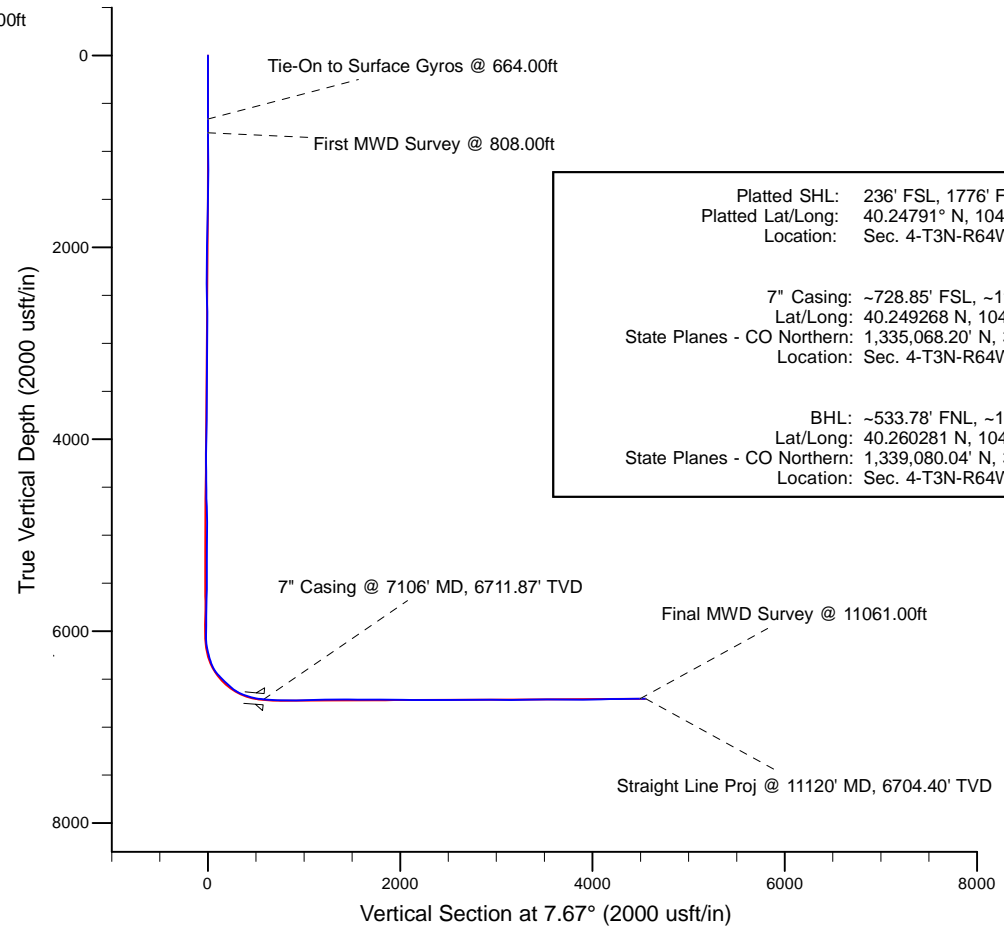
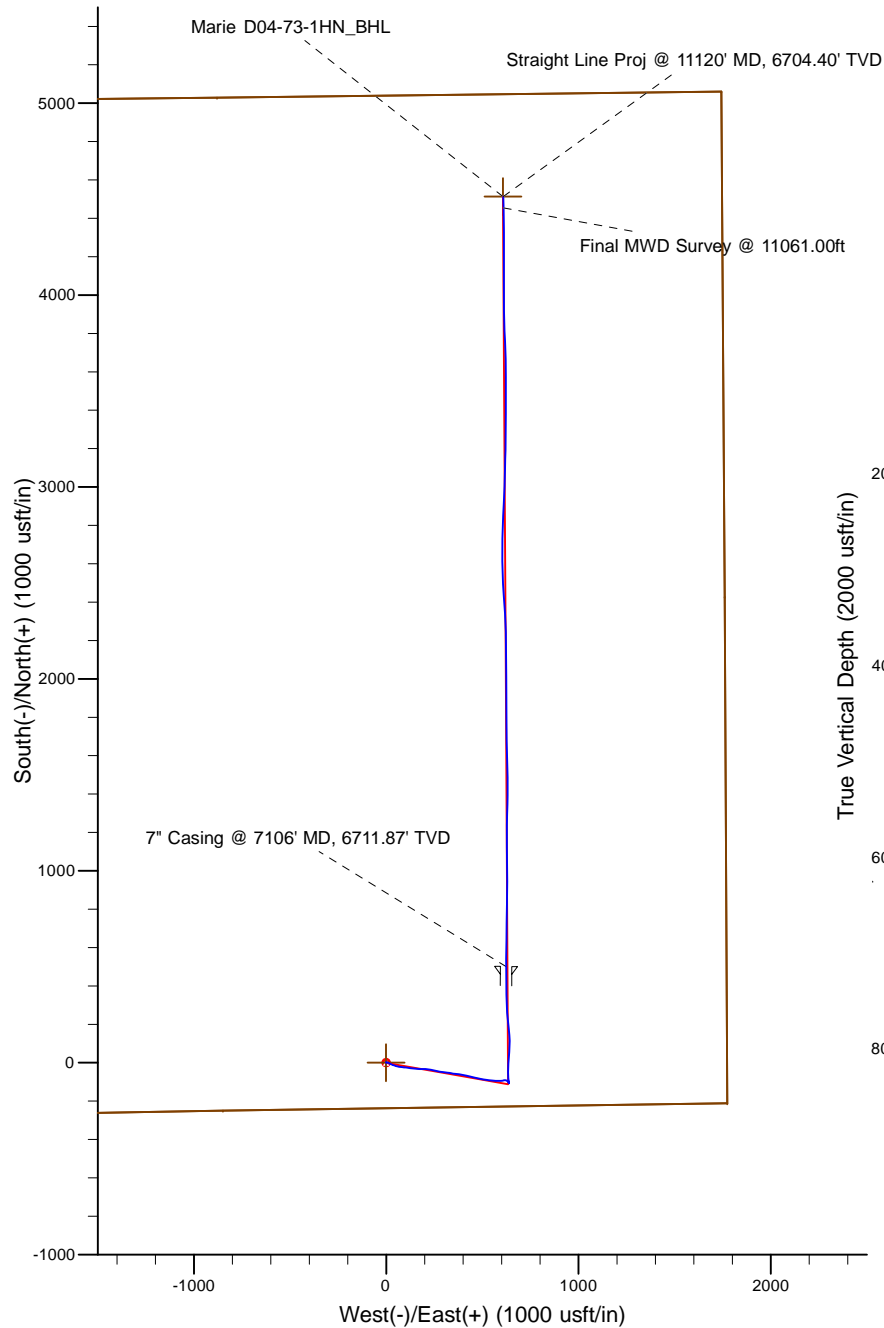


Project: Weld County, CO (NAD 83)  
Site: Sec. 4-T3N-R64W (Marie D04 Pad)  
Well: Marie D04-73-1HN  
Wellbore: Plan B  
Design: Final Surveys

# Noble Energy

**HALLIBURTON**  
Sperry Drilling



## LEGEND

- ✖ Marie D04-73-1HN, Plan B, Rev B0 - PROPOSAL V0
- Final Surveys

Platted SHL: 236' FSL, 1776' FEL  
Platted Lat/Long: 40.24791° N, 104.55299° W  
Location: Sec. 4-T3N-R64W

7" Casing: ~728.85' FSL, ~1146.23' FEL  
Lat/Long: 40.249268 N, 104.550733 W  
State Planes - CO Northern: 1,335,068.20' N, 3,264,963.51' E  
Location: Sec. 4-T3N-R64W

BHL: ~533.78' FNL, ~1137.37' FEL  
Lat/Long: 40.260281 N, 104.550634 W  
State Planes - CO Northern: 1,339,080.04' N, 3,264,948.26' E  
Location: Sec. 4-T3N-R64W

WELL DETAILS: Marie D04-73-1HN

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

Created By: Fred Hartmann  
Created On: 01/23/2014

# Noble Energy

Weld County, CO (NAD 83)

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

Marie D04-73-1HN

Design: Final Surveys

## Sperry Drilling Services

### Final Survey Report

23 January, 2014

Surface UWI : 900918615

Well Coordinates: 1,334,566.85 N, 3,264,338.77 E (40° 14' 52.48" N, 104° 33' 10.76" W)

Ground Level: 4,720.00 usft

Local Coordinate Origin:

Centered on Well Marie D04-73-1HN

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 D04-73-1HN - 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
325.00	0.60	354.61	324.99	1.69	-0.16	1.66	0.18
664.00	0.60	152.01	663.99	1.89	0.51	1.94	0.35
<b>Tie-On to Surface Gyros @ 664.00ft</b>							
808.00	0.32	296.29	807.99	1.41	0.50	1.46	0.61
<b>First MWD Survey @ 808.00ft</b>							
993.00	0.52	51.16	992.98	2.16	0.69	2.23	0.39
1,085.00	0.65	70.48	1,084.98	2.60	1.51	2.78	0.25
1,178.00	0.58	80.45	1,177.97	2.85	2.47	3.16	0.14
1,271.00	0.80	86.88	1,270.97	2.97	3.58	3.42	0.25
1,360.00	0.39	96.97	1,359.96	2.96	4.50	3.54	0.47
1,457.00	0.52	84.29	1,456.96	2.97	5.27	3.64	0.17
1,551.00	2.66	123.92	1,550.92	1.79	7.50	2.78	2.43
1,646.00	5.14	116.79	1,645.69	-1.36	13.13	0.41	2.65
1,740.00	7.47	115.36	1,739.12	-5.87	22.41	-2.83	2.48
1,835.00	8.52	111.94	1,833.19	-11.15	34.52	-6.44	1.21
1,930.00	10.84	107.68	1,926.83	-16.49	49.56	-9.73	2.55
2,024.00	10.26	98.28	2,019.25	-20.38	66.27	-11.36	1.93
2,119.00	11.63	97.52	2,112.52	-22.85	84.14	-11.42	1.45
2,214.00	10.55	95.57	2,205.75	-24.95	102.29	-11.08	1.20
2,309.00	11.11	97.85	2,299.05	-27.04	120.01	-10.79	0.74
2,404.00	12.04	96.08	2,392.12	-29.34	138.93	-10.54	1.05
2,499.00	11.67	94.73	2,485.09	-31.19	158.36	-9.77	0.49
2,594.00	11.42	90.68	2,578.17	-32.09	177.34	-8.14	0.89
2,689.00	13.23	90.91	2,670.98	-32.37	197.61	-5.71	1.91
2,783.00	13.41	101.07	2,762.46	-34.64	219.07	-5.09	2.49
2,878.00	13.36	100.84	2,854.88	-38.82	240.66	-6.35	0.08
2,973.00	12.73	100.23	2,947.43	-42.74	261.74	-7.43	0.68
3,068.00	12.37	100.08	3,040.16	-46.38	282.06	-8.33	0.38
3,163.00	11.21	98.12	3,133.16	-49.47	301.22	-8.83	1.29
3,257.00	11.41	96.23	3,225.33	-51.77	319.51	-8.66	0.45
3,352.00	11.10	101.15	3,318.51	-54.55	337.82	-8.98	1.06
3,447.00	12.86	96.87	3,411.44	-57.59	357.29	-9.39	2.07
3,542.00	11.27	95.12	3,504.33	-59.68	377.04	-8.83	1.72
3,636.00	11.72	102.05	3,596.45	-62.49	395.52	-9.15	1.54
3,731.00	11.31	101.98	3,689.54	-66.44	414.07	-10.59	0.43
3,826.00	13.73	102.83	3,782.28	-70.88	434.18	-12.30	2.55
3,921.00	13.30	104.18	3,874.64	-76.06	455.77	-14.56	0.56
4,016.00	11.79	101.56	3,967.37	-80.68	475.87	-16.46	1.70
4,111.00	10.50	101.58	4,060.58	-84.36	493.86	-17.70	1.36
4,205.00	13.06	98.69	4,152.59	-87.69	512.75	-18.48	2.79
4,301.00	11.88	95.77	4,246.33	-90.32	533.31	-18.34	1.39
4,396.00	11.09	96.12	4,339.43	-92.28	552.12	-17.77	0.83
4,490.00	10.75	95.33	4,431.72	-94.06	569.84	-17.17	0.40
4,585.00	7.75	90.11	4,525.48	-94.89	585.07	-15.97	3.28
4,680.00	6.06	85.05	4,619.79	-94.47	596.47	-14.03	1.89
4,774.00	5.17	77.21	4,713.34	-93.11	605.55	-11.46	1.25
4,869.00	5.02	72.99	4,807.96	-90.94	613.69	-8.23	0.42
4,964.00	3.88	106.45	4,902.69	-90.64	620.75	-6.99	2.93
5,059.00	3.41	114.74	4,997.50	-92.73	626.40	-8.31	0.74

## Design Report for Marie D04-73-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,154.00	0.98	151.40	5,092.42	-94.62	629.36	-9.79	2.83
5,249.00	1.07	124.69	5,187.41	-95.84	630.48	-10.85	0.51
5,344.00	0.59	98.51	5,282.40	-96.42	631.69	-11.26	0.63
5,438.00	1.03	112.87	5,376.39	-96.82	632.95	-11.49	0.51
5,533.00	1.21	88.50	5,471.37	-97.13	634.74	-11.55	0.53
5,628.00	0.91	81.98	5,566.36	-96.99	636.48	-11.19	0.34
5,723.00	1.70	180.99	5,661.34	-98.30	637.21	-12.38	2.16
5,817.00	1.16	164.92	5,755.31	-100.61	637.43	-14.65	0.71
5,912.00	0.83	153.14	5,850.30	-102.15	637.99	-16.10	0.41
6,007.00	1.44	172.95	5,945.28	-103.95	638.45	-17.82	0.75
6,100.00	1.25	179.86	6,038.25	-106.13	638.60	-19.96	0.27
6,148.00	2.79	345.26	6,086.24	-105.52	638.30	-19.40	8.36
6,195.00	8.24	353.06	6,133.00	-101.07	637.60	-15.08	11.68
6,243.00	11.81	357.27	6,180.26	-92.74	636.95	-6.91	7.59
6,290.00	14.14	355.34	6,226.06	-82.22	636.26	3.43	5.04
6,338.00	15.94	355.52	6,272.41	-69.80	635.26	15.60	3.75
6,384.00	17.56	356.61	6,316.46	-56.57	634.36	28.59	3.59
6,479.00	31.07	2.90	6,402.85	-17.60	634.76	67.27	14.46
6,527.00	40.47	5.25	6,441.75	10.35	636.81	95.24	19.79
6,574.00	44.95	3.75	6,476.28	42.12	639.29	127.06	9.77
6,622.00	44.86	3.10	6,510.28	75.94	641.32	160.85	0.97
6,669.00	46.28	359.90	6,543.18	109.49	642.19	194.21	5.72
6,717.00	48.93	355.07	6,575.55	144.88	640.60	229.07	9.25
6,763.00	53.30	353.67	6,604.42	180.50	637.08	263.90	9.79
6,811.00	59.41	354.90	6,631.00	220.24	633.11	302.76	12.91
6,858.00	66.14	355.77	6,652.49	261.87	629.73	343.57	14.41
6,906.00	70.67	357.14	6,670.16	306.40	626.98	387.33	9.80
6,953.00	73.83	359.28	6,684.49	351.14	625.58	431.48	8.00
7,001.00	77.02	359.54	6,696.56	397.58	625.11	477.45	6.67
7,065.00	83.10	359.90	6,707.61	460.59	624.80	539.85	9.52
7,106.00	84.95	0.01	6,711.87	501.37	624.77	580.26	4.53
<b>7" Casing @ 7106' MD, 6711.87' TVD</b>							
7,146.00	86.76	0.12	6,714.76	541.26	624.82	619.80	4.53
7,241.00	87.63	0.75	6,719.41	636.14	625.54	713.93	1.13
7,335.00	88.58	0.77	6,722.52	730.08	626.78	807.20	1.01
7,430.00	91.36	0.94	6,722.57	825.06	628.20	901.52	2.93
7,525.00	91.48	0.64	6,720.21	920.02	629.51	995.80	0.34
7,620.00	90.77	359.53	6,718.35	1,015.00	629.65	1,089.95	1.39
7,714.00	92.00	358.75	6,716.08	1,108.96	628.24	1,182.88	1.55
7,809.00	91.05	0.34	6,713.55	1,203.92	627.49	1,276.89	1.95
7,903.00	90.31	1.84	6,712.43	1,297.90	629.27	1,370.26	1.78
7,998.00	89.26	0.72	6,712.79	1,392.87	631.40	1,464.67	1.62
8,093.00	88.77	359.71	6,714.42	1,487.85	631.75	1,558.85	1.18
8,188.00	90.80	357.69	6,714.78	1,582.82	629.60	1,652.68	3.01
8,283.00	88.83	358.43	6,715.09	1,677.76	626.38	1,746.34	2.22
8,378.00	90.18	0.13	6,715.91	1,772.74	625.19	1,840.32	2.28
8,473.00	90.25	359.79	6,715.55	1,867.74	625.12	1,934.46	0.37
8,568.00	88.98	359.58	6,716.19	1,962.73	624.60	2,028.53	1.35
8,663.00	88.52	0.14	6,718.26	2,057.71	624.37	2,122.63	0.76
8,757.00	90.28	359.50	6,719.25	2,151.70	624.07	2,215.74	1.99
8,851.00	90.43	358.39	6,718.66	2,245.68	622.34	2,308.65	1.19

**Design Report for Marie D04-73-1HN - Final Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,946.00	89.97	357.19	6,718.33	2,340.61	618.68	2,402.24	1.35
9,041.00	89.14	354.49	6,719.07	2,435.35	611.79	2,495.21	2.97
9,136.00	91.08	358.83	6,718.89	2,530.16	606.25	2,588.43	5.00
9,231.00	91.05	359.37	6,717.12	2,625.13	604.76	2,682.35	0.57
9,326.00	90.37	0.84	6,715.94	2,720.12	604.94	2,776.52	1.70
9,421.00	89.63	2.16	6,715.94	2,815.08	607.42	2,870.96	1.59
9,516.00	89.17	2.52	6,716.94	2,910.00	611.30	2,965.55	0.61
9,611.00	88.52	2.18	6,718.85	3,004.90	615.20	3,060.12	0.77
9,706.00	90.59	1.80	6,719.59	3,099.83	618.49	3,154.64	2.22
9,800.00	91.70	0.63	6,717.71	3,193.79	620.49	3,248.03	1.72
9,894.00	90.80	0.10	6,715.66	3,287.76	621.09	3,341.24	1.11
9,989.00	90.93	1.11	6,714.23	3,382.75	622.09	3,435.51	1.07
10,084.00	89.78	359.97	6,713.64	3,477.74	622.98	3,529.77	1.70
10,178.00	90.03	359.82	6,713.80	3,571.74	622.81	3,622.90	0.31
10,273.00	90.34	358.25	6,713.49	3,666.72	621.21	3,716.82	1.68
10,367.00	88.49	358.29	6,714.45	3,760.67	618.37	3,809.55	1.97
10,462.00	89.72	357.53	6,715.93	3,855.59	614.91	3,903.16	1.52
10,557.00	92.50	359.75	6,714.09	3,950.53	612.66	3,996.95	3.74
10,652.00	91.42	359.66	6,710.84	4,045.47	612.17	4,090.98	1.14
10,747.00	90.68	0.72	6,709.10	4,140.45	612.48	4,185.16	1.36
10,842.00	89.91	359.90	6,708.61	4,235.45	613.00	4,279.37	1.18
10,937.00	91.36	359.45	6,707.56	4,330.44	612.46	4,373.44	1.60
11,061.00	90.80	358.89	6,705.22	4,454.40	610.66	4,496.05	0.64
<b>Final MWD Survey @ 11061.00ft</b>							
11,120.00	90.80	358.89	6,704.40	4,513.39	609.52	4,554.36	0.00
<b>Straight Line Proj @ 11120' MD, 6704.40' TVD</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,061.00	6,705.22	4,454.40	610.66	Final MWD Survey @ 11061.00ft
11,120.00	6,704.40	4,513.39	609.52	Straight Line Proj @ 11120' MD, 6704.40' TVD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Marie D04-73-1HN_BHL	7.67	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
325.00	664.00	Surface Gyros	Flexi-Shot
808.00	7,065.00	MWD Surveys - Intermediate	MWD+SC
7,146.00	11,061.00	MWD Surveys - Production	MWD+SC

## Design Report for Marie D04-73-1HN - Final Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,106.00	6,711.87	7" Casing @ 7106' MD, 6711.87' 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 D04-73-1HN_SL - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,334,566.85	3,264,338.77	40.247910	-104.552990
Point 1				0.00	5,001.39	-3,505.96	1,339,568.03	3,260,832.96	
Point 2				0.00	2,360.20	-3,492.08	1,336,926.95	3,260,846.84	
Point 3				0.00	-291.89	-3,475.29	1,334,274.98	3,260,863.63	
Point 4				0.00	-249.49	-848.79	1,334,317.37	3,263,490.02	
Point 5				0.00	-210.49	1,774.95	1,334,356.37	3,266,113.64	
Point 6				0.00	2,427.05	1,760.55	1,336,993.80	3,266,099.24	
Point 7				0.00	5,060.92	1,743.39	1,339,627.56	3,266,082.09	
Point 8				0.00	5,029.21	-879.87	1,339,595.85	3,263,458.94	
Point 9				0.00	5,001.39	-3,505.96	1,339,568.03	3,260,832.96	
Marie D04-73-1HN_46 - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,334,566.85	3,264,338.77	40.247910	-104.552990
Point 1				0.00	4,541.37	-3,045.94	1,339,108.03	3,261,292.96	
Point 2				0.00	2,360.20	-3,032.06	1,336,926.95	3,261,306.84	
Point 3				0.00	168.13	-3,015.27	1,334,734.98	3,261,323.63	
Point 4				0.00	210.53	-848.79	1,334,777.37	3,263,490.02	
Point 5				0.00	249.53	1,314.93	1,334,816.37	3,265,653.64	
Point 6				0.00	2,427.05	1,300.53	1,336,993.80	3,265,639.24	
Point 7				0.00	4,600.90	1,283.37	1,339,167.56	3,265,622.09	
Point 8				0.00	4,569.19	-879.87	1,339,135.85	3,263,458.94	
Point 9				0.00	4,541.37	-3,045.94	1,339,108.03	3,261,292.96	
Marie D04-73-1HN_SL - actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.01	0.00	1,334,566.86	3,264,338.77	40.247910	-104.552990
Marie D04-73-1HN_BF - actual wellpath misses target center by 2.52usft at 11119.81usft MD (6704.40 TVD, 4513.20 N, 609.52 E) - Point	0.00	0.00	6,706.16	4,513.19	607.71	1,339,079.84	3,264,946.46	40.260280	-104.550640

Directional Difficulty Index

Average Dogleg over Survey:	1.99 °/100usft	Maximum Dogleg over Survey:	19.79 °/100usft at 6,527.00 usft
Net Tortosity applicable to Plans:	0.96 °/100usft	Directional Difficulty Index:	6.288

Audit Info

**North Reference Sheet for Sec. 4-T3N-R64W (Marie D04 Pad) - Marie D04-73-1HN -**

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 D04-73-1HN

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: 1,334,566.85 usft N, 3,264,338.77 usft E

Geographical Coordinates of Well: 40° 14' 52.48" N, 104° 33' 10.76" W

Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,120.00usft  
the Bottom Hole Displacement is 4,554.36usft in the Direction of 7.69° (Grid).

Magnetic Convergence at surface is: -7.82° ( 9 January 2014, , BGGM2013)

