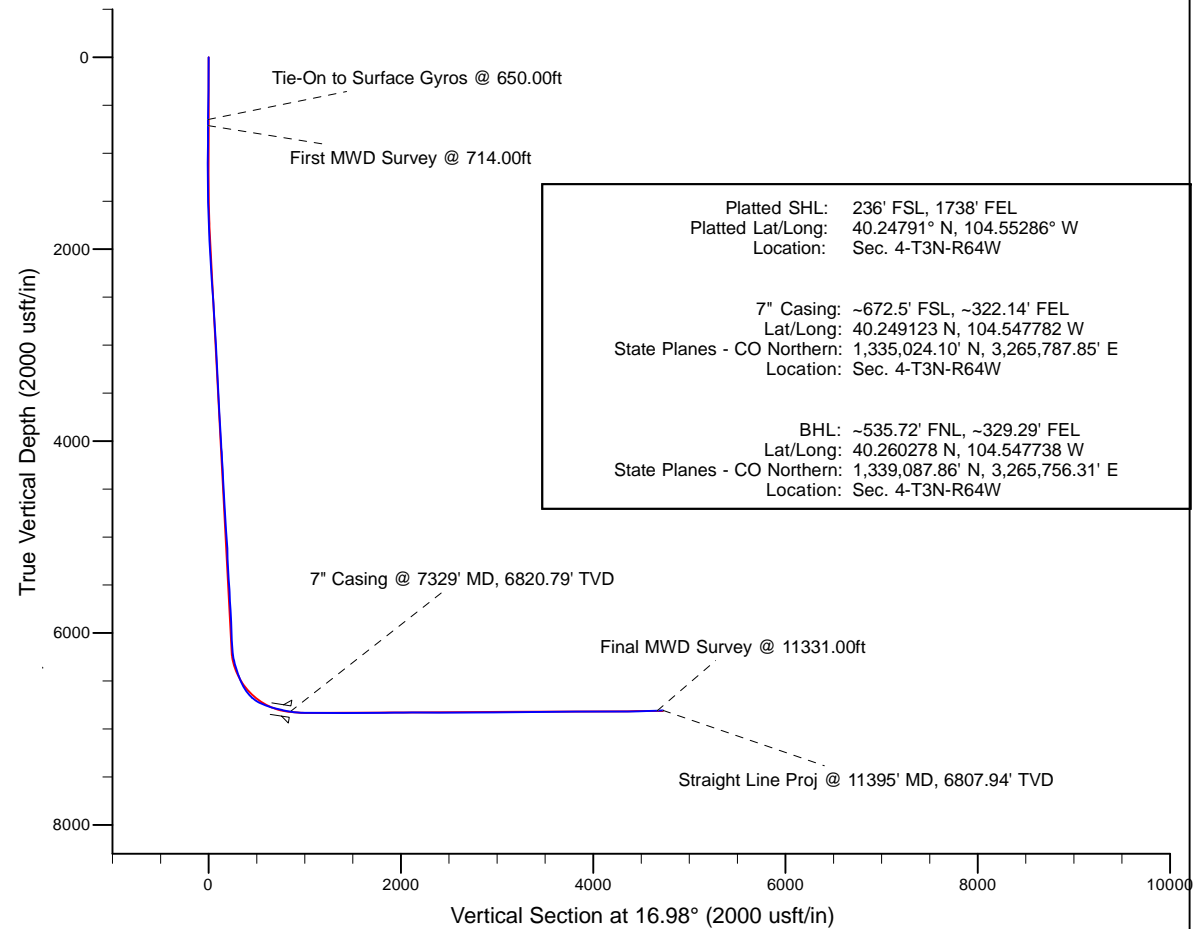
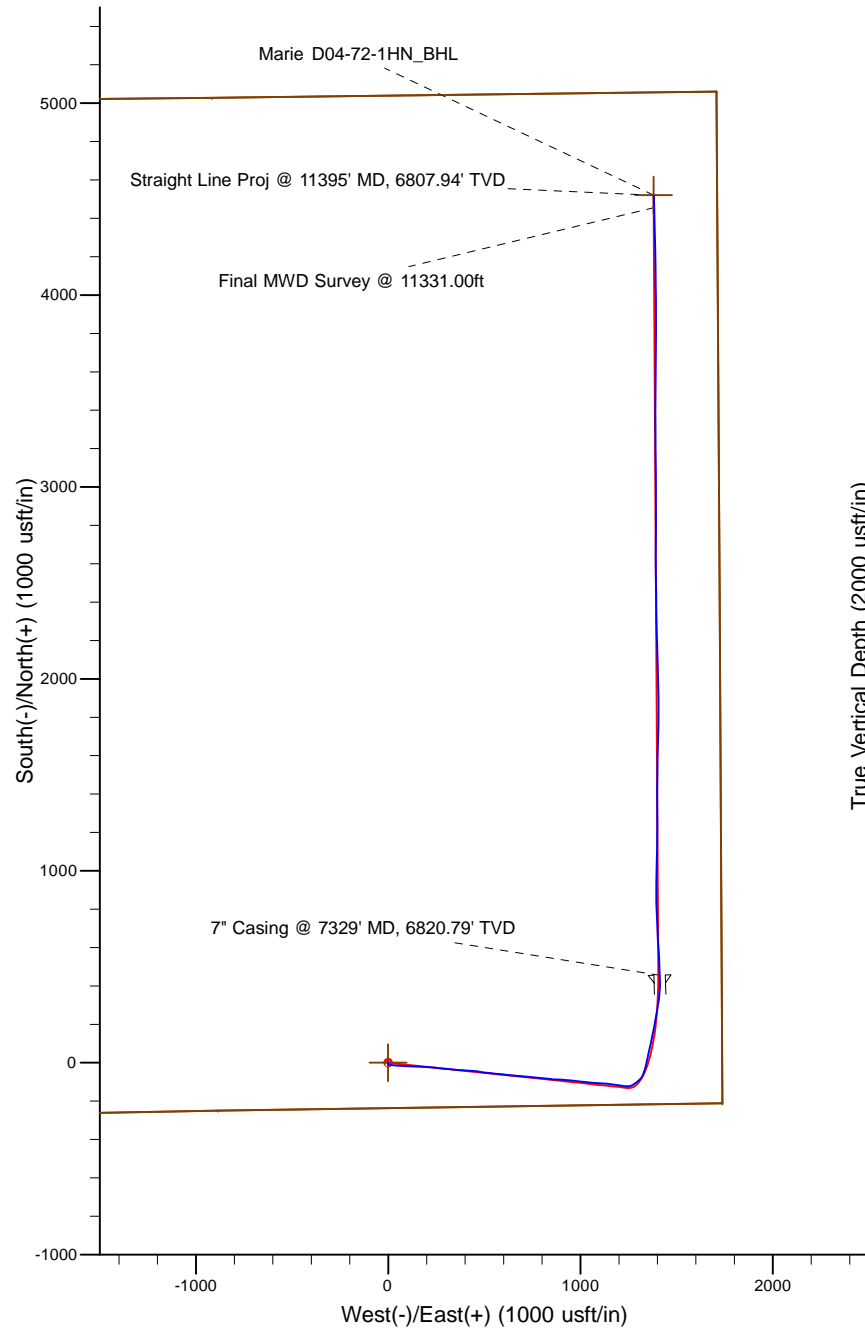


Project: Weld County, CO (NAD 83)  
 Site: Sec. 4-T3N-R64W (Marie D04 Pad)  
 Well: Marie D04-72-1HN  
 Wellbore: Plan B  
 Design: Final Surveys

# Noble Energy



## LEGEND

- Marie D04-72-1HN, Plan B, Rev B0 - PROPOSAL V0
- Final Surveys

Platted SHL: 236' FSL, 1738' FEL  
 Platted Lat/Long: 40.24791° N, 104.55286° W  
 Location: Sec. 4-T3N-R64W

7" Casing: ~672.5' FSL, ~322.14' FEL  
 Lat/Long: 40.249123 N, 104.547782 W  
 State Planes - CO Northern: 1,335,024.10' N, 3,265,787.85' E  
 Location: Sec. 4-T3N-R64W

BHL: ~535.72' FNL, ~329.29' FEL  
 Lat/Long: 40.260278 N, 104.547738 W  
 State Planes - CO Northern: 1,339,087.86' N, 3,265,756.31' E  
 Location: Sec. 4-T3N-R64W

WELL DETAILS: Marie D04-72-1HN

Ground Level: 4720.00  
 RKB = 24 @ 4744.00usft (H&P 343)

Created By: Fred Hartmann  
 Created On: 01/31/2014

# Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T3N-R64W (Marie D04 Pad)

Marie D04-72-1HN

Design: Final Surveys

## Sperry Drilling Services

### Final Survey Report

31 January, 2014

Well Coordinates: 1,334,567.24 N, 3,264,375.06 E (40° 14' 52.48" N, 104° 33' 10.30" W)

Ground Level: 4,720.00 usft

Local Coordinate Origin:

Centered on Well Marie D04-72-1HN

Viewing Datum:

RKB = 24 @ 4744.00usft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

**HALLIBURTON**

**Design Report for Marie D04-72-1HN - 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
350.00	0.60	193.01	349.99	-1.79	-0.41	-1.83	0.17
650.00	0.50	166.01	649.98	-4.59	-0.45	-4.52	0.09
<b>Tie-On to Surface Gyros @ 650.00ft</b>							
714.00	0.19	315.06	713.98	-4.78	-0.46	-4.71	1.05
<b>First MWD Survey @ 714.00ft</b>							
900.00	0.37	275.42	899.98	-4.51	-1.27	-4.68	0.14
992.00	0.49	206.83	991.98	-4.83	-1.75	-5.13	0.54
1,085.00	0.77	152.89	1,084.97	-5.74	-1.64	-5.97	0.67
1,177.00	0.81	171.00	1,176.96	-6.93	-1.26	-7.00	0.27
1,270.00	3.16	114.58	1,269.90	-8.65	1.18	-7.93	3.00
1,362.00	5.97	101.01	1,361.61	-10.62	8.18	-7.77	3.25
1,456.00	7.05	96.90	1,455.00	-12.25	18.71	-6.25	1.25
1,551.00	8.25	94.94	1,549.15	-13.53	31.29	-3.81	1.29
1,645.00	7.56	96.67	1,642.26	-14.83	44.15	-1.29	0.78
1,740.00	9.15	97.23	1,736.25	-16.51	57.85	1.11	1.68
1,834.00	10.91	86.77	1,828.81	-16.95	74.15	5.45	2.69
1,929.00	10.65	93.16	1,922.14	-16.92	91.89	10.65	1.29
2,024.00	12.71	92.89	2,015.17	-17.94	111.09	15.29	2.17
2,119.00	14.99	93.84	2,107.40	-19.29	133.79	20.63	2.41
2,213.00	15.54	90.78	2,198.09	-20.27	158.51	26.91	1.04
2,308.00	15.30	94.00	2,289.67	-21.32	183.74	33.27	0.94
2,403.00	14.84	93.36	2,381.40	-22.91	208.39	38.96	0.51
2,498.00	16.38	95.18	2,472.89	-24.83	233.88	44.56	1.70
2,593.00	17.39	95.79	2,563.80	-27.47	261.34	50.06	1.08
2,688.00	17.20	95.21	2,654.50	-30.18	289.45	55.68	0.27
2,782.00	16.49	95.01	2,744.47	-32.61	316.58	61.28	0.76
2,877.00	16.71	95.96	2,835.51	-35.20	343.60	66.69	0.37
2,972.00	15.19	93.97	2,926.85	-37.48	369.60	72.10	1.70
3,067.00	15.95	94.42	3,018.36	-39.35	395.03	77.74	0.81
3,162.00	13.27	93.74	3,110.28	-41.07	418.93	83.08	2.83
3,257.00	12.95	93.55	3,202.81	-42.44	440.43	88.05	0.34
3,352.00	13.79	96.80	3,295.23	-44.44	462.30	92.52	1.19
3,446.00	15.12	101.32	3,386.26	-48.17	485.45	95.71	1.85
3,541.00	15.31	95.53	3,477.93	-51.81	510.08	99.43	1.61
3,636.00	16.49	96.39	3,569.30	-54.52	535.97	104.39	1.27
3,731.00	15.33	95.04	3,660.66	-57.12	561.88	109.47	1.28
3,825.00	19.02	96.50	3,750.45	-59.95	589.48	114.83	3.95
3,920.00	18.94	96.03	3,840.29	-63.32	620.20	120.58	0.18
4,015.00	16.01	94.73	3,930.89	-66.02	648.59	126.29	3.11
4,110.00	13.31	94.12	4,022.79	-67.89	672.56	131.50	2.85
4,205.00	14.99	97.22	4,114.91	-70.22	695.66	136.02	1.94
4,300.00	15.18	93.79	4,206.63	-72.58	720.25	140.94	0.96
4,395.00	16.11	96.35	4,298.11	-74.86	745.77	146.21	1.22
4,490.00	15.53	95.39	4,389.52	-77.52	771.53	151.20	0.67
4,585.00	13.97	93.03	4,481.38	-79.32	795.64	156.52	1.76
4,679.00	14.76	98.72	4,572.45	-81.73	818.81	160.97	1.72
4,774.00	15.99	96.08	4,664.05	-84.95	843.78	165.19	1.49
4,869.00	15.75	92.32	4,755.43	-86.86	869.68	170.93	1.11
4,964.00	13.86	93.36	4,847.27	-88.05	893.92	176.87	2.01

## Design Report for Marie D04-72-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,059.00	16.94	94.23	4,938.85	-89.74	919.09	182.61	3.25
5,154.00	16.77	92.49	5,029.77	-91.36	946.59	189.09	0.56
5,248.00	15.99	98.58	5,119.96	-93.88	972.94	194.38	2.01
5,343.00	13.60	98.22	5,211.80	-97.43	996.93	197.99	2.52
5,438.00	15.36	97.27	5,303.78	-100.62	1,020.47	201.81	1.87
5,532.00	15.73	95.12	5,394.34	-103.33	1,045.51	206.53	0.73
5,627.00	12.95	89.13	5,486.38	-104.32	1,068.99	212.44	3.31
5,722.00	14.36	95.44	5,578.70	-105.27	1,091.36	218.07	2.16
5,817.00	15.38	93.30	5,670.52	-107.11	1,115.67	223.40	1.22
5,912.00	15.36	96.88	5,762.12	-109.35	1,140.74	228.59	1.00
6,007.00	14.94	97.26	5,853.82	-112.40	1,165.37	232.86	0.45
6,101.00	15.63	98.69	5,944.49	-115.84	1,189.91	236.74	0.84
6,196.00	15.29	98.82	6,036.06	-119.70	1,214.94	240.36	0.36
6,238.00	13.61	95.73	6,076.73	-121.04	1,225.33	242.11	4.40
6,290.00	13.49	92.23	6,127.28	-121.89	1,237.48	244.85	1.59
6,338.00	12.73	90.05	6,174.03	-122.11	1,248.36	247.81	1.89
6,384.00	13.40	74.50	6,218.85	-120.69	1,258.57	252.15	7.75
6,432.00	15.78	62.58	6,265.31	-116.20	1,269.73	259.71	7.96
6,479.00	18.00	55.48	6,310.29	-109.14	1,281.39	269.87	6.44
6,527.00	20.75	52.63	6,355.56	-99.77	1,294.26	282.58	6.06
6,574.00	21.90	48.29	6,399.35	-88.88	1,307.42	296.84	4.15
6,622.00	20.22	35.03	6,444.17	-76.13	1,318.87	312.39	10.50
6,668.00	21.86	21.51	6,487.12	-61.64	1,326.58	328.49	11.11
6,716.00	25.92	15.43	6,531.01	-43.20	1,332.65	347.90	9.88
6,763.00	30.60	12.82	6,572.40	-21.63	1,338.04	370.11	10.30
6,858.00	42.43	12.81	6,648.61	33.40	1,350.56	426.39	12.45
6,906.00	49.58	12.50	6,681.93	67.07	1,358.11	460.80	14.90
6,953.00	57.43	12.32	6,709.86	103.94	1,366.22	498.43	16.70
7,001.00	65.08	11.59	6,732.93	145.08	1,374.92	540.32	15.99
7,048.00	68.42	10.97	6,751.48	187.43	1,383.37	583.29	7.21
7,096.00	71.89	10.12	6,767.77	231.81	1,391.62	628.14	7.42
7,143.00	74.82	9.82	6,781.23	276.15	1,399.42	672.83	6.26
7,191.00	76.42	8.13	6,793.16	322.08	1,406.67	718.87	4.77
7,238.00	77.21	4.84	6,803.88	367.54	1,411.83	763.86	7.02
7,288.00	79.44	359.37	6,814.00	416.45	1,413.62	811.16	11.60
7,329.00	81.51	358.47	6,820.79	456.87	1,412.86	849.60	5.50
<b>7" Casing @ 7329' MD, 6820.79' TVD</b>							
7,429.00	86.58	356.31	6,831.16	556.19	1,408.32	943.26	5.50
7,522.00	90.03	356.89	6,833.91	648.97	1,402.81	1,030.39	3.76
7,613.00	89.63	357.13	6,834.18	739.85	1,398.06	1,115.91	0.51
7,708.00	89.82	358.96	6,834.63	834.79	1,394.82	1,205.77	1.94
7,803.00	90.62	0.84	6,834.27	929.78	1,394.66	1,296.57	2.15
7,898.00	89.20	0.90	6,834.42	1,024.77	1,396.10	1,387.84	1.50
7,993.00	90.74	1.68	6,834.47	1,119.74	1,398.24	1,479.29	1.82
8,088.00	89.17	359.68	6,834.54	1,214.73	1,399.37	1,570.47	2.68
8,183.00	91.08	359.40	6,834.33	1,309.72	1,398.60	1,661.10	2.03
8,277.00	90.31	1.11	6,833.19	1,403.71	1,399.02	1,751.11	1.99
8,372.00	90.90	0.17	6,832.19	1,498.69	1,400.08	1,842.26	1.17
8,467.00	89.35	1.15	6,831.98	1,593.68	1,401.18	1,933.43	1.93
8,562.00	91.57	1.59	6,831.22	1,688.65	1,403.45	2,024.92	2.38
8,657.00	90.22	1.08	6,829.74	1,783.61	1,405.66	2,116.38	1.52

## Design Report for Marie D04-72-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,751.00	88.80	0.50	6,830.54	1,877.59	1,406.96	2,206.65	1.63
8,846.00	88.70	357.88	6,832.61	1,972.55	1,405.61	2,297.08	2.76
8,941.00	89.97	358.04	6,833.72	2,067.48	1,402.23	2,386.88	1.35
9,036.00	91.76	357.85	6,832.28	2,162.41	1,398.83	2,476.67	1.89
9,131.00	91.20	359.01	6,829.83	2,257.34	1,396.23	2,566.70	1.36
9,226.00	89.26	359.36	6,829.45	2,352.32	1,394.87	2,657.15	2.08
9,321.00	90.12	359.31	6,829.96	2,447.31	1,393.77	2,747.68	0.91
9,416.00	91.60	358.97	6,828.53	2,542.29	1,392.35	2,838.10	1.60
9,510.00	90.52	0.22	6,826.80	2,636.27	1,391.68	2,927.78	1.76
9,605.00	89.54	0.27	6,826.75	2,731.27	1,392.09	3,018.76	1.03
9,700.00	90.46	0.68	6,826.75	2,826.26	1,392.88	3,109.84	1.06
9,794.00	89.60	359.57	6,826.70	2,920.26	1,393.08	3,199.80	1.49
9,889.00	90.31	359.66	6,826.77	3,015.26	1,392.44	3,290.47	0.75
9,984.00	91.48	359.25	6,825.29	3,110.24	1,391.54	3,381.05	1.30
10,078.00	90.86	359.72	6,823.37	3,204.22	1,390.69	3,470.68	0.83
10,173.00	90.99	359.51	6,821.83	3,299.20	1,390.06	3,561.34	0.26
10,267.00	90.46	0.42	6,820.64	3,393.19	1,390.00	3,651.21	1.12
10,362.00	89.91	0.62	6,820.34	3,488.19	1,390.86	3,742.32	0.62
10,456.00	89.11	0.73	6,821.14	3,582.18	1,391.97	3,832.53	0.86
10,551.00	90.18	0.25	6,821.73	3,677.17	1,392.78	3,923.62	1.23
10,646.00	89.69	0.01	6,821.84	3,772.17	1,393.00	4,014.54	0.57
10,741.00	91.66	0.29	6,820.72	3,867.16	1,393.24	4,105.46	2.09
10,836.00	90.86	358.86	6,818.63	3,962.13	1,392.54	4,196.09	1.72
10,931.00	89.78	359.50	6,818.10	4,057.12	1,391.18	4,286.53	1.32
11,026.00	89.88	359.35	6,818.38	4,152.11	1,390.23	4,377.11	0.19
11,121.00	91.57	359.03	6,817.18	4,247.09	1,388.88	4,467.55	1.81
11,215.00	91.26	358.59	6,814.86	4,341.04	1,386.93	4,556.84	0.57
11,331.00	92.65	358.03	6,810.90	4,456.92	1,383.51	4,666.67	1.29
<b>Final MWD Survey @ 11331.00ft</b>							
11,395.00	92.65	358.03	6,807.94	4,520.81	1,381.32	4,727.13	0.00
<b>Straight Line Proj @ 11395' MD, 6807.94' TVD</b>							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
650.00	649.98	-4.59	-0.45	Tie-On to Surface Gyros @ 650.00ft
714.00	713.98	-4.78	-0.46	First MWD Survey @ 714.00ft
11,331.00	6,810.90	4,456.92	1,383.51	Final MWD Survey @ 11331.00ft
11,395.00	6,807.94	4,520.81	1,381.32	Straight Line Proj @ 11395' MD, 6807.94' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Marie D04-72-1HN_BHL	16.98	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
350.00	650.00	Surface Gyros	Flexi-Shot

## Design Report for Marie D04-72-1HN - Final Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
714.00	7,288.00	MWD Surveys - Intermediate	MWD+SC
7,429.00	11,331.00	MWD Surveys - Production	MWD+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,329.00	6,820.79	7" Casing @ 7329' MD, 6820.79' TVD	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
Marie D04-72-1HN_46	0.00	0.00	0.00	0.01	0.00	1,334,567.25	3,264,375.06	40.247910	-104.552860
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	4,540.98	-3,082.23	1,339,108.03	3,261,292.96	
Point 2				0.00	2,359.80	-3,068.35	1,336,926.95	3,261,306.84	
Point 3				0.00	167.74	-3,051.56	1,334,734.98	3,261,323.63	
Point 4				0.00	210.13	-885.07	1,334,777.37	3,263,490.02	
Point 5				0.00	249.13	1,278.64	1,334,816.37	3,265,653.64	
Point 6				0.00	2,426.66	1,264.24	1,336,993.80	3,265,639.24	
Point 7				0.00	4,600.51	1,247.09	1,339,167.56	3,265,622.09	
Point 8				0.00	4,568.80	-916.16	1,339,135.85	3,263,458.94	
Point 9				0.00	4,540.98	-3,082.23	1,339,108.03	3,261,292.96	
Marie D04-72-1HN_SL	0.00	0.00	0.00	0.01	0.00	1,334,567.25	3,264,375.06	40.247910	-104.552860
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	5,001.00	-3,542.25	1,339,568.03	3,260,832.96	
Point 2				0.00	2,359.80	-3,528.37	1,336,926.95	3,260,846.84	
Point 3				0.00	-292.28	-3,511.58	1,334,274.98	3,260,863.63	
Point 4				0.00	-249.89	-885.07	1,334,317.37	3,263,490.02	
Point 5				0.00	-210.89	1,738.66	1,334,356.37	3,266,113.64	
Point 6				0.00	2,426.66	1,724.26	1,336,993.80	3,266,099.24	
Point 7				0.00	5,060.53	1,707.11	1,339,627.56	3,266,082.09	
Point 8				0.00	5,028.82	-916.16	1,339,595.85	3,263,458.94	
Point 9				0.00	5,001.00	-3,542.25	1,339,568.03	3,260,832.96	
Marie D04-72-1HN_SL	0.00	0.00	0.00	0.01	0.00	1,334,567.25	3,264,375.06	40.247910	-104.552860
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Marie D04-72-1HN_BF	0.00	0.00	6,814.33	4,521.47	1,380.76	1,339,088.52	3,265,755.76	40.260280	-104.547740
- actual wellpath misses target center by 6.45usft at 11395.00usft MD (6807.94 TVD, 4520.81 N, 1381.32 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	2.12 °/100usft	Maximum Dogleg over Survey:	16.70 °/100usft at 6,953.00 usft
Net Tortousity applicable to Plans:	1.17 °/100usft	Directional Difficulty Index:	6.380

Audit Info

**North Reference Sheet for Sec. 4-T3N-R64W (Marie D04 Pad) - Marie D04-72-1HN -**

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 @ 4744.00usft (H&P 343). Northing and Easting are relative to Marie D04-72-1HN  
 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: 0.99995685

Grid Coordinates of Well: 1,334,567.24 usft N, 3,264,375.06 usft E  
 Geographical Coordinates of Well: 40° 14' 52.48" N, 104° 33' 10.30" W  
 Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,395.00usft  
 the Bottom Hole Displacement is 4,727.13usft in the Direction of 16.99° (Grid).  
 Magnetic Convergence at surface is: -7.81° (16 January 2014, , BGGM2013)

