

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 21-T1N-R67W

Howard 3C-33HZ

Plan A Rev 0

Plan: Plan A Rev 0 Permit

Sperry Drilling Services Proposal Report

20 December, 2012

Well Coordinates: 1,254,439.33 N, 3,168,291.00 E (40° 01' 48.93" N, 104° 53' 56.47" W)

Ground Level: 5,023.00 ft

Local Coordinate Origin:

Centered on Well Howard 3C-33HZ

Viewing Datum:

RKB=17 @ 5040.00ft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 431

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 21-T1N-R67W
Well: Howard 3C-33HZ
Wellbore: Plan A Rev 0
Design: Plan A Rev 0 Permit

Anadarko Petroleum Corp.

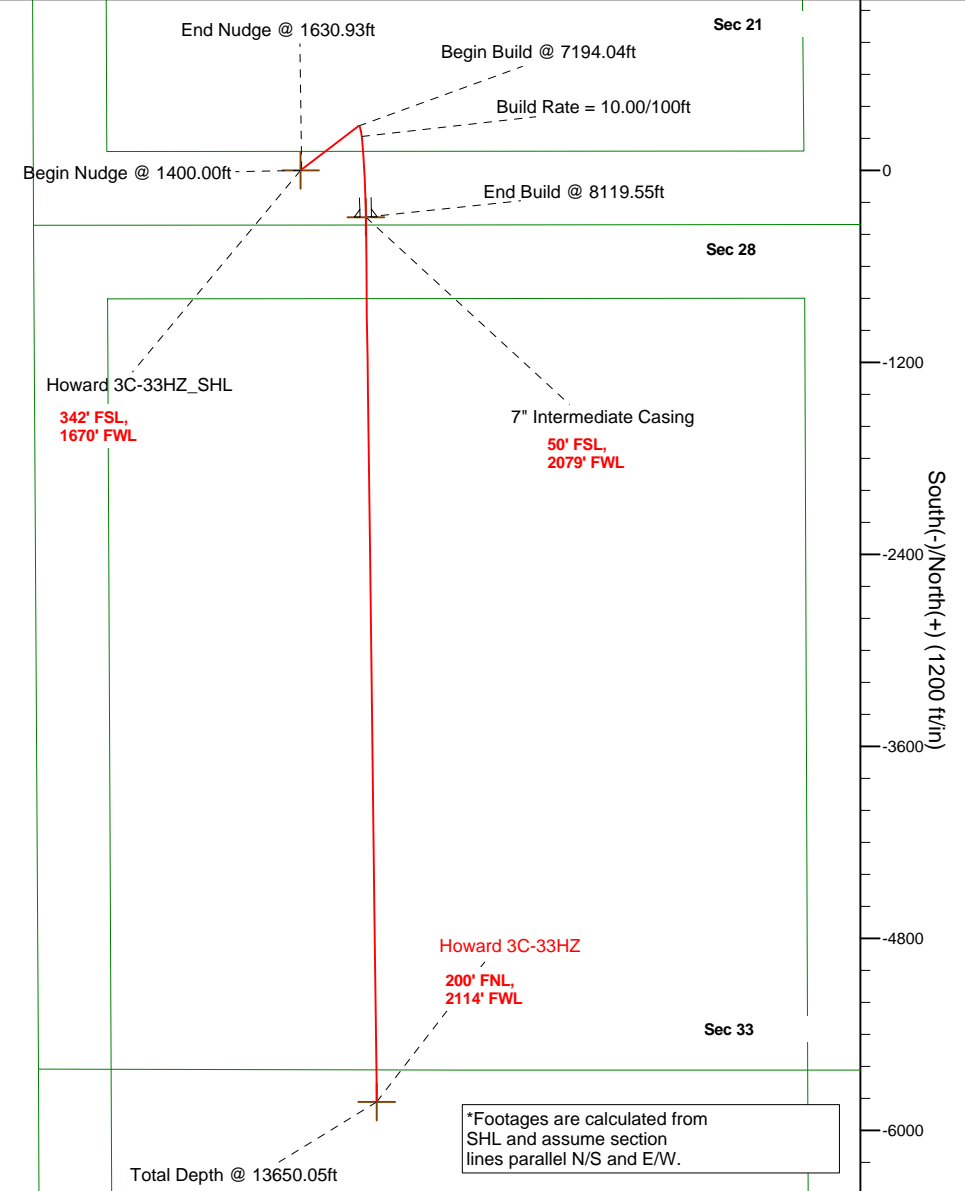
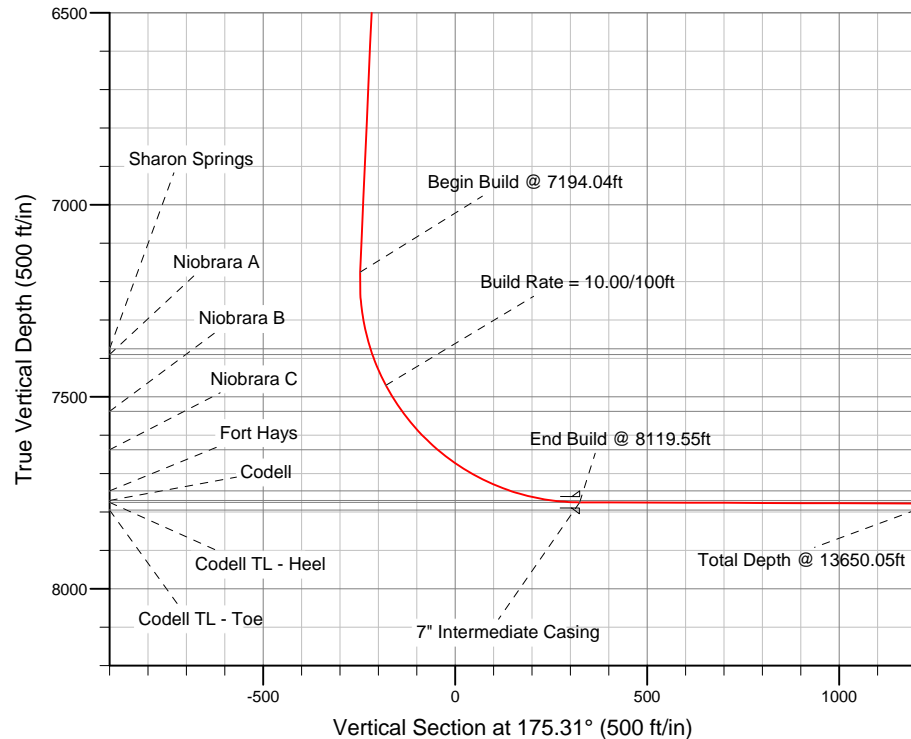
HALLIBURTON
Sperry Drilling

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSec | Target |
|-----|----------|-------|--------|---------|----------|--------|-------|--------|---------|--------------------|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 1400.00 | 0.00 | 0.00 | 1400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 1630.93 | 4.62 | 52.60 | 1630.68 | 5.65 | 7.39 | 2.00 | 52.60 | -5.03 | |
| 4 | 7194.04 | 4.62 | 52.60 | 7175.73 | 277.71 | 363.28 | 0.00 | 0.00 | -247.09 | |
| 5 | 8119.55 | 89.79 | 179.29 | 7775.00 | -292.00 | 409.00 | 10.00 | 126.61 | 324.44 | Howard 3C-33HZ_CP |
| 6 | 13650.05 | 89.79 | 179.29 | 7795.00 | -5822.04 | 477.30 | 0.00 | 0.00 | 5841.57 | Howard 3C-33HZ_BHL |

WELLBORE TARGET DETAILS (LAT/LONG)

| Name | TVD | +N/-S | +E/-W | Latitude | Longitude | Shape |
|--------------------|---------|----------|--------|-----------|-------------|-------|
| Howard 3C-33HZ_SHL | 0.00 | 0.00 | 0.00 | 40.030258 | -104.899019 | Point |
| Howard 3C-33HZ_CP | 7775.00 | -292.00 | 409.00 | 40.029456 | -104.897559 | Point |
| Howard 3C-33HZ_BHL | 7795.00 | -5822.04 | 477.30 | 40.014276 | -104.897315 | Point |



*Footages are calculated from
SHL and assume section
lines parallel N/S and E/W.

WELL DETAILS: Howard 3C-33HZ

Ground Level: 5023.00 RKB=17 @ 5040.00ft (Drilling Rig)

Plan: Plan A Rev 0 Permit (Howard 3C-33HZ/Plan A Rev 0)

Created By: Fred Hartmann Date: 12/20/2012
Reviewed: _____ Date: _____

Plan Report for Howard 3C-33HZ - Plan A Rev 0 Permit

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N-S (ft) | +E-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | Toolface Azimuth (°) |
|--------------------------------|-----------------|-------------|---------------------|-----------|-----------|-----------------------|-----------------------|----------------------|---------------------|----------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,400.00 | 0.00 | 0.00 | 1,400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Begin Nudge @ 1400.00ft | | | | | | | | | | |
| 1,500.00 | 2.00 | 52.60 | 1,499.98 | 1.06 | 1.39 | -0.94 | 2.00 | 2.00 | 0.00 | 52.60 |
| 1,600.00 | 4.00 | 52.60 | 1,599.84 | 4.24 | 5.54 | -3.77 | 2.00 | 2.00 | 0.00 | 0.00 |
| 1,630.93 | 4.62 | 52.60 | 1,630.68 | 5.65 | 7.39 | -5.03 | 2.00 | 2.00 | 0.00 | 0.00 |
| End Nudge @ 1630.93ft | | | | | | | | | | |
| 1,700.00 | 4.62 | 52.60 | 1,699.53 | 9.03 | 11.81 | -8.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,800.00 | 4.62 | 52.60 | 1,799.20 | 13.92 | 18.21 | -12.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1,900.00 | 4.62 | 52.60 | 1,898.88 | 18.81 | 24.60 | -16.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,000.00 | 4.62 | 52.60 | 1,998.55 | 23.70 | 31.00 | -21.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,100.00 | 4.62 | 52.60 | 2,098.23 | 28.59 | 37.40 | -25.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,200.00 | 4.62 | 52.60 | 2,197.90 | 33.48 | 43.80 | -29.79 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,300.00 | 4.62 | 52.60 | 2,297.58 | 38.37 | 50.19 | -34.14 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,400.00 | 4.62 | 52.60 | 2,397.25 | 43.26 | 56.59 | -38.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,500.00 | 4.62 | 52.60 | 2,496.93 | 48.15 | 62.99 | -42.84 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,600.00 | 4.62 | 52.60 | 2,596.60 | 53.04 | 69.38 | -47.19 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,700.00 | 4.62 | 52.60 | 2,696.28 | 57.93 | 75.78 | -51.55 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,800.00 | 4.62 | 52.60 | 2,795.95 | 62.82 | 82.18 | -55.90 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2,900.00 | 4.62 | 52.60 | 2,895.63 | 67.71 | 88.58 | -60.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,000.00 | 4.62 | 52.60 | 2,995.30 | 72.60 | 94.97 | -64.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,100.00 | 4.62 | 52.60 | 3,094.98 | 77.49 | 101.37 | -68.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,200.00 | 4.62 | 52.60 | 3,194.65 | 82.38 | 107.77 | -73.30 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,300.00 | 4.62 | 52.60 | 3,294.33 | 87.27 | 114.17 | -77.65 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,400.00 | 4.62 | 52.60 | 3,394.01 | 92.16 | 120.56 | -82.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,500.00 | 4.62 | 52.60 | 3,493.68 | 97.05 | 126.96 | -86.36 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,600.00 | 4.62 | 52.60 | 3,593.36 | 101.94 | 133.36 | -90.71 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,700.00 | 4.62 | 52.60 | 3,693.03 | 106.83 | 139.75 | -95.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,800.00 | 4.62 | 52.60 | 3,792.71 | 111.72 | 146.15 | -99.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3,900.00 | 4.62 | 52.60 | 3,892.38 | 116.62 | 152.55 | -103.76 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,000.00 | 4.62 | 52.60 | 3,992.06 | 121.51 | 158.95 | -108.11 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,100.00 | 4.62 | 52.60 | 4,091.73 | 126.40 | 165.34 | -112.46 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,200.00 | 4.62 | 52.60 | 4,191.41 | 131.29 | 171.74 | -116.81 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,300.00 | 4.62 | 52.60 | 4,291.08 | 136.18 | 178.14 | -121.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,400.00 | 4.62 | 52.60 | 4,390.76 | 141.07 | 184.54 | -125.52 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,500.00 | 4.62 | 52.60 | 4,490.43 | 145.96 | 190.93 | -129.87 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,600.00 | 4.62 | 52.60 | 4,590.11 | 150.85 | 197.33 | -134.22 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,700.00 | 4.62 | 52.60 | 4,689.78 | 155.74 | 203.73 | -138.57 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,800.00 | 4.62 | 52.60 | 4,789.46 | 160.63 | 210.13 | -142.92 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4,830.64 | 4.62 | 52.60 | 4,820.00 | 162.13 | 212.09 | -144.26 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sussex | | | | | | | | | | |
| 4,900.00 | 4.62 | 52.60 | 4,889.13 | 165.52 | 216.52 | -147.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,000.00 | 4.62 | 52.60 | 4,988.81 | 170.41 | 222.92 | -151.63 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,100.00 | 4.62 | 52.60 | 5,088.48 | 175.30 | 229.32 | -155.98 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,200.00 | 4.62 | 52.60 | 5,188.16 | 180.19 | 235.71 | -160.33 | 0.00 | 0.00 | 0.00 | 0.00 |

Plan Report for Howard 3C-33HZ - Plan A Rev 0 Permit

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | Toolface Azimuth (°) |
|--|-----------------|-------------|---------------------|------------|------------|-----------------------|-----------------------|----------------------|---------------------|----------------------|
| 5,300.00 | 4.62 | 52.60 | 5,287.84 | 185.08 | 242.11 | -164.68 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,400.00 | 4.62 | 52.60 | 5,387.51 | 189.97 | 248.51 | -169.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,500.00 | 4.62 | 52.60 | 5,487.19 | 194.86 | 254.91 | -173.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,600.00 | 4.62 | 52.60 | 5,586.86 | 199.75 | 261.30 | -177.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,700.00 | 4.62 | 52.60 | 5,686.54 | 204.64 | 267.70 | -182.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,800.00 | 4.62 | 52.60 | 5,786.21 | 209.53 | 274.10 | -186.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5,900.00 | 4.62 | 52.60 | 5,885.89 | 214.42 | 280.50 | -190.79 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,000.00 | 4.62 | 52.60 | 5,985.56 | 219.31 | 286.89 | -195.14 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,100.00 | 4.62 | 52.60 | 6,085.24 | 224.20 | 293.29 | -199.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,200.00 | 4.62 | 52.60 | 6,184.91 | 229.09 | 299.69 | -203.84 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,300.00 | 4.62 | 52.60 | 6,284.59 | 233.98 | 306.08 | -208.19 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,400.00 | 4.62 | 52.60 | 6,384.26 | 238.87 | 312.48 | -212.54 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,500.00 | 4.62 | 52.60 | 6,483.94 | 243.76 | 318.88 | -216.89 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,600.00 | 4.62 | 52.60 | 6,583.61 | 248.65 | 325.28 | -221.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,700.00 | 4.62 | 52.60 | 6,683.29 | 253.55 | 331.67 | -225.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,800.00 | 4.62 | 52.60 | 6,782.96 | 258.44 | 338.07 | -229.95 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6,900.00 | 4.62 | 52.60 | 6,882.64 | 263.33 | 344.47 | -234.30 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,000.00 | 4.62 | 52.60 | 6,982.31 | 268.22 | 350.87 | -238.65 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,100.00 | 4.62 | 52.60 | 7,081.99 | 273.11 | 357.26 | -243.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7,194.04 | 4.62 | 52.60 | 7,175.72 | 277.71 | 363.28 | -247.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| Begin Build @ 7194.04ft | | | | | | | | | | |
| 7,200.00 | 4.29 | 59.01 | 7,181.67 | 277.97 | 363.66 | -247.32 | 9.99 | -5.51 | 107.46 | 126.61 |
| 7,300.00 | 8.66 | 154.15 | 7,281.21 | 273.10 | 370.17 | -241.94 | 10.00 | 4.37 | 95.14 | 120.23 |
| 7,396.44 | 17.86 | 167.71 | 7,375.00 | 252.06 | 376.50 | -220.46 | 10.00 | 9.53 | 14.06 | 25.41 |
| Sharon Springs | | | | | | | | | | |
| 7,400.00 | 18.21 | 167.95 | 7,378.38 | 250.99 | 376.73 | -219.37 | 10.00 | 9.78 | 6.75 | 12.17 |
| 7,412.27 | 19.41 | 168.71 | 7,390.00 | 247.11 | 377.53 | -215.44 | 10.00 | 9.80 | 6.23 | 11.94 |
| Niobrara A | | | | | | | | | | |
| 7,500.00 | 28.06 | 172.33 | 7,470.23 | 212.30 | 383.15 | -180.29 | 10.00 | 9.87 | 4.12 | 11.22 |
| Build Rate = 10.00/100ft | | | | | | | | | | |
| 7,580.00 | 36.00 | 174.19 | 7,538.00 | 170.19 | 388.05 | -137.92 | 10.00 | 9.92 | 2.33 | 7.90 |
| Niobrara B | | | | | | | | | | |
| 7,600.00 | 37.99 | 174.55 | 7,553.97 | 158.21 | 389.23 | -125.88 | 10.00 | 9.94 | 1.79 | 6.31 |
| 7,700.00 | 47.95 | 175.96 | 7,627.06 | 90.37 | 394.78 | -57.81 | 10.00 | 9.95 | 1.41 | 6.03 |
| 7,716.61 | 49.60 | 176.15 | 7,638.00 | 77.91 | 395.64 | -45.32 | 10.00 | 9.96 | 1.14 | 4.99 |
| Niobrara C | | | | | | | | | | |
| 7,800.00 | 57.91 | 176.98 | 7,687.26 | 10.83 | 399.65 | 21.86 | 10.00 | 9.97 | 1.00 | 4.87 |
| 7,900.00 | 67.89 | 177.80 | 7,732.76 | -77.98 | 403.67 | 110.71 | 10.00 | 9.97 | 0.82 | 4.38 |
| 7,935.19 | 71.40 | 178.06 | 7,745.00 | -110.95 | 404.86 | 143.66 | 10.00 | 9.98 | 0.74 | 4.00 |
| Fort Hays | | | | | | | | | | |
| 8,000.00 | 77.86 | 178.51 | 7,762.17 | -173.38 | 406.73 | 206.03 | 10.00 | 9.98 | 0.70 | 3.91 |
| 8,045.77 | 82.43 | 178.81 | 7,770.00 | -218.45 | 407.78 | 251.04 | 10.00 | 9.98 | 0.67 | 3.79 |
| Codell | | | | | | | | | | |
| 8,100.00 | 87.84 | 179.17 | 7,774.60 | -272.46 | 408.74 | 304.94 | 10.00 | 9.98 | 0.65 | 3.74 |
| 8,119.55 | 89.79 | 179.29 | 7,775.00 | -292.00 | 409.00 | 324.44 | 10.00 | 9.98 | 0.65 | 3.71 |
| End Build @ 8119.55ft - Codell TL - Heel - 7" Intermediate Casing - Howard 3C-33HZ_CP | | | | | | | | | | |
| 8,200.00 | 89.79 | 179.29 | 7,775.29 | -372.44 | 409.99 | 404.70 | 0.00 | 0.00 | 0.00 | 3.71 |
| 8,300.00 | 89.79 | 179.29 | 7,775.65 | -472.43 | 411.23 | 504.45 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,400.00 | 89.79 | 179.29 | 7,776.01 | -572.43 | 412.46 | 604.21 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,500.00 | 89.79 | 179.29 | 7,776.38 | -672.42 | 413.70 | 703.97 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,600.00 | 89.79 | 179.29 | 7,776.74 | -772.41 | 414.93 | 803.73 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,700.00 | 89.79 | 179.29 | 7,777.10 | -872.40 | 416.17 | 903.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,800.00 | 89.79 | 179.29 | 7,777.46 | -972.39 | 417.40 | 1,003.25 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8,900.00 | 89.79 | 179.29 | 7,777.82 | -1,072.38 | 418.64 | 1,103.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,000.00 | 89.79 | 179.29 | 7,778.18 | -1,172.38 | 419.87 | 1,202.76 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,100.00 | 89.79 | 179.29 | 7,778.55 | -1,272.37 | 421.11 | 1,302.52 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,200.00 | 89.79 | 179.29 | 7,778.91 | -1,372.36 | 422.34 | 1,402.28 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,300.00 | 89.79 | 179.29 | 7,779.27 | -1,472.35 | 423.58 | 1,502.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,400.00 | 89.79 | 179.29 | 7,779.63 | -1,572.34 | 424.81 | 1,601.80 | 0.00 | 0.00 | 0.00 | 0.00 |

Plan Report for Howard 3C-33HZ - Plan A Rev 0 Permit

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N-S (ft) | +E-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | Toolface Azimuth (°) |
|---------------------|-----------------|-------------|---------------------|-----------|-----------|-----------------------|-----------------------|----------------------|---------------------|----------------------|
| 9,500.00 | 89.79 | 179.29 | 7,779.99 | -1,672.33 | 426.05 | 1,701.55 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,600.00 | 89.79 | 179.29 | 7,780.35 | -1,772.33 | 427.28 | 1,801.31 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,700.00 | 89.79 | 179.29 | 7,780.72 | -1,872.32 | 428.52 | 1,901.07 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,800.00 | 89.79 | 179.29 | 7,781.08 | -1,972.31 | 429.75 | 2,000.83 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9,900.00 | 89.79 | 179.29 | 7,781.44 | -2,072.30 | 430.99 | 2,100.59 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,000.00 | 89.79 | 179.29 | 7,781.80 | -2,172.29 | 432.22 | 2,200.35 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,100.00 | 89.79 | 179.29 | 7,782.16 | -2,272.28 | 433.46 | 2,300.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,200.00 | 89.79 | 179.29 | 7,782.52 | -2,372.28 | 434.69 | 2,399.86 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,300.00 | 89.79 | 179.29 | 7,782.89 | -2,472.27 | 435.93 | 2,499.62 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,400.00 | 89.79 | 179.29 | 7,783.25 | -2,572.26 | 437.16 | 2,599.38 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,500.00 | 89.79 | 179.29 | 7,783.61 | -2,672.25 | 438.40 | 2,699.14 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,600.00 | 89.79 | 179.29 | 7,783.97 | -2,772.24 | 439.63 | 2,798.90 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,700.00 | 89.79 | 179.29 | 7,784.33 | -2,872.24 | 440.87 | 2,898.65 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,800.00 | 89.79 | 179.29 | 7,784.69 | -2,972.23 | 442.10 | 2,998.41 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10,900.00 | 89.79 | 179.29 | 7,785.05 | -3,072.22 | 443.34 | 3,098.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,000.00 | 89.79 | 179.29 | 7,785.42 | -3,172.21 | 444.57 | 3,197.93 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,100.00 | 89.79 | 179.29 | 7,785.78 | -3,272.20 | 445.81 | 3,297.69 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,200.00 | 89.79 | 179.29 | 7,786.14 | -3,372.19 | 447.04 | 3,397.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,300.00 | 89.79 | 179.29 | 7,786.50 | -3,472.19 | 448.28 | 3,497.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,400.00 | 89.79 | 179.29 | 7,786.86 | -3,572.18 | 449.51 | 3,596.96 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,500.00 | 89.79 | 179.29 | 7,787.22 | -3,672.17 | 450.75 | 3,696.72 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,600.00 | 89.79 | 179.29 | 7,787.59 | -3,772.16 | 451.98 | 3,796.48 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,700.00 | 89.79 | 179.29 | 7,787.95 | -3,872.15 | 453.22 | 3,896.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,800.00 | 89.79 | 179.29 | 7,788.31 | -3,972.14 | 454.45 | 3,995.99 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11,900.00 | 89.79 | 179.29 | 7,788.67 | -4,072.14 | 455.69 | 4,095.75 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,000.00 | 89.79 | 179.29 | 7,789.03 | -4,172.13 | 456.92 | 4,195.51 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,100.00 | 89.79 | 179.29 | 7,789.39 | -4,272.12 | 458.16 | 4,295.27 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,200.00 | 89.79 | 179.29 | 7,789.76 | -4,372.11 | 459.39 | 4,395.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,300.00 | 89.79 | 179.29 | 7,790.12 | -4,472.10 | 460.63 | 4,494.79 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,400.00 | 89.79 | 179.29 | 7,790.48 | -4,572.09 | 461.86 | 4,594.54 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,500.00 | 89.79 | 179.29 | 7,790.84 | -4,672.09 | 463.10 | 4,694.30 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,600.00 | 89.79 | 179.29 | 7,791.20 | -4,772.08 | 464.33 | 4,794.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,700.00 | 89.79 | 179.29 | 7,791.56 | -4,872.07 | 465.57 | 4,893.82 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,800.00 | 89.79 | 179.29 | 7,791.93 | -4,972.06 | 466.80 | 4,993.58 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12,900.00 | 89.79 | 179.29 | 7,792.29 | -5,072.05 | 468.04 | 5,093.34 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,000.00 | 89.79 | 179.29 | 7,792.65 | -5,172.04 | 469.27 | 5,193.09 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,100.00 | 89.79 | 179.29 | 7,793.01 | -5,272.04 | 470.51 | 5,292.85 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,200.00 | 89.79 | 179.29 | 7,793.37 | -5,372.03 | 471.74 | 5,392.61 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,300.00 | 89.79 | 179.29 | 7,793.73 | -5,472.02 | 472.98 | 5,492.37 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,400.00 | 89.79 | 179.29 | 7,794.10 | -5,572.01 | 474.21 | 5,592.13 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,500.00 | 89.79 | 179.29 | 7,794.46 | -5,672.00 | 475.45 | 5,691.89 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,600.00 | 89.79 | 179.29 | 7,794.82 | -5,771.99 | 476.68 | 5,791.64 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13,650.05 | 89.79 | 179.29 | 7,795.00 | -5,822.04 | 477.30 | 5,841.57 | 0.00 | 0.00 | 0.00 | 0.00 |

Total Depth @ 13650.05ft - Howard 3C-33HZ_BHL**Plan Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates | | Comment |
|---------------------|---------------------|-------------------|-----------|--------------------------|
| | | +N-S (ft) | +E-W (ft) | |
| 1,400.00 | 1,400.00 | 0.00 | 0.00 | Begin Nudge @ 1400.00ft |
| 1,630.93 | 1,630.68 | 5.65 | 7.39 | End Nudge @ 1630.93ft |
| 7,194.04 | 7,175.72 | 277.71 | 363.28 | Begin Build @ 7194.04ft |
| 7,500.00 | 7,470.23 | 212.30 | 383.15 | Build Rate = 10.00/100ft |
| 8,119.55 | 7,775.00 | -292.00 | 409.00 | End Build @ 8119.55ft |
| 13,650.05 | 7,795.00 | -5,822.04 | 477.30 | Total Depth @ 13650.05ft |

Plan Report for Howard 3C-33HZ - Plan A Rev 0 Permit

Vertical Section Information

| Angle Type | Target | Azimuth (°) | Origin Type | Origin +N/_S (ft) | Origin +E/-W (ft) | Start TVD (ft) |
|---------------|--------------------|----------------|----------------|-------------------------|-------------------------|----------------------|
| Target | Howard 3C-33HZ_BHL | 175.31 | Slot | 0.00 | 0.00 | 0.00 |

Survey tool program

| From (ft) | To (ft) | Survey/Plan | Survey Tool |
|--------------|------------|---------------------|-------------|
| 0.00 | 8,119.55 | Plan A Rev 0 Permit | MWD |
| 8,119.55 | 13,650.05 | Plan A Rev 0 Permit | MWD |

Casing Details

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (") | Hole Diameter (") |
|---------------------------|---------------------------|------------------------|---------------------------|-------------------------|
| 8,119.55 | 7,775.00 | 7" Intermediate Casing | 7 | 8-3/4 |

Formation Details

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---------------------------|---------------------------|------------------|-----------|------------|-------------------------|
| 4,830.64 | 4,820.00 | Sussex | | 0.00 | |
| 7,396.44 | 7,375.00 | Sharon Springs | | 0.00 | |
| 7,412.27 | 7,390.00 | Niobrara A | | 0.00 | |
| 7,580.00 | 7,538.00 | Niobrara B | | 0.00 | |
| 7,716.61 | 7,638.00 | Niobrara C | | 0.00 | |
| 7,935.19 | 7,745.00 | Fort Hays | | 0.00 | |
| 8,045.77 | 7,770.00 | Codell | | 0.00 | |
| 8,119.55 | 7,775.00 | Codell TL - Heel | | 0.00 | |
| 13,650.05 | 7,795.00 | Codell TL - Toe | | 0.00 | |

Targets associated with this wellbore

| Target Name | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Shape |
|--------------------|-------------|---------------|---------------|-------|
| Howard 3C-33HZ_SHL | 0.00 | 0.00 | 0.00 | Point |
| Howard 3C-33HZ_BHL | 7,795.00 | -5,822.04 | 477.30 | Point |
| Howard 3C-33HZ_CP | 7,775.00 | -292.00 | 409.00 | Point |

North Reference Sheet for Sec. 21-T1N-R67W - Howard 3C-33HZ - Plan A Rev 0

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

Vertical Depths are relative to RKB=17 @ 5040.00ft (Drilling Rig). Northing and Easting are relative to Howard 3C-33HZ

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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996421

Grid Coordinates of Well: 1,254,439.33 ft N, 3,168,291.00 ft E

Geographical Coordinates of Well: 40° 01' 48.93" N, 104° 53' 56.47" W

Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,650.05ft
the Bottom Hole Displacement is 5,841.57ft in the Direction of 175.31° (True).

Magnetic Convergence at surface is: -8.36° (19 December 2012, , BGGM2012)

