

# Noble Energy

Weld County, CO (NAD 83)

Sec. 25-T5N-R63W (70 Ranch 25 PAD)

70 Ranch USX BB25-96-01HN - A2

Design: MWD Survey

## Sperry Drilling Services

### Final Survey Report

26 December, 2012

Well Coordinates: 1,381,719.96 N, 3,308,657.58 E (40° 22' 33.35" N, 104° 23' 31.63" W)

Ground Level: 4,564.00 ft

Local Coordinate Origin: Centered on Well 70 Ranch USX BB25-96-01HN - SI

Viewing Datum: KB @ 4588.00ft (H&P 315)

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 70 Ranch USX BB25-96-01HN - 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
583.00	0.00	0.00	583.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 583.00ft							
610.00	0.74	27.63	610.00	0.15	0.08	-0.07	2.74
First MWD Survey							
886.00	0.62	36.27	885.98	2.94	1.79	-1.10	0.06
1,162.00	0.82	20.74	1,161.96	5.99	3.37	-2.42	0.10
1,446.00	1.05	43.53	1,445.92	9.78	5.89	-3.71	0.15
1,729.00	0.46	268.33	1,728.91	11.62	6.54	-4.71	0.50
2,013.00	0.22	17.48	2,012.90	12.11	5.56	-5.71	0.20
2,300.00	1.43	92.22	2,299.87	12.50	9.30	-3.60	0.48
2,395.00	0.72	279.15	2,394.86	12.55	9.90	-3.26	2.26
2,490.00	0.99	160.08	2,489.86	11.87	9.59	-2.94	1.56
2,585.00	2.67	153.21	2,584.81	9.12	10.87	-0.01	1.78
2,681.00	4.93	153.74	2,680.59	3.43	13.70	6.17	2.35
2,776.00	7.19	158.40	2,775.05	-5.76	17.70	15.78	2.43
2,871.00	8.90	154.80	2,869.12	-17.94	23.01	28.53	1.88
2,966.00	10.64	152.22	2,962.73	-32.35	30.23	44.21	1.89
3,062.00	10.42	142.49	3,057.13	-47.08	39.65	61.55	1.86
3,157.00	7.89	142.75	3,150.91	-59.09	48.83	76.65	2.66
3,252.00	7.02	140.20	3,245.10	-68.74	56.49	88.97	0.98
3,347.00	5.00	143.64	3,339.58	-76.53	62.66	98.91	2.16
3,442.00	3.89	146.13	3,434.29	-82.54	66.91	106.24	1.19
3,538.00	2.10	132.69	3,530.16	-86.44	70.02	111.23	1.99
3,633.00	0.14	346.13	3,625.14	-87.51	71.27	112.85	2.33
3,918.00	1.40	258.87	3,910.11	-87.84	67.77	110.86	0.49
4,204.00	1.02	228.98	4,196.05	-90.19	62.42	109.22	0.25
4,490.00	1.03	148.47	4,482.01	-94.05	61.85	111.81	0.46
4,775.00	0.22	226.65	4,767.00	-96.61	62.79	114.38	0.35
5,061.00	0.24	340.02	5,053.00	-96.42	62.18	113.84	0.13
5,347.00	0.56	286.19	5,338.99	-95.47	60.64	112.12	0.16
5,520.00	0.35	298.33	5,511.98	-94.98	59.36	110.93	0.13
5,581.00	0.50	4.56	5,572.98	-94.63	59.22	110.57	0.79
5,680.00	5.24	151.24	5,671.85	-98.16	61.43	114.70	5.72
5,727.00	9.64	149.23	5,718.45	-103.43	64.48	120.69	9.38
5,775.00	14.63	144.42	5,765.36	-111.82	70.06	130.71	10.60
5,823.00	17.39	140.54	5,811.50	-122.29	78.15	143.93	6.16
5,871.00	19.86	139.88	5,856.98	-134.06	87.96	159.25	5.16
5,918.00	23.09	136.54	5,900.71	-146.86	99.45	176.44	7.35
5,966.00	26.16	138.29	5,944.34	-161.60	112.97	196.42	6.57
6,013.00	29.79	137.14	5,985.84	-177.89	127.81	218.44	7.81
6,061.00	33.69	135.90	6,026.66	-196.20	145.19	243.64	8.24
6,109.00	37.65	135.84	6,065.64	-216.29	164.68	271.55	8.25
6,157.00	42.14	136.39	6,102.46	-238.48	186.01	302.25	9.38
6,204.00	45.39	136.95	6,136.40	-262.12	208.31	334.70	6.96
6,252.00	48.84	138.31	6,169.06	-288.11	232.00	369.84	7.48
6,299.00	53.84	140.12	6,198.41	-315.90	255.95	406.52	11.05
6,347.00	59.33	140.22	6,224.84	-346.66	281.60	446.57	11.44
6,394.00	61.69	140.49	6,247.97	-378.16	307.70	487.48	5.05
6,442.00	64.80	140.50	6,269.58	-411.23	334.96	530.33	6.48

## Design Report for 70 Ranch USX BB25-96-01HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,489.00	66.72	141.65	6,288.87	-444.57	361.88	573.18	4.65
6,537.00	69.20	142.79	6,306.88	-479.73	389.14	617.63	5.62
6,585.00	73.27	142.10	6,322.32	-515.75	416.83	663.03	8.59
6,656.00	79.94	142.98	6,338.76	-570.55	458.81	732.00	9.47
6,711.00	83.73	142.33	6,346.57	-613.82	491.83	786.37	6.99
6,802.00	88.18	141.59	6,352.99	-685.29	547.75	877.07	4.96
6,896.00	91.14	140.91	6,353.55	-758.59	606.58	971.04	3.23
6,991.00	89.82	139.86	6,352.75	-831.77	667.15	1,066.03	1.78
7,086.00	88.46	138.21	6,354.18	-903.49	729.43	1,161.00	2.25
7,181.00	91.66	138.72	6,354.08	-974.60	792.41	1,255.95	3.41
7,276.00	90.92	138.11	6,351.94	-1,045.63	855.45	1,350.89	1.01
7,372.00	89.51	137.02	6,351.58	-1,116.48	920.22	1,446.79	1.86
7,467.00	90.40	135.99	6,351.65	-1,185.40	985.61	1,541.61	1.43
7,562.00	90.56	137.36	6,350.86	-1,254.50	1,050.79	1,636.44	1.45
7,657.00	89.60	138.95	6,350.72	-1,325.27	1,114.16	1,731.38	1.96
7,752.00	91.92	138.61	6,349.46	-1,396.72	1,176.75	1,826.34	2.47
7,848.00	90.80	139.67	6,347.19	-1,469.30	1,239.53	1,922.30	1.61
7,943.00	89.26	141.22	6,347.14	-1,542.54	1,300.03	2,017.29	2.30
8,038.00	88.61	141.61	6,348.90	-1,616.79	1,359.27	2,112.25	0.80
8,133.00	90.49	141.35	6,349.65	-1,691.11	1,418.43	2,207.21	2.00
8,228.00	90.71	140.44	6,348.65	-1,764.83	1,478.34	2,302.20	0.99
8,323.00	88.89	139.63	6,348.98	-1,837.63	1,539.36	2,397.19	2.10
8,418.00	90.15	139.41	6,349.78	-1,909.89	1,601.03	2,492.18	1.35
8,513.00	90.22	139.74	6,349.47	-1,982.21	1,662.63	2,587.18	0.36
8,609.00	89.48	140.19	6,349.73	-2,055.71	1,724.38	2,683.18	0.90
8,704.00	89.85	139.83	6,350.28	-2,128.49	1,785.43	2,778.17	0.54
8,799.00	89.97	140.49	6,350.43	-2,201.44	1,846.30	2,873.17	0.71
8,894.00	91.73	141.45	6,349.02	-2,275.22	1,906.11	2,968.15	2.11
8,989.00	90.03	141.40	6,347.56	-2,349.48	1,965.34	3,063.10	1.79
9,084.00	87.87	140.31	6,349.30	-2,423.14	2,025.29	3,158.07	2.55
9,180.00	89.36	140.33	6,351.62	-2,497.00	2,086.57	3,254.04	1.55
9,275.00	90.25	140.79	6,351.95	-2,570.37	2,146.92	3,349.03	1.05
9,370.00	88.03	142.27	6,353.37	-2,644.73	2,206.01	3,443.98	2.81
9,465.00	86.88	140.78	6,357.59	-2,719.03	2,265.05	3,538.85	1.98
9,560.00	88.90	139.58	6,361.09	-2,791.94	2,325.84	3,633.78	2.47
9,656.00	90.92	139.94	6,361.24	-2,865.22	2,387.86	3,729.77	2.14
9,751.00	91.05	139.60	6,359.61	-2,937.73	2,449.20	3,824.76	0.38
9,846.00	90.89	139.73	6,358.00	-3,010.14	2,510.68	3,919.74	0.22
9,941.00	90.34	137.91	6,356.98	-3,081.63	2,573.23	4,014.71	2.00
10,037.00	90.31	138.54	6,356.43	-3,153.22	2,637.18	4,110.66	0.66
10,132.00	90.65	138.56	6,355.64	-3,224.43	2,700.07	4,205.63	0.36
10,227.00	90.65	138.26	6,354.56	-3,295.47	2,763.12	4,300.58	0.32
10,322.00	90.89	137.88	6,353.28	-3,366.14	2,826.60	4,395.52	0.47
10,418.00	91.70	138.51	6,351.11	-3,437.69	2,890.57	4,491.44	1.07
10,513.00	90.28	138.61	6,349.47	-3,508.89	2,953.44	4,586.39	1.50
10,608.00	90.25	139.71	6,349.03	-3,580.76	3,015.56	4,681.38	1.16
10,703.00	88.68	141.60	6,349.92	-3,654.22	3,075.78	4,776.36	2.59
10,798.00	90.56	142.91	6,350.55	-3,729.33	3,133.93	4,871.28	2.41
10,893.00	90.49	142.87	6,349.68	-3,805.09	3,191.25	4,966.16	0.08
10,989.00	88.06	142.83	6,350.89	-3,881.59	3,249.21	5,062.03	2.53
11,140.00	89.07	142.94	6,354.68	-4,001.97	3,340.30	5,212.80	0.67

## Design Report for 70 Ranch USX BB25-96-01HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
Final MWD Survey							
11,197.00	89.07	142.94	6,355.60	-4,047.45	3,374.65	5,269.72	0.00
Survey Projection to TD - Estimated BHL: 529' FSL, 1402' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
583.00	583.00	0.00	0.00	Surface Casing Assumed Vertical at 583.00ft
610.00	610.00	0.15	0.08	First MWD Survey
11,140.00	6,354.68	-4,001.97	3,340.30	Final MWD Survey
11,197.00	6,355.60	-4,047.45	3,374.65	Survey Projection to TD
11,197.00	6,355.60	-4,047.45	3,374.65	Estimated BHL: 529' FSL, 1402' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	70 Ranch USX BB25-96-01HN_PlanA - Rev0_ BHL Tgt	140.04	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
583.00	11,197.00	Sperry MWD Surveys	MWD

## Design Report for 70 Ranch USX BB25-96-01HN - 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
70 Ranch USX	0.00	0.00	6,328.55	-4,041.69	3,386.39	1,377,678.43	3,312,043.84	40° 21' 52.992 N	104° 22' 48.540 W
- actual wellpath misses target center by 30.05ft at 11197.00ft MD (6355.60 TVD, -4047.45 N, 3374.65 E)									
- Point									
70 Ranch USX	0.00	0.00	0.00	29.45	24.71	1,381,749.41	3,308,682.29	40° 22' 33.636 N	104° 23' 31.308 W
- actual wellpath misses target center by 38.44ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-427.29	530.45	1,382,250.39	3,308,230.30		
Point 2				2,199.71	574.45	1,382,294.39	3,310,857.20		
Point 3				4,826.71	614.45	1,382,334.39	3,313,484.09		
Point 4				4,797.71	-1,968.55	1,379,751.49	3,313,455.09		
Point 5				4,769.71	-4,548.55	1,377,171.60	3,313,427.09		
Point 6				2,161.71	-4,599.55	1,377,120.60	3,310,819.20		
Point 7				-446.29	-4,654.55	1,377,065.60	3,308,211.30		
Point 8				-437.29	-2,060.55	1,379,659.50	3,308,220.30		
Point 9				-427.29	530.45	1,382,250.39	3,308,230.30		
70 Ranch USX	0.00	0.00	0.00	29.45	24.71	1,381,749.41	3,308,682.29	40° 22' 33.636 N	104° 23' 31.308 W
- actual wellpath misses target center by 38.44ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				32.71	70.45	1,381,790.41	3,308,690.28		
Point 2				2,199.71	114.45	1,381,834.41	3,310,857.20		
Point 3				4,366.71	154.45	1,381,874.41	3,313,024.11		
Point 4				4,337.71	-1,968.55	1,379,751.49	3,312,995.11		
Point 5				4,309.71	-4,088.55	1,377,631.58	3,312,967.11		
Point 6				2,161.71	-4,139.55	1,377,580.58	3,310,819.20		
Point 7				13.71	-4,194.55	1,377,525.58	3,308,671.29		
Point 8				22.71	-2,060.55	1,379,659.50	3,308,680.29		
Point 9				32.71	70.45	1,381,790.41	3,308,690.28		

## North Reference Sheet for Sec. 25-T5N-R63W (70 Ranch 25 PAD) - 70 Ranch USX BB25-96-01HN

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

Vertical Depths are relative to KB @ 4588.00ft (H&P 315). Northing and Easting are relative to 70 Ranch USX BB25-96-01HN - 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: 0.99995923

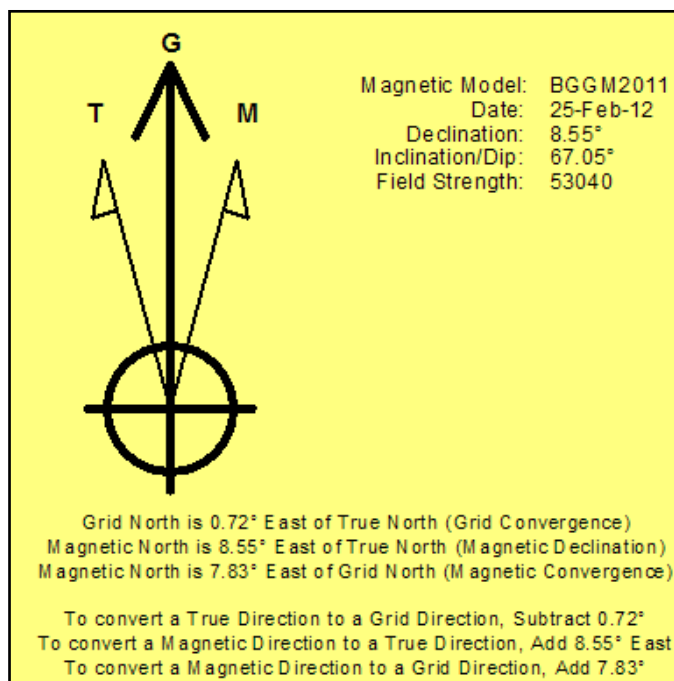
Grid Coordinates of Well: 1,381,719.96 ft N, 3,308,657.58 ft E

Geographical Coordinates of Well: 40° 22' 33.35" N, 104° 23' 31.63" W

Grid Convergence at Surface is: 0.72°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,197.00ft  
the Bottom Hole Displacement is 5,269.73ft in the Direction of 140.18° (Grid).

Magnetic Convergence at surface is: -7.83° (25 February 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)  
 Site: Sec. 25-T5N-R63W (70 Ranch 25 PAD)  
 Well: 70 Ranch USX BB25-96-01HN

# Noble Energy

**HALLIBURTON**

Sperry Drilling



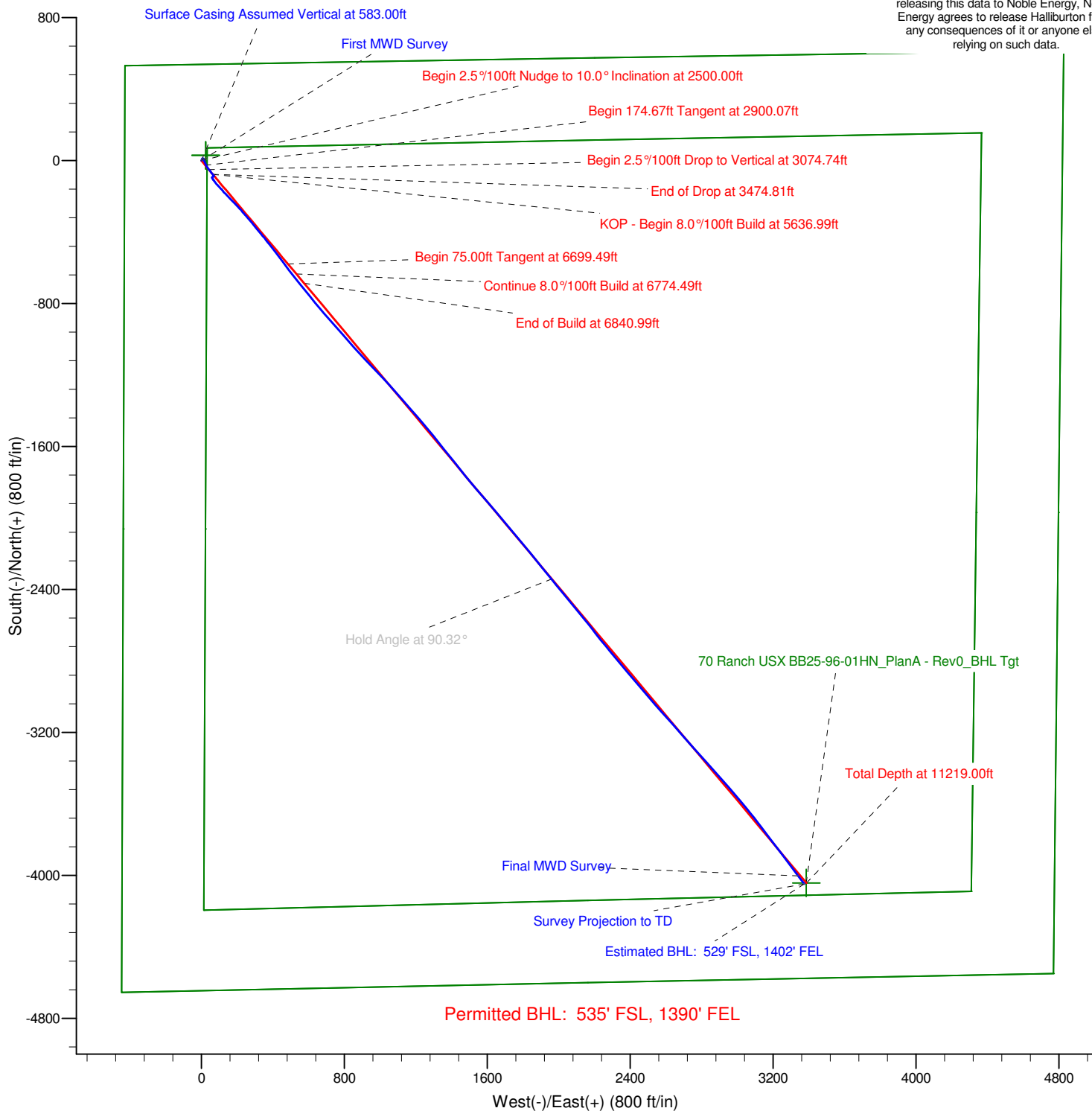
Azimuths to Grid North  
 True North: -0.72°  
 Magnetic North: 7.83°

Magnetic Field  
 Strength: 53039.8nT  
 Dip Angle: 67.05°  
 Date: 2/25/2012  
 Model: BGGM2011

## LEGEND

- 70 Ranch USX BB25-96-01HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the 70 Ranch USX BB25-96-01HN 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.

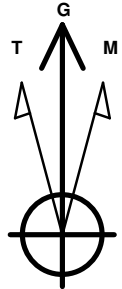


Project: Weld County, CO (NAD 83)  
Site: Sec. 25-T5N-R63W (70 Ranch 25 PAD)  
Well: 70 Ranch USX BB25-96-01HN

# Noble Energy

**HALLIBURTON**

Sperry Drilling



Azimuths to Grid North  
True North:  $-0.72^{\circ}$   
Magnetic North:  $7.83^{\circ}$

Magnetic Field  
Strength: 53039.8snT  
Dip Angle:  $67.05^{\circ}$   
Date: 2/25/2012  
Model: BGGM2011

## LEGEND

- 70 Ranch USX BB25-96-01HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the 70 Ranch USX BB25-96-01HN 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.

