

Project: Weld County, CO (NAD 83)  
 Site: Sec. 20-T6N-R62W (Wells Ranch AE PAD)  
 Well: Wells Ranch AE20-63-1HN  
 Wellbore: Plan A  
 Design: Final Surveys

# Noble Energy



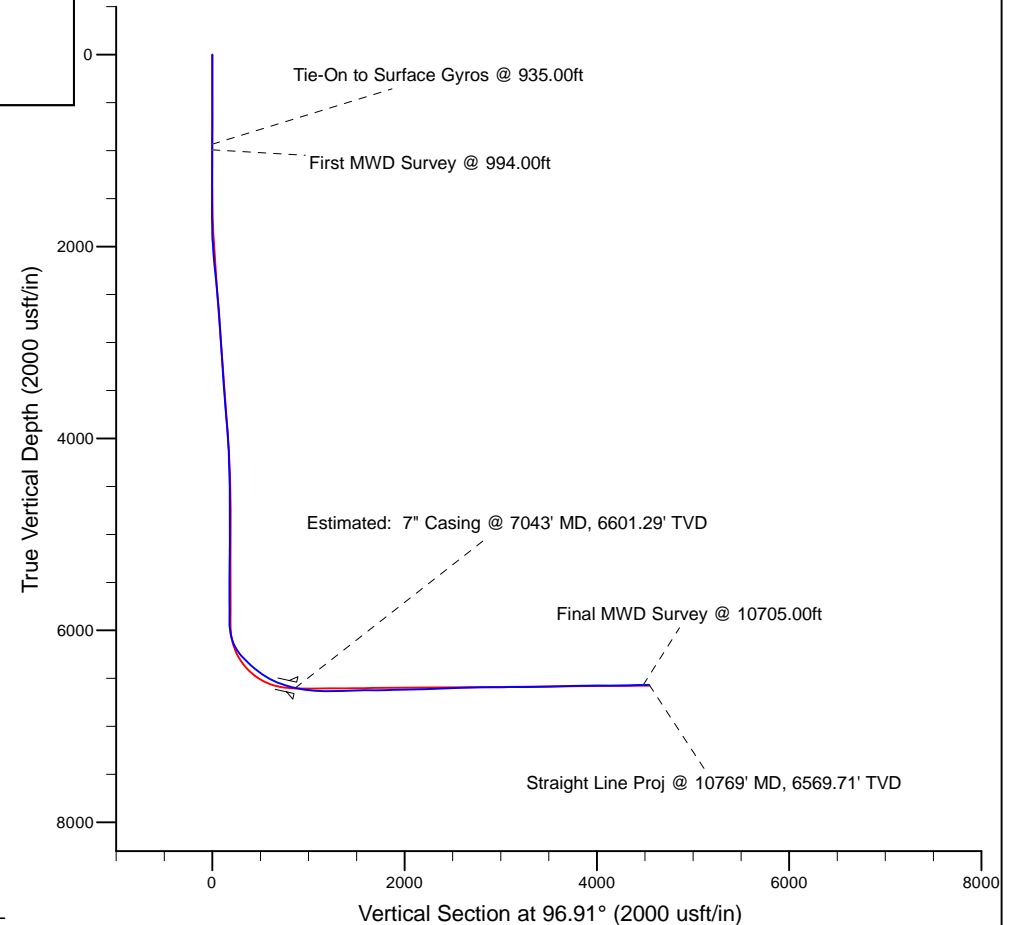
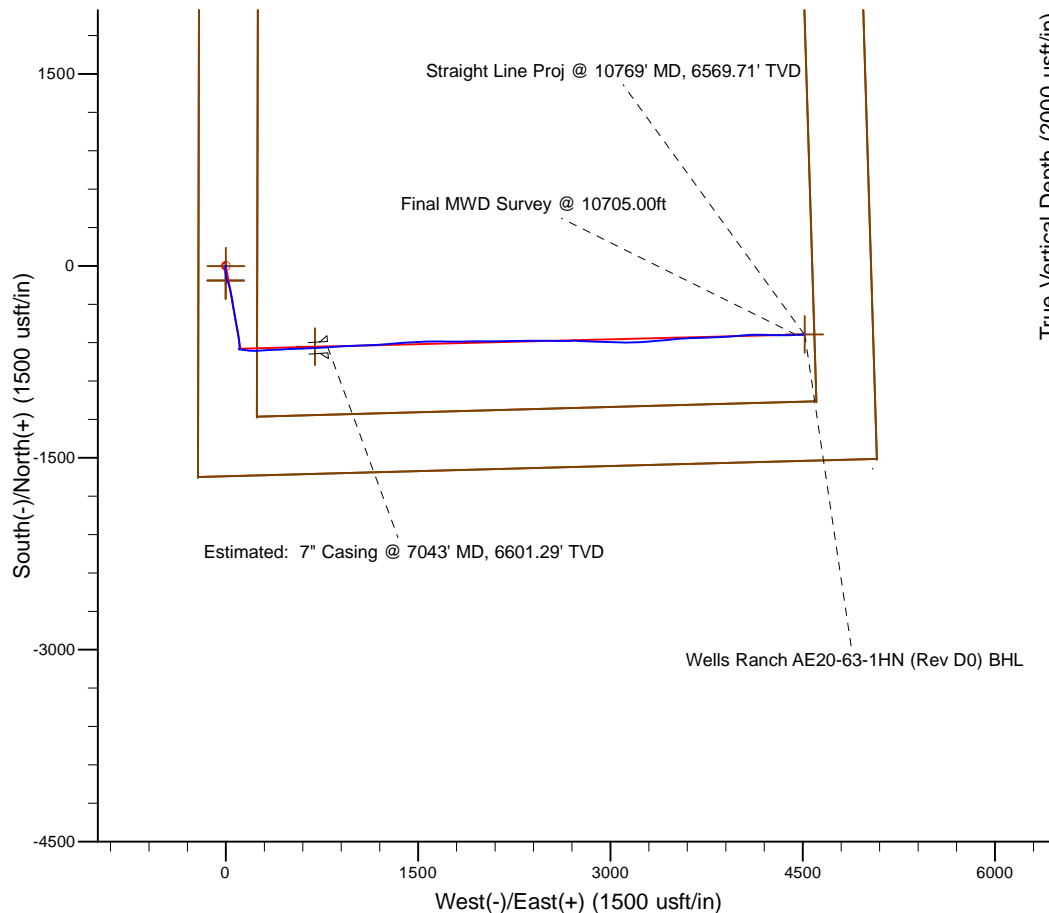
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AE20-63-1HN well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide 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.

7" Casing: ~987.22' FSL, ~1011.17' FWL  
 Lat/Long: 40° 28' 3.753 N, 104° 21' 8.973 W  
 State Planes - CO Northern: 1,415,292.58' N, 3,319,264.63' E  
 Location: Sec. 20-T6N-R62W

BHL: ~986.56' FSL, ~535.69' FEL  
 Lat/Long: 40° 28' 4.251 N, 104° 20' 20.849 W  
 State Planes - CO Northern: 1,415,391.44' N, 3,322,983.02' E  
 Location: Sec. 20-T6N-R62W

## LEGEND

- △ Wells Ranch AE20-63-1HN, Plan A, Rev D0 V0
- Final Surveys



|   |                  |
|---|------------------|
| WELL DETAILS: Wells Ranch AE20-63-1HN                       |                  |
| Ground Level: 4785.00<br>RKB 24 ft. @ 4809.00usft (H&P 343) |                  |
| Design: Final Surveys (Wells Ranch AE20-63-1HN/Plan A)      |                  |
| Created By: Fred Hartmann                                   | Date: 10/11/2013 |

# Noble Energy

Weld County, CO (NAD 83)

Sec. 20-T6N-R62W (Wells Ranch AE PAD)

Wells Ranch AE20-63-1HN - A4

Design: Final Surveys

## Sperry Drilling Services

### Final Survey Report

11 October, 2013

Well Coordinates: 1,415,927.48 N, 3,318,469.65 E (40° 28' 10.13" N, 104° 21' 19.15" W)

Ground Level: 4,785.00 usft

Local Coordinate Origin:

Centered on Well Wells Ranch AE20-63-1HN - Slot A4

Viewing Datum:

RKB 24 ft. @ 4809.00usft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

**HALLIBURTON**

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured Depth (usft)                     | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|---|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 0.00                                      | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    |
| 355.00                                    | 0.10            | 51.60       | 355.00                | 0.19         | 0.24         | 0.22                    | 0.03                    |
| 645.00                                    | 0.10            | 51.60       | 645.00                | 0.51         | 0.64         | 0.57                    | 0.00                    |
| 935.00                                    | 0.60            | 262.40      | 934.99                | 0.46         | -0.67        | -0.72                   | 0.24                    |
| <b>Tie-On to Surface Gyros @ 935.00ft</b> |                 |             |                       |              |              |                         |                         |
| 994.00                                    | 0.28            | 228.14      | 993.99                | 0.33         | -1.08        | -1.11                   | 0.68                    |
| <b>First MWD Survey @ 994.00ft</b>        |                 |             |                       |              |              |                         |                         |
| 1,086.00                                  | 0.22            | 11.36       | 1,085.99              | 0.35         | -1.21        | -1.25                   | 0.52                    |
| 1,272.00                                  | 0.12            | 179.04      | 1,271.99              | 0.50         | -1.14        | -1.19                   | 0.18                    |
| 1,458.00                                  | 1.74            | 206.03      | 1,457.96              | -2.23        | -2.38        | -2.09                   | 0.88                    |
| 1,553.00                                  | 4.47            | 191.19      | 1,552.81              | -7.16        | -3.73        | -2.84                   | 2.97                    |
| 1,648.00                                  | 6.46            | 181.98      | 1,647.38              | -16.13       | -4.63        | -2.66                   | 2.28                    |
| 1,743.00                                  | 8.01            | 181.61      | 1,741.62              | -28.09       | -5.00        | -1.59                   | 1.63                    |
| 1,838.00                                  | 8.67            | 176.38      | 1,835.62              | -41.85       | -4.74        | 0.33                    | 1.06                    |
| 2,028.00                                  | 11.80           | 166.43      | 2,022.58              | -75.04       | 0.73         | 9.75                    | 1.89                    |
| 2,122.00                                  | 12.66           | 170.40      | 2,114.45              | -94.54       | 4.70         | 16.04                   | 1.28                    |
| 2,217.00                                  | 14.38           | 159.44      | 2,206.83              | -115.85      | 10.58        | 24.44                   | 3.24                    |
| 2,313.00                                  | 12.79           | 158.91      | 2,300.14              | -136.93      | 18.59        | 34.93                   | 1.66                    |
| 2,407.00                                  | 13.30           | 165.23      | 2,391.72              | -157.10      | 25.09        | 43.80                   | 1.61                    |
| 2,502.00                                  | 14.27           | 163.97      | 2,483.98              | -178.92      | 31.11        | 52.40                   | 1.07                    |
| 2,597.00                                  | 13.31           | 164.95      | 2,576.24              | -200.73      | 37.19        | 61.06                   | 1.04                    |
| 2,692.00                                  | 13.49           | 168.60      | 2,668.66              | -222.15      | 42.22        | 68.63                   | 0.91                    |
| 2,787.00                                  | 12.26           | 167.65      | 2,761.27              | -242.87      | 46.56        | 75.43                   | 1.31                    |
| 2,882.00                                  | 13.33           | 173.61      | 2,853.91              | -263.61      | 49.94        | 81.28                   | 1.79                    |
| 2,977.00                                  | 15.16           | 175.53      | 2,945.99              | -286.88      | 52.13        | 86.25                   | 1.99                    |
| 3,072.00                                  | 15.06           | 169.42      | 3,037.71              | -311.39      | 55.36        | 92.41                   | 1.68                    |
| 3,167.00                                  | 12.45           | 167.89      | 3,129.98              | -333.54      | 59.78        | 99.45                   | 2.77                    |
| 3,262.00                                  | 12.35           | 174.01      | 3,222.77              | -353.66      | 62.99        | 105.06                  | 1.39                    |
| 3,357.00                                  | 11.61           | 169.55      | 3,315.70              | -373.16      | 65.78        | 110.18                  | 1.25                    |
| 3,452.00                                  | 11.26           | 164.15      | 3,408.82              | -391.49      | 70.05        | 116.62                  | 1.19                    |
| 3,547.00                                  | 12.86           | 167.30      | 3,501.72              | -410.73      | 74.90        | 123.75                  | 1.82                    |
| 3,642.00                                  | 15.58           | 172.03      | 3,593.80              | -433.68      | 79.00        | 130.58                  | 3.11                    |
| 3,737.00                                  | 17.17           | 172.23      | 3,684.94              | -460.21      | 82.66        | 137.41                  | 1.67                    |
| 3,832.00                                  | 19.01           | 171.15      | 3,775.24              | -489.39      | 86.94        | 145.16                  | 1.97                    |
| 3,927.00                                  | 17.23           | 167.69      | 3,865.53              | -518.43      | 92.32        | 154.00                  | 2.19                    |
| 4,021.00                                  | 13.19           | 169.89      | 3,956.22              | -542.60      | 97.17        | 161.72                  | 4.34                    |
| 4,116.00                                  | 11.41           | 170.99      | 4,049.04              | -562.55      | 100.55       | 167.47                  | 1.89                    |
| 4,211.00                                  | 9.54            | 173.19      | 4,142.45              | -579.65      | 102.95       | 171.91                  | 2.01                    |
| 4,306.00                                  | 8.28            | 172.68      | 4,236.30              | -594.26      | 104.76       | 175.46                  | 1.33                    |
| 4,401.00                                  | 8.38            | 175.12      | 4,330.30              | -607.94      | 106.22       | 178.56                  | 0.39                    |
| 4,496.00                                  | 7.06            | 179.98      | 4,424.44              | -620.67      | 106.81       | 180.68                  | 1.55                    |
| 4,591.00                                  | 5.31            | 182.75      | 4,518.88              | -630.90      | 106.60       | 181.70                  | 1.87                    |
| 4,686.00                                  | 3.82            | 180.41      | 4,613.58              | -638.46      | 106.37       | 182.38                  | 1.58                    |
| 4,781.00                                  | 3.08            | 183.14      | 4,708.40              | -644.17      | 106.20       | 182.90                  | 0.80                    |
| 4,876.00                                  | 2.00            | 186.49      | 4,803.31              | -648.37      | 105.88       | 183.08                  | 1.15                    |
| 4,971.00                                  | 0.56            | 217.47      | 4,898.28              | -650.38      | 105.41       | 182.86                  | 1.63                    |
| 5,066.00                                  | 0.50            | 185.53      | 4,993.28              | -651.16      | 105.09       | 182.63                  | 0.31                    |
| 5,160.00                                  | 0.50            | 236.52      | 5,087.28              | -651.80      | 104.70       | 182.33                  | 0.46                    |
| 5,255.00                                  | 0.34            | 320.28      | 5,182.28              | -651.81      | 104.18       | 181.81                  | 0.60                    |
| 5,350.00                                  | 0.60            | 261.70      | 5,277.27              | -651.67      | 103.51       | 181.12                  | 0.54                    |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured Depth (usft)                                | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|--|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 5,445.00   | 0.59            | 253.46      | 5,372.27              | -651.88      | 102.54       | 180.19                  | 0.09                    |
| 5,540.00   | 0.15            | 333.66      | 5,467.27              | -651.90      | 102.02       | 179.68                  | 0.61                    |
| 5,635.00   | 0.10            | 83.71       | 5,562.27              | -651.78      | 102.05       | 179.69                  | 0.22                    |
| 5,730.00   | 0.35            | 331.07      | 5,657.27              | -651.52      | 101.99       | 179.60                  | 0.42                    |
| 5,825.00   | 0.31            | 16.21       | 5,752.26              | -651.02      | 101.92       | 179.47                  | 0.27                    |
| 5,917.00   | 0.33            | 30.77       | 5,844.26              | -650.55      | 102.13       | 179.62                  | 0.09                    |
| 6,012.00   | 0.63            | 101.20      | 5,939.26              | -650.42      | 102.78       | 180.25                  | 0.64                    |
| 6,107.00   | 10.64           | 98.82       | 6,033.68              | -651.87      | 111.98       | 189.56                  | 10.54                   |
| 6,201.00   | 21.66           | 98.25       | 6,123.83              | -655.70      | 137.80       | 215.66                  | 11.72                   |
| 6,296.00   | 32.95           | 96.82       | 6,208.11              | -661.30      | 180.95       | 259.16                  | 11.90                   |
| 6,344.00   | 39.43           | 90.70       | 6,246.84              | -663.04      | 209.19       | 287.41                  | 15.44                   |
| 6,391.00   | 43.62           | 86.69       | 6,282.03              | -662.29      | 240.32       | 318.22                  | 10.55                   |
| 6,439.00   | 45.03           | 86.68       | 6,316.37              | -660.35      | 273.80       | 351.23                  | 2.94                    |
| 6,486.00   | 45.93           | 87.02       | 6,349.32              | -658.51      | 307.26       | 384.22                  | 1.98                    |
| 6,534.00   | 49.41           | 87.67       | 6,381.64              | -656.87      | 342.70       | 419.21                  | 7.32                    |
| 6,581.00   | 52.23           | 87.65       | 6,411.33              | -655.38      | 379.10       | 455.17                  | 6.00                    |
| 6,629.00   | 55.17           | 87.25       | 6,439.74              | -653.66      | 417.74       | 493.32                  | 6.16                    |
| 6,676.00   | 56.91           | 86.88       | 6,466.00              | -651.66      | 456.67       | 531.73                  | 3.76                    |
| 6,724.00   | 59.21           | 86.08       | 6,491.39              | -649.16      | 497.33       | 571.78                  | 5.00                    |
| 6,771.00   | 63.25           | 87.59       | 6,514.00              | -646.89      | 538.45       | 612.34                  | 9.04                    |
| 6,819.00   | 66.13           | 88.04       | 6,534.52              | -645.24      | 581.81       | 655.18                  | 6.06                    |
| 6,865.00   | 70.09           | 88.31       | 6,551.67              | -643.88      | 624.46       | 697.36                  | 8.63                    |
| 6,913.00   | 71.73           | 87.87       | 6,567.37              | -642.37      | 669.80       | 742.19                  | 3.52                    |
| 6,960.00   | 74.58           | 86.43       | 6,580.99              | -640.13      | 714.72       | 786.51                  | 6.74                    |
| 6,989.00   | 75.20           | 86.17       | 6,588.55              | -638.32      | 742.66       | 814.03                  | 2.31                    |
| 7,043.00   | 77.50           | 86.40       | 6,601.29              | -634.93      | 795.02       | 865.60                  | 4.28                    |
| <b>Estimated: 7" Casing @ 7043' MD, 6601.29' TVD</b> |                 |             |                       |              |              |                         |                         |
| 7,160.00   | 82.49           | 86.89       | 6,621.61              | -628.19      | 910.00       | 978.95                  | 4.28                    |
| 7,253.00   | 86.15           | 87.19       | 6,630.81              | -623.41      | 1,002.41     | 1,070.10                | 3.95                    |
| 7,345.00   | 90.83           | 88.76       | 6,633.23              | -620.17      | 1,094.29     | 1,160.93                | 5.37                    |
| 7,438.00   | 90.34           | 85.73       | 6,632.28              | -615.70      | 1,187.17     | 1,252.59                | 3.30                    |
| 7,531.00   | 91.33           | 85.21       | 6,630.93              | -608.35      | 1,279.87     | 1,343.74                | 1.20                    |
| 7,624.00   | 91.23           | 87.11       | 6,628.85              | -602.13      | 1,372.63     | 1,435.08                | 2.05                    |
| 7,717.00   | 90.74           | 84.71       | 6,627.25              | -595.49      | 1,465.37     | 1,526.35                | 2.63                    |
| 7,810.00   | 90.98           | 89.44       | 6,625.86              | -590.75      | 1,558.21     | 1,617.95                | 5.09                    |
| 7,901.00   | 91.30           | 90.96       | 6,624.04              | -591.07      | 1,649.19     | 1,708.30                | 1.71                    |
| 7,993.00   | 90.12           | 90.38       | 6,622.90              | -592.14      | 1,741.18     | 1,799.75                | 1.43                    |
| 8,085.00   | 92.34           | 88.72       | 6,620.93              | -591.42      | 1,833.14     | 1,890.96                | 3.01                    |
| 8,178.00   | 90.31           | 88.23       | 6,618.78              | -588.95      | 1,926.08     | 1,982.93                | 2.25                    |
| 8,271.00   | 92.47           | 90.68       | 6,616.52              | -588.06      | 2,019.04     | 2,075.10                | 3.51                    |
| 8,365.00   | 92.37           | 89.35       | 6,612.55              | -588.09      | 2,112.95     | 2,168.34                | 1.42                    |
| 8,460.00   | 90.62           | 89.91       | 6,610.08              | -587.47      | 2,207.91     | 2,262.54                | 1.93                    |
| 8,555.00   | 90.40           | 87.08       | 6,609.23              | -584.98      | 2,302.87     | 2,356.50                | 2.99                    |
| 8,649.00   | 92.96           | 91.48       | 6,606.47              | -583.80      | 2,396.79     | 2,449.60                | 5.41                    |
| 8,744.00   | 93.36           | 90.70       | 6,601.24              | -585.60      | 2,491.62     | 2,543.97                | 0.92                    |
| 8,839.00   | 92.03           | 90.12       | 6,596.77              | -586.28      | 2,586.51     | 2,638.25                | 1.53                    |
| 8,934.00   | 90.71           | 88.68       | 6,594.50              | -585.28      | 2,681.48     | 2,732.40                | 2.06                    |
| 9,029.00   | 90.55           | 92.31       | 6,593.45              | -586.10      | 2,776.45     | 2,826.79                | 3.82                    |
| 9,124.00   | 90.28           | 92.89       | 6,592.76              | -590.41      | 2,871.35     | 2,921.52                | 0.67                    |
| 9,219.00   | 90.40           | 92.66       | 6,592.20              | -595.01      | 2,966.24     | 3,016.27                | 0.27                    |
| 9,313.00   | 90.31           | 92.00       | 6,591.62              | -598.83      | 3,060.16     | 3,109.96                | 0.71                    |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured Depth (usft)                               | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|---|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 9,408.00  | 90.15           | 87.15       | 6,591.24              | -598.13      | 3,155.13     | 3,204.16                | 5.11                    |
| 9,503.00  | 89.85           | 86.26       | 6,591.24              | -592.67      | 3,249.97     | 3,297.66                | 0.99                    |
| 9,598.00  | 89.69           | 85.66       | 6,591.62              | -585.98      | 3,344.73     | 3,390.93                | 0.65                    |
| 9,693.00  | 93.40           | 84.73       | 6,589.06              | -578.02      | 3,439.35     | 3,483.90                | 4.03                    |
| 9,788.00  | 92.19           | 84.54       | 6,584.43              | -569.15      | 3,533.81     | 3,576.61                | 1.29                    |
| 9,883.00  | 91.33           | 89.00       | 6,581.51              | -563.80      | 3,628.59     | 3,670.06                | 4.78                    |
| 9,978.00  | 91.33           | 87.64       | 6,579.30              | -561.02      | 3,723.53     | 3,763.97                | 1.43                    |
| 10,073.00   | 90.46           | 87.69       | 6,577.82              | -557.15      | 3,818.43     | 3,857.72                | 0.92                    |
| 10,168.00   | 90.40           | 86.33       | 6,577.10              | -552.20      | 3,913.30     | 3,951.31                | 1.43                    |
| 10,263.00   | 90.40           | 84.74       | 6,576.44              | -544.80      | 4,008.01     | 4,044.44                | 1.67                    |
| 10,358.00   | 90.00           | 87.27       | 6,576.11              | -538.18      | 4,102.77     | 4,137.71                | 2.70                    |
| 10,453.00   | 91.88           | 91.91       | 6,574.55              | -537.50      | 4,197.72     | 4,231.90                | 5.27                    |
| 10,548.00   | 90.80           | 91.42       | 6,572.33              | -540.26      | 4,292.65     | 4,326.47                | 1.25                    |
| 10,643.00   | 90.71           | 89.28       | 6,571.08              | -540.84      | 4,387.64     | 4,420.84                | 2.25                    |
| 10,705.00   | 90.59           | 87.35       | 6,570.37              | -539.02      | 4,449.60     | 4,482.13                | 3.12                    |
| <b>Final MWD Survey @ 10705.00ft</b>                |                 |             |                       |              |              |                         |                         |
| 10,769.00   | 90.59           | 87.35       | 6,569.71              | -536.06      | 4,513.53     | 4,545.24                | 0.00                    |
| <b>Straight Line Proj @ 10769' MD, 6569.71' TVD</b> |                 |             |                       |              |              |                         |                         |

Design Annotations

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                      |
|-----------------------|-----------------------|-------------------|--------------|--|
|                       |                       | +N/-S (usft)      | +E/-W (usft) |  |
| 935.00                | 934.99                | 0.46              | -0.67        | Tie-On to Surface Gyros @ 935.00ft           |
| 994.00                | 993.99                | 0.33              | -1.08        | First MWD Survey @ 994.00ft                  |
| 10,705.00             | 6,570.37              | -539.02           | 4,449.60     | Final MWD Survey @ 10705.00ft                |
| 10,769.00             | 6,569.71              | -536.06           | 4,513.53     | Straight Line Proj @ 10769' MD, 6569.71' TVD |

Vertical Section Information

| Angle Type | Target               | Azimuth (°) | Origin Type | Origin       |              | Start TVD (usft) |
|------------|----------------------|-------------|-------------|--------------|--------------|------------------|
|            |                      |             |             | +N/_S (usft) | +E/-W (usft) |                  |
| User       | No Target (Freehand) | 96.91       | Slot        | 0.00         | 0.00         | 0.00             |

Survey tool program

| From (usft) | To (usft) | Survey/Plan              | Survey Tool |
|-------------|-----------|--------------------------|-------------|
| 355.00      | 935.00    | Surface Gyros            | MWD         |
| 994.00      | 6,989.00  | MWD Surveys - Vert/Build | MWD         |
| 7,160.00    | 10,705.00 | MWD Surveys - Lateral    | MWD         |

Casing Details

| Measured Depth (usft) | Vertical Depth (usft) | Name  | Casing Diameter (") | Hole Diameter (") |
|-----------------------|-----------------------|---|---------------------|-------------------|
| 7,043.00              | 6,601.29              | Estimated: 7" Casing @ 7043' MD, 6601.29' TVD | 7                   | 8-3/4             |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

**Wellbore Targets**

| Target Name<br>- hit/miss target<br>- Shape   | Dip<br>Angle<br>(°) | Dip<br>Dir.<br>(°) | TVD<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Northing<br>(usft) | Easting<br>(usft) | Latitude         | Longitude         |
|---|---------------------|--------------------|---------------|-----------------|-----------------|--------------------|-------------------|------------------|-------------------|
| Wells Ranch AE (SL) F   | 0.00                | 0.00               | 0.00          | -112.96         | -1.32           | 1,415,814.53       | 3,318,468.33      | 40° 28' 9.012 N  | 104° 21' 19.188 W |
| - actual wellpath misses target center by 112.97usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)            |                     |                    |               |                 |                 |                    |                   |                  |                   |
| - Polygon   |                     |                    |               |                 |                 |                    |                   |                  |                   |
| Point 1   |                     |                    |               | 0.00            | -1,536.69       | -216.70            | 1,414,277.89      | 3,318,251.63     |                   |
| Point 2   |                     |                    |               | 0.00            | -1,394.93       | 5,079.85           | 1,414,419.65      | 3,323,547.99     |                   |
| Point 3   |                     |                    |               | 0.00            | 3,915.17        | 4,921.18           | 1,419,729.56      | 3,323,389.33     |                   |
| Point 4   |                     |                    |               | 0.00            | 3,764.67        | -207.18            | 1,419,579.06      | 3,318,261.15     |                   |
| Point 5   |                     |                    |               | 0.00            | -1,536.69       | -216.70            | 1,414,277.89      | 3,318,251.63     |                   |
| Wells Ranch AE (SB) F   | 0.00                | 0.00               | 0.00          | -112.96         | -1.32           | 1,415,814.53       | 3,318,468.33      | 40° 28' 9.012 N  | 104° 21' 19.188 W |
| - actual wellpath misses target center by 112.97usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)            |                     |                    |               |                 |                 |                    |                   |                  |                   |
| - Polygon   |                     |                    |               |                 |                 |                    |                   |                  |                   |
| Point 1   |                     |                    |               | 0.00            | -1,064.69       | 243.30             | 1,414,749.87      | 3,318,711.62     |                   |
| Point 2   |                     |                    |               | 0.00            | -945.93         | 4,607.35           | 1,414,868.63      | 3,323,075.51     |                   |
| Point 3   |                     |                    |               | 0.00            | 3,443.17        | 4,474.83           | 1,419,257.57      | 3,322,943.00     |                   |
| Point 4   |                     |                    |               | 0.00            | 3,319.17        | 251.02             | 1,419,133.58      | 3,318,719.34     |                   |
| Point 5   |                     |                    |               | 0.00            | -1,064.69       | 243.30             | 1,414,749.87      | 3,318,711.62     |                   |
| Wells Ranch AE20-63-  | 0.00                | 0.00               | 0.00          | 0.00            | 0.00            | 1,415,927.48       | 3,318,469.65      | 40° 28' 10.128 N | 104° 21' 19.152 W |
| - actual wellpath hits target center  |                     |                    |               |                 |                 |                    |                   |                  |                   |
| - Point   |                     |                    |               |                 |                 |                    |                   |                  |                   |
| Wells Ranch AE20-63-  | 0.00                | 0.00               | 6,576.26      | -535.18         | 4,514.80        | 1,415,392.32       | 3,322,984.29      | 40° 28' 4.260 N  | 104° 20' 20.832 W |
| - actual wellpath misses target center by 6.73usft at 10769.00usft MD (6569.71 TVD, -536.06 N, 4513.53 E) |                     |                    |               |                 |                 |                    |                   |                  |                   |
| - Point   |                     |                    |               |                 |                 |                    |                   |                  |                   |
| Wells Ranch AE20-63-  | 0.00                | 0.00               | 6,598.14      | -631.16         | 694.82          | 1,415,296.34       | 3,319,164.44      | 40° 28' 3.803 N  | 104° 21' 10.268 W |
| - actual wellpath misses target center by 24.02usft at 6946.38usft MD (6577.27 TVD, -640.90 N, 701.63 E)  |                     |                    |               |                 |                 |                    |                   |                  |                   |
| - Point   |                     |                    |               |                 |                 |                    |                   |                  |                   |

**Directional Difficulty Index**

|                                    |                |                               |                                  |
|------------------------------------|----------------|-------------------------------|----------------------------------|
| Average Dogleg over Survey:        | 2.24 °/100usft | Maximum Dogleg over Survey:   | 15.44 °/100usft at 6,344.00 usft |
| Net Tortosity applicable to Plans: | 1.13 °/100usft | Directional Difficulty Index: | 6.300                            |

**Audit Info**

North Reference Sheet for Sec. 20-T6N-R62W (Wells Ranch AE PAD) - Wells Ranch AE20-63-1HN -

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 ft. @ 4809.00usft (H&P 343). Northing and Easting are relative to Wells Ranch AE20-63-1HN - Slot A4

Coordinate System is US State Plane 1983, Colorado Northern 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:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996411

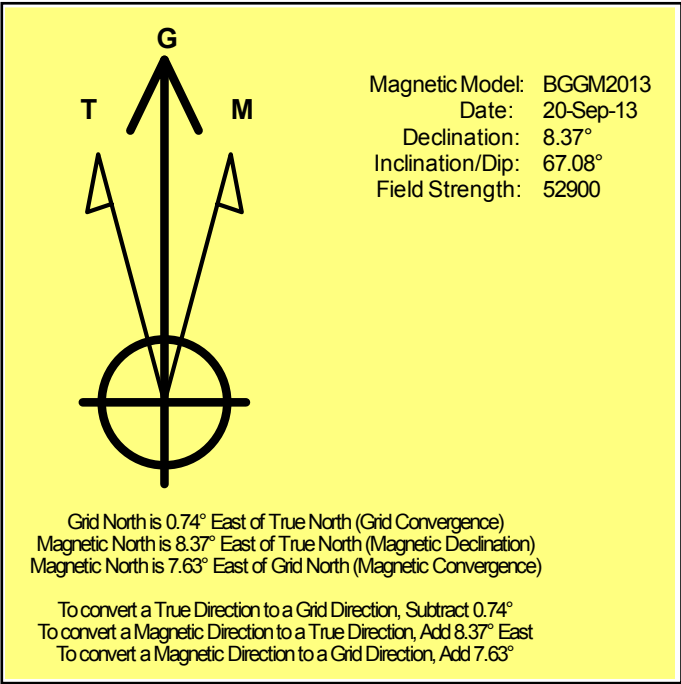
Grid Coordinates of Well: 1,415,927.48 usft N, 3,318,469.65 usft E

Geographical Coordinates of Well: 40° 28' 10.13" N, 104° 21' 19.15" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,769.00usft the Bottom Hole Displacement is 4,545.25usft in the Direction of 96.77° (Grid).

Magnetic Convergence at surface is: -7.63° (20 September 2013, , BGGM2013)



# Noble Energy

Weld County, CO (NAD 83)

Sec. 20-T6N-R62W (Wells Ranch AE PAD)

Wells Ranch AE20-63-1HN - A4

Design: Final Surveys

## Sperry Drilling Services

### Geodetic Report

11 October, 2013

Well Coordinates: 1,415,927.48 N, 3,318,469.65 E (40° 28' 10.13" N, 104° 21' 19.15" W)

Ground Level: 4,785.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Wells Ranch AE20-63-1HN - Slot A4

RKB 24 ft. @ 4809.00usft (H&P 343)

N

Grid

API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured        |                    |                | Vertical        |  | Local Coordinates |                 | Geographic Coordinates |                     | UTM Coordinates    |                   |
|-----------------|--------------------|----------------|-----------------|--|-------------------|-----------------|------------------------|---------------------|--------------------|-------------------|
| Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Depth<br>(usft) |  | +N/-S<br>(usft)   | +E/-W<br>(usft) | Latitude<br>(usft)     | Longitude<br>(usft) | Northing<br>(usft) | Easting<br>(usft) |
| 0.00            | 0.00               | 0.00           | 0.00            |  | 0.00              | 0.00            | 40° 28' 10.128 N       | 104° 21' 19.152 W   | 1,415,927.48       | 3,318,469.65      |
| 355.00          | 0.10               | 51.60          | 355.00          |  | 0.19              | 0.24            | 40° 28' 10.130 N       | 104° 21' 19.149 W   | 1,415,927.67       | 3,318,469.89      |
| 645.00          | 0.10               | 51.60          | 645.00          |  | 0.51              | 0.64            | 40° 28' 10.133 N       | 104° 21' 19.144 W   | 1,415,927.99       | 3,318,470.29      |
| 935.00          | 0.60               | 262.40         | 934.99          |  | 0.46              | -0.67           | 40° 28' 10.133 N       | 104° 21' 19.161 W   | 1,415,927.95       | 3,318,468.98      |
| 994.00          | 0.28               | 228.14         | 993.99          |  | 0.33              | -1.08           | 40° 28' 10.131 N       | 104° 21' 19.166 W   | 1,415,927.81       | 3,318,468.56      |
| 1,086.00        | 0.22               | 11.36          | 1,085.99        |  | 0.35              | -1.21           | 40° 28' 10.132 N       | 104° 21' 19.168 W   | 1,415,927.83       | 3,318,468.43      |
| 1,272.00        | 0.12               | 179.04         | 1,271.99        |  | 0.50              | -1.14           | 40° 28' 10.133 N       | 104° 21' 19.167 W   | 1,415,927.99       | 3,318,468.51      |
| 1,458.00        | 1.74               | 206.03         | 1,457.96        |  | -2.23             | -2.38           | 40° 28' 10.106 N       | 104° 21' 19.183 W   | 1,415,925.25       | 3,318,467.27      |
| 1,553.00        | 4.47               | 191.19         | 1,552.81        |  | -7.16             | -3.73           | 40° 28' 10.058 N       | 104° 21' 19.201 W   | 1,415,920.33       | 3,318,465.92      |
| 1,648.00        | 6.46               | 181.98         | 1,647.38        |  | -16.13            | -4.63           | 40° 28' 9.969 N        | 104° 21' 19.215 W   | 1,415,911.35       | 3,318,465.01      |
| 1,743.00        | 8.01               | 181.61         | 1,741.62        |  | -28.09            | -5.00           | 40° 28' 9.851 N        | 104° 21' 19.221 W   | 1,415,899.40       | 3,318,464.64      |
| 1,838.00        | 8.67               | 176.38         | 1,835.62        |  | -41.85            | -4.74           | 40° 28' 9.715 N        | 104° 21' 19.220 W   | 1,415,885.63       | 3,318,464.91      |
| 2,028.00        | 11.80              | 166.43         | 2,022.58        |  | -75.04            | 0.73            | 40° 28' 9.386 N        | 104° 21' 19.155 W   | 1,415,852.45       | 3,318,470.37      |
| 2,122.00        | 12.66              | 170.40         | 2,114.45        |  | -94.54            | 4.70            | 40° 28' 9.193 N        | 104° 21' 19.107 W   | 1,415,832.95       | 3,318,474.35      |
| 2,217.00        | 14.38              | 159.44         | 2,206.83        |  | -115.85           | 10.58           | 40° 28' 8.982 N        | 104° 21' 19.034 W   | 1,415,811.63       | 3,318,480.23      |
| 2,313.00        | 12.79              | 158.91         | 2,300.14        |  | -136.93           | 18.59           | 40° 28' 8.773 N        | 104° 21' 18.934 W   | 1,415,790.56       | 3,318,488.24      |
| 2,407.00        | 13.30              | 165.23         | 2,391.72        |  | -157.10           | 25.09           | 40° 28' 8.573 N        | 104° 21' 18.854 W   | 1,415,770.39       | 3,318,494.74      |
| 2,502.00        | 14.27              | 163.97         | 2,483.98        |  | -178.92           | 31.11           | 40° 28' 8.356 N        | 104° 21' 18.779 W   | 1,415,748.57       | 3,318,500.76      |
| 2,597.00        | 13.31              | 164.95         | 2,576.24        |  | -200.73           | 37.19           | 40° 28' 8.140 N        | 104° 21' 18.704 W   | 1,415,726.76       | 3,318,506.83      |
| 2,692.00        | 13.49              | 168.60         | 2,668.66        |  | -222.15           | 42.22           | 40° 28' 7.928 N        | 104° 21' 18.643 W   | 1,415,705.34       | 3,318,511.86      |
| 2,787.00        | 12.26              | 167.65         | 2,761.27        |  | -242.87           | 46.56           | 40° 28' 7.722 N        | 104° 21' 18.590 W   | 1,415,684.62       | 3,318,516.21      |
| 2,882.00        | 13.33              | 173.61         | 2,853.91        |  | -263.61           | 49.94           | 40° 28' 7.517 N        | 104° 21' 18.550 W   | 1,415,663.89       | 3,318,519.58      |
| 2,977.00        | 15.16              | 175.53         | 2,945.99        |  | -286.88           | 52.13           | 40° 28' 7.287 N        | 104° 21' 18.526 W   | 1,415,640.62       | 3,318,521.77      |
| 3,072.00        | 15.06              | 169.42         | 3,037.71        |  | -311.39           | 55.36           | 40° 28' 7.044 N        | 104° 21' 18.488 W   | 1,415,616.10       | 3,318,525.01      |
| 3,167.00        | 12.45              | 167.89         | 3,129.98        |  | -333.54           | 59.78           | 40° 28' 6.825 N        | 104° 21' 18.434 W   | 1,415,593.95       | 3,318,529.42      |
| 3,262.00        | 12.35              | 174.01         | 3,222.77        |  | -353.66           | 62.99           | 40° 28' 6.625 N        | 104° 21' 18.396 W   | 1,415,573.84       | 3,318,532.63      |
| 3,357.00        | 11.61              | 169.55         | 3,315.70        |  | -373.16           | 65.78           | 40° 28' 6.432 N        | 104° 21' 18.363 W   | 1,415,554.33       | 3,318,535.42      |
| 3,452.00        | 11.26              | 164.15         | 3,408.82        |  | -391.49           | 70.05           | 40° 28' 6.251 N        | 104° 21' 18.311 W   | 1,415,536.01       | 3,318,539.69      |
| 3,547.00        | 12.86              | 167.30         | 3,501.72        |  | -410.73           | 74.90           | 40° 28' 6.060 N        | 104° 21' 18.252 W   | 1,415,516.77       | 3,318,544.55      |
| 3,642.00        | 15.58              | 172.03         | 3,593.80        |  | -433.68           | 79.00           | 40° 28' 5.833 N        | 104° 21' 18.202 W   | 1,415,493.82       | 3,318,548.64      |
| 3,737.00        | 17.17              | 172.23         | 3,684.94        |  | -460.21           | 82.66           | 40° 28' 5.570 N        | 104° 21' 18.159 W   | 1,415,467.29       | 3,318,552.31      |
| 3,832.00        | 19.01              | 171.15         | 3,775.24        |  | -489.39           | 86.94           | 40° 28' 5.281 N        | 104° 21' 18.109 W   | 1,415,438.11       | 3,318,556.58      |
| 3,927.00        | 17.23              | 167.69         | 3,865.53        |  | -518.43           | 92.32           | 40° 28' 4.994 N        | 104° 21' 18.044 W   | 1,415,409.07       | 3,318,561.96      |
| 4,021.00        | 13.19              | 169.89         | 3,956.22        |  | -542.60           | 97.17           | 40° 28' 4.754 N        | 104° 21' 17.986 W   | 1,415,384.90       | 3,318,566.82      |
| 4,116.00        | 11.41              | 170.99         | 4,049.04        |  | -562.55           | 100.55          | 40° 28' 4.557 N        | 104° 21' 17.945 W   | 1,415,364.95       | 3,318,570.19      |
| 4,211.00        | 9.54               | 173.19         | 4,142.45        |  | -579.65           | 102.95          | 40° 28' 4.387 N        | 104° 21' 17.917 W   | 1,415,347.85       | 3,318,572.59      |
| 4,306.00        | 8.28               | 172.68         | 4,236.30        |  | -594.26           | 104.76          | 40° 28' 4.243 N        | 104° 21' 17.896 W   | 1,415,333.25       | 3,318,574.40      |
| 4,401.00        | 8.38               | 175.12         | 4,330.30        |  | -607.94           | 106.22          | 40° 28' 4.108 N        | 104° 21' 17.879 W   | 1,415,319.57       | 3,318,575.86      |
| 4,496.00        | 7.06               | 179.98         | 4,424.44        |  | -620.67           | 106.81          | 40° 28' 3.982 N        | 104° 21' 17.874 W   | 1,415,306.83       | 3,318,576.45      |
| 4,591.00        | 5.31               | 182.75         | 4,518.88        |  | -630.90           | 106.60          | 40° 28' 3.881 N        | 104° 21' 17.878 W   | 1,415,296.60       | 3,318,576.24      |
| 4,686.00        | 3.82               | 180.41         | 4,613.58        |  | -638.46           | 106.37          | 40° 28' 3.806 N        | 104° 21' 17.883 W   | 1,415,289.05       | 3,318,576.01      |
| 4,781.00        | 3.08               | 183.14         | 4,708.40        |  | -644.17           | 106.20          | 40° 28' 3.749 N        | 104° 21' 17.886 W   | 1,415,283.33       | 3,318,575.85      |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Geographic Coordinates |                     | UTM Coordinates    |                   |
|-----------------------------|--------------------|----------------|-----------------------------|-------------------|-----------------|------------------------|---------------------|--------------------|-------------------|
|                             |                    |                |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) | Latitude<br>(usft)     | Longitude<br>(usft) | Northing<br>(usft) | Easting<br>(usft) |
| 4,876.00                    | 2.00               | 186.49         | 4,803.31                    | -648.37           | 105.88          | 40° 28' 3.708 N        | 104° 21' 17.891 W   | 1,415,279.14       | 3,318,575.52      |
| 4,971.00                    | 0.56               | 217.47         | 4,898.28                    | -650.38           | 105.41          | 40° 28' 3.688 N        | 104° 21' 17.897 W   | 1,415,277.12       | 3,318,575.05      |
| 5,066.00                    | 0.50               | 185.53         | 4,993.28                    | -651.16           | 105.09          | 40° 28' 3.681 N        | 104° 21' 17.901 W   | 1,415,276.34       | 3,318,574.73      |
| 5,160.00                    | 0.50               | 236.52         | 5,087.28                    | -651.80           | 104.70          | 40° 28' 3.674 N        | 104° 21' 17.906 W   | 1,415,275.71       | 3,318,574.35      |
| 5,255.00                    | 0.34               | 320.28         | 5,182.28                    | -651.81           | 104.18          | 40° 28' 3.674 N        | 104° 21' 17.913 W   | 1,415,275.69       | 3,318,573.82      |
| 5,350.00                    | 0.60               | 261.70         | 5,277.27                    | -651.67           | 103.51          | 40° 28' 3.676 N        | 104° 21' 17.922 W   | 1,415,275.84       | 3,318,573.15      |
| 5,445.00                    | 0.59               | 253.46         | 5,372.27                    | -651.88           | 102.54          | 40° 28' 3.674 N        | 104° 21' 17.934 W   | 1,415,275.63       | 3,318,572.19      |
| 5,540.00                    | 0.15               | 333.66         | 5,467.27                    | -651.90           | 102.02          | 40° 28' 3.674 N        | 104° 21' 17.941 W   | 1,415,275.60       | 3,318,571.66      |
| 5,635.00                    | 0.10               | 83.71          | 5,562.27                    | -651.78           | 102.05          | 40° 28' 3.675 N        | 104° 21' 17.941 W   | 1,415,275.72       | 3,318,571.69      |
| 5,730.00                    | 0.35               | 331.07         | 5,657.27                    | -651.52           | 101.99          | 40° 28' 3.677 N        | 104° 21' 17.941 W   | 1,415,275.98       | 3,318,571.63      |
| 5,825.00                    | 0.31               | 16.21          | 5,752.26                    | -651.02           | 101.92          | 40° 28' 3.682 N        | 104° 21' 17.942 W   | 1,415,276.49       | 3,318,571.56      |
| 5,917.00                    | 0.33               | 30.77          | 5,844.26                    | -650.55           | 102.13          | 40° 28' 3.687 N        | 104° 21' 17.939 W   | 1,415,276.95       | 3,318,571.77      |
| 6,012.00                    | 0.63               | 101.20         | 5,939.26                    | -650.42           | 102.78          | 40° 28' 3.688 N        | 104° 21' 17.931 W   | 1,415,277.09       | 3,318,572.42      |
| 6,107.00                    | 10.64              | 98.82          | 6,033.68                    | -651.87           | 111.98          | 40° 28' 3.673 N        | 104° 21' 17.812 W   | 1,415,275.64       | 3,318,581.62      |
| 6,201.00                    | 21.66              | 98.25          | 6,123.83                    | -655.70           | 137.80          | 40° 28' 3.632 N        | 104° 21' 17.479 W   | 1,415,271.80       | 3,318,607.44      |
| 6,296.00                    | 32.95              | 96.82          | 6,208.11                    | -661.30           | 180.95          | 40° 28' 3.571 N        | 104° 21' 16.922 W   | 1,415,266.20       | 3,318,650.59      |
| 6,344.00                    | 39.43              | 90.70          | 6,246.84                    | -663.04           | 209.19          | 40° 28' 3.550 N        | 104° 21' 16.556 W   | 1,415,264.46       | 3,318,678.83      |
| 6,391.00                    | 43.62              | 86.69          | 6,282.03                    | -662.29           | 240.32          | 40° 28' 3.553 N        | 104° 21' 16.154 W   | 1,415,265.22       | 3,318,709.96      |
| 6,439.00                    | 45.03              | 86.68          | 6,316.37                    | -660.35           | 273.80          | 40° 28' 3.568 N        | 104° 21' 15.720 W   | 1,415,267.16       | 3,318,743.44      |
| 6,486.00                    | 45.93              | 87.02          | 6,349.32                    | -658.51           | 307.26          | 40° 28' 3.582 N        | 104° 21' 15.287 W   | 1,415,269.00       | 3,318,776.90      |
| 6,534.00                    | 49.41              | 87.67          | 6,381.64                    | -656.87           | 342.70          | 40° 28' 3.594 N        | 104° 21' 14.828 W   | 1,415,270.64       | 3,318,812.34      |
| 6,581.00                    | 52.23              | 87.65          | 6,411.33                    | -655.38           | 379.10          | 40° 28' 3.604 N        | 104° 21' 14.357 W   | 1,415,272.12       | 3,318,848.73      |
| 6,629.00                    | 55.17              | 87.25          | 6,439.74                    | -653.66           | 417.74          | 40° 28' 3.616 N        | 104° 21' 13.857 W   | 1,415,273.85       | 3,318,887.37      |
| 6,676.00                    | 56.91              | 86.88          | 6,466.00                    | -651.66           | 456.67          | 40° 28' 3.631 N        | 104° 21' 13.353 W   | 1,415,275.84       | 3,318,926.30      |
| 6,724.00                    | 59.21              | 86.08          | 6,491.39                    | -649.16           | 497.33          | 40° 28' 3.650 N        | 104° 21' 12.826 W   | 1,415,278.35       | 3,318,966.95      |
| 6,771.00                    | 63.25              | 87.59          | 6,514.00                    | -646.89           | 538.45          | 40° 28' 3.667 N        | 104° 21' 12.294 W   | 1,415,280.61       | 3,319,008.08      |
| 6,819.00                    | 66.13              | 88.04          | 6,534.52                    | -645.24           | 581.81          | 40° 28' 3.678 N        | 104° 21' 11.733 W   | 1,415,282.26       | 3,319,051.43      |
| 6,865.00                    | 70.09              | 88.31          | 6,551.67                    | -643.88           | 624.46          | 40° 28' 3.686 N        | 104° 21' 11.181 W   | 1,415,283.62       | 3,319,094.09      |
| 6,913.00                    | 71.73              | 87.87          | 6,567.37                    | -642.37           | 669.80          | 40° 28' 3.695 N        | 104° 21' 10.594 W   | 1,415,285.13       | 3,319,139.42      |
| 6,960.00                    | 74.58              | 86.43          | 6,580.99                    | -640.13           | 714.72          | 40° 28' 3.712 N        | 104° 21' 10.012 W   | 1,415,287.37       | 3,319,184.34      |
| 6,989.00                    | 75.20              | 86.17          | 6,588.55                    | -638.32           | 742.66          | 40° 28' 3.726 N        | 104° 21' 9.651 W    | 1,415,289.18       | 3,319,212.27      |
| 7,043.00                    | 77.50              | 86.40          | 6,601.29                    | -634.93           | 795.02          | 40° 28' 3.753 N        | 104° 21' 8.973 W    | 1,415,292.58       | 3,319,264.63      |
| 7,160.00                    | 82.49              | 86.89          | 6,621.61                    | -628.19           | 910.00          | 40° 28' 3.805 N        | 104° 21' 7.484 W    | 1,415,299.31       | 3,319,379.62      |
| 7,253.00                    | 86.15              | 87.19          | 6,630.81                    | -623.41           | 1,002.41        | 40° 28' 3.840 N        | 104° 21' 6.288 W    | 1,415,304.09       | 3,319,472.02      |
| 7,345.00                    | 90.83              | 88.76          | 6,633.23                    | -620.17           | 1,094.29        | 40° 28' 3.860 N        | 104° 21' 5.098 W    | 1,415,307.34       | 3,319,563.90      |
| 7,438.00                    | 90.34              | 85.73          | 6,632.28                    | -615.70           | 1,187.17        | 40° 28' 3.893 N        | 104° 21' 3.896 W    | 1,415,311.81       | 3,319,656.77      |
| 7,531.00                    | 91.33              | 85.21          | 6,630.93                    | -608.35           | 1,279.87        | 40° 28' 3.953 N        | 104° 21' 2.696 W    | 1,415,319.15       | 3,319,749.46      |
| 7,624.00                    | 91.23              | 87.11          | 6,628.85                    | -602.13           | 1,372.63        | 40° 28' 4.003 N        | 104° 21' 1.495 W    | 1,415,325.38       | 3,319,842.23      |
| 7,717.00                    | 90.74              | 84.71          | 6,627.25                    | -595.49           | 1,465.37        | 40° 28' 4.057 N        | 104° 21' 0.294 W    | 1,415,332.01       | 3,319,934.96      |
| 7,810.00                    | 90.98              | 89.44          | 6,625.86                    | -590.75           | 1,558.21        | 40° 28' 4.092 N        | 104° 20' 59.092 W   | 1,415,336.75       | 3,320,027.80      |
| 7,901.00                    | 91.30              | 90.96          | 6,624.04                    | -591.07           | 1,649.19        | 40° 28' 4.077 N        | 104° 20' 57.915 W   | 1,415,336.44       | 3,320,118.78      |
| 7,993.00                    | 90.12              | 90.38          | 6,622.90                    | -592.14           | 1,741.18        | 40° 28' 4.054 N        | 104° 20' 56.725 W   | 1,415,335.36       | 3,320,210.76      |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

| Measured Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical Depth<br>(usft) | Local Coordinates |                 | Geographic Coordinates |                     | UTM Coordinates    |                   |
|--------------------------|--------------------|----------------|--------------------------|-------------------|-----------------|------------------------|---------------------|--------------------|-------------------|
|                          |                    |                |                          | +N/-S<br>(usft)   | +E/-W<br>(usft) | Latitude<br>(usft)     | Longitude<br>(usft) | Northing<br>(usft) | Easting<br>(usft) |
| 8,085.00                 | 92.34              | 88.72          | 6,620.93                 | -591.42           | 1,833.14        | 40° 28' 4.050 N        | 104° 20' 55.535 W   | 1,415,336.08       | 3,320,302.72      |
| 8,178.00                 | 90.31              | 88.23          | 6,618.78                 | -588.95           | 1,926.08        | 40° 28' 4.062 N        | 104° 20' 54.332 W   | 1,415,338.56       | 3,320,395.66      |
| 8,271.00                 | 92.47              | 90.68          | 6,616.52                 | -588.06           | 2,019.04        | 40° 28' 4.059 N        | 104° 20' 53.129 W   | 1,415,339.44       | 3,320,488.61      |
| 8,365.00                 | 92.37              | 89.35          | 6,612.55                 | -588.09           | 2,112.95        | 40° 28' 4.047 N        | 104° 20' 51.914 W   | 1,415,339.42       | 3,320,582.52      |
| 8,460.00                 | 90.62              | 89.91          | 6,610.08                 | -587.47           | 2,207.91        | 40° 28' 4.041 N        | 104° 20' 50.686 W   | 1,415,340.03       | 3,320,677.48      |
| 8,555.00                 | 90.40              | 87.08          | 6,609.23                 | -584.98           | 2,302.87        | 40° 28' 4.053 N        | 104° 20' 49.457 W   | 1,415,342.53       | 3,320,772.43      |
| 8,649.00                 | 92.96              | 91.48          | 6,606.47                 | -583.80           | 2,396.79        | 40° 28' 4.053 N        | 104° 20' 48.242 W   | 1,415,343.71       | 3,320,866.35      |
| 8,744.00                 | 93.36              | 90.70          | 6,601.24                 | -585.60           | 2,491.62        | 40° 28' 4.023 N        | 104° 20' 47.015 W   | 1,415,341.90       | 3,320,961.18      |
| 8,839.00                 | 92.03              | 90.12          | 6,596.77                 | -586.28           | 2,586.51        | 40° 28' 4.004 N        | 104° 20' 45.787 W   | 1,415,341.22       | 3,321,056.07      |
| 8,934.00                 | 90.71              | 88.68          | 6,594.50                 | -585.28           | 2,681.48        | 40° 28' 4.001 N        | 104° 20' 44.559 W   | 1,415,342.22       | 3,321,151.03      |
| 9,029.00                 | 90.55              | 92.31          | 6,593.45                 | -586.10           | 2,776.45        | 40° 28' 3.981 N        | 104° 20' 43.330 W   | 1,415,341.40       | 3,321,246.00      |
| 9,124.00                 | 90.28              | 92.89          | 6,592.76                 | -590.41           | 2,871.35        | 40° 28' 3.926 N        | 104° 20' 42.103 W   | 1,415,337.09       | 3,321,340.89      |
| 9,219.00                 | 90.40              | 92.66          | 6,592.20                 | -595.01           | 2,966.24        | 40° 28' 3.869 N        | 104° 20' 40.876 W   | 1,415,332.49       | 3,321,435.78      |
| 9,313.00                 | 90.31              | 92.00          | 6,591.62                 | -598.83           | 3,060.16        | 40° 28' 3.819 N        | 104° 20' 39.662 W   | 1,415,328.67       | 3,321,529.69      |
| 9,408.00                 | 90.15              | 87.15          | 6,591.24                 | -598.13           | 3,155.13        | 40° 28' 3.814 N        | 104° 20' 38.433 W   | 1,415,329.37       | 3,321,624.66      |
| 9,503.00                 | 89.85              | 86.26          | 6,591.24                 | -592.67           | 3,249.97        | 40° 28' 3.855 N        | 104° 20' 37.205 W   | 1,415,334.83       | 3,321,719.50      |
| 9,598.00                 | 89.69              | 85.66          | 6,591.62                 | -585.98           | 3,344.73        | 40° 28' 3.909 N        | 104° 20' 35.978 W   | 1,415,341.53       | 3,321,814.26      |
| 9,693.00                 | 93.40              | 84.73          | 6,589.06                 | -578.02           | 3,439.35        | 40° 28' 3.976 N        | 104° 20' 34.753 W   | 1,415,349.48       | 3,321,908.87      |
| 9,788.00                 | 92.19              | 84.54          | 6,584.43                 | -569.15           | 3,533.81        | 40° 28' 4.051 N        | 104° 20' 33.529 W   | 1,415,358.35       | 3,322,003.33      |
| 9,883.00                 | 91.33              | 89.00          | 6,581.51                 | -563.80           | 3,628.59        | 40° 28' 4.092 N        | 104° 20' 32.302 W   | 1,415,363.70       | 3,322,098.11      |
| 9,978.00                 | 91.33              | 87.64          | 6,579.30                 | -561.02           | 3,723.53        | 40° 28' 4.107 N        | 104° 20' 31.073 W   | 1,415,366.48       | 3,322,193.04      |
| 10,073.00                | 90.46              | 87.69          | 6,577.82                 | -557.15           | 3,818.43        | 40° 28' 4.133 N        | 104° 20' 29.845 W   | 1,415,370.35       | 3,322,287.94      |
| 10,168.00                | 90.40              | 86.33          | 6,577.10                 | -552.20           | 3,913.30        | 40° 28' 4.170 N        | 104° 20' 28.617 W   | 1,415,375.31       | 3,322,382.81      |
| 10,263.00                | 90.40              | 84.74          | 6,576.44                 | -544.80           | 4,008.01        | 40° 28' 4.230 N        | 104° 20' 27.390 W   | 1,415,382.70       | 3,322,477.51      |
| 10,358.00                | 90.00              | 87.27          | 6,576.11                 | -538.18           | 4,102.77        | 40° 28' 4.284 N        | 104° 20' 26.163 W   | 1,415,389.32       | 3,322,572.27      |
| 10,453.00                | 91.88              | 91.91          | 6,574.55                 | -537.50           | 4,197.72        | 40° 28' 4.278 N        | 104° 20' 24.935 W   | 1,415,390.00       | 3,322,667.22      |
| 10,548.00                | 90.80              | 91.42          | 6,572.33                 | -540.26           | 4,292.65        | 40° 28' 4.239 N        | 104° 20' 23.707 W   | 1,415,387.24       | 3,322,762.15      |
| 10,643.00                | 90.71              | 89.28          | 6,571.08                 | -540.84           | 4,387.64        | 40° 28' 4.221 N        | 104° 20' 22.478 W   | 1,415,386.66       | 3,322,857.13      |
| 10,705.00                | 90.59              | 87.35          | 6,570.37                 | -539.02           | 4,449.60        | 40° 28' 4.231 N        | 104° 20' 21.676 W   | 1,415,388.48       | 3,322,919.09      |
| 10,769.00                | 90.59              | 87.35          | 6,569.71                 | -536.06           | 4,513.53        | 40° 28' 4.251 N        | 104° 20' 20.849 W   | 1,415,391.44       | 3,322,983.02      |

### Design Annotations

| Measured Depth<br>(usft) | Vertical Depth<br>(usft) | Local Coordinates |                 | Comment                                      |
|--------------------------|--------------------------|-------------------|-----------------|--|
|                          |                          | +N/-S<br>(usft)   | +E/-W<br>(usft) |  |
| 935.00                   | 934.99                   | 0.46              | -0.67           | Tie-On to Surface Gyros @ 935.00ft           |
| 994.00                   | 993.99                   | 0.33              | -1.08           | First MWD Survey @ 994.00ft                  |
| 10,705.00                | 6,570.37                 | -539.02           | 4,449.60        | Final MWD Survey @ 10705.00ft                |
| 10,769.00                | 6,569.71                 | -536.06           | 4,513.53        | Straight Line Proj @ 10769' MD, 6569.71' TVD |

## Design Report for Wells Ranch AE20-63-1HN - Final Surveys

Vertical Section Information

| Angle<br>Type | Target               | Azimuth<br>(°) | Origin<br>Type | Origin<br>+N/_S<br>(usft) | Origin<br>+E/-W<br>(usft) | Start<br>TVD<br>(usft) |
|---------------|----------------------|----------------|----------------|---------------------------|---------------------------|------------------------|
| User          | No Target (Freehand) | 96.91          | Slot           | 0.00                      | 0.00                      | 0.00                   |

Survey tool program

| From<br>(usft) | To<br>(usft) | Survey/Plan              | Survey Tool |
|----------------|--------------|--------------------------|-------------|
| 355.00         | 935.00       | Surface Gyros            | MWD         |
| 994.00         | 6,989.00     | MWD Surveys - Vert/Build | MWD         |
| 7,160.00       | 10,705.00    | MWD Surveys - Lateral    | MWD         |

Casing Details

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Name  | Casing<br>Diameter<br>(") | Hole<br>Diameter<br>(") |
|-----------------------------|-----------------------------|---|---------------------------|-------------------------|
| 7,043.00                    | 6,601.29                    | Estimated: 7" Casing @ 7043' MD, 6601.29' TVD | 7                         | 8-3/4                   |

Design Targets

| Shape | Target Name | TVD<br>(') | Northing<br>(') | Easting<br>(') | +N/-S | +E/-W | Created | Updated |
|-------|-------------|------------|-----------------|----------------|-------|-------|---------|---------|
|-------|-------------|------------|-----------------|----------------|-------|-------|---------|---------|

Directional Difficulty Index

|                                    |                |                               |                                  |
|------------------------------------|----------------|-------------------------------|----------------------------------|
| Average Dogleg over Survey:        | 2.24 °/100usft | Maximum Dogleg over Survey:   | 15.44 °/100usft at 6,344.00 usft |
| Net Tortosity applicable to Plans: | 1.13 °/100usft | Directional Difficulty Index: | 6.300                            |

Audit Info

**North Reference Sheet for Sec. 20-T6N-R62W (Wells Ranch AE PAD) - Wells Ranch AE20-63-1HN**

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 ft. @ 4809.00usft (H&P 343). Northing and Easting are relative to Wells Ranch AE20-63-1HN - Slot A4

Coordinate System is US State Plane 1983, Colorado Northern 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:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996411

Grid Coordinates of Well: 1,415,927.48 usft N, 3,318,469.65 usft E

Geographical Coordinates of Well: 40° 28' 10.13" N, 104° 21' 19.15" W

Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,769.00usft

the Bottom Hole Displacement is 4,545.25usft in the Direction of 96.77° (Grid).

Magnetic Convergence at surface is: -7.63° (20 September 2013, , BGGM2013)

