

Noble Energy (Rockies)

Weld County, CO (NAD 83)

Sec. 9-T4N-R64W (Alter 9 PAD)

Alter C16-29D - A1

Plan A

Survey: Sperry MWD Surveys

Sperry Drilling Services Standard Report

05 February, 2012

Well Coordinates: 1,361,209.77 N, 3,261,346.59 E (40° 19' 16.07" N, 104° 33' 45.72" W)

Ground Level: 4,700.00 ft

Local Coordinate Origin: Centered on Well Alter C16-29D - Slot A1

Viewing Datum: KB @ 4724.00ft (H&P 322)

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 Alter C16-29D - Sperry MWD Surveys

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
880.00	0.09	272.47	880.00	0.03	-0.69	-0.53	0.01
970.00	2.85	130.75	969.96	-1.43	0.93	1.65	3.25
1,064.00	4.59	127.73	1,063.76	-5.26	5.68	7.74	1.86
1,158.00	5.94	133.96	1,157.36	-10.93	12.16	16.35	1.56
1,253.00	6.67	133.61	1,251.79	-18.15	19.69	26.78	0.77
1,347.00	7.29	133.31	1,345.09	-26.01	27.98	38.20	0.66
1,442.00	9.57	127.70	1,439.06	-34.97	38.62	52.10	2.55
1,536.00	11.87	127.06	1,531.41	-45.58	52.52	69.52	2.45
1,631.00	13.85	129.15	1,624.03	-58.65	69.13	90.61	2.14
1,725.00	14.93	136.07	1,715.08	-74.47	86.26	113.93	2.16
1,819.00	15.04	136.26	1,805.89	-92.01	103.09	138.17	0.13
1,913.00	16.00	136.28	1,896.46	-110.18	120.48	163.26	1.02
2,008.00	16.07	132.16	1,987.76	-128.47	139.28	189.47	1.20
2,102.00	16.72	130.23	2,077.94	-145.93	159.24	216.00	0.90
2,196.00	16.62	127.42	2,167.99	-162.84	180.24	242.91	0.86
2,291.00	14.50	124.46	2,259.51	-177.82	200.84	268.23	2.38
2,385.00	12.94	125.93	2,350.82	-190.66	219.07	290.36	1.70
2,480.00	12.81	128.15	2,443.44	-203.41	235.96	311.44	0.54
2,574.00	14.00	131.14	2,534.87	-217.32	252.72	333.20	1.46
2,668.00	16.68	136.69	2,625.52	-234.63	270.54	358.02	3.25
2,763.00	17.54	139.12	2,716.32	-255.37	289.27	385.83	1.18
2,857.00	18.40	139.24	2,805.73	-277.32	308.22	414.61	0.92
2,951.00	16.75	139.54	2,895.34	-298.86	326.70	442.77	1.76
3,046.00	16.63	139.34	2,986.34	-319.59	344.44	469.84	0.14
3,140.00	15.35	135.48	3,076.70	-338.67	361.93	495.61	1.77
3,234.00	12.96	137.60	3,167.84	-355.32	377.76	518.52	2.60
3,329.00	11.26	139.66	3,260.73	-370.26	390.95	538.33	1.85
3,423.00	9.22	138.19	3,353.22	-382.87	401.91	554.92	2.19
3,517.00	6.77	133.11	3,446.30	-392.27	410.98	567.95	2.71
3,611.00	10.52	127.82	3,539.22	-401.32	421.81	582.05	4.07
3,705.00	13.77	126.69	3,631.10	-413.27	437.56	601.75	3.47
3,799.00	16.37	129.20	3,721.86	-428.33	456.80	626.12	2.85
3,894.00	16.80	129.73	3,812.91	-445.57	477.73	653.20	0.48
3,988.00	16.09	129.44	3,903.07	-462.52	498.24	679.79	0.76
4,082.00	16.22	127.77	3,993.36	-478.84	518.68	705.89	0.51
4,177.00	14.64	128.38	4,084.93	-494.42	538.58	731.09	1.67
4,271.00	16.22	124.54	4,175.54	-509.24	558.71	755.96	2.00
4,365.00	15.39	129.95	4,265.99	-524.70	579.08	781.44	1.80
4,460.00	16.29	130.97	4,357.38	-541.53	598.81	807.36	0.99
4,554.00	15.46	130.06	4,447.80	-558.23	618.35	833.06	0.92
4,648.00	14.60	129.25	4,538.58	-573.79	637.12	857.41	0.94
4,742.00	12.78	128.38	4,629.91	-587.75	654.44	879.62	1.95
4,837.00	10.86	125.78	4,722.89	-599.50	669.94	898.99	2.10
4,931.00	9.31	122.01	4,815.43	-608.71	683.57	915.28	1.79
5,025.00	6.92	119.80	4,908.49	-615.56	694.94	928.30	2.56
5,120.00	4.21	111.55	5,003.03	-619.68	703.15	937.15	2.97
5,214.00	2.07	114.14	5,096.88	-621.65	707.91	941.99	2.28
5,308.00	1.27	264.01	5,190.87	-622.45	708.42	942.91	3.44
5,403.00	0.85	257.90	5,285.85	-622.71	706.68	941.80	0.46

Survey Report for Alter C16-29D - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,497.00	0.68	263.43	5,379.84	-622.92	705.45	941.03	0.20
5,592.00	0.59	301.29	5,474.84	-622.73	704.47	940.17	0.44
5,686.00	0.68	338.15	5,568.83	-621.96	703.85	939.20	0.44
5,780.00	1.02	353.22	5,662.82	-620.61	703.54	938.06	0.43
5,874.00	1.16	1.00	5,756.80	-618.83	703.46	936.81	0.22
5,969.00	1.24	29.87	5,851.78	-616.97	703.99	935.95	0.63
6,157.00	2.00	24.93	6,039.71	-612.24	706.38	934.55	0.41
6,251.00	2.15	28.86	6,133.65	-609.20	707.93	933.65	0.22
6,346.00	0.67	60.38	6,228.62	-607.37	709.27	933.41	1.70
6,440.00	1.13	49.19	6,322.60	-606.49	710.45	933.70	0.52
6,535.00	1.69	47.39	6,417.57	-604.93	712.19	933.94	0.59
6,629.00	2.46	54.45	6,511.51	-602.82	714.85	934.49	0.86
6,723.00	1.59	59.57	6,605.45	-600.99	717.62	935.31	0.94
6,818.00	1.45	48.62	6,700.42	-599.52	719.66	935.84	0.34
6,912.00	1.46	8.36	6,794.39	-597.55	720.72	935.30	1.07
7,006.00	2.85	347.72	6,888.32	-594.08	720.40	932.74	1.67
7,101.00	2.63	276.61	6,983.24	-591.52	717.73	929.04	3.36
7,158.00	2.63	276.61	7,040.18	-591.22	715.13	926.91	0.00

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Alter C16-29D_Plan A - Rev 0_BHL Tgt	132.20	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
880.00	7,158.00	Sperry MWD Surveys	MWD

Survey Report for Alter C16-29D - Sperry MWD Surveys

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
Alter C16-29D_Sec. - survey hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
Alter C16-29D_Sec. - survey hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
Alter C16-29D_Plan. - survey hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
Alter C16-29D_Plan - survey misses target center by 49.78ft at 7158.00ft MD (7040.18 TVD, -591.22 N, 715.13 E) - Point	0.00	0.00	7,039.00	-605.01	667.31	1,360,604.79	3,262,013.87	40° 19' 10.020 N	104° 33' 37.188 W
Alter C16-29D_Plan. - survey misses target center by 38.40ft at 5113.25ft MD (4996.30 TVD, -619.49 N, 702.68 E) - Circle (radius 75.00)	0.00	0.00	5,000.00	-605.01	667.31	1,360,604.79	3,262,013.87	40° 19' 10.020 N	104° 33' 37.188 W
Alter C16-29D_Sec. - survey hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
Alter C16-29D_Sec. - survey hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W

North Reference Sheet for Sec. 9-T4N-R64W (Alter 9 PAD) - Alter C16-29D - 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 @ 4724.00ft (H&P 322). Northing and Easting are relative to Alter C16-29D - Slot A1

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: 0.99995760

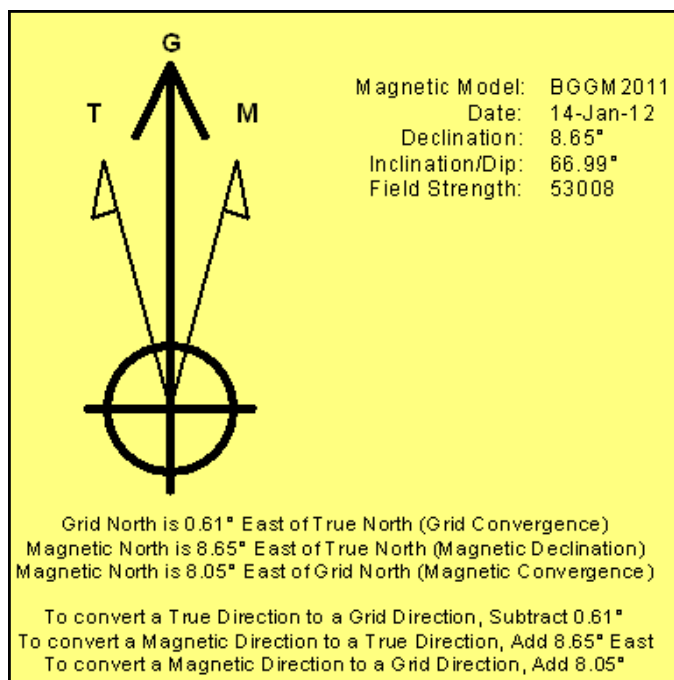
Grid Coordinates of Well: 1,361,209.77 ft N, 3,261,346.59 ft E

Geographical Coordinates of Well: 40° 19' 16.07" N, 104° 33' 45.72" W

Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 7,158.00ft
the Bottom Hole Displacement is 927.88ft in the Direction of 129.58° (Grid).

Magnetic Convergence at surface is: -8.05° (14 January 2012, , BGGM2011)



Plan: Plan B - Rev 0 Proposal (Alter C16-29D/Sidetrack #1)
Created By: Jay Lantz Date: 16:04, February 06 2012
Approved: Date: