

# Noble Energy

Weld County, CO (NAD 83)

Sec. 36-T6N-R65W (Bill Mansfield 36 PAD)

Mansfield E36-65HN - A2

Plan A

Design: MWD Survey

## Sperry Drilling Services

### Standard Report

25 February, 2012

*for ACTUAL  
05-123-34611-00*

Well Coordinates: 1,405,426.33 N, 3,244,963.18 E (40° 26' 34.66" N, 104° 37' 11.57" W)

Ground Level: 4,654.00 ft

Local Coordinate Origin: Centered on Well Mansfield E36-65HN - Slot A2

Viewing Datum: KB @ 4678.00ft (H&P 343)

TVDs to System: N

North Reference: Grid

Unit System: API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 431

**HALLIBURTON**

## Design Report for Mansfield E36-65HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
610.00	0.00	0.00	610.00	0.00	0.00	0.00	0.00
726.00	0.65	234.37	726.00	-0.38	-0.53	-0.52	0.56
821.00	0.68	204.13	820.99	-1.21	-1.20	-1.16	0.37
916.00	0.80	218.54	915.98	-2.24	-1.85	-1.76	0.23
1,010.00	0.69	238.94	1,009.98	-3.05	-2.74	-2.63	0.30
1,102.00	0.65	266.87	1,101.97	-3.36	-3.74	-3.61	0.35
1,287.00	0.42	229.70	1,286.96	-3.86	-5.30	-5.16	0.22
1,379.00	0.60	261.20	1,378.96	-4.15	-6.03	-5.88	0.36
1,563.00	0.90	149.20	1,562.95	-5.54	-6.25	-6.04	0.68
1,655.00	1.53	171.50	1,654.93	-7.38	-5.69	-5.43	0.84
1,840.00	1.31	169.45	1,839.87	-11.90	-4.94	-4.51	0.12
1,932.00	0.80	168.33	1,931.86	-13.56	-4.62	-4.13	0.55
2,031.00	1.66	203.73	2,030.83	-15.55	-5.06	-4.49	1.12
2,127.00	3.56	212.76	2,126.73	-19.33	-7.23	-6.53	2.02
2,222.00	4.82	206.91	2,221.47	-25.37	-10.63	-9.71	1.40
2,317.00	7.80	205.24	2,315.89	-34.76	-15.19	-13.93	3.14
2,413.00	8.85	205.24	2,410.88	-47.33	-21.12	-19.40	1.09
2,509.00	12.32	209.71	2,505.23	-62.91	-29.34	-27.06	3.71
2,604.00	12.63	213.64	2,597.99	-80.36	-40.12	-37.20	0.95
2,699.00	13.29	208.37	2,690.57	-98.62	-51.06	-47.48	1.42
2,795.00	13.64	207.80	2,783.93	-118.34	-61.59	-57.28	0.39
2,890.00	13.33	204.46	2,876.31	-138.22	-71.34	-66.32	0.88
2,985.00	13.12	202.07	2,968.80	-158.18	-79.93	-74.18	0.62
3,081.00	12.91	201.86	3,062.33	-178.23	-88.02	-81.54	0.22
3,176.00	11.58	199.55	3,155.17	-197.07	-95.16	-88.00	1.49
3,367.00	11.73	205.83	3,342.24	-232.61	-110.03	-101.58	0.67
3,463.00	12.46	207.56	3,436.10	-250.57	-119.08	-109.97	0.85
3,558.00	11.08	203.90	3,529.11	-268.01	-127.52	-117.78	1.65
3,654.00	13.01	204.54	3,622.99	-286.27	-135.74	-125.34	2.02
3,749.00	14.27	206.18	3,715.31	-306.51	-145.35	-134.22	1.39
3,845.00	15.74	205.43	3,808.03	-328.88	-156.16	-144.21	1.54
3,940.00	13.80	201.41	3,899.89	-351.07	-165.83	-153.08	2.31
4,036.00	10.49	193.57	3,993.73	-370.23	-172.07	-158.62	3.84
4,131.00	5.88	187.12	4,087.74	-383.48	-174.70	-160.77	4.94
4,226.00	2.74	177.04	4,182.46	-390.58	-175.19	-161.00	3.39
4,322.00	0.37	107.08	4,278.43	-392.96	-174.77	-160.50	2.75
4,417.00	0.28	353.65	4,373.42	-392.82	-174.50	-160.24	0.57
4,513.00	0.25	49.35	4,469.42	-392.45	-174.37	-160.12	0.26
4,608.00	0.19	206.89	4,564.42	-392.45	-174.28	-160.03	0.45
4,703.00	0.20	137.65	4,659.42	-392.72	-174.24	-159.98	0.23
4,799.00	0.19	148.64	4,755.42	-392.98	-174.05	-159.78	0.04
4,990.00	0.51	156.04	4,946.42	-394.02	-173.54	-159.23	0.17
5,085.00	0.33	148.04	5,041.42	-394.64	-173.22	-158.89	0.20
5,181.00	0.43	281.91	5,137.42	-394.80	-173.43	-159.09	0.73
5,276.00	0.96	288.18	5,232.41	-394.48	-174.53	-160.21	0.56
5,561.00	1.21	255.70	5,517.36	-394.48	-179.72	-165.39	0.23
5,657.00	1.14	257.97	5,613.34	-394.93	-181.63	-167.29	0.09
5,847.00	0.87	261.58	5,803.31	-395.53	-184.91	-170.54	0.15
5,942.00	0.62	282.81	5,898.30	-395.52	-186.12	-171.75	0.39

## Design Report for Mansfield E36-65HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,038.00	0.50	251.84	5,994.30	-395.54	-187.03	-172.66	0.33
6,086.00	2.86	89.09	6,042.28	-395.59	-186.03	-171.66	6.96
6,133.00	8.96	88.56	6,089.01	-395.48	-181.19	-166.83	12.98
6,181.00	11.50	88.72	6,136.24	-395.27	-172.67	-158.32	5.29
6,228.00	12.26	86.15	6,182.23	-394.84	-163.01	-148.68	1.97
6,276.00	14.89	87.38	6,228.89	-394.21	-151.76	-137.46	5.51
6,324.00	17.51	91.00	6,274.98	-394.05	-138.38	-124.09	5.85
6,372.00	20.98	90.20	6,320.29	-394.21	-122.56	-108.28	7.25
6,419.00	24.68	87.50	6,363.60	-393.81	-104.34	-90.08	8.18
6,467.00	29.49	84.61	6,406.33	-392.26	-82.55	-68.36	10.39
6,515.00	33.51	84.29	6,447.25	-389.84	-57.59	-43.51	8.38
6,563.00	38.91	86.01	6,485.96	-387.47	-29.35	-15.37	11.45
6,610.00	44.94	87.90	6,520.92	-385.83	1.99	15.89	13.11
6,658.00	51.08	89.46	6,553.01	-385.03	37.64	51.49	13.02
6,705.00	54.60	88.51	6,581.40	-384.36	75.09	88.88	7.66
6,753.00	56.74	88.12	6,608.47	-383.19	114.71	128.44	4.51
6,801.00	58.82	85.41	6,634.06	-380.89	155.24	168.86	6.45
6,849.00	61.23	84.69	6,658.04	-377.30	196.66	210.13	5.19
6,896.00	63.80	85.83	6,679.73	-373.86	238.21	251.52	5.88
6,944.00	67.36	87.49	6,699.58	-371.32	281.83	295.03	8.06
6,992.00	73.78	88.62	6,715.54	-369.80	327.05	340.16	13.56
7,040.00	80.33	89.25	6,726.28	-368.93	373.80	386.84	13.71
7,087.00	82.72	86.46	6,733.21	-367.19	420.24	433.20	7.77
7,213.00	88.49	84.55	6,742.86	-357.34	545.43	557.94	4.82
7,309.00	90.43	83.17	6,743.77	-347.07	640.86	652.95	2.48
7,404.00	95.52	82.12	6,738.84	-334.93	734.92	746.51	5.47
7,500.00	99.02	81.20	6,726.69	-321.13	829.13	840.16	3.77

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	Mansfield E36-65HN_PlanA - Rev1_BHL Tgt	92.06	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
610.00	7,500.00	Sperry MWD Surveys	MWD



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Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Mansfield E36-65HN	0.00	0.00	6,748.00	-162.51	4,508.27	1,405,263.83	3,249,471.28	40° 26' 32.604 N	104° 36' 13.284 W
- actual wellpath misses target center by 3682.62ft at 7500.00ft MD (6726.69 TVD, -321.13 N, 829.13 E)									
- Point									
Bill E36-67HN_Sec.	0.00	0.00	0.00	40.07	-0.40	1,405,466.40	3,244,962.78	40° 26' 35.052 N	104° 37' 11.568 W
- actual wellpath misses target center by 40.08ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				196.60	1,989.07	1,407,415.33	3,245,159.78		
Point 2				4,539.60	2,020.07	1,407,446.33	3,249,502.61		
Point 3				4,623.60	-2,348.93	1,403,077.49	3,249,586.61		
Point 4				254.60	-2,390.93	1,403,035.49	3,245,217.77		
Point 5				196.60	1,989.07	1,407,415.33	3,245,159.78		
Bill E36-67HN_Sec.	0.00	0.00	0.00	40.07	-0.40	1,405,466.40	3,244,962.78	40° 26' 35.052 N	104° 37' 11.568 W
- actual wellpath misses target center by 40.08ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-263.40	2,449.07	1,407,875.31	3,244,699.79		
Point 2				4,999.60	2,480.07	1,407,906.31	3,249,962.59		
Point 3				5,083.60	-2,808.93	1,402,617.51	3,250,046.59		
Point 4				-205.40	-2,850.93	1,402,575.51	3,244,757.79		
Point 5				-263.40	2,449.07	1,407,875.31	3,244,699.79		

**North Reference Sheet for Sec. 36-T6N-R65W (Bill Mansfield 36 PAD) - Mansfield E36-65HN - Plan A**

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

Vertical Depths are relative to KB @ 4678.00ft (H&P 343). Northing and Easting are relative to Mansfield E36-65HN - Slot A2

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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996246

Grid Coordinates of Well: 1,405,426.33 ft N, 3,244,963.18 ft E

Geographical Coordinates of Well: 40° 26' 34.66" N, 104° 37' 11.57" W

Grid Convergence at Surface is: 0.57°

Based upon Minimum Curvature type calculations, at a Measured Depth of 7,500.00ft  
the Bottom Hole Displacement is 889.14ft in the Direction of 111.17° (Grid).

Magnetic Convergence at surface is: -8.11° (12 February 2012, , BGGM2011)

