

# Noble Energy

Weld County, CO (NAD 83)  
Sec. 9-T4N-R64W (Alter 9 PAD)  
Alter C09-33D - A4

Design: MWD Survey

## Sperry Drilling Services

### Final Survey Report

04 May, 2012

Well Coordinates: 1,361,278.99 N, 3,261,345.86 E (40° 19' 16.75" N, 104° 33' 45.72" W)  
Ground Level: 4,701.00 ft

Local Coordinate Origin:	Centered on Well Alter C09-33D - Slot A4
Viewing Datum:	KB @ 4725.00ft (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**

## Design Report for Alter C09-33D - 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
786.00	0.70	121.07	785.98	-2.48	4.11	-4.68	0.09
<b>First MWD Survey</b>							
877.00	2.16	286.48	876.96	-2.28	2.94	-3.70	3.12
967.00	3.38	275.70	966.86	-1.53	-1.32	-0.12	1.47
1,061.00	3.52	275.32	1,060.69	-0.99	-6.95	4.30	0.15
1,155.00	5.54	271.13	1,154.39	-0.63	-14.36	9.87	2.18
1,250.00	6.52	286.80	1,248.87	1.02	-24.11	18.01	2.01
1,344.00	8.15	295.18	1,342.10	5.39	-35.25	29.05	2.07
1,438.00	10.38	301.07	1,434.87	12.60	-48.54	43.61	2.57
1,533.00	11.00	306.90	1,528.22	22.46	-63.12	60.94	1.31
1,627.00	12.23	313.76	1,620.30	34.73	-77.48	79.79	1.97
1,722.00	13.69	316.54	1,712.88	49.85	-92.48	101.09	1.67
1,816.00	15.71	314.69	1,803.80	66.88	-109.18	124.93	2.21
1,910.00	16.94	316.74	1,894.01	85.80	-127.62	151.33	1.44
2,004.00	17.20	315.95	1,983.87	105.76	-146.66	178.91	0.37
2,099.00	17.83	314.91	2,074.46	126.13	-166.73	207.49	0.74
2,193.00	18.48	318.34	2,163.78	147.42	-186.83	236.74	1.33
2,287.00	15.80	317.06	2,253.60	167.92	-205.45	264.38	2.88
2,382.00	16.50	317.76	2,344.85	187.38	-223.33	290.76	0.76
2,476.00	17.31	320.00	2,434.79	207.97	-241.29	318.00	1.11
2,571.00	17.36	319.22	2,525.47	229.53	-259.63	346.17	0.25
2,665.00	18.30	320.30	2,614.96	251.50	-278.22	374.81	1.06
2,759.00	19.19	317.51	2,703.97	274.25	-298.08	404.91	1.34
2,854.00	19.71	316.90	2,793.55	297.46	-319.58	436.50	0.59
2,948.00	17.27	315.38	2,882.69	318.97	-340.21	466.28	2.65
3,042.00	17.07	315.86	2,972.50	338.80	-359.62	494.02	0.26
3,137.00	17.32	316.14	3,063.26	359.01	-379.13	522.09	0.28
3,231.00	16.18	314.75	3,153.27	378.32	-398.12	549.18	1.29
3,325.00	14.98	315.35	3,243.81	396.18	-415.96	574.42	1.29
3,420.00	12.69	310.24	3,336.05	411.66	-432.56	597.11	2.73
3,514.00	13.32	306.73	3,427.64	424.80	-449.12	618.15	1.07
3,609.00	13.98	312.55	3,519.97	439.11	-466.35	640.47	1.60
3,703.00	15.31	319.47	3,610.92	456.22	-482.78	664.18	2.34
3,797.00	18.79	319.94	3,700.77	477.25	-500.59	691.61	3.70
3,891.00	18.82	319.48	3,789.75	500.36	-520.19	721.76	0.16
3,986.00	18.09	318.97	3,879.87	523.14	-539.82	751.72	0.79
4,080.00	15.25	316.77	3,969.91	543.16	-557.88	778.62	3.09
4,174.00	14.30	317.89	4,060.80	560.78	-574.13	802.55	1.06
4,269.00	15.51	319.59	4,152.60	579.15	-590.23	826.90	1.35
4,363.00	15.22	317.19	4,243.24	597.77	-606.76	851.73	0.74
4,457.00	16.91	311.20	4,333.58	615.83	-625.44	877.71	2.52
4,552.00	15.71	309.41	4,424.75	633.10	-645.77	904.33	1.37
4,646.00	13.43	308.96	4,515.72	648.05	-664.09	927.89	2.43
4,740.00	10.28	308.60	4,607.71	660.14	-679.14	947.11	3.35
4,834.00	8.63	311.13	4,700.43	670.02	-691.01	962.50	1.81
4,929.00	6.90	303.75	4,794.55	677.88	-701.12	975.24	2.10
5,023.00	5.23	295.97	4,888.03	682.89	-709.67	984.86	1.98
5,118.00	4.47	287.71	4,982.69	685.91	-717.09	992.29	1.08
5,212.00	3.63	287.32	5,076.45	687.91	-723.42	998.23	0.89

## Design Report for Alter C09-33D - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,306.00	2.07	325.37	5,170.34	690.20	-727.22	1,002.55	2.52
5,400.00	1.66	342.44	5,264.29	692.89	-728.60	1,005.41	0.73
5,589.00	1.59	65.18	5,453.24	696.60	-727.05	1,006.88	1.14
5,778.00	1.60	14.86	5,642.17	700.25	-723.99	1,007.23	0.72
5,966.00	1.03	18.28	5,830.12	704.39	-722.79	1,009.25	0.31
6,155.00	1.07	21.47	6,019.09	707.65	-721.61	1,010.67	0.04
6,344.00	1.03	4.37	6,208.06	710.99	-720.83	1,012.44	0.17
6,532.00	0.91	350.47	6,396.03	714.14	-720.95	1,014.72	0.14
6,721.00	0.90	1.92	6,585.01	717.11	-721.15	1,016.93	0.10
6,910.00	1.11	350.87	6,773.98	720.40	-721.39	1,019.39	0.15
7,099.00	0.80	348.19	6,962.95	723.50	-721.95	1,021.95	0.17
7,147.00	0.44	338.07	7,010.95	724.00	-722.09	1,022.40	0.78
<b>Final MWD Survey</b>							
7,205.00	0.44	338.07	7,068.95	724.41	-722.25	1,022.81	0.00
<b>Estimated BHL: 1331' FSL, 62' FEL - Survey Projection to TD</b>							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
786.00	785.98	-2.48	4.11	First MWD Survey
7,147.00	7,010.95	724.00	-722.09	Final MWD Survey
7,205.00	7,068.95	724.41	-722.25	Estimated BHL: 1331' FSL, 62' FEL
7,205.00	7,068.95	724.41	-722.25	Survey Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Alter C09-33D_PlanA - Rev0_BHL Tgt	314.14	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
786.00	7,205.00	Sperry MWD Surveys	MWD

## Design Report for Alter C09-33D - MWD Survey

**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 C09-33D_PlanA	0.00	0.00	0.00	0.00	0.00	1,361,278.99	3,261,345.86	40° 19' 16.752 N	104° 33' 45.720 W
- actual wellpath hits target center									
- Polygon									
Point 1				-660.00	815.00	1,362,093.96	3,260,685.89		
Point 2				-660.00	616.00	1,361,894.96	3,260,685.89		
Point 3				-660.00	815.00	1,362,093.96	3,260,685.89		
Alter C09-33D_PlanA	0.00	0.00	5,200.00	713.60	-735.35	1,361,992.56	3,260,610.54	40° 19' 23.880 N	104° 33' 55.116 W
- actual wellpath misses target center by 23.76ft at 5336.44ft MD (5200.76 TVD, 691.09 N, -727.79 E)									
- Circle (radius 75.00)									
Alter C16-29D_Sec.	0.00	0.00	1.00	-69.22	0.73	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
- actual wellpath misses target center by 69.22ft at 1.22ft MD (1.22 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-651.27	-608.22	1,360,670.80	3,260,694.62		
Point 2				-685.27	4,670.78	1,365,949.57	3,260,660.62		
Point 3				4,595.73	4,701.78	1,365,980.57	3,265,941.39		
Point 4				4,629.73	-570.22	1,360,708.80	3,265,975.39		
Point 5				-651.27	-608.22	1,360,670.80	3,260,694.62		
Alter C09-33D_PlanA	0.00	0.00	7,060.00	713.60	-735.35	1,361,992.56	3,260,610.54	40° 19' 23.880 N	104° 33' 55.116 W
- actual wellpath misses target center by 16.96ft at 7196.01ft MD (7059.96 TVD, 724.34 N, -722.23 E)									
- Point									
Alter C16-29D_Sec.	0.00	0.00	1.00	-69.22	0.73	1,361,209.77	3,261,346.59	40° 19' 16.068 N	104° 33' 45.720 W
- actual wellpath misses target center by 69.22ft at 1.22ft MD (1.22 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-191.27	-148.22	1,361,130.78	3,261,154.60		
Point 2				-225.27	4,210.78	1,365,489.59	3,261,120.60		
Point 3				4,135.73	4,241.78	1,365,520.59	3,265,481.41		
Point 4				4,169.73	-110.22	1,361,168.78	3,265,515.41		
Point 5				-191.27	-148.22	1,361,130.78	3,261,154.60		

**North Reference Sheet for Sec. 9-T4N-R64W (Alter 9 PAD) - Alter C09-33D**

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

Vertical Depths are relative to KB @ 4725.00ft (H&P 322). Northing and Easting are relative to Alter C09-33D - Slot A4

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: 1,361,278.99 ft N, 3,261,345.86 ft E

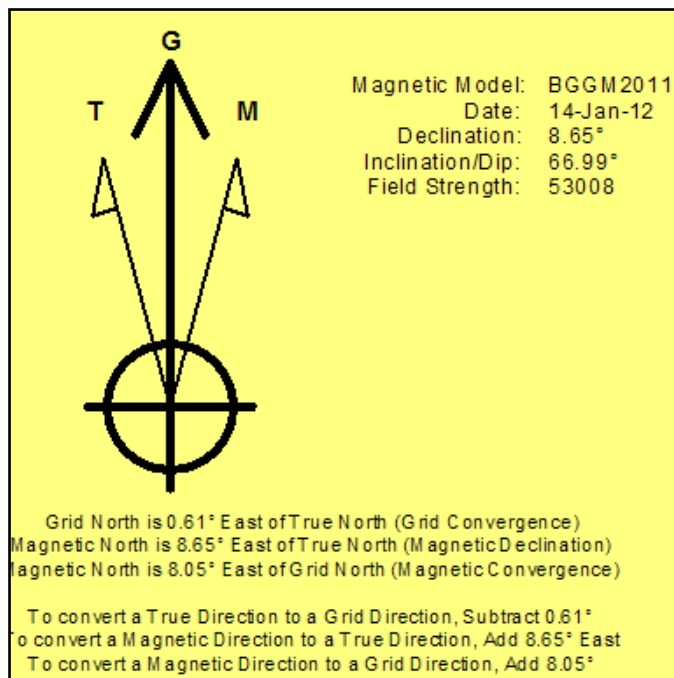
Geographical Coordinates of Well: 40° 19' 16.75" N, 104° 33' 45.72" W

Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 7,205.00ft

the Bottom Hole Displacement is 1,022.95ft in the Direction of 315.09° (Grid).

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



# Noble Energy

**HALLIBURTON**

Sperry Drilling



Azimuths to Grid North  
 True North: -0.61°  
 Magnetic North: 8.05°

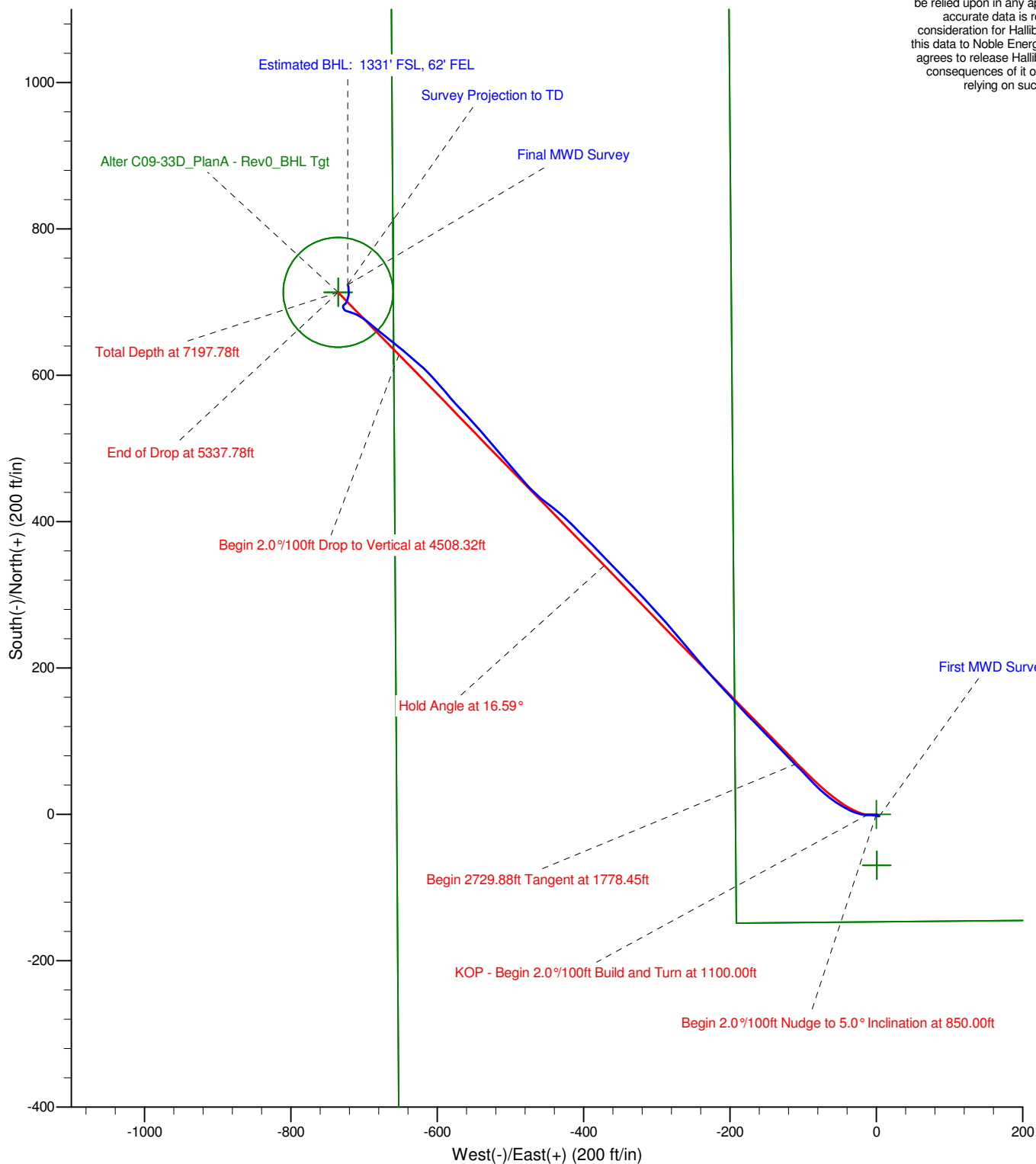
Magnetic Field  
 Strength: 53007.8snT  
 Dip Angle: 66.99°  
 Date: 1/14/2012  
 Model: BGGM2011

## LEGEND

- Alter C09-33D, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Permitted BHL: 1320' FSL, 75' FEL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Alter C09-33D well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



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### LEGEND

Alter C09-33D, Plan A, Plan A - Rev 0 Proposal V0

MWD Survey

