

Noble Energy

Weld County, CO (NAD 83)

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

Wells Ranch AA24-62-1HN

MWD Survey

Sperry Drilling Services

Final Survey Report

04 January, 2013

Well Coordinates: 1,414,771.99 N, 3,307,804.96 E (40° 28' 00.05" N, 104° 23' 37.32" W)

Ground Level: 4,827.00 ft

Local Coordinate Origin: Centered on Well Wells Ranch AA24-62-1HN - Slot A

Viewing Datum: KB=24' @ 4851.00ft (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

Design Report for Wells Ranch AA24-62-1HN - 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
620.00	0.00	0.00	620.00	0.00	0.00	0.00	0.00
Tie On To Surface Casing Assumed Vertical							
713.00	0.50	156.64	713.00	-0.37	0.16	0.19	0.54
First MWD Survey							
806.00	0.63	182.03	805.99	-1.26	0.30	0.39	0.30
897.00	0.53	181.18	896.99	-2.18	0.28	0.44	0.11
990.00	0.40	228.74	989.99	-2.82	0.02	0.23	0.42
1,084.00	0.50	250.73	1,083.98	-3.17	-0.61	-0.38	0.21
1,179.00	0.94	254.08	1,178.98	-3.52	-1.75	-1.49	0.47
1,274.00	0.53	188.57	1,273.97	-4.17	-2.56	-2.25	0.91
1,368.00	0.76	209.74	1,367.96	-5.14	-2.94	-2.56	0.35
1,653.00	6.05	220.99	1,652.36	-18.13	-13.74	-12.38	1.86
1,747.00	7.55	224.28	1,745.70	-26.29	-21.30	-19.33	1.65
1,842.00	10.14	223.57	1,839.56	-36.82	-31.42	-28.65	2.73
1,937.00	11.88	218.61	1,932.81	-50.52	-43.29	-39.49	2.08
2,035.00	13.64	215.84	2,028.39	-67.77	-56.35	-51.26	1.90
2,130.00	13.91	213.46	2,120.65	-86.38	-69.20	-62.73	0.66
2,224.00	12.35	211.27	2,212.20	-104.40	-80.65	-72.83	1.74
2,319.00	14.24	214.13	2,304.65	-122.76	-92.48	-83.30	2.11
2,414.00	12.24	207.07	2,397.12	-141.40	-103.62	-93.05	2.70
2,509.00	13.40	207.87	2,489.75	-160.10	-113.35	-101.39	1.24
2,604.00	13.83	209.21	2,582.08	-179.74	-124.04	-110.62	0.56
2,699.00	14.33	206.35	2,674.23	-200.19	-134.80	-119.86	0.90
2,794.00	12.42	204.00	2,766.65	-220.06	-144.17	-127.76	2.09
2,889.00	13.43	203.59	2,859.24	-239.50	-152.74	-134.89	1.07
2,983.00	12.58	204.87	2,950.83	-258.79	-161.42	-142.14	0.95
3,078.00	12.35	205.41	3,043.59	-277.35	-170.13	-149.47	0.27
3,173.00	9.36	196.97	3,136.89	-293.92	-176.74	-154.87	3.56
3,268.00	6.70	190.64	3,230.95	-306.76	-180.02	-157.20	2.95
3,363.00	3.98	198.94	3,325.53	-315.33	-182.12	-158.67	2.97
3,457.00	1.29	200.70	3,419.42	-319.40	-183.55	-159.80	2.86
3,552.00	1.55	87.13	3,514.40	-320.34	-182.64	-158.83	2.51
3,647.00	2.47	76.95	3,609.34	-319.81	-179.37	-155.60	1.04
3,742.00	1.25	90.14	3,704.29	-319.35	-176.33	-152.61	1.35
3,836.00	1.30	223.45	3,798.28	-320.13	-176.04	-152.26	2.49
3,930.00	1.85	227.12	3,892.25	-321.94	-177.89	-153.97	0.59
4,025.00	1.82	237.41	3,987.20	-323.79	-180.28	-156.22	0.35
4,120.00	1.67	251.11	4,082.16	-325.05	-182.86	-158.70	0.47
4,215.00	1.60	251.39	4,177.12	-325.93	-185.43	-161.20	0.07
4,309.00	1.35	226.51	4,271.09	-327.11	-187.48	-163.16	0.72
4,403.00	1.01	197.46	4,365.07	-328.66	-188.53	-164.09	0.72
4,498.00	0.72	185.22	4,460.06	-330.05	-188.83	-164.30	0.36
4,592.00	0.40	246.80	4,554.05	-330.77	-189.19	-164.60	0.68
4,687.00	0.65	229.63	4,649.05	-331.25	-189.91	-165.28	0.31
4,781.00	0.73	288.03	4,743.04	-331.41	-190.88	-166.24	0.72
4,876.00	1.35	233.95	4,838.03	-331.88	-192.36	-167.68	1.15
4,970.00	3.10	249.89	4,931.95	-333.41	-195.64	-170.84	1.96
5,064.00	3.48	248.65	5,025.80	-335.32	-200.69	-175.73	0.41
5,159.00	2.08	251.21	5,120.69	-336.92	-205.01	-179.92	1.48

Design Report for Wells Ranch AA24-62-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,253.00	0.93	216.23	5,214.65	-338.09	-207.07	-181.90	1.51
5,348.00	0.68	210.79	5,309.64	-339.19	-207.82	-182.56	0.27
5,442.00	0.97	186.92	5,403.63	-340.46	-208.20	-182.85	0.47
5,537.00	0.64	147.16	5,498.63	-341.71	-208.01	-182.57	0.66
5,631.00	1.26	87.80	5,592.61	-342.11	-206.69	-181.22	1.15
5,726.00	1.25	70.10	5,687.59	-341.72	-204.67	-179.24	0.41
5,821.00	1.16	82.87	5,782.57	-341.24	-202.74	-177.35	0.30
5,916.00	0.83	61.72	5,877.56	-340.80	-201.18	-175.83	0.51
5,933.00	0.86	54.49	5,894.55	-340.67	-200.97	-175.62	0.65
6,010.00	0.19	48.90	5,971.55	-340.25	-200.40	-175.09	0.87
6,058.00	2.42	83.91	6,019.54	-340.09	-199.34	-174.04	4.72
6,104.00	7.46	88.53	6,065.35	-339.91	-195.38	-170.11	10.98
6,152.00	12.15	91.40	6,112.64	-339.95	-187.21	-161.96	9.82
6,199.00	15.68	94.62	6,158.25	-340.58	-175.93	-150.66	7.69
6,247.00	17.66	94.61	6,204.23	-341.69	-162.21	-136.89	4.13
6,294.00	20.16	92.99	6,248.69	-342.69	-147.01	-121.66	5.43
6,342.00	23.73	90.59	6,293.21	-343.22	-129.09	-103.75	7.67
6,388.00	27.82	91.09	6,334.62	-343.52	-109.09	-83.78	8.90
6,436.00	30.58	92.37	6,376.52	-344.24	-85.69	-60.39	5.90
6,483.00	34.19	91.66	6,416.20	-345.11	-60.54	-35.24	7.72
6,531.00	39.03	91.62	6,454.72	-345.93	-31.93	-6.65	10.08
6,578.00	44.90	94.11	6,489.65	-347.54	-0.56	24.75	12.98
6,626.00	50.16	93.33	6,522.05	-349.83	34.76	60.14	11.02
6,673.00	52.61	91.40	6,551.38	-351.33	71.44	96.84	6.12
6,721.00	56.29	90.36	6,579.29	-351.92	110.48	135.82	7.87
6,767.00	59.67	90.63	6,603.67	-352.26	149.48	174.74	7.36
6,815.00	61.64	90.23	6,627.20	-352.57	191.32	216.49	4.17
6,861.00	63.79	91.39	6,648.28	-353.16	232.19	257.29	5.18
6,909.00	68.44	92.57	6,667.71	-354.68	276.04	301.14	9.94
6,955.00	74.32	92.17	6,682.39	-356.48	319.58	344.69	12.81
7,003.00	78.59	91.91	6,693.63	-358.14	366.20	391.31	8.91
7,046.00	80.42	91.64	6,701.47	-359.45	408.46	433.55	4.30
7,189.00	84.51	90.18	6,720.21	-361.69	550.17	575.05	3.03
7,283.00	85.52	89.84	6,728.38	-361.71	643.82	668.45	1.13
7,378.00	87.26	91.61	6,734.36	-362.91	738.61	763.08	2.61
7,473.00	88.73	91.69	6,737.69	-365.64	833.51	857.93	1.55
7,521.00	92.31	93.99	6,737.25	-368.02	881.44	905.90	8.86
7,567.00	93.67	93.77	6,734.85	-371.13	927.27	951.84	2.99
7,615.00	93.39	92.20	6,731.90	-373.62	975.11	999.74	3.32
7,661.00	91.76	90.16	6,729.83	-374.57	1,021.05	1,045.62	5.67
7,756.00	89.41	86.85	6,728.86	-372.09	1,116.00	1,140.13	4.27
7,804.00	92.16	85.94	6,728.20	-369.07	1,163.89	1,187.68	6.03
7,851.00	94.51	85.15	6,725.47	-365.43	1,210.67	1,234.07	5.27
7,946.00	95.84	87.80	6,716.90	-359.61	1,305.09	1,327.81	3.11
8,040.00	96.03	88.56	6,707.18	-356.64	1,398.54	1,420.80	0.83
8,134.00	92.90	90.17	6,699.86	-355.60	1,492.23	1,514.17	3.74
8,229.00	90.71	91.42	6,696.87	-356.92	1,587.17	1,608.95	2.65
8,324.00	91.02	89.95	6,695.44	-358.06	1,682.15	1,703.76	1.58
8,419.00	89.17	88.24	6,695.28	-356.56	1,777.13	1,798.38	2.65
8,513.00	91.51	88.86	6,694.72	-354.18	1,871.09	1,891.92	2.58
8,608.00	94.22	90.93	6,689.97	-354.00	1,965.96	1,986.52	3.59

Design Report for Wells Ranch AA24-62-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,702.00	91.45	90.14	6,685.32	-354.88	2,059.83	2,080.20	3.06
8,750.00	91.57	89.87	6,684.06	-354.88	2,107.81	2,128.06	0.62
8,797.00	92.19	89.46	6,682.52	-354.61	2,154.78	2,174.89	1.58
8,892.00	88.74	90.65	6,681.75	-354.70	2,249.76	2,269.62	3.84
8,986.00	86.54	90.27	6,685.62	-355.45	2,343.68	2,363.34	2.38
9,081.00	89.57	89.27	6,688.84	-355.07	2,438.61	2,457.99	3.36
9,174.00	90.93	88.66	6,688.43	-353.39	2,531.59	2,550.60	1.60
9,269.00	90.99	88.56	6,686.84	-351.09	2,626.55	2,645.14	0.12
9,364.00	91.82	88.06	6,684.51	-348.29	2,721.48	2,739.62	1.02
9,458.00	92.28	88.25	6,681.15	-345.26	2,815.37	2,833.04	0.53
9,553.00	90.96	87.90	6,678.46	-342.07	2,910.27	2,927.46	1.44
9,647.00	92.93	88.61	6,675.27	-339.21	3,004.17	3,020.90	2.23
9,742.00	92.34	87.93	6,670.91	-336.35	3,099.03	3,115.29	0.95
9,836.00	90.28	87.89	6,668.76	-332.92	3,192.93	3,208.70	2.19
9,931.00	89.54	88.00	6,668.91	-329.51	3,287.87	3,303.14	0.79
10,026.00	91.39	88.20	6,668.14	-326.36	3,382.81	3,397.60	1.96
10,120.00	90.98	90.96	6,666.19	-325.67	3,476.78	3,491.27	2.97
10,168.00	89.51	92.16	6,665.99	-326.98	3,524.76	3,539.21	3.95
10,215.00	89.17	92.88	6,666.53	-329.05	3,571.71	3,586.19	1.69
10,309.00	87.93	92.97	6,668.91	-333.84	3,665.56	3,680.14	1.32
10,357.00	88.86	92.55	6,670.25	-336.15	3,713.48	3,728.10	2.13
10,404.00	89.48	92.20	6,670.93	-338.10	3,760.44	3,775.07	1.51
10,452.00	90.25	91.65	6,671.05	-339.71	3,808.41	3,823.04	1.97
10,499.00	91.30	92.42	6,670.41	-341.38	3,855.37	3,870.00	2.77
10,593.00	88.31	90.82	6,670.73	-344.04	3,949.32	3,963.89	3.61
10,688.00	90.06	90.12	6,672.08	-344.82	4,044.31	4,058.68	1.98
10,782.00	90.00	87.08	6,672.03	-342.52	4,138.27	4,152.22	3.23
10,877.00	91.64	84.36	6,670.67	-335.43	4,232.98	4,246.17	3.34
10,972.00	91.57	84.56	6,668.01	-326.27	4,327.50	4,339.77	0.22
11,066.00	93.85	84.65	6,663.57	-317.44	4,420.97	4,432.35	2.43
11,094.00	94.32	84.81	6,661.57	-314.87	4,448.78	4,459.90	1.77
Final MWD Survey							
11,156.00	94.32	84.81	6,656.90	-309.28	4,510.35	4,520.90	0.00
Bit Projection - Estimated BHL 350°FSL 538°FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
620.00	620.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
713.00	713.00	-0.37	0.16	First MWD Survey
11,094.00	6,661.57	-314.87	4,448.78	Final MWD Survey
11,156.00	6,656.90	-309.28	4,510.35	Bit Projection
11,156.00	6,656.90	-309.28	4,510.35	Estimated BHL 350°FSL 538°FEL

Design Report for Wells Ranch AA24-62-1HN - MWD Survey

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Wells Ranch AA24-62-1HN_PlanC - Rev0_ BHL Tgt	94.18	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
620.00	11,156.00	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	32.00	3,484.78	131.81	1,418,256.64	3,307,936.76	40° 28' 34.464 N	104° 23' 35.052 W
- actual wellpath misses target center by 3487.27ft at 32.00ft MD (32.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-235.19	4,591.78	1,419,363.60	3,307,569.78		
Point 2				5,021.81	4,646.78	1,419,418.60	3,312,826.59		
Point 3				5,050.81	-654.22	1,414,117.79	3,312,855.59		
Point 4				-241.19	-710.22	1,414,061.79	3,307,563.78		
Point 5				-235.19	4,591.78	1,419,363.60	3,307,569.78		
Wells Ranch	0.00	0.00	6,684.37	-329.50	4,512.12	1,414,442.51	3,312,316.93	40° 27' 56.232 N	104° 22' 39.000 W
- actual wellpath misses target center by 34.09ft at 11153.87ft MD (6657.06 TVD, -309.47 N, 4508.23 E)									
- Point									
Bob	0.00	0.00	32.00	3,484.78	131.81	1,418,256.64	3,307,936.76	40° 28' 34.464 N	104° 23' 35.052 W
- actual wellpath misses target center by 3487.27ft at 32.00ft MD (32.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				224.81	4,131.78	1,418,903.62	3,308,029.76		
Point 2				4,561.81	4,186.78	1,418,958.62	3,312,366.61		
Point 3				4,590.81	-194.22	1,414,577.77	3,312,395.60		
Point 4				218.81	-250.22	1,414,521.78	3,308,023.76		
Point 5				224.81	4,131.78	1,418,903.62	3,308,029.76		
Wells Ranch	89.43		6,725.00	-368.06	632.37	1,414,403.94	3,308,437.31	40° 27' 56.333 N	104° 23' 29.198 W
- actual wellpath misses target center by 6.79ft at 7271.30ft MD (6727.46 TVD, -361.73 N, 632.16 E)									
- Rectangle (sides W70.00 H16.00 D3,880.16)									
Wells Ranch	0.00	0.00	6,002.31	-376.00	-166.00	1,414,396.00	3,307,638.97	40° 27' 56.353 N	104° 23' 39.528 W
- actual wellpath misses target center by 49.35ft at 6041.40ft MD (6002.95 TVD, -340.16 N, -199.92 E)									
- Circle (radius 35.00)									

North Reference Sheet for Sec. 24-T6N-R63W (Wells Ranch 24 South PAD) - Wells Ranch AA24-62-1HN

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' @ 4851.00ft (H&P 343). Northing and Easting are relative to Wells Ranch AA24-62-1HN - 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: 0.99996393

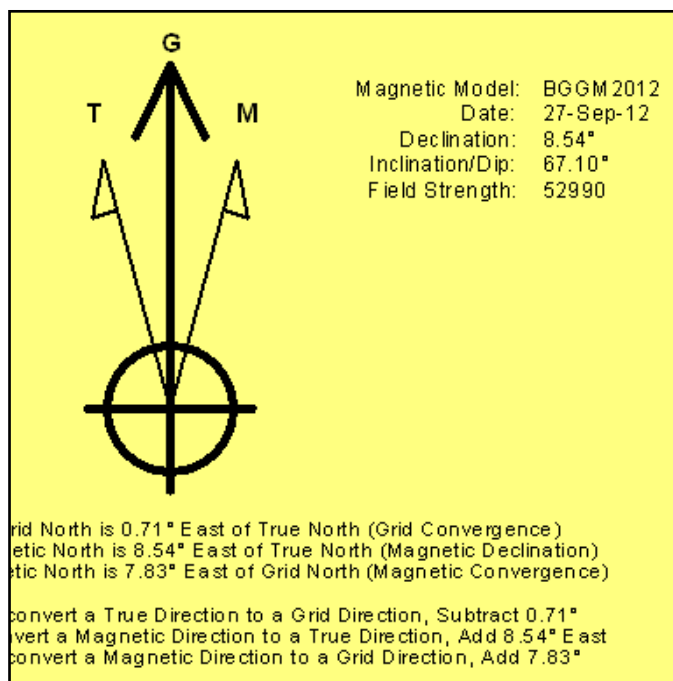
Grid Coordinates of Well: 1,414,771.99 ft N, 3,307,804.96 ft E

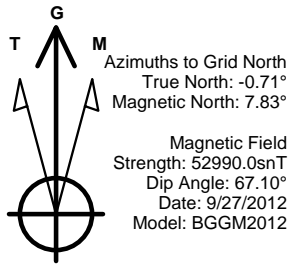
Geographical Coordinates of Well: 40° 28' 00.05" N, 104° 23' 37.32" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,156.00ft
the Bottom Hole Displacement is 4,520.94ft in the Direction of 93.92° (Grid).

Magnetic Convergence at surface is: -7.83° (27 September 2012, , BGGM2012)



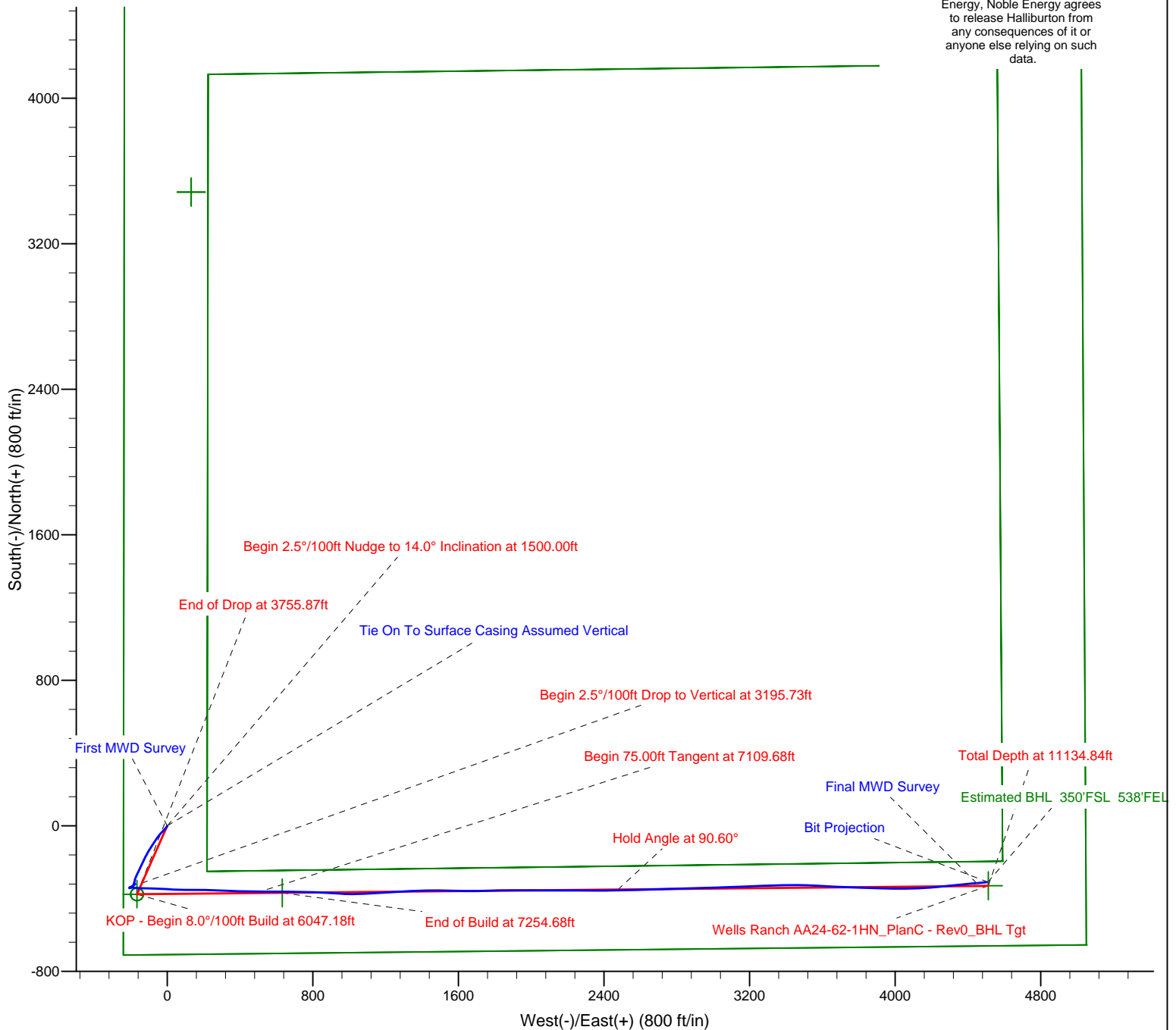


LEGEND

- Wells Ranch AA24-62-1HN, Plan C, Plan C - Rev 0 Proposal V0
- MWD Survey

Permitted BHL: 330' FSL, 535'
 FEL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AA24-62-1HN 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. 24-T6N-R63W (Wells Ranch 24 South PAD)
 Well: Wells Ranch AA24-62-1HN

Noble Energy

HALLIBURTON
 Sperry Drilling



Azimuths to Grid North
 True North: -0.71°
 Magnetic North: 7.83°

Magnetic Field
 Strength: 52990.0snT
 Dip Angle: 67.10°
 Date: 9/27/2012
 Model: BGGM2012

LEGEND

— Wells Ranch AA24-62-1HN, Plan C, Plan C - Rev 0 Proposal V0
 — MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AA24-62-1HN 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.

