

Noble Energy

Weld County, CO (NAD 83)

Sec. 12-T6N-R63W (Wells Ranch 12 North PAD)

Wells Ranch AA12-67-1HN

MWD Surveys

Sperry Drilling Services

Final Survey Report

04 January, 2013

Well Coordinates: 1,429,110.91 N, 3,312,631.81 E (40° 30' 21.13" N, 104° 22' 32.52" W)

Ground Level: 4,893.00 ft

Local Coordinate Origin: Centered on Well Wells Ranch AA12-67-1HN - Slot A

Viewing Datum: KB=24' @ 4917.00ft (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 Wells Ranch AA12-67-1HN - 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
672.00	0.00	0.00	672.00	0.00	0.00	0.00	0.00
Tie On Surface Casing Assumed Vertical							
807.00	0.59	345.25	807.00	0.67	-0.18	0.07	0.44
First MWD Survey							
1,084.00	0.73	11.62	1,083.98	3.78	-0.18	-0.41	0.12
1,363.00	0.37	330.92	1,362.97	6.31	-0.26	-0.72	0.18
1,647.00	0.25	55.75	1,646.96	7.46	-0.20	-0.96	0.15
1,932.00	0.22	139.81	1,931.96	7.39	0.67	-1.81	0.11
2,122.00	0.61	316.79	2,121.96	7.85	0.21	-1.43	0.44
2,406.00	1.76	34.83	2,405.91	12.53	1.67	-3.60	0.61
2,691.00	0.65	203.15	2,690.87	14.64	3.53	-5.77	0.84
2,975.00	0.75	81.70	2,974.86	13.42	4.74	-6.77	0.43
3,260.00	0.28	100.83	3,259.85	13.56	7.27	-9.29	0.17
3,544.00	0.79	180.36	3,543.84	11.47	7.94	-9.63	0.28
3,639.00	2.80	157.31	3,638.79	8.68	8.83	-10.07	2.21
3,734.00	3.82	153.10	3,733.63	3.72	11.16	-11.60	1.10
3,829.00	5.38	160.23	3,828.32	-3.30	14.09	-13.41	1.75
3,924.00	7.10	161.63	3,922.75	-13.06	17.45	-15.21	1.82
4,019.00	8.73	161.79	4,016.85	-25.48	21.55	-17.33	1.72
4,114.00	9.99	162.83	4,110.58	-40.21	26.24	-19.67	1.34
4,208.00	10.69	166.67	4,203.05	-56.48	30.66	-21.50	1.04
4,303.00	11.49	170.40	4,296.28	-74.38	34.27	-22.28	1.13
4,398.00	12.60	159.32	4,389.20	-93.41	39.50	-24.49	2.69
4,493.00	13.63	155.08	4,481.72	-113.26	47.88	-29.68	1.48
4,588.00	12.09	153.15	4,574.34	-132.28	57.09	-35.82	1.68
4,683.00	11.88	157.49	4,667.27	-150.19	65.33	-41.17	0.97
4,778.00	12.58	152.60	4,760.11	-168.41	73.83	-46.73	1.32
4,873.00	12.78	150.04	4,852.80	-186.70	83.84	-53.77	0.63
4,967.00	11.11	155.01	4,944.76	-203.92	92.86	-60.01	2.09
5,062.00	12.12	157.90	5,037.82	-221.46	100.48	-64.80	1.23
5,157.00	12.66	162.97	5,130.61	-240.65	107.28	-68.54	1.28
5,252.00	11.29	160.90	5,223.54	-259.39	113.37	-71.64	1.51
5,347.00	10.94	159.79	5,316.75	-276.64	119.53	-75.04	0.43
5,442.00	11.07	162.31	5,410.01	-293.79	125.42	-78.18	0.52
5,537.00	11.81	164.12	5,503.12	-311.83	130.85	-80.74	0.87
5,632.00	12.06	166.49	5,596.07	-330.83	135.83	-82.70	0.58
5,726.00	12.48	170.67	5,687.92	-350.40	139.77	-83.55	1.05
5,821.00	13.58	176.58	5,780.48	-371.67	142.10	-82.55	1.82
5,916.00	12.60	180.62	5,873.01	-393.16	142.65	-79.75	1.41
5,990.00	10.48	176.94	5,945.51	-407.95	142.92	-77.71	3.03
6,103.00	15.23	185.64	6,055.66	-433.00	142.01	-72.92	4.53
6,151.00	19.10	195.78	6,101.52	-446.84	139.25	-68.04	10.16
6,198.00	22.56	196.69	6,145.44	-462.88	134.57	-60.92	7.39
6,246.00	26.78	199.75	6,189.05	-481.89	128.27	-51.74	9.18
6,292.00	30.82	202.78	6,229.36	-502.52	120.20	-40.56	9.34
6,340.00	35.02	208.15	6,269.65	-526.01	108.94	-25.78	10.65
6,387.00	38.72	213.96	6,307.25	-550.11	94.35	-7.62	10.81
6,435.00	42.38	219.69	6,343.73	-575.03	75.62	14.76	10.87
6,482.00	45.01	224.40	6,377.72	-599.10	53.87	39.99	8.90

Design Report for Wells Ranch AA12-67-1HN - MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,530.00	45.47	228.64	6,411.53	-622.54	29.15	68.06	6.34
6,577.00	47.26	234.60	6,443.98	-643.62	2.49	97.67	9.93
6,625.00	48.80	242.07	6,476.10	-662.31	-27.86	130.56	12.00
6,672.00	49.69	249.41	6,506.81	-676.90	-60.28	164.86	11.98
6,720.00	50.64	255.02	6,537.57	-688.14	-95.36	201.25	9.19
6,767.00	54.69	256.75	6,566.07	-697.24	-131.59	238.46	9.10
6,815.00	56.90	257.36	6,593.05	-706.13	-170.28	278.06	4.72
6,862.00	61.74	258.06	6,617.02	-714.72	-209.77	318.40	10.38
6,910.00	66.61	259.19	6,637.93	-723.23	-252.11	361.56	10.36
6,957.00	70.43	259.17	6,655.14	-731.44	-295.06	405.26	8.13
7,005.00	74.70	259.69	6,669.51	-739.84	-340.07	451.03	8.96
7,052.00	77.65	263.52	6,680.75	-746.49	-385.20	496.65	10.10
7,134.00	83.18	267.05	6,694.40	-753.11	-465.74	577.24	7.97
7,256.00	87.54	270.05	6,704.27	-756.18	-587.26	697.75	4.33
7,383.00	87.87	270.52	6,709.36	-755.55	-714.16	823.01	0.45
7,478.00	87.97	271.62	6,712.80	-753.77	-809.08	916.49	1.16
7,572.00	91.05	271.75	6,713.61	-751.01	-903.02	1,008.86	3.28
7,667.00	90.80	272.39	6,712.07	-747.58	-997.95	1,102.10	0.72
7,762.00	89.23	272.58	6,712.05	-743.46	-1,092.85	1,195.21	1.66
7,857.00	89.35	271.25	6,713.23	-740.29	-1,187.79	1,288.50	1.41
7,952.00	92.47	271.40	6,711.72	-738.09	-1,282.74	1,381.95	3.29
8,047.00	92.60	270.21	6,707.52	-736.76	-1,377.64	1,475.48	1.26
8,142.00	92.72	270.29	6,703.11	-736.34	-1,472.54	1,569.16	0.15
8,237.00	90.80	267.72	6,700.19	-737.99	-1,567.46	1,663.19	3.38
8,331.00	92.06	269.41	6,697.84	-740.35	-1,661.40	1,756.35	2.24
8,426.00	90.80	271.07	6,695.47	-739.95	-1,756.36	1,850.10	2.19
8,521.00	90.96	277.51	6,694.01	-732.85	-1,851.04	1,942.51	6.78
8,616.00	90.22	280.39	6,693.03	-718.07	-1,944.86	2,032.90	3.13
8,711.00	89.94	284.68	6,692.90	-697.45	-2,037.58	2,121.27	4.53
8,806.00	89.29	283.45	6,693.54	-674.37	-2,129.73	2,208.71	1.46
8,900.00	88.58	281.82	6,695.29	-653.81	-2,221.43	2,296.10	1.89
8,995.00	88.05	277.70	6,698.08	-637.72	-2,314.99	2,386.02	4.37
9,090.00	86.79	273.56	6,702.36	-628.41	-2,409.42	2,477.84	4.55
9,185.00	86.82	268.42	6,707.66	-626.77	-2,504.22	2,571.24	5.40
9,280.00	91.23	266.16	6,709.27	-631.26	-2,599.07	2,665.64	5.22
9,375.00	91.76	266.70	6,706.79	-637.17	-2,693.86	2,760.18	0.80
9,469.00	91.17	267.17	6,704.39	-642.20	-2,787.69	2,853.66	0.80
9,564.00	91.91	267.08	6,701.84	-646.96	-2,882.54	2,948.09	0.78
9,659.00	89.88	267.73	6,700.35	-651.26	-2,977.42	3,042.49	2.24
9,754.00	90.71	268.55	6,699.86	-654.34	-3,072.37	3,136.76	1.23
9,849.00	91.17	268.44	6,698.31	-656.84	-3,167.32	3,230.95	0.50
9,944.00	90.92	268.44	6,696.57	-659.42	-3,262.27	3,325.14	0.26
10,038.00	87.81	267.29	6,697.62	-662.93	-3,356.19	3,418.46	3.53
10,133.00	85.27	267.21	6,703.35	-667.47	-3,450.90	3,512.72	2.68
10,228.00	85.09	266.43	6,711.33	-672.73	-3,545.41	3,606.91	0.84
10,323.00	88.58	266.12	6,716.58	-678.89	-3,640.05	3,701.35	3.69
10,418.00	90.62	266.39	6,717.24	-685.09	-3,734.84	3,795.95	2.17
10,513.00	92.44	268.16	6,714.70	-689.61	-3,829.70	3,890.35	2.67
10,608.00	90.99	267.47	6,711.86	-693.23	-3,924.58	3,984.64	1.69
10,702.00	90.00	266.35	6,711.05	-698.29	-4,018.44	4,078.15	1.59
10,797.00	90.62	265.84	6,710.53	-704.76	-4,113.22	4,172.78	0.85

Design Report for Wells Ranch AA12-67-1HN - MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
10,892.00	91.23	265.71	6,709.00	-711.76	-4,207.94	4,267.44	0.66
10,987.00	90.83	266.25	6,707.29	-718.42	-4,302.69	4,362.07	0.71
11,082.00	89.45	266.40	6,707.06	-724.51	-4,397.50	4,456.67	1.46
11,177.00	91.11	267.11	6,706.59	-729.89	-4,492.34	4,551.19	1.90
11,292.00	92.87	267.11	6,702.60	-735.68	-4,607.12	4,665.48	1.53
Final MWD Survey							
11,354.00	92.87	267.11	6,699.50	-738.80	-4,668.96	4,727.05	0.00
Estimated BHL 1597'FNL 538'FWL - Bit Projection							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
672.00	672.00	0.00	0.00	Tie On Surface Casing Assumed Vertical
807.00	807.00	0.67	-0.18	First MWD Survey
11,292.00	6,702.60	-735.68	-4,607.12	Final MWD Survey
11,354.00	6,699.50	-738.80	-4,668.96	Estimated BHL 1597'FNL 538'FWL
11,354.00	6,699.50	-738.80	-4,668.96	Bit Projection

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
User	No Target (Freehand)	261.05	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
672.00	11,354.00	Sperry MWD Surveys	MWD

Design Report for Wells Ranch AA12-67-1HN - MWD Surveys

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	90.00	89.26	6,703.00	-737.00	-470.00	1,428,373.93	3,312,161.83	40° 30' 13.909 N	104° 22' 38.725 W
- actual wellpath misses target center by 18.22ft at 7138.53ft MD (6694.93 TVD, -753.34 N, -470.24 E)									
- Rectangle (sides W70.00 H16.00 D4,201.00)									
Wells Ranch	0.00	0.00	35.00	-3,235.87	-36.85	1,425,875.15	3,312,594.96	40° 29' 49.164 N	104° 22' 33.528 W
- actual wellpath misses target center by 3236.07ft at 35.00ft MD (35.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-295.85	-3,924.87	1,425,186.18	3,312,335.97		
Point 2				-4,629.85	-3,983.87	1,425,127.18	3,308,002.11		
Point 3				-4,795.85	392.13	1,429,503.03	3,307,836.12		
Point 4				-229.85	465.13	1,429,576.03	3,312,401.97		
Point 5				-295.85	-3,924.87	1,425,186.18	3,312,335.97		
Wells Ranch	0.00	0.00	35.00	-3,235.87	-36.85	1,425,875.15	3,312,594.96	40° 29' 49.164 N	104° 22' 33.528 W
- actual wellpath misses target center by 3236.07ft at 35.00ft MD (35.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				164.15	-4,384.87	1,424,726.19	3,312,795.95		
Point 2				-5,089.85	-4,443.87	1,424,667.19	3,307,542.13		
Point 3				-5,255.85	852.13	1,429,963.02	3,307,376.13		
Point 4				230.15	925.13	1,430,036.01	3,312,861.95		
Point 5				164.15	-4,384.87	1,424,726.19	3,312,795.95		
Wells Ranch	0.00	0.00	6,000.00	-419.23	152.59	1,428,691.69	3,312,784.39	40° 30' 16.971 N	104° 22' 30.614 W
- actual wellpath misses target center by 9.61ft at 6045.57ft MD (5999.94 TVD, -419.15 N, 142.98 E)									
- Circle (radius 35.00)									
Wells Ranch	0.00	0.00	6,703.00	-737.00	-470.00	1,428,373.93	3,312,161.83	40° 30' 13.909 N	104° 22' 38.725 W
- actual wellpath misses target center by 18.22ft at 7138.53ft MD (6694.93 TVD, -753.34 N, -470.24 E)									
- Point									
Wells Ranch	0.00	0.00	6,703.00	-791.11	-4,670.65	1,428,319.82	3,307,961.32	40° 30' 13.896 N	104° 23' 33.108 W
- actual wellpath misses target center by 52.45ft at 11354.00ft MD (6699.50 TVD, -738.80 N, -4668.96 E)									
- Point									

North Reference Sheet for Sec. 12-T6N-R63W (Wells Ranch 12 North PAD) - Wells Ranch AA12-67-1HN

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' @ 4917.00ft (H&P 315). Northing and Easting are relative to Wells Ranch AA12-67-1HN - Slot A3

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: 0.99996674

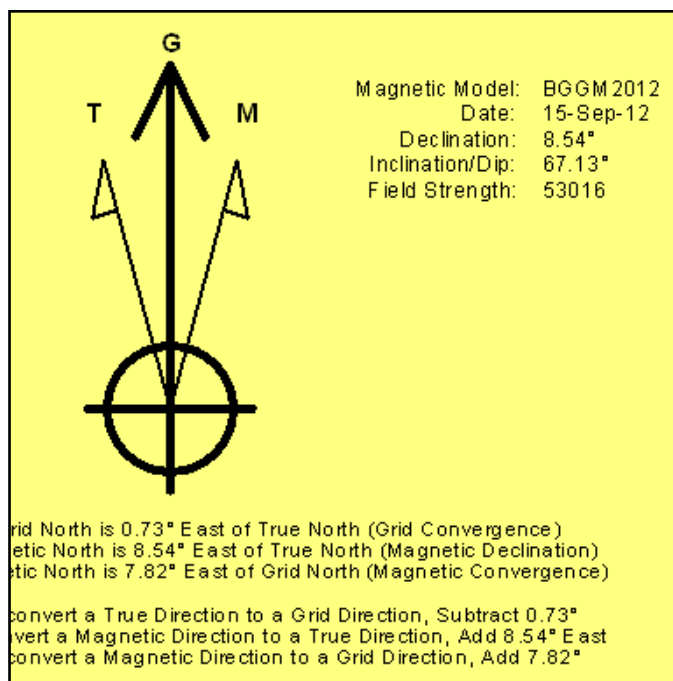
Grid Coordinates of Well: 1,429,110.91 ft N, 3,312,631.81 ft E

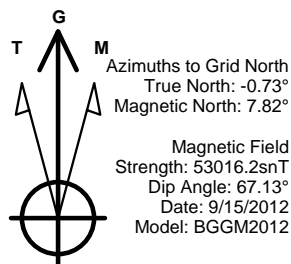
Geographical Coordinates of Well: 40° 30' 21.13" N, 104° 22' 32.52" W

Grid Convergence at Surface is: 0.73°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,354.00ft the Bottom Hole Displacement is 4,727.05ft in the Direction of 261.01° (Grid).

Magnetic Convergence at surface is: -7.82° (15 September 2012, , BGGM2012)



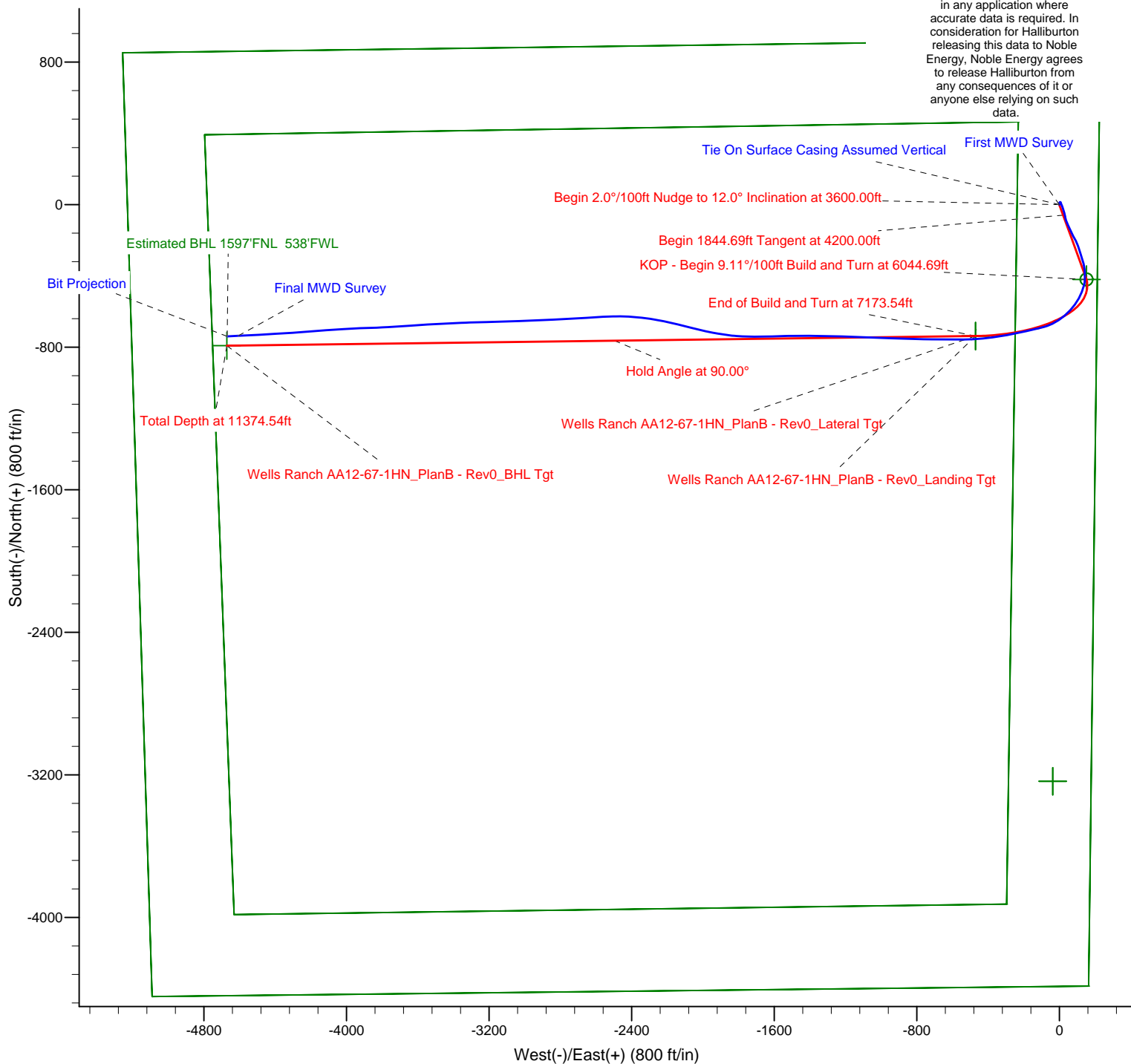


LEGEND

- Wells Ranch AA12-67-1HN, Plan B, Plan B - Rev 0 Proposal V0
- MWD Surveys

Permitted BHL: 1650' FNL,
 535' FWL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch AA12-67-1HN 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. 12-T6N-R63W (Wells Ranch 12 North PAD)
Well: Wells Ranch AA12-67-1HN

Noble Energy

HALLIBURTON

Sperry Drilling



Azimuths to Grid North
True North: -0.73°
Magnetic North: 7.82°

Magnetic Field
Strength: 53016.2snT
Dip Angle: 67.13°
Date: 9/15/2012
Model: BGGM2012

LEGEND

- Wells Ranch AA12-67-1HN, Plan B, Plan B - Rev 0 Proposal V0
- MWD Surveys

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