.7 | -1,204.9 | 2,302.5 | 0.88 | -0.88 | 6.27 |
| 7,399.0 | 0.31 | 84.19 | 6,702.8 | 2,599.1 | -1,204.8 | 2,303.0 | 0.22 | -0.11 | 32.07 |

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**Survey**

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|---|---|---|---|---|---|---|---|---|---|
| 7,484.0 | 0.79 | 206.71 | 6,787.8 | 2,599.3 | -1,205.3 | 2,303.0 | 1.17 | 0.56 | 144.14 |
| 7,568.0 | 1.71 | 216.56 | 6,871.7 | 2,599.1 | -1,206.8 | 2,302.0 | 1.12 | 1.10 | 11.73 |
| 7,654.0 | 1.01 | 179.77 | 6,957.7 | 2,599.2 | -1,208.6 | 2,301.2 | 1.26 | -0.81 | -42.78 |
| 7,740.0 | 1.05 | 53.61 | 7,043.7 | 2,599.9 | -1,208.9 | 2,301.8 | 2.14 | 0.05 | -146.70 |
| 7,825.0 | 0.62 | 98.56 | 7,128.7 | 2,600.7 | -1,208.5 | 2,302.9 | 0.88 | -0.51 | 52.88 |
| 7,909.0 | 1.01 | 153.67 | 7,212.7 | 2,601.7 | -1,209.2 | 2,303.7 | 0.99 | 0.46 | 65.61 |
| 8,034.0 | 2.43 | 179.69 | 7,337.6 | 2,603.9 | -1,212.8 | 2,304.2 | 1.27 | 1.14 | 20.82 |
| 8,079.0 | 2.15 | 182.15 | 7,382.6 | 2,604.7 | -1,214.6 | 2,304.2 | 0.66 | -0.62 | 5.47 |
| 8,165.0 | 2.73 | 195.01 | 7,468.5 | 2,605.9 | -1,218.2 | 2,303.6 | 0.92 | 0.67 | 14.95 |
| 8,207.0 | 2.90 | 195.20 | 7,510.5 | 2,606.3 | -1,220.2 | 2,303.1 | 0.41 | 0.40 | 0.45 |
| 8,295.0 | 2.94 | 195.42 | 7,598.4 | 2,607.3 | -1,224.5 | 2,301.9 | 0.05 | 0.05 | 0.25 |
| **Last PZD Survey** | | | | | | | | | |
| 8,350.0 | 2.94 | 195.42 | 7,653.3 | 2,607.9 | -1,227.3 | 2,301.1 | 0.00 | 0.00 | 0.00 |
| **Straightline Projection to TD** | | | | | | | | | |

**Design Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 829.4 | 811.3 | -60.6 | 115.8 | Last Payzone Surface Survey |
| 8,295.0 | 7,598.4 | -1,224.5 | 2,301.9 | Last PZD Survey |
| 8,350.0 | 7,653.3 | -1,227.3 | 2,301.1 | Straightline Projection to TD |

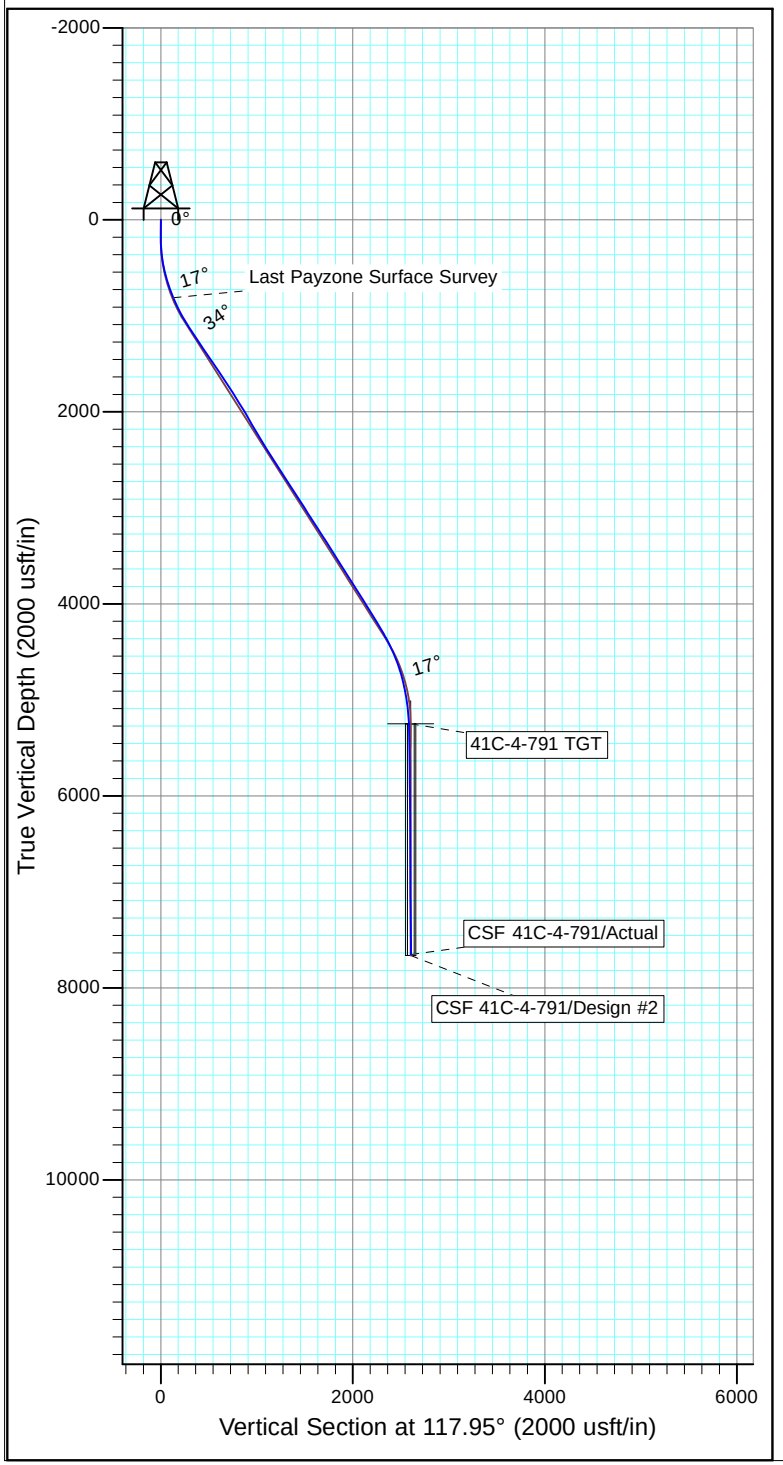
Checked By: _____ Approved By: _____ Date: _____

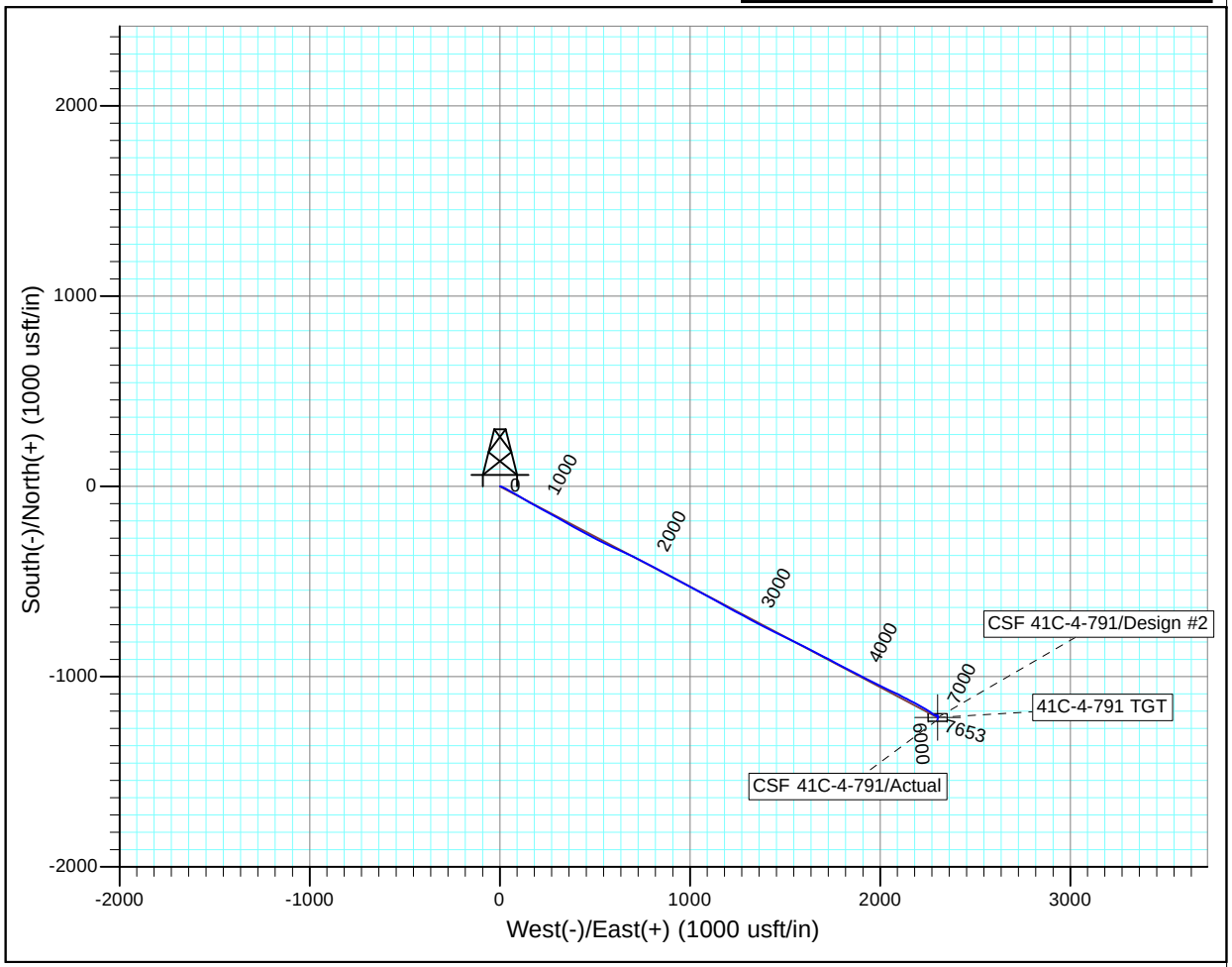
VANGUARD NATURAL RESOURCES, INC.

Project: Garfield County, CO
Site: MPD 25
Well: CSF 41C-4-791
Wellbore: Wellbore #1
Design: Actual

Azimuths to Grid North
True North: 1.30°
Magnetic North: 10.73°

Magnetic Field
Strength: 51498.6snT
Dip Angle: 65.64°
Date: 2/7/2018
Model: IGRF2015




PAYZONE DIRECTIONAL

Design: Actual (CSF 41C-4-791/Wellbore #1)

Created By: Derek Stephens Date: 13:02, February 07 2018

THIS SURVEY IS CORRECT TO THE BEST OF MY KNOWLEDGE AND IS SUPPORTED BY ACTUAL FIELD DATA