

# Noble Energy

Weld County, CO (NAD 83)  
Sec. 15-T4N-R64W (Stockley 15 PAD)  
Stockley C15-79HN - A1

Design: MWD Survey

## Sperry Drilling Services

# Final Survey Report

06 March, 2012

Well Coordinates: 1,355,757.66 N, 3,266,279.60 E (40° 18' 21.67" N, 104° 32' 42.79" W)  
Ground Level: 4,676.00 ft

Local Coordinate Origin:	Centered on Well Stockley C15-79HN - Slot A1
Viewing Datum:	KB @ 4700.00ft (Rig KB)
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 Stockley C15-79HN - 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
876.00	0.83	6.74	875.97	6.30	0.74	6.27	0.09
<b>First MWD Survey</b>							
967.00	2.09	7.27	966.94	8.60	1.03	8.56	1.38
1,155.00	1.71	2.20	1,154.83	14.81	1.57	14.75	0.22
1,438.00	1.73	353.37	1,437.71	23.27	1.24	23.21	0.09
1,721.00	2.01	343.05	1,720.56	32.26	-0.70	32.26	0.15
2,007.00	1.18	8.28	2,006.45	39.97	-1.74	40.01	0.37
2,292.00	0.31	28.17	2,291.42	43.55	-0.95	43.56	0.31
2,578.00	0.99	112.89	2,577.40	43.28	1.69	43.20	0.35
2,863.00	0.51	82.46	2,862.38	42.48	5.22	42.29	0.21
3,148.00	0.17	237.48	3,147.38	42.42	6.12	42.20	0.23
3,432.00	1.28	152.65	3,431.35	39.38	7.22	39.12	0.45
3,718.00	2.61	156.81	3,717.18	30.56	11.25	30.17	0.47
4,003.00	1.78	173.69	4,001.97	20.19	14.29	19.71	0.37
4,288.00	1.69	151.71	4,286.85	12.09	16.77	11.53	0.23
4,573.00	1.08	160.79	4,571.76	5.85	19.65	5.20	0.23
4,858.00	0.86	153.73	4,856.72	1.40	21.48	0.69	0.09
5,143.00	1.03	200.21	5,141.69	-2.92	21.54	-3.63	0.27
5,429.00	0.59	288.21	5,427.66	-4.87	19.25	-5.51	0.41
5,714.00	0.94	326.72	5,712.64	-2.46	16.58	-3.01	0.21
5,830.00	0.54	279.02	5,828.63	-1.58	15.52	-2.09	0.60
5,905.00	0.32	333.14	5,903.63	-1.34	15.07	-1.83	0.58
5,952.00	2.95	350.77	5,950.61	-0.03	14.82	-0.51	5.63
6,000.00	7.69	356.21	5,998.39	4.40	14.41	3.92	9.92
6,048.00	11.98	351.21	6,045.67	12.53	13.43	12.08	9.10
6,095.00	14.97	354.80	6,091.37	23.40	12.14	22.99	6.60
6,143.00	17.74	358.08	6,137.43	36.89	11.33	36.49	6.08
6,190.00	21.46	358.10	6,181.70	52.64	10.81	52.26	7.91
6,238.00	25.66	358.06	6,225.68	71.81	10.16	71.44	8.75
6,285.00	28.70	357.76	6,267.49	93.26	9.38	92.90	6.47
6,333.00	31.70	356.92	6,308.97	117.38	8.25	117.04	6.31
6,380.00	36.12	357.50	6,347.97	143.56	6.98	143.25	9.43
6,428.00	40.21	358.30	6,385.70	173.20	5.90	172.91	8.58
6,475.00	41.92	358.08	6,421.13	204.05	4.93	203.78	3.65
6,523.00	44.32	359.02	6,456.17	236.85	4.10	236.59	5.18
6,570.00	46.32	358.96	6,489.21	270.26	3.51	270.00	4.26
6,618.00	51.47	356.56	6,520.76	306.38	2.07	306.15	11.37
6,665.00	55.75	355.35	6,548.64	344.11	-0.61	343.95	9.34
6,713.00	59.13	355.34	6,574.47	384.43	-3.89	384.35	7.04
6,759.00	61.14	355.14	6,597.38	424.18	-7.20	424.19	4.39
6,807.00	65.80	356.49	6,618.81	467.00	-10.33	467.09	10.03
6,854.00	71.59	356.05	6,635.88	510.68	-13.18	510.83	12.35
6,902.00	77.42	355.83	6,648.70	556.80	-16.45	557.04	12.15
6,950.00	81.94	355.00	6,657.29	603.86	-20.23	604.19	9.57
6,984.00	82.79	354.81	6,661.81	637.42	-23.22	637.84	2.56
7,114.00	87.72	356.60	6,672.56	766.57	-32.91	767.24	4.03
7,209.00	89.75	355.98	6,674.66	861.34	-39.06	862.16	2.23
7,304.00	91.92	356.84	6,673.28	956.14	-45.01	957.10	2.46
7,398.00	92.48	357.26	6,669.67	1,049.94	-49.84	1,051.01	0.74

**Design Report for Stockley C15-79HN - MWD Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,493.00	91.48	358.70	6,666.39	1,144.82	-53.19	1,145.95	1.84
7,588.00	89.75	357.90	6,665.37	1,239.77	-56.00	1,240.94	2.01
7,682.00	90.80	357.63	6,664.91	1,333.70	-59.67	1,334.94	1.15
7,777.00	90.25	0.14	6,664.04	1,428.67	-61.52	1,429.92	2.70
7,872.00	89.07	1.40	6,664.61	1,523.65	-60.24	1,524.81	1.82
7,965.00	89.63	357.26	6,665.66	1,616.62	-61.33	1,617.76	4.49
8,058.00	89.88	3.26	6,666.06	1,709.58	-60.91	1,710.65	6.46
8,149.00	90.13	4.20	6,666.05	1,800.38	-54.99	1,801.22	1.07
8,248.00	91.30	1.21	6,664.82	1,899.25	-50.32	1,899.88	3.24
8,340.00	91.11	0.50	6,662.88	1,991.22	-48.94	1,991.75	0.80
8,434.00	91.49	357.85	6,660.75	2,085.18	-50.30	2,085.70	2.85
8,525.00	90.00	357.17	6,659.57	2,176.08	-54.25	2,176.69	1.80
8,617.00	89.14	356.94	6,660.26	2,267.96	-58.98	2,268.67	0.97
8,709.00	90.37	357.22	6,660.65	2,359.83	-63.66	2,360.65	1.37
8,802.00	89.38	355.22	6,660.85	2,452.63	-69.79	2,453.59	2.40
8,897.00	88.58	355.45	6,662.54	2,547.29	-77.52	2,548.47	0.88
8,991.00	89.51	355.55	6,664.11	2,640.99	-84.89	2,642.35	1.00
9,086.00	90.31	355.65	6,664.26	2,735.71	-92.18	2,737.26	0.85
9,181.00	90.68	356.62	6,663.44	2,830.49	-98.58	2,832.20	1.09
9,276.00	89.51	357.03	6,663.28	2,925.34	-103.84	2,927.17	1.31
9,371.00	89.32	358.18	6,664.25	3,020.25	-107.81	3,022.16	1.23
9,466.00	90.87	358.26	6,664.09	3,115.20	-110.76	3,117.16	1.63
9,561.00	89.38	358.32	6,663.89	3,210.16	-113.60	3,212.16	1.57
9,657.00	90.31	358.28	6,664.15	3,306.11	-116.45	3,308.16	0.97
9,752.00	91.54	358.18	6,662.61	3,401.05	-119.38	3,403.14	1.30
9,847.00	89.44	358.56	6,661.80	3,496.01	-122.08	3,498.13	2.25
9,942.00	90.68	359.66	6,661.70	3,590.99	-123.56	3,593.11	1.74
10,037.00	88.82	358.74	6,662.12	3,685.98	-124.89	3,688.09	2.18
10,133.00	89.50	358.12	6,663.52	3,781.93	-127.52	3,784.08	0.96
10,228.00	90.62	358.97	6,663.42	3,876.90	-129.93	3,879.07	1.48
10,323.00	90.19	358.79	6,662.75	3,971.88	-131.78	3,974.06	0.49
10,418.00	89.44	359.12	6,663.06	4,066.86	-133.52	4,069.05	0.86
10,513.00	90.12	358.36	6,663.42	4,161.83	-135.61	4,164.04	1.07
10,608.00	89.88	358.66	6,663.42	4,256.80	-138.08	4,259.04	0.40
10,702.00	90.74	358.67	6,662.92	4,350.77	-140.27	4,353.03	0.91
10,798.00	89.26	357.61	6,662.92	4,446.72	-143.38	4,449.03	1.90
10,893.00	89.81	358.15	6,663.69	4,541.65	-146.90	4,544.02	0.81
10,989.00	91.48	357.93	6,662.61	4,637.58	-150.18	4,640.01	1.75
11,084.00	90.49	357.04	6,660.97	4,732.48	-154.35	4,734.99	1.40
11,178.00	90.56	357.39	6,660.11	4,826.36	-158.91	4,828.98	0.38
11,253.00	91.11	356.56	6,659.02	4,901.25	-162.87	4,903.95	1.33
11,347.00	90.31	356.40	6,657.85	4,995.06	-168.64	4,997.91	0.87
11,442.00	90.25	356.73	6,657.39	5,089.89	-174.33	5,092.87	0.35
11,570.00	89.26	358.03	6,657.94	5,217.75	-180.18	5,220.86	1.28
11,633.00	90.31	358.33	6,658.17	5,280.72	-182.19	5,283.85	1.73
11,729.00	89.57	359.20	6,658.27	5,376.69	-184.25	5,379.85	1.19
11,824.00	91.18	359.29	6,657.65	5,471.68	-185.51	5,474.82	1.70
11,919.00	91.36	359.49	6,655.55	5,566.65	-186.52	5,569.78	0.28
12,015.00	89.63	359.32	6,654.72	5,662.64	-187.51	5,665.74	1.81
12,110.00	89.94	1.07	6,655.07	5,757.63	-187.19	5,760.68	1.87
12,206.00	89.94	0.99	6,655.17	5,853.62	-185.47	5,856.55	0.08

**Design Report for Stockley C15-79HN - MWD Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
12,301.00	87.59	0.14	6,657.22	5,948.58	-184.53	5,951.44	2.63
12,397.00	87.90	358.93	6,661.00	6,044.51	-185.31	6,047.33	1.30
12,492.00	88.14	358.90	6,664.28	6,139.43	-187.11	6,142.26	0.25
12,587.00	88.45	357.83	6,667.11	6,234.35	-189.81	6,237.22	1.17
12,683.00	88.76	358.13	6,669.44	6,330.26	-193.20	6,333.19	0.45
12,779.00	88.70	357.97	6,671.57	6,426.18	-196.46	6,429.17	0.18
12,874.00	89.20	357.47	6,673.31	6,521.09	-200.24	6,524.15	0.74
12,969.00	88.89	357.00	6,674.90	6,615.97	-204.82	6,619.12	0.59
13,064.00	89.26	356.79	6,676.43	6,710.81	-209.97	6,714.09	0.45
13,159.00	90.31	357.93	6,676.79	6,805.71	-214.34	6,809.08	1.63
13,254.00	90.25	356.99	6,676.32	6,900.61	-218.55	6,904.07	0.99
13,349.00	90.43	356.99	6,675.76	6,995.48	-223.54	6,999.05	0.19
13,445.00	90.56	356.38	6,674.93	7,091.32	-229.09	7,095.01	0.65
13,540.00	90.99	356.52	6,673.64	7,186.13	-234.98	7,189.97	0.48
13,635.00	90.74	356.18	6,672.21	7,280.92	-241.02	7,284.91	0.44
13,710.00	91.18	356.37	6,670.95	7,355.75	-245.89	7,359.86	0.64
<b>Final MWD Survey</b>							
13,772.00	91.18	356.37	6,669.68	7,417.61	-249.82	7,421.82	0.00
<b>Estimated BHL: 2469' FSL, 70' FWL - Survey Projection to TD</b>							

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
876.00	875.97	6.30	0.74	First MWD Survey
13,710.00	6,670.95	7,355.75	-245.89	Final MWD Survey
13,772.00	6,669.68	7,417.61	-249.82	Survey Projection to TD
13,772.00	6,669.68	7,417.61	-249.82	Estimated BHL: 2469' FSL, 70' FWL

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Stockley C15-79HN_PlanA - Rev1_BHL Tgt	358.11	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
876.00	13,772.00	Sperry MWD Surveys	MWD

**HALLIBURTON****Design Report for Stockley C15-79HN - 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
Stockley	0.00	0.00	6,670.00	7,418.72	-244.40	1,363,176.06	3,266,035.21	40° 19' 35.004 N	104° 32' 44.916 W
- actual wellpath misses target center by 5.54ft at 13772.00ft MD (6669.68 TVD, 7417.61 N, -249.82 E)									
- Point									
Stockley	0.00	0.00	0.00	0.00	0.00	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
- actual wellpath hits target center									
- Polygon									
Point 1				156.00	5,408.00	1,361,165.43	3,266,435.60		
Point 2				141.00	7,126.00	1,362,883.36	3,266,420.60		
Point 3				1,856.00	7,169.00	1,362,926.36	3,268,135.52		
Point 4				1,871.00	5,455.00	1,361,212.43	3,268,150.52		
Point 5				156.00	5,408.00	1,361,165.43	3,266,435.60		
Stockley	0.00	0.00	0.00	0.00	0.00	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
- actual wellpath hits target center									
- Polygon									
Point 1				-304.00	4,948.00	1,360,705.45	3,265,975.62		
Point 2				2,331.00	4,995.00	1,360,752.45	3,268,610.50		
Point 3				2,352.00	-281.00	1,355,476.68	3,268,631.50		
Point 4				-278.00	-320.00	1,355,437.68	3,266,001.61		
Point 5				-290.00	2,310.00	1,358,067.57	3,265,989.61		
Point 6				-304.00	4,948.00	1,360,705.45	3,265,975.62		
Stockley	0.00	0.00	0.00	0.00	0.00	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
- actual wellpath hits target center									
- Polygon									
Point 1				156.00	4,488.00	1,360,245.47	3,266,435.60		
Point 2				1,871.00	4,535.00	1,360,292.47	3,268,150.52		
Point 3				1,892.00	179.00	1,355,936.66	3,268,171.52		
Point 4				182.00	140.00	1,355,897.66	3,266,461.59		
Point 5				170.00	2,310.00	1,358,067.57	3,266,449.59		
Point 6				156.00	4,488.00	1,360,245.47	3,266,435.60		
Stockley	0.00	0.00	0.00	0.00	0.00	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
- actual wellpath hits target center									
- Polygon									
Point 1				-304.00	4,948.00	1,360,705.45	3,265,975.62		
Point 2				-319.00	7,586.00	1,363,343.34	3,265,960.62		
Point 3				2,316.00	7,629.00	1,363,386.34	3,268,595.50		
Point 4				2,331.00	4,995.00	1,360,752.45	3,268,610.50		
Point 5				-304.00	4,948.00	1,360,705.45	3,265,975.62		

**North Reference Sheet for Sec. 15-T4N-R64W (Stockley 15 PAD) - Stockley C15-79HN**

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

Vertical Depths are relative to KB @ 4700.00ft (Rig KB). Northing and Easting are relative to Stockley C15-79HN - 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: 0.99995731

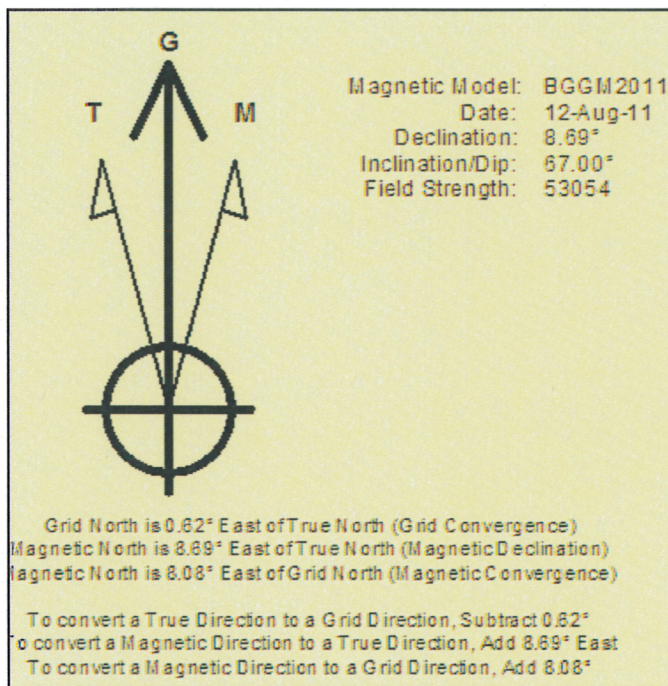
Grid Coordinates of Well: 1,355,757.66 ft N, 3,266,279.60 ft E

Geographical Coordinates of Well: 40° 18' 21.67" N, 104° 32' 42.79" W

Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,772.00ft the Bottom Hole Displacement is 7,421.82ft in the Direction of 358.07° (Grid).

Magnetic Convergence at surface is: -8.08° (12 August 2011, , BGGM2011)





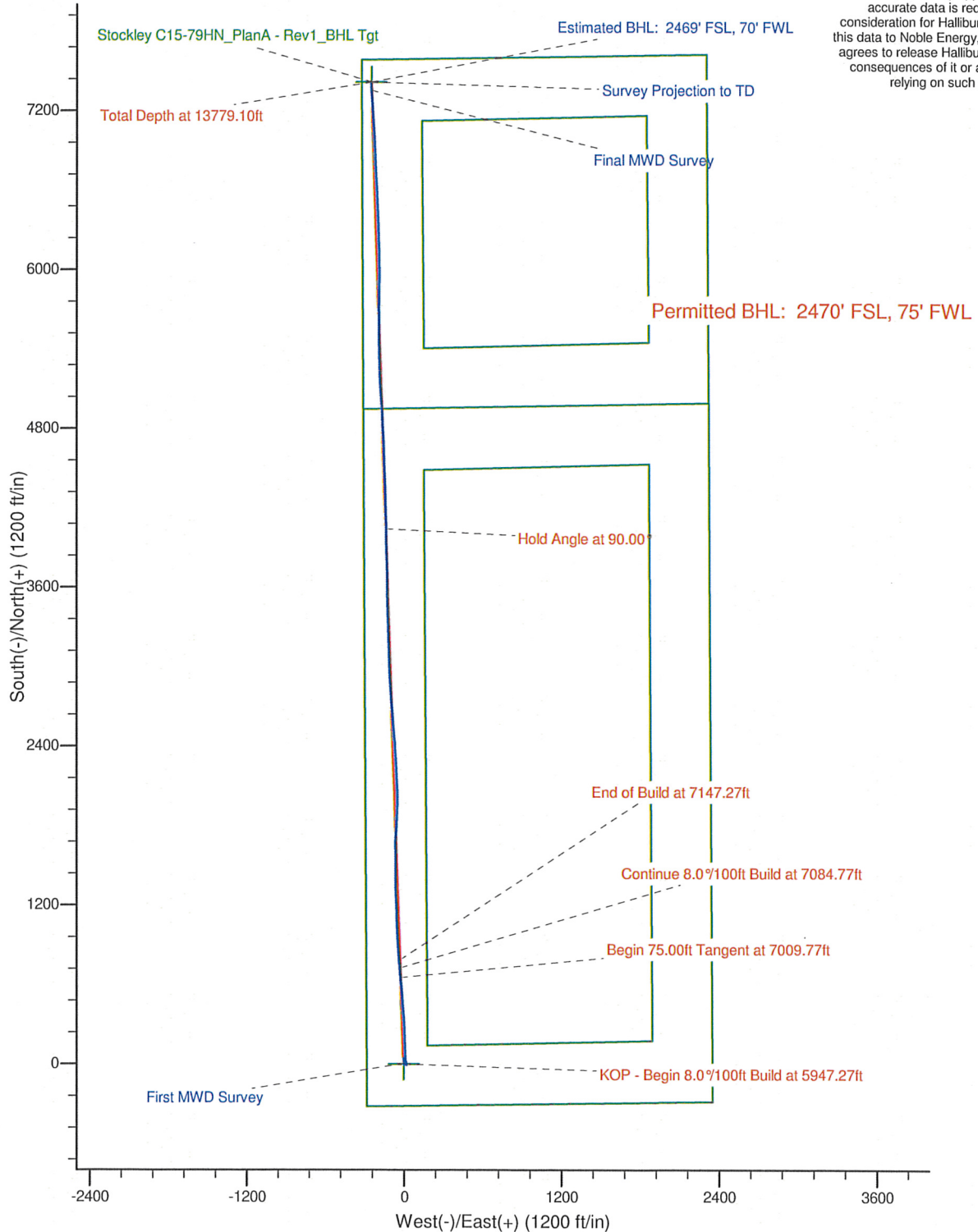
Azimuths to Grid North  
 True North: -0.62°  
 Magnetic North: 8.08°

Magnetic Field  
 Strength: 53054.4snT  
 Dip Angle: 67.00°  
 Date: 8/12/2011  
 Model: BGGM2011

### LEGEND

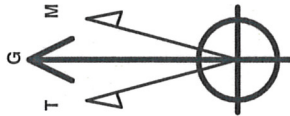
- Stockley C15-79HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Stockley C15-79HN 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.



# Noble Energy

Project: Weld County, CO (NAD 83)  
 Site: Sec. 15-T4N-R64W (Stockley 15 PAD)  
 Well: Stockley C15-79HN



Azimuths to Grid North  
 True North: -0.62°  
 Magnetic North: 8.08°  
 Magnetic Field  
 Strength: 53054.4snT  
 Dip Angle: 67.00°  
 Date: 8/12/2011  
 Model: BGGM2011

## LEGEND

- Stockley C15-79HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Stockley C15-79HN 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.

