

Noble Energy

Weld County, CO (NAD 83)

Sec. 21-T5N-R63W (70 Ranch 21 PAD)

70 Ranch BB21-65HN - A2

Design: MWD Surveys

Sperry Drilling Services

Final Survey Report

31 October, 2011

Well Coordinates: 1,384,753.84 N, 3,292,411.04 E (40° 23' 05.28" N, 104° 27' 01.08" W)

Ground Level: 4,612.00 ft

Local Coordinate Origin: Centered on Well 70 Ranch BB21-65HN - Slot A2

Viewing Datum: KB @ 4636.00ft (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

Survey Report for 70 Ranch BB21-65HN - 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
704.00	0.42	119.42	703.99	-1.27	2.25	2.22	0.06
First MWD Survey							
796.00	0.14	127.97	795.99	-1.50	2.63	2.60	0.31
1,070.00	0.57	204.79	1,069.99	-2.95	2.32	2.26	0.20
1,351.00	1.59	246.04	1,350.94	-5.80	-1.83	-1.95	0.43
1,634.00	1.49	212.74	1,633.84	-10.49	-7.40	-7.62	0.31
1,918.00	2.41	235.73	1,917.68	-16.96	-14.34	-14.68	0.42
2,201.00	0.73	52.91	2,200.61	-19.22	-17.82	-18.21	1.11
2,491.00	1.78	344.58	2,490.55	-13.76	-17.54	-17.82	0.57
2,777.00	1.89	343.80	2,776.40	-4.95	-20.04	-20.13	0.04
3,064.00	1.45	355.84	3,063.28	3.21	-21.62	-21.55	0.20
3,351.00	1.08	106.03	3,350.24	6.09	-19.28	-19.15	0.73
3,638.00	1.13	69.85	3,637.19	6.32	-14.03	-13.89	0.24
3,924.00	2.21	27.22	3,923.08	12.19	-8.86	-8.60	0.55
4,210.00	1.84	141.31	4,208.98	13.51	-3.46	-3.18	1.19
4,497.00	2.81	74.68	4,495.79	11.78	6.20	6.45	0.93
4,688.00	2.01	50.94	4,686.62	15.12	13.32	13.63	0.66
4,975.00	0.61	110.18	4,973.55	17.77	18.66	19.03	0.62
5,167.00	0.87	82.11	5,165.53	17.62	21.07	21.43	0.23
5,358.00	0.62	187.29	5,356.52	16.79	22.37	22.71	0.62
5,570.00	0.59	187.25	5,568.51	14.57	22.09	22.38	0.01
5,633.00	0.42	164.41	5,631.51	14.02	22.11	22.39	0.41
5,714.00	3.78	70.85	5,712.45	14.61	24.71	25.01	4.73
5,746.00	7.51	67.76	5,744.29	15.75	27.64	27.96	11.69
5,794.00	11.78	73.57	5,791.60	18.33	35.25	35.62	9.11
5,841.00	14.85	79.19	5,837.33	20.81	45.77	46.19	7.08
5,889.00	18.81	81.77	5,883.27	23.08	59.48	59.94	8.39
5,937.00	23.45	82.93	5,928.03	25.36	76.62	77.13	9.71
5,985.00	27.35	88.35	5,971.38	26.85	97.14	97.67	9.45
6,032.00	29.50	92.81	6,012.72	26.60	119.49	120.01	6.43
6,080.00	32.68	89.49	6,053.82	26.13	144.26	144.77	7.52
6,127.00	35.14	86.19	6,092.83	27.15	170.45	170.98	6.54
6,175.00	38.14	86.90	6,131.34	28.87	199.04	199.60	6.31
6,223.00	42.84	88.19	6,167.84	30.18	230.17	230.75	9.95
6,271.00	47.23	90.61	6,201.75	30.51	264.12	264.69	9.82
6,318.00	51.29	92.09	6,232.42	29.66	299.71	300.26	8.96
6,366.00	54.44	92.24	6,261.39	28.21	337.94	338.45	6.57
6,414.00	58.03	92.19	6,288.07	26.67	377.81	378.28	7.48
6,462.00	61.92	89.83	6,312.08	25.96	419.35	419.80	9.15
6,510.00	64.98	90.05	6,333.54	26.00	462.28	462.72	6.39
6,558.00	67.76	90.84	6,352.77	25.65	506.25	506.68	5.98
6,606.00	72.15	91.11	6,369.22	24.89	551.33	551.72	9.16
6,654.00	75.53	92.37	6,382.58	23.48	597.40	597.76	7.48
6,725.00	83.00	90.45	6,395.80	21.78	667.09	667.39	10.85
6,818.00	86.66	89.54	6,404.18	21.79	759.69	759.98	4.05
6,913.00	89.69	88.97	6,407.20	23.03	854.62	854.92	3.25
7,008.00	89.69	90.05	6,407.71	23.84	949.62	949.91	1.14
7,103.00	89.69	91.18	6,408.23	22.82	1,044.61	1,044.86	1.19
7,199.00	91.67	91.26	6,407.09	20.78	1,140.57	1,140.76	2.06

Survey Report for 70 Ranch BB21-65HN - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,294.00	90.68	91.95	6,405.14	18.12	1,235.52	1,235.63	1.27
7,390.00	89.69	91.12	6,404.83	15.54	1,331.48	1,331.52	1.35
7,485.00	89.32	88.78	6,405.65	15.63	1,426.47	1,426.49	2.49
7,580.00	89.63	88.33	6,406.52	18.02	1,521.43	1,521.48	0.58
7,675.00	88.95	88.77	6,407.70	20.43	1,616.40	1,616.47	0.85
7,771.00	87.71	89.70	6,410.50	21.71	1,712.34	1,712.43	1.61
7,866.00	88.95	89.75	6,413.27	22.16	1,807.30	1,807.37	1.31
7,961.00	89.51	89.08	6,414.54	23.13	1,902.29	1,902.36	0.92
8,057.00	89.88	87.64	6,415.05	25.88	1,998.24	1,998.35	1.55
8,152.00	90.06	87.08	6,415.10	30.26	2,093.14	2,093.32	0.62
8,248.00	90.74	87.23	6,414.43	35.02	2,189.02	2,189.28	0.73
8,343.00	89.88	86.99	6,413.92	39.81	2,283.90	2,284.23	0.94
8,439.00	90.87	86.24	6,413.29	45.48	2,379.73	2,380.16	1.29
8,534.00	88.70	86.85	6,413.65	51.20	2,474.55	2,475.08	2.37
8,630.00	89.26	87.24	6,415.36	56.15	2,570.40	2,571.01	0.71
8,725.00	90.93	87.86	6,415.20	60.21	2,665.31	2,665.99	1.88
8,821.00	90.43	89.67	6,414.06	62.28	2,761.28	2,761.98	1.96
8,917.00	91.05	88.63	6,412.82	63.70	2,857.26	2,857.96	1.26
9,012.00	92.84	89.95	6,409.60	64.88	2,952.19	2,952.90	2.34
9,108.00	91.79	89.71	6,405.72	65.17	3,048.11	3,048.81	1.12
9,204.00	91.05	88.63	6,403.34	66.56	3,144.07	3,144.77	1.36
9,299.00	88.27	89.44	6,403.90	68.16	3,239.04	3,239.76	3.05
9,395.00	89.32	89.99	6,405.92	68.63	3,335.02	3,335.72	1.23
9,490.00	88.02	88.78	6,408.13	69.65	3,429.98	3,430.69	1.87
9,586.00	88.95	88.80	6,410.66	71.68	3,525.93	3,526.66	0.97
9,681.00	90.19	88.84	6,411.38	73.64	3,620.90	3,621.65	1.31
9,777.00	89.07	88.93	6,412.00	75.50	3,716.88	3,717.65	1.17
9,872.00	90.43	89.28	6,412.41	76.99	3,811.87	3,812.64	1.48
9,967.00	90.31	88.75	6,411.80	78.62	3,906.85	3,907.64	0.57
10,063.00	89.94	88.82	6,411.59	80.66	4,002.83	4,003.64	0.39
10,158.00	88.58	87.38	6,412.82	83.81	4,097.76	4,098.62	2.08
10,253.00	91.42	88.03	6,412.82	87.61	4,192.68	4,193.59	3.07
10,349.00	91.24	88.57	6,410.59	90.46	4,288.61	4,289.56	0.59
10,444.00	90.19	89.13	6,409.40	92.36	4,383.58	4,384.55	1.25
10,540.00	88.21	89.05	6,410.74	93.89	4,479.55	4,480.54	2.06
10,635.00	89.32	89.35	6,412.79	95.21	4,574.52	4,575.51	1.21
10,730.00	88.15	88.79	6,414.89	96.75	4,669.48	4,670.49	1.37
10,826.00	89.01	89.00	6,417.27	98.61	4,765.43	4,766.45	0.92
Final MWD Survey							
10,856.00	89.01	89.00	6,417.78	99.13	4,795.43	4,796.45	0.00

Survey Projection to TD - Estimated BHL: 2639' FNL 536' FEL

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
704.00	703.99	-1.27	2.25	First MWD Survey
10,826.00	6,417.27	98.61	4,765.43	Final MWD Survey
10,856.00	6,417.78	99.13	4,795.43	Survey Projection to TD
10,856.00	6,417.78	99.13	4,795.43	Estimated BHL: 2639' FNL 536' FEL

Survey Report for 70 Ranch BB21-65HN - Sperry MWD Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	88.82	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
704.00	10,856.00	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
70 Ranch	0.00	0.00	-1.00	25.50	-0.30	1,384,779.33	3,292,410.74	40° 23' 5.532 N	104° 27' 1.080 W
- survey misses target center by 25.52ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
70 Ranch	0.00	0.00	-1.00	25.50	-0.30	1,384,779.33	3,292,410.74	40° 23' 5.532 N	104° 27' 1.080 W
- survey misses target center by 25.52ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
70 Ranch	0.00	0.00	6,411.00	104.60	4,796.31	1,384,858.44	3,297,207.15	40° 23' 5.748 N	104° 25' 59.088 W
- survey misses target center by 8.76ft at 10856.00ft MD (6417.78 TVD, 99.13 N, 4795.43 E)									
- Point									

North Reference Sheet for Sec. 21-T5N-R63W (70 Ranch 21 PAD) - 70 Ranch BB21-65HN

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

Vertical Depths are relative to KB @ 4636.00ft (H&P 315). Northing and Easting are relative to 70 Ranch BB21-65HN - 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: 0.99995958

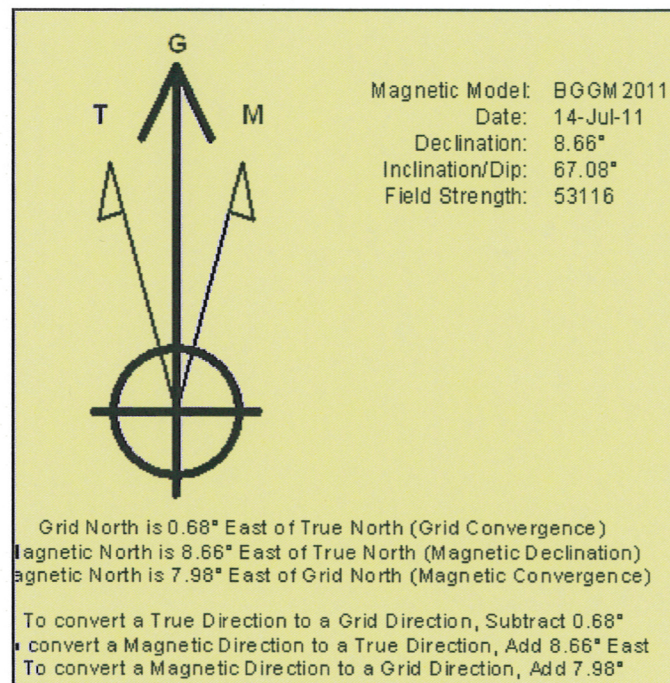
Grid Coordinates of Well: 1,384,753.84 ft N, 3,292,411.04 ft E

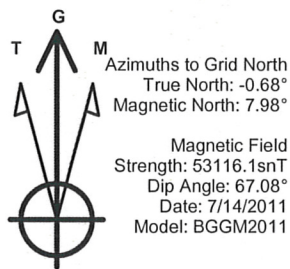
Geographical Coordinates of Well: 40° 23' 05.28" N, 104° 27' 01.08" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,856.00ft the Bottom Hole Displacement is 4,796.45ft in the Direction of 88.82° (Grid).

Magnetic Convergence at surface is: -7.98° (14 July 2011, , BGGM2011)



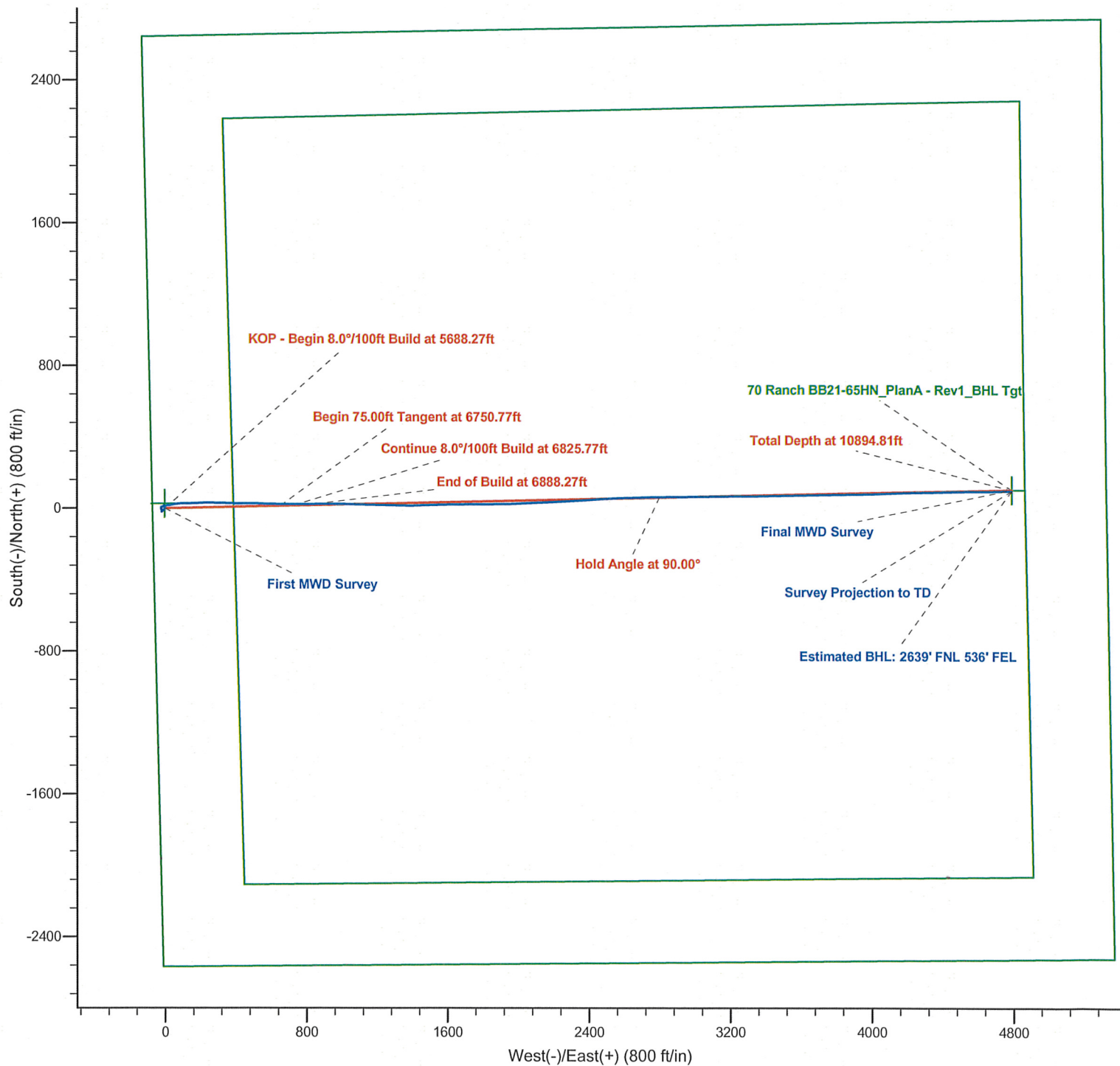


LEGEND

- 70 Ranch BB21-65HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the 70 Ranch BB21-65HN 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.

Permitted BHL: 2634' FNL, 535' FEL

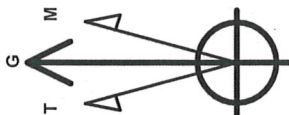


Project: Weld County, CO (NAD 83)
Site: Sec. 21-T5N-R63W (70 Ranch 21 PAD)
Well: 70 Ranch BB21-65HN

Noble Energy

HALLIBURTON

Sperry Drilling



Azimuths to Grid North
True North: -0.68°
Magnetic North: 7.98°

Magnetic Field
Strength: 53116.1nT
Dip Angle: 67.08°
Date: 7/14/2011
Model: BGGM2011

LEGEND

- 70 Ranch BB21-65HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the 70 Ranch BB21-65HN 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.

