# Noble Energy

**Garfield County, CO (NAD 83)**
**Sec. 35-T7S-R95W (Battlement Mesa 35L PAD)**
**BM 34-43C (ABANDONED) - B9**

**Plan A**

**Design: Gyro and Sperry MWD Survey**

Sperry Drilling Services

# Final Survey Report

**15 March, 2011**

Well Coordinates: 1,577,305.50 N, 2,301,444.10 E (39° 23' 32.53" N, 107° 58' 19.40" W)
Ground Level: 9,211.00 ft

| | |
|---|---|
| Local Coordinate Origin: | Centered on Well BM 34-43C (ABANDONED) - Slot B |
| Viewing Datum: | RKB 24' @ 9235.00ft (H&P 322) |
| TVDs to System: | N |
| North Reference: | Grid |
| Unit System: | API - US Survey Feet - Custom |

Geodetic Scale Factor Applied
Version: 2003.16 Build: 43I

HALLIBURTON

## Design Report for BM 34-43C (ABANDONED) - Gyro and Sperry MWD Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 187.00 | 1.68 | 241.59 | 186.97 | -1.30 | -2.41 | 2.63 | 0.90 |
| **Surveys from 187.00ft to 524.00ft are Gyro Surveys** | | | | | | | |
| 249.00 | 3.05 | 267.97 | 248.92 | -1.80 | -4.86 | 5.12 | 2.77 |
| 341.00 | 5.47 | 262.66 | 340.66 | -2.44 | -11.66 | 11.91 | 2.66 |
| 432.00 | 7.50 | 277.45 | 431.08 | -2.23 | -21.85 | 21.85 | 2.87 |
| 524.00 | 8.97 | 264.99 | 522.14 | -2.07 | -34.95 | 34.64 | 2.50 |
| **Tie-On to Gyro Survey** | | | | | | | |
| 607.00 | 11.15 | 251.34 | 603.87 | -5.21 | -49.00 | 49.04 | 3.88 |
| **First Sperry MWD Survey** | | | | | | | |
| 698.00 | 13.16 | 251.97 | 692.82 | -11.23 | -67.19 | 68.07 | 2.21 |
| 790.00 | 14.97 | 248.88 | 782.06 | -18.75 | -88.23 | 90.20 | 2.13 |
| 881.00 | 16.67 | 252.66 | 869.61 | -26.88 | -111.66 | 114.79 | 2.18 |
| 973.00 | 17.30 | 257.86 | 957.60 | -33.69 | -137.63 | 141.60 | 1.79 |
| 1,067.00 | 18.47 | 261.61 | 1,047.06 | -38.80 | -166.03 | 170.44 | 1.75 |
| 1,161.00 | 18.47 | 263.49 | 1,136.22 | -42.66 | -195.55 | 200.14 | 0.63 |
| 1,256.00 | 19.64 | 263.85 | 1,226.02 | -46.08 | -226.38 | 231.02 | 1.24 |
| 1,350.00 | 19.21 | 263.15 | 1,314.66 | -49.62 | -257.44 | 262.15 | 0.52 |
| 1,444.00 | 18.57 | 261.68 | 1,403.60 | -53.63 | -287.60 | 292.50 | 0.85 |
| 1,538.00 | 18.37 | 259.84 | 1,492.76 | -58.40 | -316.99 | 322.25 | 0.66 |
| 1,633.00 | 19.02 | 260.60 | 1,582.75 | -63.57 | -347.00 | 352.69 | 0.73 |
| 1,727.00 | 18.70 | 258.08 | 1,671.70 | -69.19 | -376.86 | 383.06 | 0.93 |
| 1,822.00 | 18.16 | 257.15 | 1,761.83 | -75.63 | -406.19 | 413.09 | 0.65 |
| 1,916.00 | 19.12 | 258.79 | 1,850.90 | -81.88 | -435.57 | 443.13 | 1.16 |
| 2,010.00 | 18.07 | 260.59 | 1,939.99 | -87.25 | -465.06 | 473.09 | 1.27 |
| 2,105.00 | 18.13 | 258.37 | 2,030.29 | -92.64 | -494.07 | 502.60 | 0.73 |
| 2,199.00 | 18.37 | 258.21 | 2,119.56 | -98.62 | -522.90 | 532.04 | 0.26 |
| 2,293.00 | 19.41 | 260.70 | 2,208.50 | -104.17 | -552.81 | 562.45 | 1.40 |
| 2,388.00 | 19.63 | 262.18 | 2,298.04 | -108.89 | -584.20 | 594.15 | 0.57 |
| 2,482.00 | 19.18 | 259.61 | 2,386.70 | -113.82 | -615.03 | 625.34 | 1.03 |
| 2,577.00 | 19.95 | 261.37 | 2,476.22 | -119.07 | -646.40 | 657.13 | 1.02 |
| 2,671.00 | 19.25 | 260.84 | 2,564.77 | -123.94 | -677.56 | 688.62 | 0.77 |
| 2,765.00 | 18.79 | 260.64 | 2,653.64 | -128.87 | -707.79 | 719.23 | 0.49 |
| 2,860.00 | 18.36 | 258.59 | 2,743.69 | -134.32 | -737.55 | 749.48 | 0.82 |
| 2,954.00 | 18.10 | 259.20 | 2,832.97 | -139.98 | -766.41 | 778.88 | 0.34 |
| 3,048.00 | 17.67 | 261.62 | 2,922.43 | -144.80 | -794.87 | 807.73 | 0.91 |
| 3,143.00 | 17.47 | 262.20 | 3,013.00 | -148.84 | -823.26 | 836.35 | 0.28 |
| 3,237.00 | 16.92 | 262.03 | 3,102.80 | -152.65 | -850.79 | 864.08 | 0.59 |
| 3,270.00 | 16.90 | 262.02 | 3,134.37 | -153.98 | -860.29 | 873.65 | 0.06 |
| **Final Sperry MWD Survey** | | | | | | | |
| 3,332.00 | 16.90 | 262.02 | 3,193.69 | -156.48 | -878.14 | 891.64 | 0.00 |
| **Estimated BHL: 1906' FSL, 303' FEL - Survey Projection to TD of Sperry Directional Work** | | | | | | | |

# Design Report for BM 34-43C (ABANDONED) - Gyro and Sperry MWD Survey

## *Design Annotations*

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 187.00 | 186.97 | -1.30 | -2.41 | Surveys from 187.00ft to 524.00ft are Gyro Surveys |
| 524.00 | 522.14 | -2.07 | -34.95 | Tie-On to Gyro Survey |
| 607.00 | 603.87 | -5.21 | -49.00 | First Sperry MWD Survey |
| 3,270.00 | 3,134.37 | -153.98 | -860.29 | Final Sperry MWD Survey |
| 3,332.00 | 3,193.69 | -156.48 | -878.14 | Estimated BHL: 1906' FSL, 303' FEL |
| 3,332.00 | 3,193.69 | -156.48 | -878.14 | Survey Projection to TD of Sperry Directional Work |

## *Vertical Section Information*

| Angle Type | Target | Azimuth (°) | Origin Type | Origin +N/_S (ft) | Origin +E/-W (ft) | Start TVD (ft) |
|---|---|---|---|---|---|---|
| User | No Target (Freehand) | 258.33 | Slot | 0.00 | 0.00 | 0.00 |

## *Survey tool program*

| From (ft) | To (ft) | Survey/Plan | Survey Tool |
|---|---|---|---|
| 187.00 | 524.00 | Gyro Surveys | NS-GYRO-MS |
| 607.00 | 3,332.00 | Sperry MWD Surveys | MWD |

# North Reference Sheet for Sec. 35-T7S-R95W (Battlement Mesa 35L PAD) - BM 34-43C (ABANDONED) - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 24' @ 9235.00ft (H&P 322). Northing and Easting are relative to BM 34-43C (ABANDONED) - Slot B9

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99994880

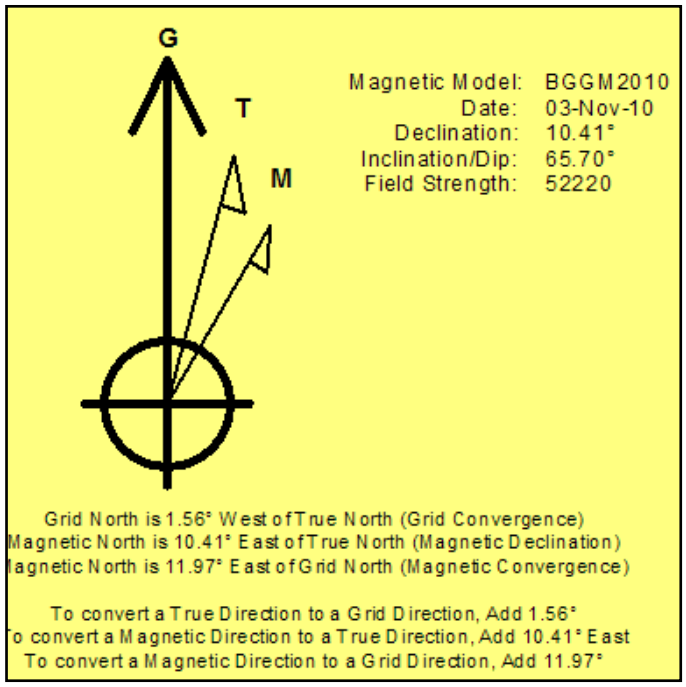
Grid Coordinates of Well: 1,577,305.50 ft N, 2,301,444.10 ft E

Geographical Coordinates of Well: 39° 23' 32.53" N, 107° 58' 19.40" W

Grid Convergence at Surface is: -1.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 3,332.00ft
the Bottom Hole Displacement is 891.97ft in the Direction of 259.90° (Grid).

Magnetic Convergence at surface is: -11.97° ( 3 November 2010, , BGGM2010)



# Noble Energy

**Garfield County, CO (NAD 83)**
**Sec. 35-T7S-R95W (Battlement Mesa 35L PAD)**
**BM 34-43C - A6**

**Plan A**

**Design: Vaughn Gyro and Sperry MWD Survey**

Sperry Drilling Services

# Final Survey Report

**15 March, 2011**

Well Coordinates: 1,577,317.20 N, 2,301,464.80 E (39° 23' 32.65" N, 107° 58' 19.14" W)
Ground Level: 9,211.00 ft

| | |
|---|---|
| Local Coordinate Origin: | Centered on Well BM 34-43C - Slot A6 |
| Viewing Datum: | RKB 24' @ 9235.00ft |
| TVDs to System: | N |
| North Reference: | Grid |
| Unit System: | API - US Survey Feet - Custom |

Geodetic Scale Factor Applied
Version: 2003.16 Build: 43I

HALLIBURTON

## Design Report for BM 34-43C - Vaughn Gyro and Sperry MWD Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 191.00 | 0.49 | 202.78 | 191.00 | -0.75 | -0.32 | 0.47 | 0.26 |
| **Surveys from 191.00ft to 557.00ft are Vaughn Gyro Surveys** | | | | | | | |
| 282.00 | 2.58 | 266.12 | 281.96 | -1.25 | -2.51 | 2.72 | 2.64 |
| 312.00 | 2.96 | 292.76 | 311.93 | -1.00 | -3.90 | 4.02 | 4.43 |
| 374.00 | 3.12 | 287.76 | 373.84 | 0.14 | -6.98 | 6.80 | 0.50 |
| 435.00 | 2.73 | 253.45 | 434.77 | 0.23 | -9.96 | 9.69 | 2.89 |
| 465.00 | 2.63 | 249.01 | 464.73 | -0.22 | -11.28 | 11.08 | 0.77 |
| 557.00 | 3.84 | 277.97 | 556.59 | -0.55 | -16.30 | 16.06 | 2.17 |
| **Tie-On to Vaughn Gyro Survey** | | | | | | | |
| 610.00 | 4.98 | 249.43 | 609.44 | -1.11 | -20.22 | 20.01 | 4.60 |
| **First Sperry MWD Survey** | | | | | | | |
| 702.00 | 6.59 | 246.71 | 700.97 | -4.60 | -28.80 | 29.13 | 1.77 |
| 793.00 | 7.27 | 241.70 | 791.30 | -9.40 | -38.67 | 39.78 | 1.00 |
| 885.00 | 8.22 | 246.47 | 882.47 | -14.78 | -49.83 | 51.81 | 1.25 |
| 976.00 | 8.53 | 253.69 | 972.50 | -19.27 | -62.27 | 64.91 | 1.20 |
| 1,070.00 | 9.49 | 255.05 | 1,065.34 | -23.23 | -76.45 | 79.60 | 1.05 |
| 1,165.00 | 11.11 | 263.49 | 1,158.81 | -26.29 | -93.11 | 96.54 | 2.33 |
| 1,259.00 | 12.38 | 262.39 | 1,250.84 | -28.65 | -112.10 | 115.60 | 1.37 |
| 1,353.00 | 13.95 | 261.28 | 1,342.36 | -31.70 | -133.28 | 136.96 | 1.69 |
| 1,447.00 | 15.61 | 262.51 | 1,433.25 | -35.07 | -157.03 | 160.88 | 1.80 |
| 1,542.00 | 17.22 | 262.59 | 1,524.38 | -38.55 | -183.64 | 187.65 | 1.69 |
| 1,636.00 | 18.21 | 263.51 | 1,613.92 | -42.00 | -212.04 | 216.14 | 1.09 |
| 1,731.00 | 19.56 | 264.76 | 1,703.80 | -45.14 | -242.62 | 246.71 | 1.48 |
| 1,825.00 | 19.44 | 263.31 | 1,792.41 | -48.39 | -273.83 | 277.91 | 0.53 |
| 1,919.00 | 19.94 | 260.93 | 1,880.92 | -52.74 | -305.19 | 309.49 | 1.01 |
| 2,013.00 | 18.79 | 258.75 | 1,969.60 | -58.22 | -335.87 | 340.64 | 1.44 |
| 2,108.00 | 18.96 | 260.03 | 2,059.49 | -63.88 | -366.08 | 371.36 | 0.47 |
| 2,202.00 | 20.06 | 260.62 | 2,148.09 | -69.15 | -397.02 | 402.73 | 1.19 |
| 2,297.00 | 20.13 | 260.22 | 2,237.31 | -74.58 | -429.21 | 435.34 | 0.16 |
| 2,391.00 | 21.25 | 259.85 | 2,325.24 | -80.33 | -461.92 | 468.53 | 1.20 |
| 2,485.00 | 22.00 | 260.92 | 2,412.63 | -86.11 | -496.07 | 503.14 | 0.90 |
| 2,580.00 | 21.49 | 262.55 | 2,500.87 | -91.18 | -530.90 | 538.26 | 0.83 |
| 2,674.00 | 21.09 | 262.81 | 2,588.45 | -95.53 | -564.75 | 572.28 | 0.44 |
| 2,769.00 | 20.91 | 262.93 | 2,677.14 | -99.75 | -598.53 | 606.20 | 0.19 |
| 2,863.00 | 20.68 | 262.53 | 2,765.02 | -103.98 | -631.63 | 639.46 | 0.29 |
| 2,957.00 | 20.58 | 262.68 | 2,852.99 | -108.24 | -664.48 | 672.47 | 0.12 |
| 3,052.00 | 20.66 | 262.67 | 2,941.91 | -112.51 | -697.66 | 705.82 | 0.08 |
| 3,146.00 | 20.68 | 263.20 | 3,029.86 | -116.59 | -730.59 | 738.88 | 0.20 |
| 3,240.00 | 20.39 | 263.67 | 3,117.88 | -120.36 | -763.35 | 771.70 | 0.35 |
| 3,383.00 | 18.53 | 264.57 | 3,252.71 | -125.25 | -810.73 | 819.07 | 1.32 |
| 3,477.00 | 18.61 | 260.83 | 3,341.82 | -129.06 | -840.41 | 848.89 | 1.27 |
| 3,571.00 | 18.20 | 257.43 | 3,431.01 | -134.64 | -869.54 | 878.55 | 1.22 |
| 3,666.00 | 18.23 | 257.32 | 3,521.25 | -141.13 | -898.52 | 908.25 | 0.05 |
| 3,760.00 | 17.89 | 256.06 | 3,610.62 | -147.84 | -926.88 | 937.38 | 0.55 |
| 3,854.00 | 17.31 | 256.74 | 3,700.22 | -154.53 | -954.50 | 965.79 | 0.65 |
| 3,949.00 | 16.25 | 255.41 | 3,791.17 | -161.12 | -981.12 | 993.20 | 1.19 |
| 4,043.00 | 15.48 | 255.29 | 3,881.59 | -167.61 | -1,005.99 | 1,018.87 | 0.82 |
| 4,137.00 | 14.20 | 255.02 | 3,972.45 | -173.78 | -1,029.26 | 1,042.91 | 1.36 |
| 4,232.00 | 13.24 | 254.47 | 4,064.74 | -179.70 | -1,051.00 | 1,065.41 | 1.02 |

## Design Report for BM 34-43C - Vaughn Gyro and Sperry MWD Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|---|---|---|---|---|---|---|---|
| 4,326.00 | 12.59 | 254.28 | 4,156.36 | -185.36 | -1,071.23 | 1,086.37 | 0.69 |
| 4,421.00 | 11.78 | 251.37 | 4,249.22 | -191.27 | -1,090.39 | 1,106.34 | 1.07 |
| 4,515.00 | 10.93 | 256.29 | 4,341.39 | -196.44 | -1,108.14 | 1,124.78 | 1.37 |
| 4,609.00 | 10.50 | 254.39 | 4,433.75 | -200.86 | -1,125.04 | 1,142.23 | 0.59 |
| 4,703.00 | 10.30 | 260.61 | 4,526.21 | -204.54 | -1,141.58 | 1,159.18 | 1.21 |
| 4,798.00 | 9.47 | 258.77 | 4,619.79 | -207.44 | -1,157.63 | 1,175.47 | 0.93 |
| 4,892.00 | 8.72 | 254.92 | 4,712.61 | -210.80 | -1,172.10 | 1,190.32 | 1.03 |
| 4,986.00 | 8.21 | 260.50 | 4,805.59 | -213.77 | -1,185.60 | 1,204.14 | 1.03 |
| 5,081.00 | 7.08 | 264.68 | 4,899.75 | -215.43 | -1,198.12 | 1,216.74 | 1.32 |
| 5,175.00 | 6.72 | 266.35 | 4,993.06 | -216.31 | -1,209.37 | 1,227.93 | 0.44 |
| 5,269.00 | 5.40 | 271.65 | 5,086.54 | -216.54 | -1,219.28 | 1,237.67 | 1.52 |
| 5,364.00 | 3.26 | 272.17 | 5,181.26 | -216.31 | -1,226.45 | 1,244.64 | 2.25 |
| 5,458.00 | 3.06 | 274.11 | 5,275.12 | -216.03 | -1,231.62 | 1,249.64 | 0.24 |
| 5,552.00 | 2.92 | 269.63 | 5,368.99 | -215.86 | -1,236.52 | 1,254.39 | 0.29 |
| 5,647.00 | 2.62 | 267.56 | 5,463.88 | -215.97 | -1,241.11 | 1,258.91 | 0.33 |
| 5,741.00 | 2.26 | 262.79 | 5,557.79 | -216.29 | -1,245.09 | 1,262.87 | 0.44 |
| 5,836.00 | 2.63 | 258.00 | 5,652.71 | -216.98 | -1,249.09 | 1,266.92 | 0.44 |
| 5,930.00 | 2.59 | 268.95 | 5,746.61 | -217.47 | -1,253.32 | 1,271.16 | 0.53 |
| 6,024.00 | 2.51 | 264.00 | 5,840.52 | -217.72 | -1,257.49 | 1,275.29 | 0.25 |
| 6,118.00 | 2.32 | 259.06 | 5,934.43 | -218.30 | -1,261.40 | 1,279.24 | 0.30 |
| 6,212.00 | 2.50 | 259.94 | 6,028.35 | -219.02 | -1,265.29 | 1,283.19 | 0.20 |
| 6,307.00 | 1.21 | 230.04 | 6,123.30 | -220.02 | -1,268.10 | 1,286.15 | 1.65 |
| 6,401.00 | 0.88 | 233.62 | 6,217.29 | -221.09 | -1,269.44 | 1,287.68 | 0.36 |
| 6,495.00 | 0.81 | 213.39 | 6,311.28 | -222.07 | -1,270.39 | 1,288.81 | 0.32 |
| 6,590.00 | 0.89 | 221.53 | 6,406.26 | -223.19 | -1,271.25 | 1,289.88 | 0.15 |
| 6,684.00 | 0.68 | 201.23 | 6,500.26 | -224.25 | -1,271.93 | 1,290.78 | 0.37 |
| 6,778.00 | 0.89 | 246.96 | 6,594.25 | -225.06 | -1,272.81 | 1,291.80 | 0.68 |
| 6,873.00 | 0.85 | 249.46 | 6,689.24 | -225.59 | -1,274.15 | 1,293.22 | 0.06 |
| 6,967.00 | 0.86 | 219.77 | 6,783.23 | -226.38 | -1,275.25 | 1,294.46 | 0.47 |
| 7,061.00 | 1.04 | 231.77 | 6,877.21 | -227.45 | -1,276.37 | 1,295.78 | 0.28 |
| 7,156.00 | 0.65 | 296.13 | 6,972.21 | -227.75 | -1,277.53 | 1,296.98 | 1.01 |
| 7,250.00 | 0.91 | 303.51 | 7,066.20 | -227.10 | -1,278.63 | 1,297.92 | 0.30 |
| 7,344.00 | 0.82 | 293.32 | 7,160.19 | -226.42 | -1,279.87 | 1,298.99 | 0.19 |
| 7,439.00 | 0.47 | 263.72 | 7,255.18 | -226.20 | -1,280.88 | 1,299.94 | 0.50 |
| 7,533.00 | 1.24 | 204.52 | 7,349.17 | -227.16 | -1,281.69 | 1,300.93 | 1.15 |
| 7,627.00 | 1.47 | 206.94 | 7,443.14 | -229.16 | -1,282.66 | 1,302.29 | 0.25 |
| 7,722.00 | 1.55 | 211.01 | 7,538.11 | -231.35 | -1,283.87 | 1,303.93 | 0.14 |
| 7,816.00 | 1.70 | 208.07 | 7,632.07 | -233.67 | -1,285.18 | 1,305.69 | 0.18 |
| 7,910.00 | 1.81 | 206.01 | 7,726.03 | -236.24 | -1,286.49 | 1,307.51 | 0.13 |
| 8,005.00 | 1.81 | 197.07 | 7,820.98 | -239.02 | -1,287.59 | 1,309.16 | 0.30 |
| 8,099.00 | 1.80 | 186.63 | 7,914.94 | -241.90 | -1,288.20 | 1,310.35 | 0.35 |
| 8,193.00 | 2.05 | 180.04 | 8,008.88 | -245.05 | -1,288.37 | 1,311.17 | 0.35 |
| 8,288.00 | 1.76 | 180.88 | 8,103.83 | -248.21 | -1,288.39 | 1,311.85 | 0.31 |
| 8,382.00 | 1.05 | 161.43 | 8,197.80 | -250.47 | -1,288.14 | 1,312.07 | 0.90 |
| 8,476.00 | 1.74 | 173.23 | 8,291.77 | -252.70 | -1,287.70 | 1,312.10 | 0.79 |
| 8,570.00 | 0.86 | 174.97 | 8,385.75 | -254.82 | -1,287.47 | 1,312.32 | 0.94 |
| 8,665.00 | 0.91 | 177.08 | 8,480.74 | -256.29 | -1,287.36 | 1,312.52 | 0.06 |
| 8,759.00 | 0.49 | 194.06 | 8,574.73 | -257.42 | -1,287.42 | 1,312.82 | 0.49 |
| 8,853.00 | 0.65 | 188.82 | 8,668.72 | -258.34 | -1,287.60 | 1,313.18 | 0.18 |
| 8,948.00 | 0.53 | 187.01 | 8,763.72 | -259.31 | -1,287.74 | 1,313.52 | 0.13 |
| 9,042.00 | 0.36 | 244.64 | 8,857.72 | -259.86 | -1,288.06 | 1,313.95 | 0.48 |

# Design Report for BM 34-43C - Vaughn Gyro and Sperry MWD Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) |
|---|---|---|---|---|---|---|---|
| 9,137.00 | 0.54 | 205.56 | 8,952.71 | -260.40 | -1,288.52 | 1,314.51 | 0.36 |
| 9,231.00 | 0.70 | 225.97 | 9,046.71 | -261.20 | -1,289.13 | 1,315.27 | 0.29 |
| 9,325.00 | 0.92 | 240.28 | 9,140.70 | -261.97 | -1,290.20 | 1,316.47 | 0.32 |
| 9,420.00 | 0.86 | 246.94 | 9,235.69 | -262.63 | -1,291.51 | 1,317.90 | 0.13 |
| 9,514.00 | 0.92 | 266.39 | 9,329.68 | -262.95 | -1,292.92 | 1,319.34 | 0.33 |
| 9,608.00 | 1.36 | 316.94 | 9,423.66 | -262.18 | -1,294.43 | 1,320.66 | 1.12 |
| 9,703.00 | 1.76 | 318.54 | 9,518.63 | -260.27 | -1,296.17 | 1,321.96 | 0.42 |
| 9,797.00 | 1.20 | 320.04 | 9,612.59 | -258.43 | -1,297.75 | 1,323.13 | 0.60 |
| 9,892.00 | 1.31 | 283.56 | 9,707.57 | -257.41 | -1,299.45 | 1,324.58 | 0.83 |
| 9,986.00 | 1.31 | 269.09 | 9,801.55 | -257.18 | -1,301.57 | 1,326.60 | 0.35 |
| 10,080.00 | 1.36 | 266.95 | 9,895.52 | -257.25 | -1,303.76 | 1,328.76 | 0.08 |
| 10,102.00 | 1.28 | 262.26 | 9,917.52 | -257.30 | -1,304.26 | 1,329.26 | 0.61 |
| **Final Sperry MWD Survey** | | | | | | | |
| 10,160.00 | 1.28 | 262.26 | 9,975.50 | -257.47 | -1,305.54 | 1,330.55 | 0.00 |
| **Survey Projection to TD - Estimated BHL: 1816' FSL, 709' FEL** | | | | | | | |

## *Design Annotations*

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 191.00 | 191.00 | -0.75 | -0.32 | Surveys from 191.00ft to 557.00ft are Vaughn Gyro Surveys |
| 557.00 | 556.59 | -0.55 | -16.30 | Tie-On to Vaughn Gyro Survey |
| 610.00 | 609.44 | -1.11 | -20.22 | First Sperry MWD Survey |
| 10,102.00 | 9,917.52 | -257.30 | -1,304.26 | Final Sperry MWD Survey |
| 10,160.00 | 9,975.50 | -257.47 | -1,305.54 | Survey Projection to TD |
| 10,160.00 | 9,975.50 | -257.47 | -1,305.54 | Estimated BHL: 1816' FSL, 709' FEL |

## *Vertical Section Information*

| | Angle Type | Target | Azimuth (°) | Origin Type | Origin +N/_S (ft) | Origin +E/-W (ft) | Start TVD (ft) |
|---|---|---|---|---|---|---|---|
| Target | | BM 34-43C Plan A0 BHL | 258.02 | Slot | 0.00 | 0.00 | 0.00 |

## *Survey tool program*

| From (ft) | To (ft) | Survey/Plan | Survey Tool |
|---|---|---|---|
| 191.00 | 557.00 | Vaughn Gyro Surveys | NS-GYRO-MS |
| 610.00 | 10,160.00 | Sperry MWD Surveys | MWD |

## Design Report for BM 34-43C - Vaughn Gyro and Sperry MWD Survey

### *Targets*

| Target Name<br>- hit/miss target<br>- Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| BM 34-43C Plan A0 | 0.00 | 360.00 | 6,976.00 | -275.91 | -1,300.07 | 1,577,041.30 | 2,300,164.80 | 39° 23' 29.571 N | 107° 58' 35.595 W |
| - actual wellpath misses target center by 53.18ft at 7159.73ft MD (6975.93 TVD, -227.73 N, -1277.57 E)<br>- Rectangle (sides W200.00 H200.00 D3,051.00) | | | | | | | | | |
| BM 34-43C Plan A0 | 0.00 | 360.00 | 10,030.00 | -275.91 | -1,300.07 | 1,577,041.30 | 2,300,164.80 | 39° 23' 29.571 N | 107° 58' 35.595 W |
| - actual wellpath misses target center by 57.79ft at 10160.00ft MD (9975.50 TVD, -257.47 N, -1305.54 E)<br>- Point | | | | | | | | | |
| BM 34-43C Plan A0 | 0.00 | 360.00 | 6,976.00 | -225.91 | -1,250.07 | 1,577,091.30 | 2,300,214.79 | 39° 23' 30.078 N | 107° 58' 34.976 W |
| - actual wellpath misses target center by 27.56ft at 7159.49ft MD (6975.69 TVD, -227.73 N, -1277.57 E)<br>- Rectangle (sides W25.00 H25.00 D0.00) | | | | | | | | | |

# North Reference Sheet for Sec. 35-T7S-R95W (Battlement Mesa 35L PAD) - BM 34-43C - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 24' @ 9235.00ft. Northing and Easting are relative to BM 34-43C - Slot A6

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99994881

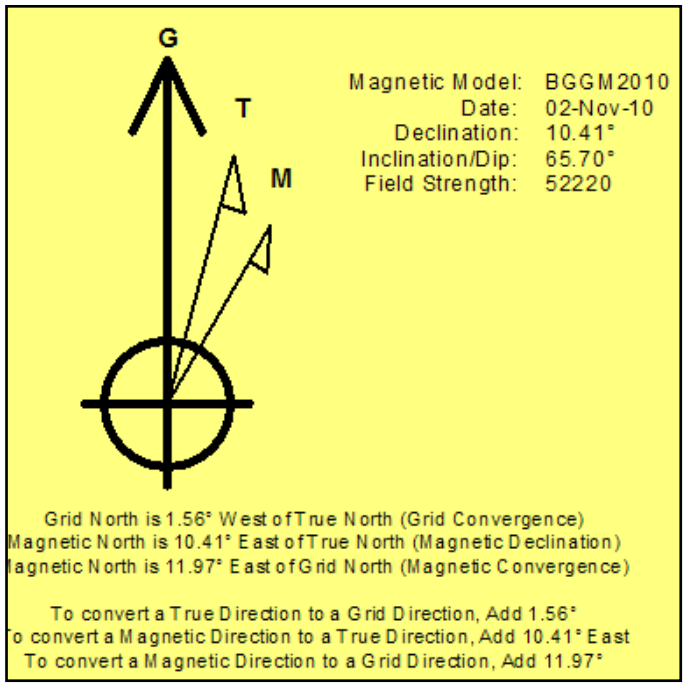
Grid Coordinates of Well: 1,577,317.20 ft N, 2,301,464.80 ft E

Geographical Coordinates of Well: 39° 23' 32.65" N, 107° 58' 19.14" W

Grid Convergence at Surface is: -1.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,160.00ft
the Bottom Hole Displacement is 1,330.69ft in the Direction of 258.84° (Grid).

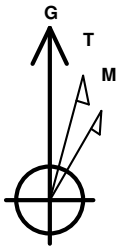
Magnetic Convergence at surface is: -11.97° ( 2 November 2010, , BGGM2010)



Project: Garfield County, CO (NAD 83)
Site: Sec. 35-T7S-R95W (Battlement Mesa 35L PAD)
Well: BM 34-43C

# Noble Energy

HALLIBURTON
Sperry Drilling



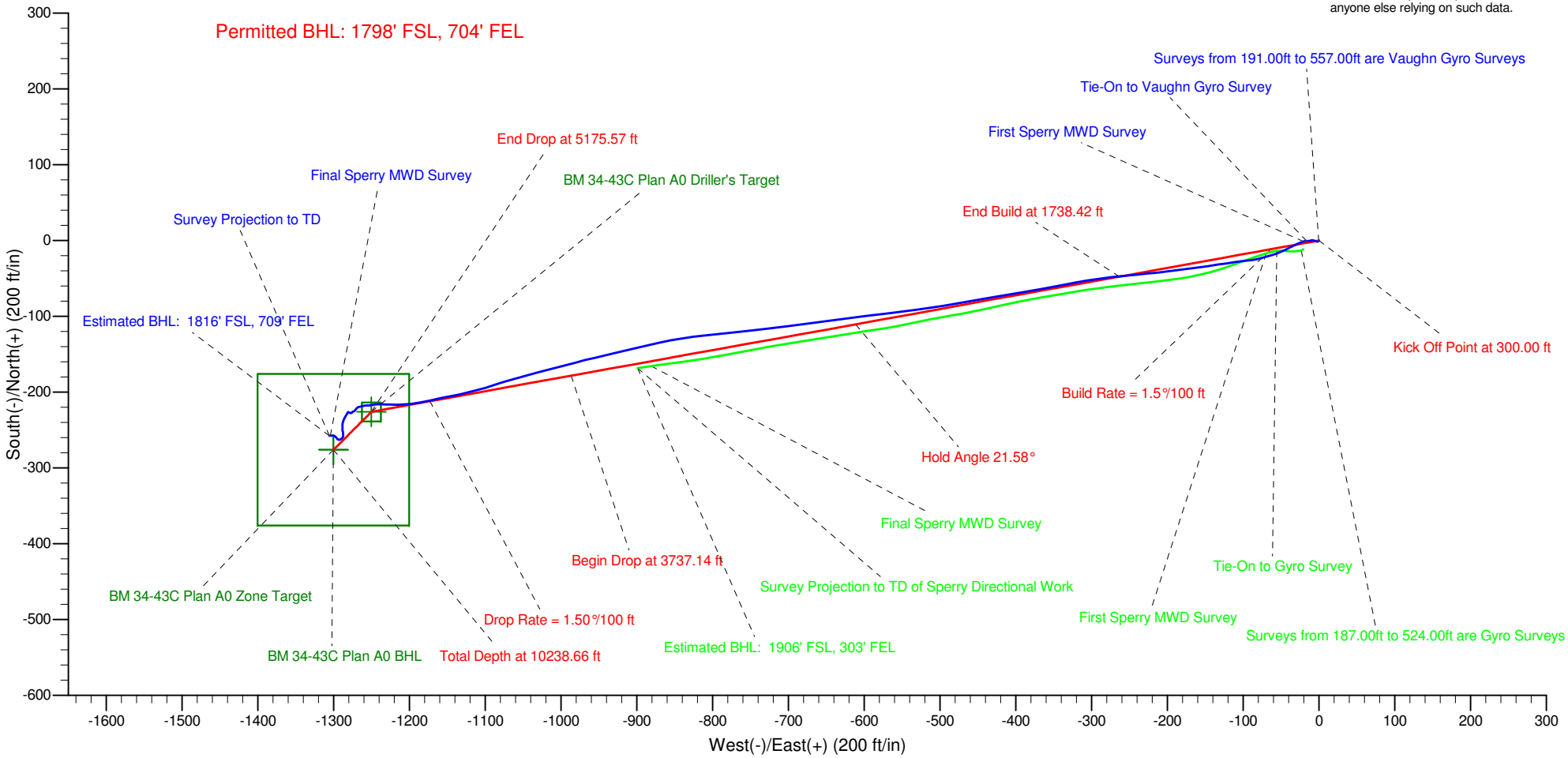

Azimuths to Grid North
True North: 1.56°
Magnetic North: 11.97°

Magnetic Field
Strength: 52220.3snT
Dip Angle: 65.70°
Date: 11/2/2010
Model: BGGM2010

LEGEND

BM 34-43C, Plan A, Plan A rev1 V0
BM 34-43C (ABANDONED), Plan A, Gyro and Sperry MWD Survey V0
Vaughn Gyro and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Battlement Mesa 34-43C well located at Garfield County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



Project: Garfield County, CO (NAD 83)
Site: Sec. 35-T7S-R95W (Battlement Mesa 35L PAD)
Well: BM 34-43C

# Noble Energy

HALLIBURTON
Sperry Drilling

G T M

Azimuths to Grid North
True North: 1.56°
Magnetic North: 11.97°

Magnetic Field
Strength: 52220.3snT
Dip Angle: 65.70°
Date: 11/2/2010
Model: BGGM2010

LEGEND

- BM 34-43C, Plan A, Plan A rev1 V0
- BM 34-43C (ABANDONED), Plan A, Gyro and Sperry MWD Surv
- Vaughn Gyro and Sperry MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Battlement Mesa 34-43C well located at Garfield County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.