

Noble Energy

Weld County, CO (NAD 83)

Sec. 23-T6N-R65W (Reliance E23)

Reliance E23-63-1HNC

05-123-38222

Original Wellbore

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

02 March, 2015

Surface UWI : 05-123-38222

Well Coordinates: 1,414,378.87 N, 3,244,354.00 E (40° 28' 03.18" N, 104° 37' 18.30" W)

Ground Level: 4,694.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Reliance E23-63-1HNC

KB = 30' @ 4724.00usft (H&P 321)

N

Grid

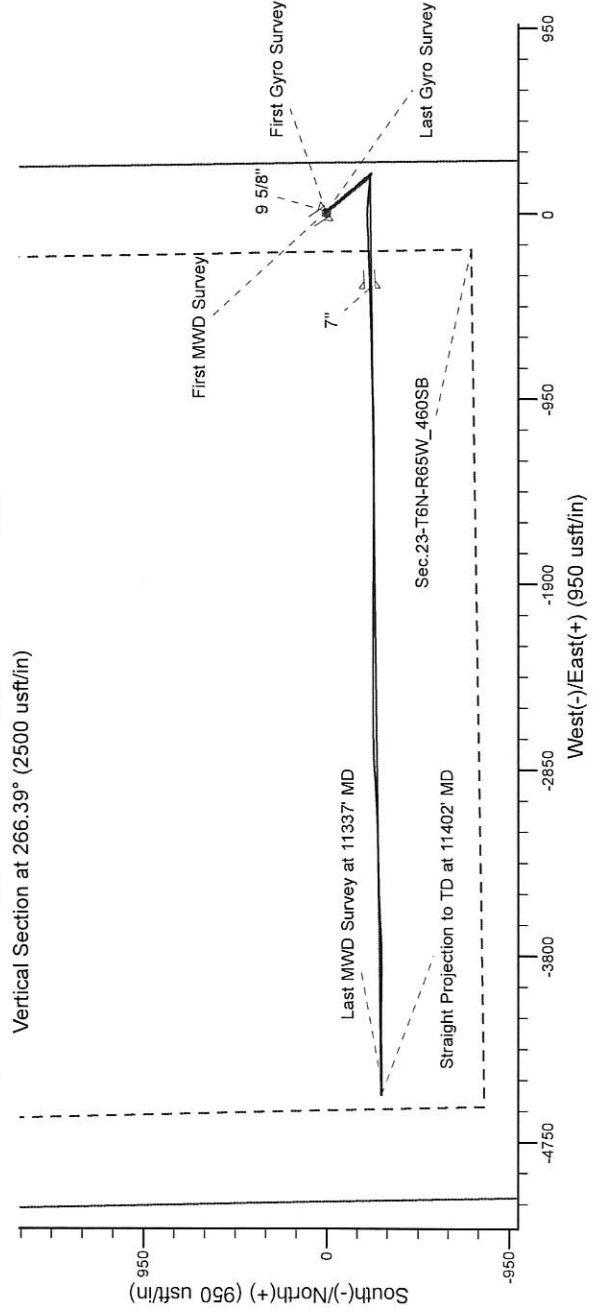
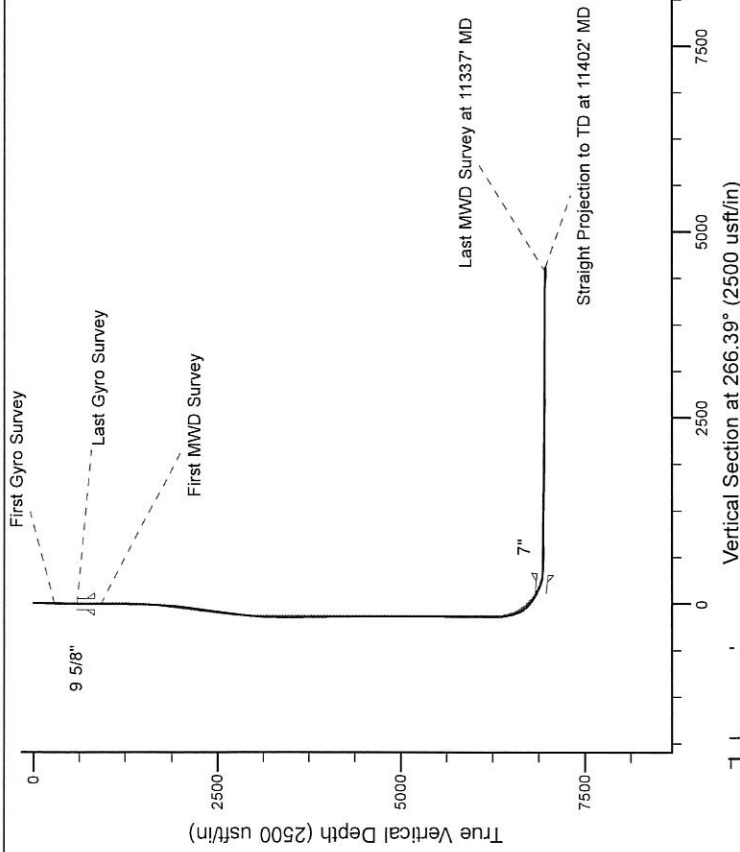
Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 23-T6N-R65W (Reliance E23)
 Well: Reliance E23-63-1HNC
 Wellbore: Original Wellbore
 Design: Actual Surveys

Noble Energy

HALLIBURTON
 Sperry Drilling



Platted SHL: 1217 FSL, 256 FEL
 Platted Lat/Long: 40.467550 N, 104.621750 W
 Location: Sec. 23-T6N-R65W

~7" Casing: 725' FSL, 725' FEL
 Lat/Long: 40.466938 N, 104.623142 W
 State Planes - CO Northern: 1414152.23 N, 3243968.97 E
 Location: Sec. 23-T6N-R65W

Platted BHL: 990' FSL, 535' FWL
 Lat/Long: 40.466890 N, 104.637970 W
 State Planes - CO Northern: 1414094.19 N, 3239843.62 E
 Location: Sec. 23-T6N-R65W

LEGEND

- △ Reliance E23-63-1HNC, Original Wellbore, Rev B0 V0
- Actual Surveys

WELL DETAILS: Reliance E23-63-1HNC

Ground Level: 4694.00
 KB - 30' @ 4724.00usft (H&P 321)

Created By: Amanda Marchand
 Created On: 3/2/2015

Design Report for Reliance E23-63-1HNC - Actual 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 |
| 286.00 | 1.20 | 93.90 | 285.98 | -0.20 | 2.99 | -2.97 | 0.42 |
| First Gyro Survey | | | | | | | |
| 592.00 | 0.20 | 108.10 | 591.95 | -0.59 | 6.69 | -6.64 | 0.33 |
| Last Gyro Survey | | | | | | | |
| 917.00 | 1.18 | 148.60 | 916.93 | -3.62 | 8.98 | -8.73 | 0.32 |
| First MWD Survey | | | | | | | |
| 1,009.00 | 1.23 | 148.60 | 1,008.91 | -5.27 | 9.98 | -9.63 | 0.05 |
| 1,101.00 | 0.25 | 96.10 | 1,100.90 | -6.14 | 10.70 | -10.29 | 1.19 |
| 1,193.00 | 0.58 | 88.76 | 1,192.89 | -6.15 | 11.36 | -10.95 | 0.36 |
| 1,284.00 | 0.47 | 78.00 | 1,283.89 | -6.06 | 12.19 | -11.78 | 0.16 |
| 1,377.00 | 0.67 | 52.75 | 1,376.89 | -5.65 | 12.99 | -12.61 | 0.34 |
| 1,468.00 | 0.69 | 80.11 | 1,467.88 | -5.23 | 13.96 | -13.60 | 0.35 |
| 1,561.00 | 2.15 | 138.38 | 1,560.85 | -6.44 | 15.67 | -15.23 | 2.02 |
| 1,654.00 | 3.71 | 143.70 | 1,653.73 | -10.17 | 18.61 | -17.93 | 1.70 |
| 1,746.00 | 5.46 | 134.73 | 1,745.43 | -15.65 | 23.48 | -22.45 | 2.05 |
| 1,838.00 | 7.82 | 144.28 | 1,836.81 | -23.82 | 30.24 | -28.68 | 2.82 |
| 1,930.00 | 9.87 | 138.82 | 1,927.71 | -34.83 | 39.09 | -36.82 | 2.41 |
| 2,021.00 | 11.80 | 140.36 | 2,017.09 | -47.87 | 50.16 | -47.05 | 2.14 |
| 2,113.00 | 13.27 | 142.07 | 2,106.89 | -63.44 | 62.66 | -58.54 | 1.65 |
| 2,205.00 | 12.52 | 138.08 | 2,196.57 | -79.19 | 75.81 | -70.67 | 1.26 |
| 2,300.00 | 12.80 | 139.02 | 2,289.26 | -94.80 | 89.59 | -83.44 | 0.37 |
| 2,394.00 | 12.87 | 141.70 | 2,380.92 | -110.87 | 102.91 | -95.72 | 0.64 |
| 2,489.00 | 13.34 | 142.12 | 2,473.44 | -127.83 | 116.19 | -107.91 | 0.50 |
| 2,583.00 | 12.46 | 139.86 | 2,565.07 | -144.14 | 129.39 | -120.05 | 1.08 |
| 2,678.00 | 11.77 | 139.55 | 2,657.95 | -159.35 | 142.28 | -131.96 | 0.73 |
| 2,773.00 | 11.51 | 139.07 | 2,751.00 | -173.88 | 154.78 | -143.52 | 0.29 |
| 2,868.00 | 11.96 | 138.64 | 2,844.01 | -188.43 | 167.49 | -155.29 | 0.48 |
| 2,962.00 | 9.45 | 140.02 | 2,936.37 | -201.66 | 178.89 | -165.83 | 2.68 |
| 3,057.00 | 7.52 | 143.70 | 3,030.33 | -212.64 | 187.58 | -173.81 | 2.11 |
| 3,152.00 | 5.57 | 141.75 | 3,124.70 | -221.28 | 194.12 | -179.79 | 2.07 |
| 3,247.00 | 2.63 | 139.95 | 3,219.45 | -226.57 | 198.37 | -183.71 | 3.10 |
| 3,342.00 | 3.51 | 154.00 | 3,314.31 | -230.85 | 201.05 | -186.11 | 1.21 |
| 3,436.00 | 1.36 | 138.52 | 3,408.22 | -234.27 | 203.05 | -187.89 | 2.37 |
| 3,531.00 | 0.92 | 307.64 | 3,503.22 | -234.65 | 203.19 | -188.01 | 2.39 |
| 3,626.00 | 1.23 | 292.60 | 3,598.20 | -233.79 | 201.65 | -186.52 | 0.44 |
| 3,720.00 | 1.60 | 287.32 | 3,692.17 | -233.01 | 199.46 | -184.39 | 0.42 |
| 3,815.00 | 1.05 | 292.26 | 3,787.14 | -232.29 | 197.39 | -182.37 | 0.59 |
| 3,910.00 | 0.81 | 291.88 | 3,882.13 | -231.71 | 195.96 | -180.98 | 0.25 |
| 4,005.00 | 0.88 | 292.78 | 3,977.12 | -231.18 | 194.67 | -179.72 | 0.07 |
| 4,100.00 | 1.02 | 305.83 | 4,072.11 | -230.40 | 193.31 | -178.41 | 0.27 |
| 4,289.00 | 1.69 | 309.06 | 4,261.05 | -227.66 | 189.78 | -175.07 | 0.36 |
| 4,384.00 | 1.11 | 293.90 | 4,356.03 | -226.40 | 187.85 | -173.22 | 0.72 |
| 4,479.00 | 0.42 | 1.58 | 4,451.02 | -225.68 | 187.02 | -172.43 | 1.08 |
| 4,574.00 | 0.71 | 346.44 | 4,546.01 | -224.76 | 186.89 | -172.36 | 0.34 |
| 4,764.00 | 0.51 | 134.20 | 4,736.01 | -224.21 | 187.22 | -172.73 | 0.62 |
| 4,859.00 | 0.33 | 143.92 | 4,831.01 | -224.72 | 187.69 | -173.16 | 0.20 |
| 4,953.00 | 0.36 | 146.98 | 4,925.01 | -225.19 | 188.01 | -173.45 | 0.04 |
| 5,048.00 | 0.37 | 132.00 | 5,020.00 | -225.64 | 188.40 | -173.81 | 0.10 |
| 5,237.00 | 0.09 | 43.32 | 5,209.00 | -225.94 | 188.95 | -174.35 | 0.20 |

Design Report for Reliance E23-63-1HNC - Actual Surveys

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 5,332.00 | 0.24 | 181.19 | 5,304.00 | -226.09 | 189.00 | -174.38 | 0.33 |
| 5,427.00 | 0.24 | 130.10 | 5,399.00 | -226.42 | 189.15 | -174.51 | 0.22 |
| 5,522.00 | 0.65 | 55.57 | 5,494.00 | -226.24 | 189.75 | -175.12 | 0.66 |
| 5,616.00 | 0.17 | 73.07 | 5,588.00 | -225.90 | 190.32 | -175.71 | 0.52 |
| 5,711.00 | 0.06 | 323.28 | 5,683.00 | -225.82 | 190.42 | -175.82 | 0.21 |
| 5,806.00 | 0.57 | 154.71 | 5,777.99 | -226.20 | 190.60 | -175.97 | 0.66 |
| 5,901.00 | 1.14 | 108.69 | 5,872.98 | -226.93 | 191.69 | -177.02 | 0.89 |
| 5,996.00 | 0.71 | 163.58 | 5,967.97 | -227.80 | 192.75 | -178.02 | 0.98 |
| 6,090.00 | 0.60 | 115.53 | 6,061.97 | -228.57 | 193.36 | -178.58 | 0.58 |
| 6,185.00 | 0.96 | 87.72 | 6,156.96 | -228.75 | 194.61 | -179.81 | 0.54 |
| 6,280.00 | 0.65 | 12.59 | 6,251.95 | -228.20 | 195.52 | -180.76 | 1.07 |
| 6,328.00 | 2.43 | 289.24 | 6,299.94 | -227.60 | 194.62 | -179.90 | 5.09 |
| 6,375.00 | 4.54 | 271.62 | 6,346.85 | -227.22 | 191.82 | -177.13 | 4.98 |
| 6,423.00 | 7.53 | 273.57 | 6,394.58 | -226.97 | 186.78 | -172.11 | 6.24 |
| 6,469.00 | 9.69 | 275.75 | 6,440.06 | -226.39 | 179.92 | -165.30 | 4.75 |
| 6,517.00 | 12.70 | 274.98 | 6,487.14 | -225.53 | 170.64 | -156.10 | 6.28 |
| 6,563.00 | 14.86 | 276.55 | 6,531.81 | -224.42 | 159.74 | -145.29 | 4.77 |
| 6,611.00 | 19.85 | 273.30 | 6,577.61 | -223.24 | 145.48 | -131.13 | 10.59 |
| 6,658.00 | 26.39 | 274.77 | 6,620.81 | -221.91 | 127.09 | -112.86 | 13.97 |
| 6,706.00 | 35.95 | 276.50 | 6,661.84 | -219.43 | 102.40 | -88.37 | 20.00 |
| 6,753.00 | 42.48 | 274.54 | 6,698.23 | -216.60 | 72.84 | -59.05 | 14.14 |
| 6,801.00 | 47.53 | 274.04 | 6,732.16 | -214.07 | 39.00 | -25.44 | 10.55 |
| 6,847.00 | 51.76 | 270.70 | 6,761.95 | -212.66 | 3.99 | 9.41 | 10.73 |
| 6,895.00 | 55.37 | 268.53 | 6,790.45 | -212.93 | -34.62 | 47.96 | 8.35 |
| 6,942.00 | 59.40 | 267.08 | 6,815.78 | -214.46 | -74.17 | 87.53 | 8.96 |
| 6,990.00 | 62.39 | 267.32 | 6,839.12 | -216.51 | -116.05 | 129.46 | 6.24 |
| 7,037.00 | 65.08 | 268.05 | 6,859.92 | -218.21 | -158.16 | 171.59 | 5.89 |
| 7,085.00 | 65.78 | 267.90 | 6,879.88 | -219.75 | -201.78 | 215.23 | 1.49 |
| 7,132.00 | 70.31 | 268.07 | 6,897.45 | -221.28 | -245.34 | 258.79 | 9.64 |
| 7,180.00 | 76.38 | 268.26 | 6,911.20 | -222.75 | -291.28 | 304.73 | 12.65 |
| 7,230.00 | 82.68 | 267.26 | 6,920.28 | -224.68 | -340.38 | 353.86 | 12.75 |
| 7,455.00 | 90.22 | 269.36 | 6,934.20 | -231.28 | -564.68 | 578.13 | 3.48 |
| 7,549.00 | 89.97 | 268.50 | 6,934.05 | -233.03 | -658.66 | 672.03 | 0.95 |
| 7,643.00 | 90.65 | 268.42 | 6,933.54 | -235.56 | -752.63 | 765.97 | 0.73 |
| 7,738.00 | 92.74 | 267.69 | 6,930.73 | -238.78 | -847.52 | 860.88 | 2.33 |
| 7,832.00 | 90.28 | 268.31 | 6,928.25 | -242.06 | -941.43 | 954.80 | 2.70 |
| 7,927.00 | 89.17 | 269.64 | 6,928.71 | -243.76 | -1,036.41 | 1,049.70 | 1.82 |
| 8,021.00 | 88.12 | 268.93 | 6,930.93 | -244.93 | -1,130.37 | 1,143.55 | 1.35 |
| 8,116.00 | 87.44 | 268.90 | 6,934.61 | -246.73 | -1,225.28 | 1,238.39 | 0.72 |
| 8,210.00 | 87.50 | 269.87 | 6,938.76 | -247.74 | -1,319.18 | 1,332.17 | 1.03 |
| 8,305.00 | 88.61 | 270.45 | 6,941.98 | -247.47 | -1,414.13 | 1,426.91 | 1.32 |
| 8,495.00 | 90.43 | 270.99 | 6,943.58 | -245.08 | -1,604.10 | 1,616.35 | 1.00 |
| 8,589.00 | 90.06 | 270.57 | 6,943.17 | -243.80 | -1,698.09 | 1,710.07 | 0.60 |
| 8,684.00 | 89.69 | 270.22 | 6,943.38 | -243.15 | -1,793.08 | 1,804.84 | 0.54 |
| 8,779.00 | 89.48 | 269.78 | 6,944.07 | -243.15 | -1,888.08 | 1,899.65 | 0.51 |
| 8,873.00 | 90.03 | 270.77 | 6,944.47 | -242.70 | -1,982.08 | 1,993.43 | 1.20 |
| 8,968.00 | 89.32 | 270.16 | 6,945.01 | -241.93 | -2,077.07 | 2,088.19 | 0.99 |
| 9,063.00 | 89.29 | 269.17 | 6,946.16 | -242.48 | -2,172.06 | 2,183.02 | 1.04 |
| 9,158.00 | 89.94 | 269.37 | 6,946.80 | -243.69 | -2,267.05 | 2,277.90 | 0.72 |
| 9,253.00 | 89.57 | 269.75 | 6,947.21 | -244.42 | -2,362.05 | 2,372.75 | 0.56 |
| 9,348.00 | 89.26 | 270.26 | 6,948.18 | -244.41 | -2,457.04 | 2,467.56 | 0.63 |

Design Report for Reliance E23-63-1HNC - Actual Surveys

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) |
|--|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|
| 9,443.00 | 88.89 | 270.46 | 6,949.71 | -243.82 | -2,552.03 | 2,562.32 | 0.44 |
| 9,537.00 | 88.67 | 269.94 | 6,951.71 | -243.49 | -2,646.01 | 2,656.09 | 0.60 |
| 9,632.00 | 88.46 | 268.36 | 6,954.09 | -244.90 | -2,740.96 | 2,750.95 | 1.68 |
| 9,727.00 | 89.11 | 266.80 | 6,956.11 | -248.91 | -2,835.85 | 2,845.90 | 1.78 |
| 9,821.00 | 90.43 | 266.24 | 6,956.48 | -254.61 | -2,929.68 | 2,939.90 | 1.53 |
| 9,916.00 | 90.22 | 266.26 | 6,955.94 | -260.83 | -3,024.47 | 3,034.90 | 0.22 |
| 10,011.00 | 90.52 | 267.80 | 6,955.33 | -265.75 | -3,119.34 | 3,129.88 | 1.65 |
| 10,106.00 | 91.36 | 269.00 | 6,953.77 | -268.40 | -3,214.29 | 3,224.81 | 1.54 |
| 10,200.00 | 91.11 | 269.05 | 6,951.75 | -270.00 | -3,308.25 | 3,318.69 | 0.27 |
| 10,295.00 | 90.37 | 269.01 | 6,950.52 | -271.61 | -3,403.23 | 3,413.58 | 0.78 |
| 10,390.00 | 89.82 | 268.11 | 6,950.36 | -274.00 | -3,498.20 | 3,508.51 | 1.11 |
| 10,484.00 | 89.29 | 267.57 | 6,951.09 | -277.54 | -3,592.13 | 3,602.48 | 0.80 |
| 10,579.00 | 88.71 | 267.05 | 6,952.75 | -282.00 | -3,687.01 | 3,697.45 | 0.82 |
| 10,674.00 | 90.55 | 267.98 | 6,953.36 | -286.12 | -3,781.91 | 3,792.42 | 2.17 |
| 10,769.00 | 91.79 | 270.31 | 6,951.42 | -287.53 | -3,876.87 | 3,887.28 | 2.78 |
| 10,864.00 | 90.18 | 270.86 | 6,949.79 | -286.56 | -3,971.85 | 3,982.01 | 1.79 |
| 10,958.00 | 90.37 | 271.30 | 6,949.34 | -284.79 | -4,065.83 | 4,075.70 | 0.51 |
| 11,053.00 | 88.21 | 269.83 | 6,950.52 | -283.85 | -4,160.81 | 4,170.43 | 2.75 |
| 11,147.00 | 86.86 | 269.13 | 6,954.56 | -284.71 | -4,254.72 | 4,264.20 | 1.62 |
| 11,242.00 | 88.27 | 269.43 | 6,958.59 | -285.90 | -4,349.62 | 4,358.99 | 1.52 |
| 11,337.00 | 90.92 | 269.57 | 6,959.27 | -286.73 | -4,444.61 | 4,453.84 | 2.79 |
| Last MWD Survey at 11337' MD | | | | | | | |
| 11,402.00 | 90.92 | 269.57 | 6,958.22 | -287.22 | -4,509.60 | 4,518.73 | 0.00 |
| Straight Projection to TD at 11402' MD | | | | | | | |

Design Annotations

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates | | Comment |
|-----------------------|-----------------------|-------------------|--------------|--|
| | | +N/-S (usft) | +E/-W (usft) | |
| 286.00 | 285.98 | -0.20 | 2.99 | First Gyro Survey |
| 592.00 | 591.95 | -0.59 | 6.69 | Last Gyro Survey |
| 917.00 | 916.93 | -3.62 | 8.98 | First MWD Survey |
| 11,337.00 | 6,959.27 | -286.73 | -4,444.61 | Last MWD Survey at 11337' MD |
| 11,402.00 | 6,958.22 | -287.22 | -4,509.60 | Straight Projection to TD at 11402' MD |

Vertical Section Information

| Angle Type | Target | Azimuth (°) | Origin Type | Origin | | Start TVD (usft) |
|------------|--------------------------|-------------|-------------|--------------|--------------|------------------|
| | | | | +N/_S (usft) | +E/-W (usft) | |
| Target | Reliance E23-63-1HNC_BHL | 266.39 | Slot | 0.00 | 0.00 | 0.00 |

Survey tool program

| From (usft) | To (usft) | Survey/Plan | Survey Tool |
|-------------|-----------|----------------------|----------------|
| 286.00 | 592.00 | Gyro Surveys | Flexi-Shot |
| 917.00 | 7,230.00 | Intermediate Surveys | MWD+IFR1+MS_WY |
| 7,455.00 | 11,402.00 | Production Surveys | MWD+IFR1+MS_WY |

Design Report for Reliance E23-63-1HNC - Actual Surveys

Casing Details

| Measured Depth (usft) | Vertical Depth (usft) | Name | Casing Diameter (") | Hole Diameter (") |
|-----------------------|-----------------------|--------|---------------------|-------------------|
| 832.00 | 831.94 | 9 5/8" | 9-5/8 | 13-3/4 |
| 7,275.00 | 6,925.43 | 7" | 7 | 8-3/4 |

Wellbore Targets

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (usft) | +N/-S (usft) | +E/-W (usft) | Northing (usft) | Easting (usft) | Latitude | Longitude |
|---|---------------|--------------|------------|--------------|--------------|-----------------|----------------|-----------|-------------|
| Reliance E23-63-1HNC - actual wellpath misses target center by 12.85usft at 7359.86usft MD (6931.92 TVD, -229.48 N, -469.59 E) - Point | 0.00 | 0.00 | 6,943.50 | -234.97 | -468.70 | 1,414,143.90 | 3,243,885.32 | 40.466918 | -104.623443 |
| Reliance E23-63-1HNC - actual wellpath misses target center by 3.80usft at 11402.00usft MD (6958.22 TVD, -287.22 N, -4509.60 E) - Point | 0.00 | 0.00 | 6,955.55 | -284.69 | -4,510.54 | 1,414,094.19 | 3,239,843.62 | 40.466890 | -104.637970 |

Directional Difficulty Index

| | | | |
|-------------------------------------|----------------|-------------------------------|----------------------------------|
| Average Dogleg over Survey: | 1.69 °/100usft | Maximum Dogleg over Survey: | 20.00 °/100usft at 6,706.00 usft |
| Net Tortousity applicable to Plans: | 0.69 °/100usft | Directional Difficulty Index: | 6.204 |

Audit Info

North Reference Sheet for Sec. 23-T6N-R65W (Reliance E23) - Reliance E23-63-1HNC - Original Wellbore

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

Vertical Depths are relative to KB = 30' @ 4724.00usft (H&P 321). Northing and Easting are relative to Reliance E23-63-1HNC

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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996399

Grid Coordinates of Well: 1,414,378.87 usft N, 3,244,354.00 usft E

Geographical Coordinates of Well: 40° 28' 03.18" N, 104° 37' 18.30" W

Grid Convergence at Surface is: 0.57°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,402.00usft the Bottom Hole Displacement is 4,518.73usft in the Direction of 266.36° (Grid).

Magnetic Convergence at surface is: -7.84° (14 January 2015, , BGGM2014)

