

# Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T3N-R64W (Guttersen 04 PAD)

Guttersen D04-31D - A3

Plan B

Survey: Sperry MWD Surveys

## Sperry Drilling Services

# Standard Report

21 May, 2012

Well Coordinates: 1,339,279.65 N, 3,261,123.47 E (40° 15' 39.38" N, 104° 33' 51.59" W)

Ground Level: 4,747.00 ft

Local Coordinate Origin: Centered on Well Guttersen D04-31D - Slot A3

Viewing Datum: KB @ 4760.00ft (Ensign 132)

TVDs to System: N

North Reference: Grid

Unit System: API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

**Survey Report for Guttersen D04-31D - Sperry MWD Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
750.00	0.00	0.00	750.00	0.00	0.00	0.00	0.00
822.00	0.28	97.82	822.00	-0.02	0.17	-0.03	0.39
917.00	0.28	50.40	917.00	0.09	0.58	-0.28	0.24
1,012.00	2.25	252.51	1,011.98	-0.32	-1.02	0.64	2.64
1,107.00	4.15	196.02	1,106.84	-4.19	-3.75	5.18	3.64
1,202.00	7.18	205.94	1,201.37	-12.83	-7.29	14.51	3.34
1,295.00	8.64	205.25	1,293.48	-24.38	-12.81	27.23	1.57
1,388.00	10.63	203.88	1,385.17	-38.54	-19.27	42.72	2.15
1,481.00	12.33	206.00	1,476.30	-55.31	-27.09	61.13	1.88
1,574.00	13.72	202.61	1,566.91	-74.42	-35.69	82.00	1.70
1,666.00	14.40	197.68	1,656.16	-95.39	-43.36	104.33	1.50
1,758.00	16.76	197.85	1,744.77	-118.92	-50.90	129.03	2.57
1,850.00	17.99	198.62	1,832.57	-145.01	-59.50	156.50	1.36
1,944.00	17.92	198.26	1,921.99	-172.50	-68.67	185.47	0.14
2,040.00	19.28	200.43	2,012.98	-201.38	-78.83	216.09	1.59
2,135.00	17.74	197.99	2,103.06	-229.84	-88.77	246.24	1.81
2,230.00	19.46	197.77	2,193.10	-258.68	-98.07	276.53	1.81
2,325.00	18.06	196.17	2,283.05	-287.89	-107.00	307.06	1.57
2,420.00	18.43	196.69	2,373.27	-316.42	-115.42	336.77	0.43
2,515.00	19.04	195.49	2,463.24	-345.74	-123.87	367.24	0.76
2,611.00	17.86	194.75	2,554.30	-375.06	-131.80	397.54	1.25
2,706.00	17.96	198.39	2,644.70	-403.05	-140.13	426.72	1.18
2,801.00	19.63	198.19	2,734.63	-432.11	-149.73	457.32	1.76
2,896.00	19.20	197.27	2,824.23	-462.19	-159.35	488.89	0.56
2,991.00	18.78	196.46	2,914.06	-491.77	-168.32	519.78	0.52
3,086.00	17.84	196.89	3,004.25	-520.36	-176.88	549.59	1.00
3,181.00	18.61	199.72	3,094.49	-548.56	-186.22	579.29	1.23
3,275.00	17.76	201.25	3,183.79	-576.04	-196.48	608.62	1.04
3,370.00	17.80	198.43	3,274.25	-603.32	-206.32	637.62	0.91
3,465.00	17.93	197.77	3,364.67	-631.02	-215.38	666.76	0.25
3,560.00	18.21	200.20	3,454.99	-658.88	-224.97	696.22	0.85
3,655.00	18.58	203.02	3,545.14	-686.74	-236.01	726.16	1.01
3,750.00	18.34	197.84	3,635.25	-714.90	-246.51	756.20	1.74
3,845.00	19.48	200.21	3,725.13	-743.99	-256.56	786.98	1.45
3,940.00	18.93	199.46	3,814.84	-773.39	-267.17	818.23	0.63
4,035.00	18.50	200.08	3,904.82	-802.07	-277.47	848.71	0.50
4,130.00	19.78	201.71	3,994.56	-831.16	-288.60	879.84	1.46
4,225.00	18.67	199.34	4,084.27	-860.44	-299.58	911.10	1.43
4,320.00	17.75	200.02	4,174.51	-888.40	-309.57	940.79	0.99
4,415.00	17.10	199.67	4,265.15	-915.16	-319.23	969.24	0.69
4,510.00	15.84	201.65	4,356.25	-940.36	-328.72	996.16	1.45
4,605.00	14.66	202.91	4,447.90	-963.49	-338.18	1,021.10	1.29
4,700.00	14.56	205.28	4,539.83	-985.36	-347.96	1,044.97	0.64
4,795.00	12.35	204.58	4,632.22	-1,005.40	-357.29	1,066.96	2.33
4,890.00	9.88	206.92	4,725.43	-1,021.90	-365.20	1,085.15	2.64
4,986.00	8.80	206.74	4,820.15	-1,035.81	-372.24	1,100.59	1.13
5,080.00	7.02	213.08	4,913.26	-1,047.04	-378.61	1,113.29	2.11
5,176.00	7.00	213.21	5,008.54	-1,056.85	-385.01	1,124.66	0.03
5,271.00	4.41	210.68	5,103.06	-1,064.84	-390.05	1,133.86	2.74
5,366.00	2.53	195.09	5,197.89	-1,070.00	-392.46	1,139.53	2.20

## Survey Report for Guttersen D04-31D - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,461.00	1.05	86.90	5,292.85	-1,071.98	-392.13	1,141.29	3.19
5,556.00	0.84	126.93	5,387.84	-1,072.35	-390.71	1,141.17	0.71
5,651.00	1.62	39.66	5,482.83	-1,071.74	-389.30	1,140.13	1.88
5,746.00	1.29	58.93	5,577.80	-1,070.15	-387.52	1,138.05	0.62
5,842.00	1.42	71.89	5,673.77	-1,069.22	-385.47	1,136.50	0.35
5,937.00	1.53	79.37	5,768.74	-1,068.62	-383.10	1,135.16	0.23
6,222.00	1.20	73.38	6,053.66	-1,067.07	-376.50	1,131.53	0.13
6,507.00	1.23	69.25	6,338.59	-1,065.13	-370.78	1,127.82	0.03
6,792.00	2.09	45.61	6,623.47	-1,060.41	-364.21	1,121.21	0.38
7,075.00	2.64	39.81	6,906.23	-1,051.80	-356.35	1,110.49	0.21
7,240.00	1.90	30.49	7,071.10	-1,046.52	-352.53	1,104.26	0.50
7,293.00	1.90	30.49	7,124.07	-1,045.00	-351.63	1,102.53	0.00

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Guttersen D04-31D_PlanB - Rev0_BHL Tgt	199.12	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
822.00	7,293.00	Sperry MWD Surveys	MWD

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
Guttersen D04-31D_	0.00	0.00	5,000.00	-1,031.16	-357.56	1,338,248.53	3,260,765.93	40.258120	-104.565650
- survey misses target center by 36.33ft at 5163.07ft MD (4995.70 TVD, -1055.53 N, -384.15 E)									
- Circle (radius 75.00)									
Guttersen D04-31D_	0.00	0.00	7,090.00	-1,031.16	-357.56	1,338,248.53	3,260,765.93	40.258120	-104.565650
- survey misses target center by 24.87ft at 7240.00ft MD (7071.10 TVD, -1046.52 N, -352.53 E)									
- Point									
Guttersen D04-69H1	0.00	0.00	-11.00	21.86	-0.23	1,339,301.50	3,261,123.24	40.261000	-104.564330
- survey misses target center by 761.31ft at 750.00ft MD (750.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Guttersen D04-69H1	0.00	0.00	-11.00	21.86	-0.23	1,339,301.50	3,261,123.24	40.261000	-104.564330
- survey misses target center by 761.31ft at 750.00ft MD (750.00 TVD, 0.00 N, 0.00 E)									
- Polygon									

# North Reference Sheet for Sec. 4-T3N-R64W (Guttersen 04 PAD) - Guttersen D04-31D - Plan B

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.  
Vertical Depths are relative to KB @ 4760.00ft (Ensign 132). Northing and Easting are relative to Guttersen D04-31D - Slot A3  
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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995686

Grid Coordinates of Well: 1,339,279.65 ft N, 3,261,123.47 ft E  
Geographical Coordinates of Well: 40° 15' 39.38" N, 104° 33' 51.59" W  
Grid Convergence at Surface is: 0.60°

Based upon Minimum Curvature type calculations, at a Measured Depth of 7,293.00ft  
the Bottom Hole Displacement is 1,102.58ft in the Direction of 198.60° (Grid).

Magnetic Convergence at surface is: -8.01° (15 May 2012, , BGGM2011)

