

Noble Energy

Weld County, CO (NAD 83)

Sec. 6-T6N-R62W (Wells Ranch 5 South PAD)

Wells Ranch AE05-63HN

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

01 October, 2013

Well Coordinates: 1,431,430.98 N, 3,317,985.87 E (40° 30' 43.38" N, 104° 21' 22.82" W)
Ground Level: 4,945.00 ft

Local Coordinate Origin:	Centered on Well Wells Ranch AE05-63HN
Viewing Datum:	KB=24' @ 4969.00ft (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 AE05-63HN - 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
627.00	0.00	0.00	627.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 627.00ft							
718.00	0.62	201.12	718.00	-0.46	-0.18	-0.19	0.68
First MWD Survey							
812.00	0.34	163.50	812.00	-1.20	-0.28	-0.32	0.43
904.00	1.02	198.55	903.99	-2.24	-0.46	-0.53	0.83
997.00	0.91	215.46	996.98	-3.63	-1.16	-1.27	0.33
1,089.00	1.18	205.34	1,088.96	-5.08	-1.99	-2.14	0.35
1,183.00	1.06	212.90	1,182.94	-6.68	-2.87	-3.08	0.20
1,277.00	0.70	310.06	1,276.93	-7.04	-3.78	-4.00	1.43
1,370.00	1.18	297.72	1,369.92	-6.23	-5.07	-5.26	0.56
1,464.00	1.18	279.65	1,463.90	-5.62	-6.88	-7.05	0.39
1,559.00	1.34	281.16	1,558.88	-5.24	-8.93	-9.09	0.17
1,654.00	1.40	277.59	1,653.85	-4.87	-11.17	-11.32	0.11
1,749.00	1.19	283.10	1,748.83	-4.49	-13.28	-13.42	0.26
1,844.00	0.68	224.13	1,843.82	-4.68	-14.64	-14.77	1.08
1,939.00	1.06	223.74	1,938.81	-5.71	-15.64	-15.81	0.40
2,034.00	1.07	234.01	2,033.79	-6.87	-16.96	-17.17	0.20
2,129.00	0.85	154.41	2,128.78	-8.03	-17.37	-17.62	1.31
2,224.00	1.03	151.07	2,223.77	-9.41	-16.66	-16.94	0.20
2,319.00	1.08	143.66	2,318.75	-10.88	-15.71	-16.04	0.15
2,414.00	0.95	149.08	2,413.74	-12.28	-14.78	-15.15	0.17
2,509.00	3.17	124.56	2,508.67	-14.44	-12.21	-12.65	2.46
2,603.00	4.50	108.73	2,602.46	-17.10	-6.58	-7.10	1.80
2,699.00	6.62	105.22	2,698.00	-19.76	2.33	1.72	2.24
2,794.00	9.02	105.41	2,792.11	-23.18	14.79	14.07	2.53
2,889.00	12.24	98.47	2,885.47	-26.64	31.94	31.10	3.64
2,984.00	13.15	91.28	2,978.16	-28.37	52.71	51.80	1.92
3,079.00	13.07	91.46	3,070.68	-28.88	74.25	73.32	0.09
3,173.00	13.84	80.67	3,162.11	-27.33	95.97	95.08	2.79
3,268.00	13.68	80.17	3,254.39	-23.57	118.25	117.46	0.21
3,363.00	11.44	71.08	3,347.12	-18.60	138.24	137.59	3.14
3,458.00	8.33	66.42	3,440.70	-12.79	153.46	152.99	3.38
3,553.00	6.32	61.43	3,534.92	-7.53	164.36	164.05	2.22
3,648.00	4.08	65.75	3,629.52	-3.64	172.04	171.84	2.39
3,743.00	2.96	43.68	3,724.34	-0.48	176.81	176.71	1.83
3,838.00	0.33	39.15	3,819.30	1.50	178.68	178.64	2.77
3,933.00	0.76	325.69	3,914.29	2.24	178.50	178.48	0.78
4,028.00	1.11	302.82	4,009.28	3.26	177.37	177.38	0.53
4,123.00	0.90	300.91	4,104.27	4.14	175.95	176.00	0.22
4,218.00	1.11	301.58	4,199.25	5.00	174.53	174.60	0.22
4,313.00	0.68	290.98	4,294.24	5.69	173.22	173.31	0.48
4,408.00	0.65	247.66	4,389.23	5.68	172.19	172.29	0.52
4,503.00	0.52	259.46	4,484.23	5.40	171.27	171.36	0.19
4,598.00	0.50	210.83	4,579.23	4.97	170.64	170.71	0.44
4,693.00	0.44	280.02	4,674.22	4.67	170.06	170.13	0.56
4,788.00	0.96	356.49	4,769.22	5.53	169.66	169.75	1.01
4,883.00	1.33	353.14	4,864.20	7.42	169.48	169.62	0.40
4,978.00	1.03	359.05	4,959.18	9.37	169.33	169.54	0.34

Design Report for Wells Ranch AE05-63HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,073.00	1.27	12.78	5,054.16	11.25	169.55	169.82	0.38
5,168.00	0.29	85.00	5,149.15	12.30	170.02	170.32	1.28
5,263.00	0.25	51.23	5,244.15	12.45	170.42	170.73	0.17
5,358.00	0.20	32.13	5,339.15	12.72	170.67	170.98	0.09
5,453.00	1.24	239.84	5,434.14	12.34	169.87	170.17	1.49
5,548.00	1.72	268.54	5,529.11	11.79	167.56	167.84	0.91
5,643.00	1.20	268.59	5,624.08	11.73	165.14	165.42	0.55
5,738.00	1.37	233.62	5,719.06	11.03	163.23	163.49	0.83
5,833.00	1.19	235.82	5,814.03	9.80	161.50	161.73	0.20
5,928.00	1.55	263.21	5,909.01	9.10	159.41	159.61	0.78
6,017.00	1.30	285.35	5,997.98	9.22	157.24	157.45	0.67
6,065.00	2.67	72.93	6,045.97	9.69	157.78	158.01	7.98
6,112.00	8.35	78.77	6,092.73	10.68	162.18	162.43	12.13
6,160.00	14.47	78.94	6,139.76	12.51	171.49	171.80	12.75
6,207.00	20.12	79.51	6,184.62	15.11	185.21	185.59	12.03
6,255.00	23.78	78.13	6,229.13	18.61	202.81	203.29	7.70
6,302.00	25.74	79.92	6,271.81	22.34	222.13	222.72	4.46
6,350.00	27.76	86.25	6,314.68	24.90	243.56	244.21	7.27
6,397.00	31.19	88.51	6,355.59	25.93	266.65	267.33	7.67
6,445.00	35.12	88.54	6,395.77	26.61	292.89	293.57	8.19
6,492.00	37.99	88.65	6,433.52	27.29	320.87	321.56	6.11
6,540.00	39.80	92.86	6,470.88	26.87	350.99	351.66	6.67
6,587.00	43.82	93.41	6,505.91	25.15	382.27	382.87	8.59
6,635.00	47.52	89.90	6,539.45	24.20	416.58	417.13	9.31
6,682.00	51.08	89.02	6,570.09	24.54	452.20	452.74	7.71
6,730.00	55.98	89.26	6,598.61	25.11	490.78	491.33	10.22
6,777.00	59.83	89.69	6,623.58	25.48	530.59	531.13	8.23
6,825.00	63.45	86.33	6,646.38	26.96	572.79	573.35	9.74
6,872.00	65.76	86.53	6,666.54	29.61	615.16	615.78	4.93
6,920.00	67.98	87.97	6,685.39	31.72	659.25	659.92	5.39
6,967.00	68.50	90.04	6,702.82	32.48	702.89	703.56	4.24
7,015.00	73.40	89.69	6,718.48	32.59	748.25	748.90	10.23
7,062.00	80.14	89.01	6,729.23	33.11	793.97	794.62	14.41
7,113.00	86.21	89.47	6,735.29	33.78	844.58	845.22	11.94
7,141.00	86.80	89.35	6,737.00	34.07	872.53	873.16	2.14
Estimated 7" Casing Point: 1331' FSL, 766' FWL (Not a Survey Station)							
7,250.00	89.08	88.87	6,740.92	35.76	981.44	982.07	2.14
7,345.00	88.80	88.17	6,742.67	38.21	1,076.39	1,077.05	0.79
7,440.00	90.25	88.60	6,743.46	40.89	1,171.34	1,172.05	1.59
7,547.00	90.59	89.35	6,742.68	42.81	1,278.32	1,279.03	0.77
7,629.00	90.22	89.08	6,742.10	43.93	1,360.31	1,361.02	0.56
7,724.00	89.66	89.36	6,742.20	45.22	1,455.30	1,456.01	0.66
7,819.00	91.36	91.73	6,741.35	44.32	1,550.28	1,550.91	3.07
7,914.00	90.31	90.23	6,739.97	42.69	1,645.26	1,645.79	1.93
8,009.00	90.86	87.79	6,739.00	44.34	1,740.23	1,740.77	2.63
8,104.00	90.09	87.27	6,738.21	48.43	1,835.14	1,835.76	0.98
8,199.00	90.22	86.21	6,737.95	53.83	1,929.98	1,930.72	1.12
8,294.00	88.77	85.94	6,738.79	60.33	2,024.75	2,025.65	1.55
8,389.00	88.12	85.13	6,741.37	67.73	2,119.43	2,120.51	1.09
8,484.00	88.40	87.07	6,744.25	74.19	2,214.16	2,215.40	2.06
8,579.00	91.70	90.86	6,744.17	75.90	2,309.11	2,310.36	5.29

Design Report for Wells Ranch AE05-63HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,674.00	90.15	89.67	6,742.64	75.46	2,404.10	2,405.28	2.06
8,769.00	90.65	90.86	6,741.97	75.02	2,499.09	2,500.22	1.36
8,864.00	90.95	89.68	6,740.65	74.57	2,594.08	2,595.14	1.28
8,959.00	90.89	87.19	6,739.12	77.17	2,689.02	2,690.12	2.62
9,054.00	91.54	86.51	6,737.11	82.39	2,783.86	2,785.07	0.99
9,149.00	92.22	86.76	6,733.99	87.96	2,878.64	2,879.99	0.76
9,244.00	90.31	86.36	6,731.89	93.66	2,973.44	2,974.92	2.05
9,339.00	90.86	85.31	6,730.92	100.56	3,068.19	3,069.83	1.25
9,434.00	90.37	85.74	6,729.90	107.97	3,162.89	3,164.72	0.69
9,529.00	91.42	88.46	6,728.42	112.78	3,257.75	3,259.68	3.07
9,624.00	91.29	88.39	6,726.17	115.39	3,352.68	3,354.65	0.16
9,719.00	91.82	89.64	6,723.59	117.02	3,447.63	3,449.60	1.43
9,814.00	90.59	89.74	6,721.60	117.53	3,542.61	3,544.55	1.30
9,909.00	89.20	88.29	6,721.77	119.17	3,637.59	3,639.54	2.11
10,004.00	88.73	86.92	6,723.49	123.13	3,732.49	3,734.51	1.52
10,099.00	90.68	88.46	6,723.98	126.96	3,827.40	3,829.50	2.62
10,194.00	90.37	89.62	6,723.11	128.56	3,922.38	3,924.48	1.26
10,289.00	90.68	91.54	6,722.24	127.59	4,017.37	4,019.39	2.05
10,384.00	91.57	90.66	6,720.37	125.77	4,112.33	4,114.25	1.32
10,479.00	90.80	89.77	6,718.41	125.41	4,207.31	4,209.18	1.24
10,574.00	91.85	89.22	6,716.21	126.25	4,302.28	4,304.12	1.25
10,669.00	90.90	87.58	6,713.93	128.90	4,397.21	4,399.09	1.99
10,763.00	90.34	86.45	6,712.91	133.80	4,491.08	4,493.06	1.34
10,859.00	89.41	87.60	6,713.12	138.78	4,586.94	4,589.04	1.54
10,953.00	90.99	86.94	6,712.79	143.26	4,680.83	4,683.02	1.82
11,048.00	91.42	86.72	6,710.80	148.51	4,775.67	4,777.97	0.51
Final MWD Survey							
11,116.00	91.42	86.72	6,709.11	152.40	4,843.53	4,845.93	0.00
Survey Projection to TD - Estimated BHL: 1322' FSL, 540' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
627.00	627.00	0.00	0.00	Surface Casing Assumed Vertical at 627.00ft
718.00	718.00	-0.46	-0.18	First MWD Survey
7,141.00	6,737.00	34.07	872.53	Estimated 7" Casing Point: 1331' FSL, 766' FWL (Not a Survey Station)
11,048.00	6,710.80	148.51	4,775.67	Final MWD Survey
11,116.00	6,709.11	152.40	4,843.53	Survey Projection to TD
11,116.00	6,709.11	152.40	4,843.53	Estimated BHL: 1322' FSL, 540' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Wells Ranch AE05-63HN_PlanA - Rev0_BH L Tgt	88.22	Slot	0.00	0.00	0.00

Design Report for Wells Ranch AE05-63HN - MWD Survey

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
627.00	7,141.00	Sperry MWD Surveys	MWD+IFR1+MS_WY
7,141.00	11,116.00	Sperry MWD Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
667.00	667.00	9 5/8" Csg	9-5/8	13-3/4
7,141.00	6,737.00	7" Csg	7	8-3/4

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
Wells Ranch	0.00	0.00	6,711.68	150.45	4,847.80	1,431,581.42	3,322,833.51	40° 30' 44.244 N	104° 20' 20.040 W
- actual wellpath misses target center by 5.35ft at 11116.00ft MD (6709.11 TVD, 152.40 N, 4843.53 E)									
- Point									
Wells Ranch	0.00	0.00	0.00	36.43	-0.47	1,431,467.41	3,317,985.40	40° 30' 43.740 N	104° 21' 22.824 W
- actual wellpath misses target center by 36.44ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				588.46	-860.62	1,430,570.39	3,318,574.31		
Point 2				491.84	3,526.39	1,434,957.25	3,318,477.69		
Point 3				4,861.85	3,660.01	1,435,090.87	3,322,847.56		
Point 4				4,944.47	-691.00	1,430,740.00	3,322,930.18		
Point 5				588.46	-860.62	1,430,570.39	3,318,574.31		
Wells Ranch	0.00	0.00	0.00	36.43	-0.47	1,431,467.41	3,317,985.40	40° 30' 43.740 N	104° 21' 22.824 W
- actual wellpath misses target center by 36.44ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				128.42	-1,320.58	1,430,110.44	3,318,114.28		
Point 2				31.88	3,986.43	1,435,417.28	3,318,017.75		
Point 3				5,321.89	4,119.97	1,435,550.81	3,323,307.59		
Point 4				5,404.43	-1,151.04	1,430,279.98	3,323,390.12		
Point 5				128.42	-1,320.58	1,430,110.44	3,318,114.28		

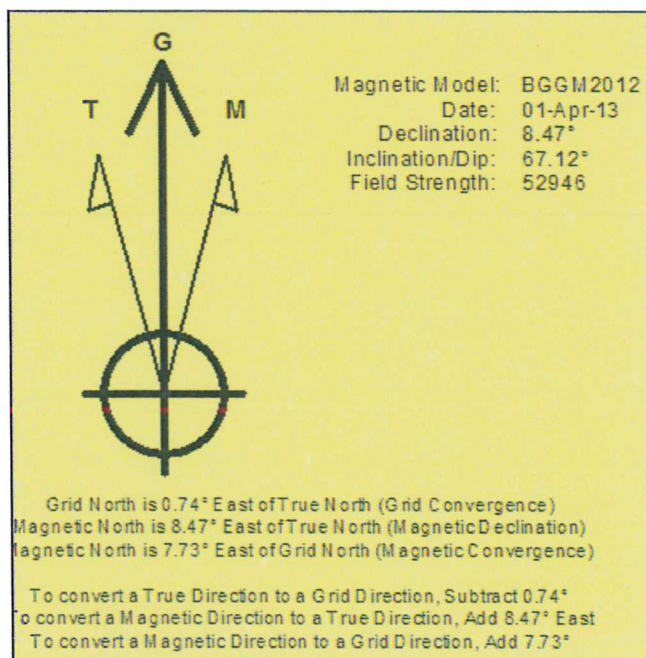
North Reference Sheet for Sec. 6-T6N-R62W (Wells Ranch 5 South PAD) - Wells Ranch AE05-63HN

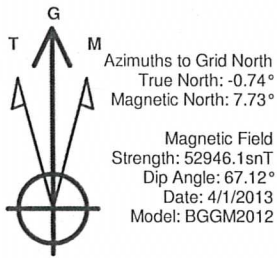
All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
 Vertical Depths are relative to KB=24' @ 4969.00ft (H&P 343). Northing and Easting are relative to Wells Ranch AE05-63HN
 Coordinate System is US State Plane 1983, Colorado Northern Zone 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: 0.99996722

Grid Coordinates of Well: 1,431,430.98 ft N, 3,317,985.87 ft E
 Geographical Coordinates of Well: 40° 30' 43.38" N, 104° 21' 22.82" W
 Grid Convergence at Surface is: 0.74°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,116.00ft
 the Bottom Hole Displacement is 4,845.93ft in the Direction of 88.20° (Grid).

Magnetic Convergence at surface is: -7.73° (1 April 2013, , BGGM2012)



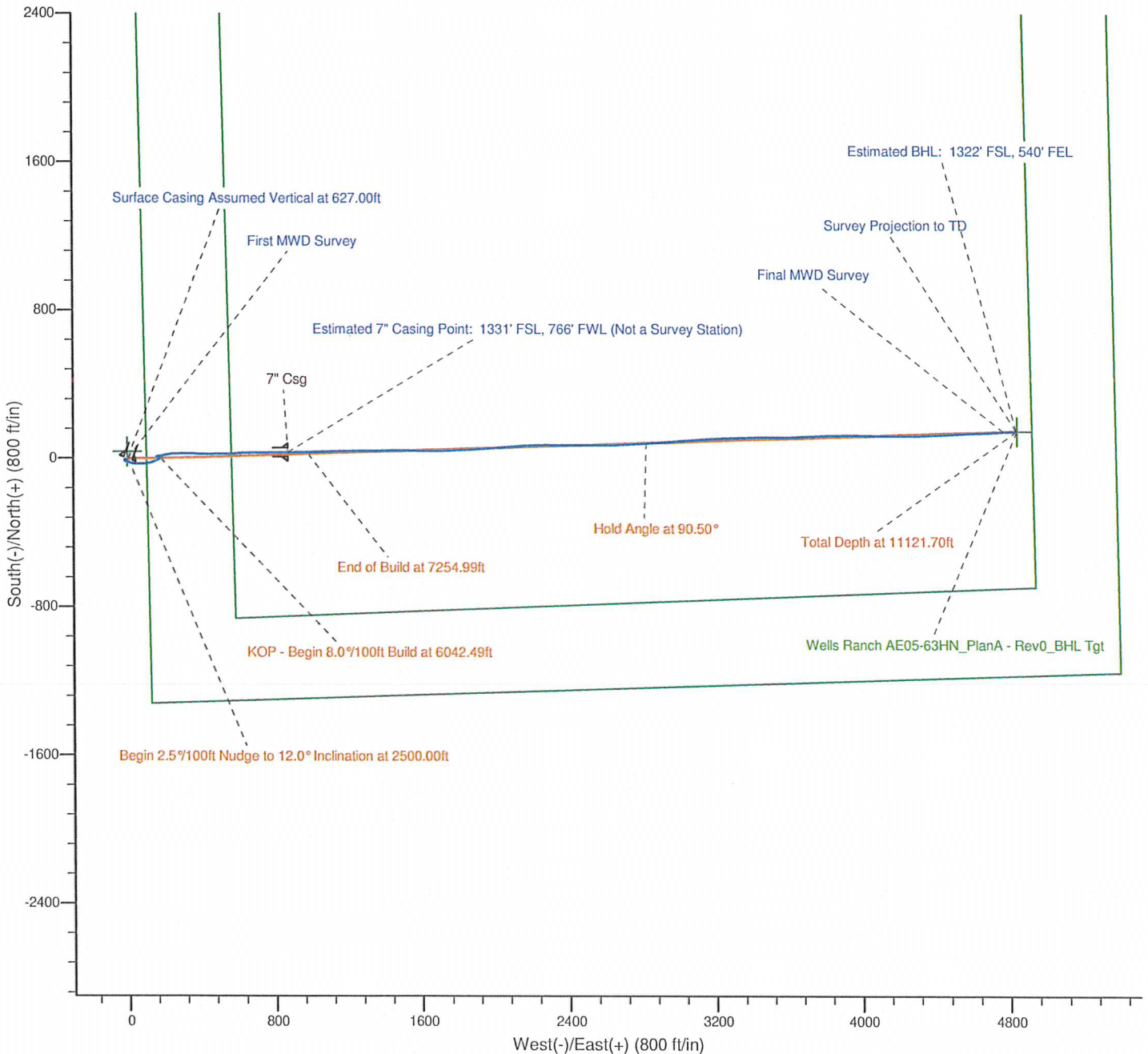


LEGEND

- Wells Ranch AE05-63HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AE05-63HN 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.

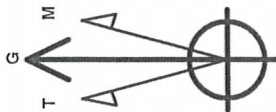
Permitted BHL: 1320' FSL, 535' FEL



Noble Energy

Project: Weld County, CO (NAD 83)
 Site: Sec. 6-T6N-R62W (Wells Ranch 5 South PAD)
 Well: Wells Ranch AE05-63HN

HALLIBURTON
 Sperry Drilling



Azimuths to Grid North
 True North: -0.74°
 Magnetic North: 7.73°
 Magnetic Field
 Strength: 52946.1 nT
 Dip Angle: 67.12°
 Date: 4/1/2013
 Model: BGGM2012

LEGEND

- Wells Ranch AE05-63HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AE05-63HN 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.

