

# Noble Energy

Weld County, CO (NAD 83)

Sec. 24-T6N-R63W (Wells Ranch 24 South PAD)

Wells Ranch AA24-62HN - A2

Design: MWD Survey

## Sperry Drilling Services

### Final Survey Report

03 January, 2013

Well Coordinates: 1,414,808.42 N, 3,307,804.51 E (40° 28' 00.41" N, 104° 23' 37.32" W)

Ground Level: 4,828.00 ft

Local Coordinate Origin: Centered on Well Wells Ranch AA24-62HN - Slot A2

Viewing Datum: KB=24' @ 4852.00ft (H&P 343)

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 Wells Ranch AA24-62HN - Sperry MWD Surveys from DD**

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
621.00	0.00	0.00	621.00	0.00	0.00	0.00	0.00
<b>Tie On Surface Casing Assume Vertical</b>							
713.00	0.50	58.63	713.00	0.21	0.34	0.34	0.54
<b>First MWD Survey</b>							
897.00	0.96	57.31	896.98	1.46	2.33	2.31	0.25
989.00	0.97	56.42	988.97	2.31	3.62	3.60	0.02
1,084.00	0.68	48.84	1,083.96	3.12	4.72	4.69	0.33
1,179.00	0.69	36.24	1,178.95	3.95	5.48	5.45	0.16
1,273.00	1.11	35.19	1,272.94	5.16	6.34	6.30	0.45
1,368.00	0.49	48.35	1,367.93	6.18	7.17	7.12	0.68
1,463.00	0.85	56.29	1,462.93	6.84	8.06	8.00	0.39
1,558.00	0.74	33.96	1,557.92	7.74	8.99	8.93	0.34
1,652.00	0.96	223.56	1,651.91	7.67	8.79	8.72	1.80
1,747.00	0.61	193.95	1,746.90	6.60	8.12	8.06	0.55
1,842.00	0.16	98.17	1,841.90	6.09	8.13	8.08	0.68
2,035.00	0.20	77.07	2,034.90	6.13	8.72	8.67	0.04
2,129.00	0.49	250.55	2,128.90	6.03	8.50	8.45	0.73
2,224.00	2.12	241.03	2,223.87	5.05	6.58	6.54	1.73
2,319.00	2.26	233.15	2,318.80	3.07	3.55	3.52	0.35
2,414.00	2.40	230.67	2,413.73	0.69	0.51	0.50	0.18
2,509.00	3.22	230.97	2,508.61	-2.25	-3.10	-3.08	0.86
2,604.00	5.50	229.01	2,603.33	-6.92	-8.61	-8.55	2.40
2,699.00	5.92	239.73	2,697.86	-12.37	-16.28	-16.18	1.20
2,794.00	7.05	250.50	2,792.25	-16.79	-26.01	-25.87	1.74
2,888.00	8.82	249.04	2,885.35	-21.29	-38.18	-38.00	1.89
2,983.00	11.13	247.17	2,978.91	-27.46	-53.43	-53.20	2.46
3,078.00	12.60	247.54	3,071.88	-34.98	-71.46	-71.16	1.55
3,172.00	12.41	243.76	3,163.65	-43.36	-89.99	-89.62	0.89
3,267.00	12.80	243.21	3,256.36	-52.61	-108.54	-108.10	0.43
3,362.00	12.02	244.91	3,349.14	-61.55	-126.90	-126.37	0.91
3,457.00	10.25	249.90	3,442.35	-68.65	-143.79	-143.21	2.12
3,552.00	8.04	251.42	3,536.13	-73.67	-158.03	-157.40	2.34
3,647.00	6.76	253.80	3,630.34	-77.35	-169.70	-169.04	1.39
3,741.00	5.54	248.49	3,723.80	-80.56	-179.23	-178.55	1.43
3,836.00	4.95	237.48	3,818.40	-84.44	-186.95	-186.24	1.23
3,930.00	3.44	226.92	3,912.15	-88.55	-192.43	-191.68	1.80
4,025.00	0.70	231.76	4,007.08	-90.86	-194.97	-194.20	2.89
4,120.00	0.85	293.02	4,102.07	-90.94	-196.08	-195.30	0.84
4,215.00	0.17	301.15	4,197.07	-90.59	-196.85	-196.08	0.72
4,309.00	0.28	250.00	4,291.07	-90.60	-197.18	-196.41	0.23
4,403.00	0.03	255.35	4,385.07	-90.68	-197.42	-196.65	0.27
4,497.00	0.49	0.41	4,479.07	-90.29	-197.44	-196.67	0.53
4,592.00	0.68	339.82	4,574.06	-89.35	-197.63	-196.87	0.30
4,687.00	1.20	334.62	4,669.05	-87.92	-198.25	-197.51	0.55
4,781.00	1.17	349.43	4,763.03	-86.09	-198.85	-198.12	0.33
4,875.00	1.16	10.70	4,857.01	-84.21	-198.85	-198.13	0.46
4,970.00	1.46	21.16	4,951.98	-82.14	-198.24	-197.54	0.40
5,064.00	2.30	29.48	5,045.93	-79.38	-196.88	-196.20	0.94
5,159.00	2.13	50.32	5,140.86	-76.59	-194.58	-193.93	0.86

## Survey Report for Wells Ranch AA24-62HN - Sperry MWD Surveys from DD

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,253.00	1.53	75.47	5,234.82	-75.16	-192.02	-191.38	1.05
5,347.00	1.22	88.76	5,328.79	-74.83	-189.80	-189.17	0.47
5,442.00	0.87	79.92	5,423.77	-74.68	-188.08	-187.45	0.40
5,536.00	1.43	67.30	5,517.75	-74.10	-186.30	-185.67	0.65
5,631.00	2.12	78.46	5,612.71	-73.29	-183.48	-182.86	0.81
5,726.00	0.86	91.24	5,707.68	-72.96	-181.05	-180.43	1.36
5,820.00	1.36	79.62	5,801.66	-72.77	-179.25	-178.63	0.58
5,896.00	1.06	113.76	5,877.64	-72.89	-177.72	-177.09	1.01
5,915.00	1.49	108.74	5,896.64	-73.04	-177.32	-176.70	2.34
5,963.00	1.86	122.54	5,944.62	-73.66	-176.07	-175.45	1.14
6,010.00	4.48	122.82	5,991.54	-75.07	-173.89	-173.25	5.57
6,058.00	9.67	115.44	6,039.16	-77.82	-168.67	-168.01	10.95
6,104.00	11.20	127.49	6,084.40	-82.20	-161.63	-160.93	5.78
6,152.00	10.98	119.73	6,131.51	-87.30	-153.96	-153.22	3.14
6,199.00	13.36	110.86	6,177.45	-91.45	-145.00	-144.22	6.43
6,247.00	17.47	107.57	6,223.72	-95.61	-132.94	-132.13	8.75
6,294.00	22.01	104.67	6,267.94	-99.97	-117.69	-116.84	9.88
6,342.00	26.60	98.27	6,311.69	-103.79	-98.34	-97.46	11.01
6,389.00	29.22	88.54	6,353.24	-105.02	-76.44	-75.56	11.16
6,437.00	33.69	85.47	6,394.18	-103.67	-51.45	-50.57	9.89
6,483.00	39.39	84.87	6,431.12	-101.35	-24.17	-23.31	12.42
6,531.00	45.73	85.21	6,466.46	-98.55	8.16	8.99	13.22
6,578.00	51.54	87.09	6,497.51	-96.21	43.34	44.15	12.72
6,626.00	56.51	87.44	6,525.69	-94.36	82.13	82.92	10.37
6,673.00	61.52	87.62	6,549.88	-92.63	122.37	123.15	10.66
6,721.00	65.53	87.12	6,571.28	-90.65	165.28	166.04	8.41
6,767.00	67.20	87.40	6,589.72	-88.64	207.37	208.11	3.67
6,815.00	69.12	87.45	6,607.57	-86.64	251.88	252.60	4.00
6,861.00	69.16	86.83	6,623.95	-84.49	294.81	295.51	1.26
6,909.00	67.14	85.41	6,641.82	-81.48	339.26	339.93	5.02
6,955.00	70.15	85.85	6,658.57	-78.22	381.97	382.62	6.60
7,003.00	73.27	84.99	6,673.63	-74.58	427.39	428.01	6.72
7,050.00	75.70	85.33	6,686.20	-70.76	472.52	473.09	5.22
7,082.00	77.45	86.53	6,693.63	-68.55	503.56	504.12	6.57
7,189.00	82.03	89.38	6,712.69	-64.81	608.74	609.27	5.02
7,237.00	85.12	90.28	6,718.06	-64.67	656.44	656.96	6.70
7,284.00	90.62	90.95	6,719.80	-65.18	703.38	703.91	11.79
7,379.00	93.11	90.30	6,716.71	-66.21	798.32	798.85	2.71
7,473.00	93.33	89.15	6,711.43	-65.76	892.17	892.69	1.24
7,567.00	90.83	88.46	6,708.02	-63.80	986.08	986.58	2.76
7,662.00	93.30	87.78	6,704.60	-60.69	1,080.96	1,081.43	2.70
7,757.00	90.68	87.43	6,701.30	-56.72	1,175.81	1,176.24	2.78
7,851.00	90.00	86.71	6,700.74	-51.92	1,269.68	1,270.07	1.05
7,946.00	89.17	86.55	6,701.43	-46.33	1,364.51	1,364.86	0.89
8,041.00	87.96	89.42	6,703.81	-42.99	1,459.41	1,459.72	3.28
8,089.00	88.61	89.35	6,705.25	-42.48	1,507.39	1,507.69	1.36
8,135.00	89.35	89.01	6,706.06	-41.82	1,553.38	1,553.67	1.77
8,183.00	91.36	90.40	6,705.77	-41.57	1,601.37	1,601.67	5.09
8,230.00	93.55	93.48	6,703.75	-43.16	1,648.29	1,648.60	8.04
8,325.00	93.52	93.78	6,697.90	-49.16	1,742.92	1,743.27	0.32
8,419.00	92.90	93.41	6,692.63	-55.05	1,836.59	1,836.99	0.77

## Survey Report for Wells Ranch AA24-62HN - Sperry MWD Surveys from DD

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,514.00	91.97	91.97	6,688.60	-59.50	1,931.40	1,931.83	1.80
8,608.00	91.45	89.93	6,685.79	-61.06	2,025.34	2,025.78	2.24
8,703.00	91.66	89.14	6,683.21	-60.29	2,120.30	2,120.73	0.86
8,798.00	89.63	87.88	6,682.14	-57.82	2,215.25	2,215.66	2.51
8,892.00	89.23	87.26	6,683.08	-53.84	2,309.16	2,309.53	0.78
8,987.00	92.56	88.89	6,681.59	-50.64	2,404.08	2,404.42	3.90
9,081.00	91.60	88.14	6,678.18	-48.21	2,497.98	2,498.30	1.30
9,175.00	92.37	87.56	6,674.93	-44.69	2,591.86	2,592.15	1.03
9,270.00	89.97	88.02	6,672.99	-41.02	2,686.76	2,687.01	2.57
9,364.00	89.41	88.81	6,673.50	-38.42	2,780.72	2,780.95	1.03
9,458.00	89.72	89.22	6,674.21	-36.81	2,874.71	2,874.92	0.55
9,553.00	88.61	87.47	6,675.59	-34.06	2,969.65	2,969.83	2.18
9,648.00	91.30	88.54	6,675.67	-30.76	3,064.59	3,064.74	3.05
9,742.00	90.49	87.84	6,674.20	-27.79	3,158.53	3,158.65	1.14
9,837.00	92.38	89.96	6,671.82	-25.97	3,253.47	3,253.57	2.99
9,932.00	91.30	89.92	6,668.77	-25.87	3,348.42	3,348.52	1.14
10,026.00	93.70	92.93	6,664.67	-28.20	3,442.28	3,442.40	4.09
10,121.00	95.44	92.46	6,657.10	-32.65	3,536.87	3,537.02	1.90
10,215.00	90.56	91.89	6,652.18	-36.21	3,630.65	3,630.82	5.23
10,310.00	91.14	91.36	6,650.77	-38.91	3,725.60	3,725.79	0.83
10,405.00	91.64	90.28	6,648.47	-40.26	3,820.56	3,820.76	1.25
10,499.00	90.86	89.91	6,646.42	-40.42	3,914.53	3,914.74	0.92
10,594.00	90.68	89.35	6,645.14	-39.81	4,009.52	4,009.72	0.62
10,688.00	91.33	89.14	6,643.49	-38.57	4,103.50	4,103.68	0.73
10,783.00	91.79	87.79	6,640.91	-36.02	4,198.43	4,198.58	1.50
10,877.00	91.05	88.21	6,638.58	-32.75	4,292.34	4,292.46	0.91
10,972.00	91.14	86.91	6,636.76	-28.70	4,387.24	4,387.32	1.37
11,035.00	91.76	87.17	6,635.17	-25.45	4,450.13	4,450.19	1.07
<b>Final MWD Survey</b>							
11,096.00	91.76	87.17	6,633.29	-22.44	4,511.03	4,511.06	0.00
<b>Bit Projection - Estimated BHL 675.59 FSL, 535.70 FEL</b>							

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
621.00	621.00	0.00	0.00	Tie On Surface Casing Assume Vertical
713.00	713.00	0.21	0.34	First MWD Survey
11,035.00	6,635.17	-25.45	4,450.13	Final MWD Survey
11,096.00	6,633.29	-22.44	4,511.03	Bit Projection - Estimated BHL 675.59 FSL, 535.70 FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
Target	Wells Ranch AA24-62HN_PlanB - Rev0_BH L Tgt	90.48	Slot	0.00	0.00	0.00

## Survey Report for Wells Ranch AA24-62HN - Sperry MWD Surveys from DD

### Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
621.00	11,096.00	Sperry MWD Surveys from DD	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
Bob	0.00	0.00	33.00	3,448.35	132.26	1,418,256.64	3,307,936.76	40° 28' 34.464 N	104° 23' 35.052 W
- survey misses target center by 3450.88ft at 33.00ft MD (33.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Bob	0.00	0.00	33.00	3,448.35	132.26	1,418,256.64	3,307,936.76	40° 28' 34.464 N	104° 23' 35.052 W
- survey misses target center by 3450.88ft at 33.00ft MD (33.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Wells Ranch	0.00	0.00	6,624.47	-38.04	4,511.21	1,414,770.39	3,312,315.56	40° 27' 59.472 N	104° 22' 38.964 W
- survey misses target center by 17.92ft at 11095.68ft MD (6633.30 TVD, -22.45 N, 4510.71 E)									
- Point									
Wells Ranch	0.00	0.00	5,996.48	-83.00	-165.00	1,414,725.42	3,307,639.52	40° 27' 59.608 N	104° 23' 39.468 W
- survey misses target center by 11.47ft at 6016.33ft MD (5997.84 TVD, -75.35 N, -173.44 E)									
- Circle (radius 35.00)									
Wells Ranch		89.45	6,719.00	-75.23	643.37	1,414,733.19	3,308,447.86	40° 27' 59.585 N	104° 23' 29.009 W
- survey misses target center by 10.81ft at 7224.09ft MD (6716.87 TVD, -64.64 N, 643.58 E)									
- Rectangle (sides W70.00 H16.00 D3,869.17)									

## North Reference Sheet for Sec. 24-T6N-R63W (Wells Ranch 24 South PAD) - Wells Ranch AA24-62HN

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

Vertical Depths are relative to KB=24' @ 4852.00ft (H&P 343). Northing and Easting are relative to Wells Ranch AA24-62HN - 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: 0.99996394

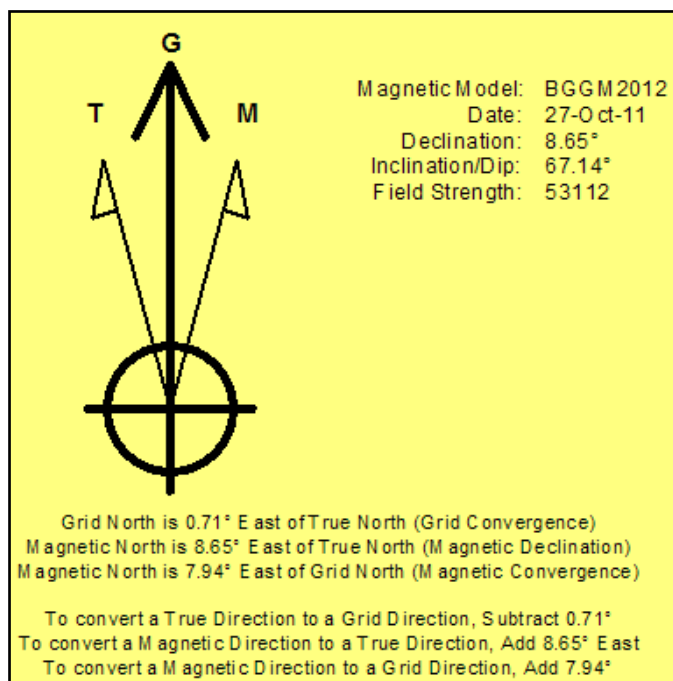
Grid Coordinates of Well: 1,414,808.42 ft N, 3,307,804.51 ft E

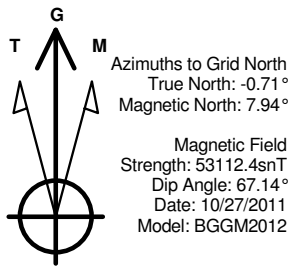
Geographical Coordinates of Well: 40° 28' 00.41" N, 104° 23' 37.32" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,096.00ft the Bottom Hole Displacement is 4,511.08ft in the Direction of 90.29° (Grid).

Magnetic Convergence at surface is: -7.94° (27 October 2011, , BGGM2012)



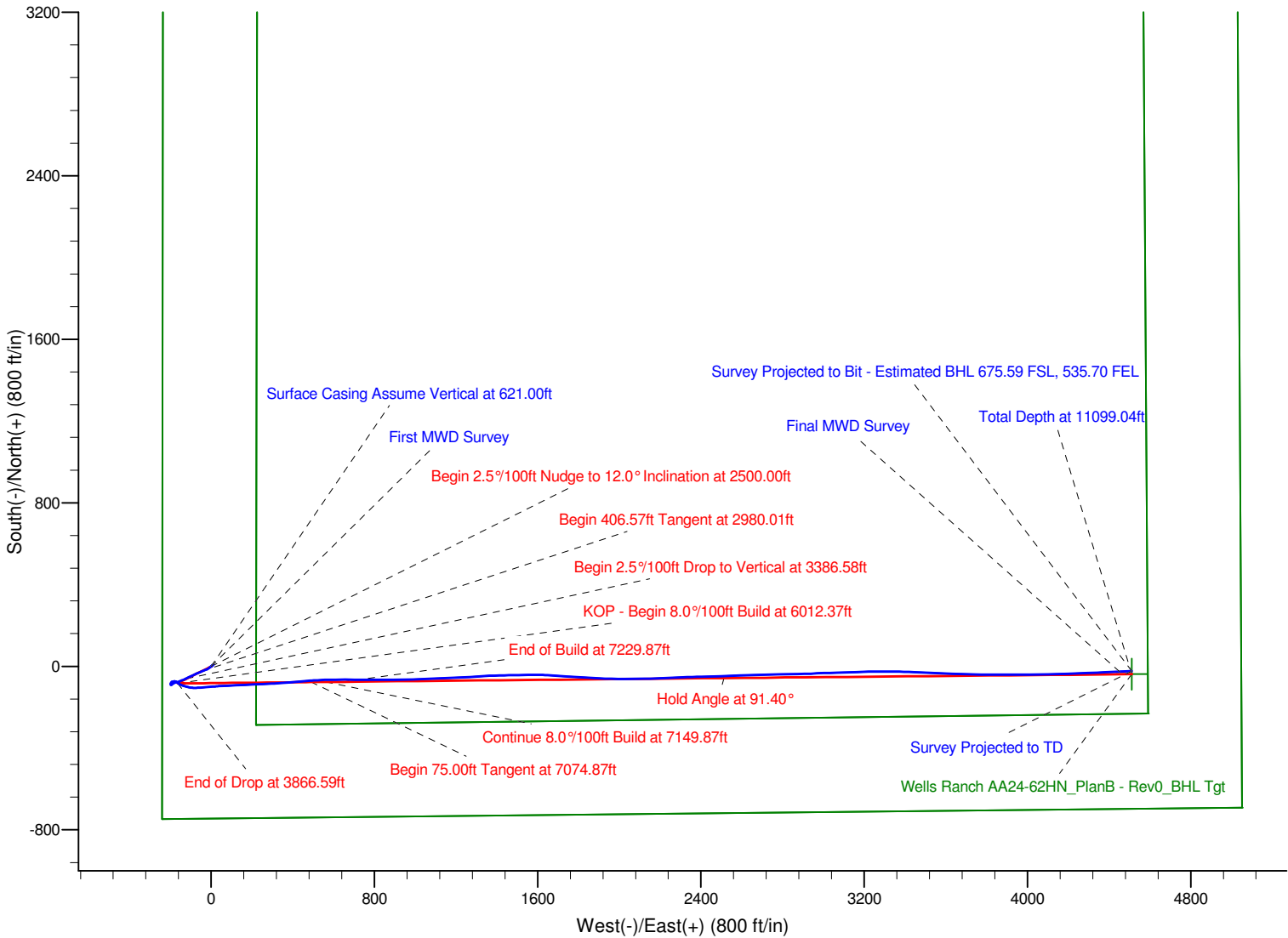


LEGEND

- Wells Ranch AA24-62HN, Plan B, Plan B - Rev 0 Proposal V
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AA24-62HN 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: 660' FSL, 535' FEL

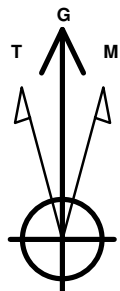


Project: Weld County, CO (NAD 83)  
Site: Sec. 24-T6N-R63W (Wells Ranch 24 South PAD)  
Well: Wells Ranch AA24-62HN

# Noble Energy

**HALLIBURTON**

Sperry Drilling



Azimuths to Grid North  
True North:  $-0.71^\circ$   
Magnetic North:  $7.94^\circ$

Magnetic Field  
Strength: 53112.4snT  
Dip Angle:  $67.14^\circ$   
Date: 10/27/2011  
Model: BGGM2012

## LEGEND

— Wells Ranch AA24-62HN, Plan B, Plan B - Rev 0 Proposal V0  
— MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AA24-62HN 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.

