

Noble Energy

Weld County, CO (NAD 83)

Sec. 3-T7N-R63W (Ball Ranch 3 PAD)

Ball Ranch AC04-72HN

MWD Survey

Sperry Drilling Services

Final Survey Report

06 January, 2013

Well Coordinates: 1,466,748.11 N, 3,297,107.59 E (40° 36' 34.92" N, 104° 25' 47.60" W)

Ground Level: 4,890.00 ft

Local Coordinate Origin: Centered on Well Ball Ranch AC04-72HN - Slot A1

Viewing Datum: KB @ 4914.00ft (H&P 322)

TVDs to System: N

North Reference: Grid

Unit System: API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

HALLIBURTON

Design Report for Ball Ranch AC04-72HN - 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
880.00	0.00	0.00	880.00	0.00	0.00	0.00	0.00
Tie On To Surface Casing Assumed Vertical							
915.00	0.65	135.51	915.00	-0.14	0.14	0.10	1.86
First MWD Survey							
1,008.00	0.68	153.82	1,007.99	-1.01	0.75	0.80	0.23
1,101.00	0.61	150.89	1,100.99	-1.94	1.24	1.57	0.08
1,195.00	0.74	210.13	1,194.98	-2.90	1.18	2.52	0.72
1,288.00	2.87	260.55	1,287.93	-3.80	-1.42	4.04	2.65
1,381.00	4.08	273.22	1,380.76	-4.00	-7.02	5.61	1.53
1,474.00	5.29	273.45	1,473.45	-3.56	-14.61	7.06	1.30
1,568.00	6.95	273.20	1,566.91	-2.98	-24.61	8.98	1.77
1,663.00	9.06	276.90	1,660.98	-1.76	-37.78	11.05	2.29
1,758.00	11.19	276.09	1,754.50	0.12	-54.37	13.34	2.25
1,852.00	13.49	272.40	1,846.32	1.54	-74.40	16.91	2.59
1,947.00	15.85	273.84	1,938.22	2.88	-98.42	21.56	2.51
2,042.00	16.91	272.06	2,029.36	4.24	-125.17	26.86	1.23
2,137.00	19.36	273.02	2,119.63	5.57	-154.70	32.88	2.60
2,232.00	18.72	278.04	2,209.44	8.53	-185.53	37.64	1.85
2,326.00	16.53	276.00	2,299.03	12.04	-213.76	41.23	2.42
2,421.00	18.07	279.39	2,389.73	15.86	-241.74	44.45	1.94
2,515.00	18.11	284.13	2,479.09	21.80	-270.30	45.76	1.57
2,610.00	15.58	282.63	2,570.00	28.20	-297.07	46.18	2.70
2,705.00	17.23	277.14	2,661.14	32.74	-323.48	48.32	2.38
2,800.00	19.49	285.66	2,751.31	38.76	-352.71	49.71	3.69
2,895.00	17.89	285.75	2,841.30	47.00	-382.02	48.98	1.68
2,990.00	16.59	285.76	2,932.03	54.65	-409.11	48.28	1.37
3,085.00	17.56	284.98	3,022.84	62.04	-436.01	47.78	1.05
3,180.00	16.86	283.90	3,113.59	69.05	-463.23	47.72	0.81
3,275.00	19.71	282.58	3,203.78	75.85	-492.24	48.31	3.03
3,371.00	19.96	281.99	3,294.09	82.78	-524.07	49.47	0.33
3,465.00	18.48	282.95	3,382.84	89.45	-554.28	50.48	1.61
3,561.00	16.25	282.15	3,474.46	95.69	-582.25	51.35	2.34
3,656.00	16.17	279.92	3,565.69	100.77	-608.27	52.87	0.66
3,751.00	16.57	281.83	3,656.84	105.82	-634.56	54.48	0.71
3,846.00	20.42	278.91	3,746.92	111.17	-664.20	56.64	4.17
3,941.00	22.79	277.78	3,835.23	116.23	-698.81	60.30	2.53
4,036.00	24.63	283.74	3,922.23	123.42	-736.28	62.60	3.18
4,131.00	23.53	284.21	4,008.96	132.78	-773.89	62.84	1.18
4,226.00	21.82	284.65	4,096.61	141.90	-809.36	62.78	1.81
4,321.00	19.43	280.03	4,185.52	149.12	-842.01	63.86	3.04
4,416.00	16.90	281.50	4,275.78	154.62	-871.10	65.73	2.71
4,511.00	13.99	284.91	4,367.34	160.33	-895.74	66.29	3.21
4,606.00	10.39	280.74	4,460.19	164.88	-915.26	66.71	3.90
4,701.00	8.23	276.83	4,553.93	167.29	-930.43	68.13	2.37
4,796.00	8.11	277.05	4,647.97	168.92	-943.83	69.87	0.13
4,891.00	7.76	283.28	4,742.06	171.22	-956.72	70.83	0.98
4,978.00	4.73	292.03	4,828.53	173.91	-965.77	70.46	3.64
5,074.00	1.91	295.29	4,924.36	176.08	-970.88	69.62	2.94
5,169.00	2.13	172.33	5,019.33	175.01	-972.08	70.96	3.74

Design Report for Ball Ranch AC04-72HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,264.00	3.59	229.75	5,114.23	171.33	-974.11	75.02	3.19
5,359.00	1.79	224.78	5,209.12	168.36	-977.43	78.72	1.91
5,454.00	1.56	205.66	5,304.08	166.14	-979.03	81.27	0.63
5,549.00	0.65	177.06	5,399.06	164.44	-979.57	83.05	1.09
5,644.00	0.85	216.04	5,494.06	163.33	-979.95	84.22	0.56
5,739.00	0.90	150.04	5,589.05	162.11	-980.00	85.41	1.00
5,834.00	0.81	106.12	5,684.04	161.28	-978.98	85.97	0.68
5,929.00	1.21	74.34	5,779.02	161.36	-977.37	85.49	0.71
6,024.00	1.29	83.79	5,874.00	161.75	-975.34	84.61	0.23
6,119.00	1.32	80.94	5,968.98	162.04	-973.19	83.80	0.08
6,195.00	1.60	77.24	6,044.95	162.41	-971.30	82.97	0.39
6,213.00	1.64	73.38	6,062.94	162.54	-970.80	82.72	0.65
6,260.00	1.86	129.96	6,109.92	162.24	-969.57	82.71	3.55
6,308.00	5.41	176.25	6,157.83	159.48	-968.83	85.20	9.04
6,355.00	9.32	184.95	6,204.43	153.48	-969.01	91.06	8.63
6,403.00	13.86	185.76	6,251.44	143.88	-969.93	100.59	9.46
6,450.00	17.79	185.89	6,296.65	131.13	-971.23	113.26	8.36
6,498.00	22.24	189.54	6,341.74	114.87	-973.49	129.57	9.62
6,545.00	27.46	186.50	6,384.38	95.32	-976.19	149.19	11.43
6,593.00	33.54	185.56	6,425.72	71.10	-978.73	173.28	12.71
6,640.00	39.34	184.98	6,463.51	43.31	-981.28	200.83	12.36
6,688.00	46.60	183.99	6,498.61	10.72	-983.82	233.05	15.19
6,735.00	50.75	183.87	6,529.64	-24.49	-986.24	267.75	8.83
6,783.00	54.60	183.92	6,558.74	-62.56	-988.83	305.29	8.02
6,830.00	56.79	182.97	6,585.23	-101.31	-991.16	343.41	4.95
6,877.00	58.68	182.65	6,610.32	-141.01	-993.11	382.35	4.06
6,924.00	59.02	182.38	6,634.63	-181.19	-994.87	421.72	0.87
6,972.00	60.26	181.29	6,658.89	-222.59	-996.19	462.16	3.24
7,019.00	62.02	181.65	6,681.57	-263.73	-997.25	502.29	3.80
7,067.00	64.33	181.66	6,703.23	-306.55	-998.49	544.07	4.81
7,114.00	65.60	182.20	6,723.12	-349.11	-999.92	585.66	2.90
7,162.00	65.45	182.09	6,743.01	-392.76	-1,001.56	628.37	0.38
7,209.00	66.12	182.66	6,762.28	-435.59	-1,003.34	670.30	1.80
7,256.00	67.82	183.26	6,780.67	-478.78	-1,005.57	712.71	3.80
7,303.00	71.76	183.31	6,796.90	-522.81	-1,008.10	755.99	8.38
7,351.00	77.60	181.35	6,809.58	-569.04	-1,009.97	801.25	12.79
7,394.00	81.04	179.48	6,817.55	-611.29	-1,010.27	842.26	9.07
7,510.00	85.34	179.42	6,831.30	-726.44	-1,009.16	953.55	3.71
7,604.00	85.49	181.46	6,838.82	-820.13	-1,009.88	1,044.51	2.17
7,699.00	85.77	182.91	6,846.06	-914.78	-1,013.50	1,137.11	1.55
7,794.00	87.66	184.34	6,851.50	-1,009.43	-1,019.49	1,230.30	2.49
7,889.00	89.08	185.01	6,854.20	-1,104.07	-1,027.23	1,323.91	1.65
7,984.00	92.13	186.12	6,853.20	-1,198.61	-1,036.44	1,417.79	3.42
8,079.00	92.47	184.26	6,849.39	-1,293.14	-1,045.03	1,511.50	1.99
8,174.00	91.69	182.82	6,845.94	-1,387.89	-1,050.89	1,604.76	1.72
8,270.00	89.38	180.77	6,845.04	-1,483.83	-1,053.90	1,698.46	3.22
8,365.00	90.43	181.34	6,845.20	-1,578.81	-1,055.65	1,790.92	1.26
8,460.00	90.25	181.25	6,844.64	-1,673.78	-1,057.79	1,883.47	0.21
8,555.00	88.80	181.13	6,845.42	-1,768.76	-1,059.77	1,975.98	1.53
8,649.00	89.97	182.14	6,846.43	-1,862.71	-1,062.45	2,067.67	1.64
8,744.00	89.08	181.72	6,847.22	-1,957.65	-1,065.65	2,160.45	1.04

Design Report for Ball Ranch AC04-72HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,839.00	89.85	182.42	6,848.11	-2,052.58	-1,069.08	2,253.28	1.10
9,029.00	90.31	182.28	6,847.84	-2,242.42	-1,076.87	2,439.15	0.25
9,124.00	89.54	181.99	6,847.97	-2,337.36	-1,080.41	2,532.00	0.87
9,219.00	89.38	180.66	6,848.86	-2,432.32	-1,082.61	2,624.56	1.41
9,313.00	90.55	179.16	6,848.92	-2,526.32	-1,082.46	2,715.60	2.02
9,408.00	89.81	176.12	6,848.62	-2,621.23	-1,078.55	2,806.59	3.29
9,503.00	90.59	175.36	6,848.29	-2,715.96	-1,071.49	2,896.63	1.15
9,598.00	91.60	177.27	6,846.47	-2,810.74	-1,065.39	2,986.95	2.27
9,693.00	92.28	178.50	6,843.26	-2,905.62	-1,061.88	3,078.02	1.48
9,788.00	92.62	181.34	6,839.20	-3,000.52	-1,061.75	3,169.94	3.01
9,884.00	92.04	182.14	6,835.29	-3,096.40	-1,064.66	3,263.55	1.03
9,979.00	90.56	182.43	6,833.14	-3,191.30	-1,068.45	3,356.43	1.59
10,074.00	90.92	183.82	6,831.91	-3,286.15	-1,073.63	3,449.61	1.51
10,169.00	91.42	184.83	6,829.97	-3,380.85	-1,080.79	3,543.15	1.19
10,264.00	88.15	186.36	6,830.33	-3,475.38	-1,090.05	3,637.03	3.80
10,359.00	86.73	186.92	6,834.57	-3,569.65	-1,101.02	3,731.08	1.61
10,454.00	86.76	187.41	6,839.96	-3,663.76	-1,112.85	3,825.19	0.52
10,549.00	87.41	186.22	6,844.80	-3,757.96	-1,124.11	3,919.25	1.43
10,644.00	89.78	185.47	6,847.12	-3,852.43	-1,133.78	4,013.17	2.62
10,740.00	89.91	187.35	6,847.38	-3,947.83	-1,144.50	4,108.26	1.96
10,835.00	88.83	184.68	6,848.43	-4,042.29	-1,154.45	4,202.24	3.03
10,930.00	89.17	182.83	6,850.09	-4,137.07	-1,160.67	4,295.61	1.98
11,025.00	92.06	181.12	6,849.07	-4,231.99	-1,163.95	4,388.39	3.53
11,120.00	94.13	180.66	6,843.94	-4,326.83	-1,165.42	4,480.65	2.23
11,215.00	94.60	180.12	6,836.71	-4,421.56	-1,166.06	4,572.59	0.75
11,246.00	94.85	180.04	6,834.15	-4,452.45	-1,166.11	4,602.53	0.85
Final MWD Survey							
11,303.00	94.85	180.04	6,829.34	-4,509.25	-1,166.15	4,657.57	0.00
Bit Projection - Estimated BHL 542'FSL 672'FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
880.00	880.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
915.00	915.00	-0.14	0.14	First MWD Survey
11,246.00	6,834.15	-4,452.45	-1,166.11	Final MWD Survey
11,303.00	6,829.34	-4,509.25	-1,166.15	Bit Projection
11,303.00	6,829.34	-4,509.25	-1,166.15	Estimated BHL 542'FSL 672'FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Ball Ranch AC04-72HN_PlanA - Rev1_BH L Tgt	194.33	Slot	0.00	0.00	0.00

Design Report for Ball Ranch AC04-72HN - MWD Survey

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
880.00	11,303.00	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
Ball Ranch	0.00	0.00	6,829.51	-4,517.26	-1,153.59	1,462,230.95	3,295,954.02	40° 35' 50.424 N	104° 26' 3.264 W
- actual wellpath misses target center by 14.90ft at 11303.00ft MD (6829.34 TVD, -4509.25 N, -1166.15 E)									
- Point									
Ball Ranch	0.00	0.00	0.00	0.00	0.00	1,466,748.11	3,297,107.59	40° 36' 34.920 N	104° 25' 47.604 W
- actual wellpath hits target center									
- Polygon									
Point 1				149.00	-220.00	1,466,528.12	3,297,256.58		
Point 2				4,534.00	-111.00	1,466,637.11	3,301,641.48		
Point 3				4,341.00	-4,517.00	1,462,231.22	3,301,448.48		
Point 4				-54.00	-4,585.00	1,462,163.22	3,297,053.59		
Point 5				149.00	-220.00	1,466,528.12	3,297,256.58		
Ball Ranch	0.00	0.00	0.00	0.00	0.00	1,466,748.11	3,297,107.59	40° 36' 34.920 N	104° 25' 47.604 W
- actual wellpath hits target center									
- Polygon									
Point 1				-311.00	240.00	1,466,988.11	3,296,796.59		
Point 2				-514.00	-5,045.00	1,461,703.23	3,296,593.60		
Point 3				-3,212.00	-5,045.00	1,461,703.23	3,293,895.66		
Point 4				-2,900.00	240.00	1,466,988.11	3,294,207.66		
Point 5				-311.00	240.00	1,466,988.11	3,296,796.59		
Ball Ranch	0.00	0.00	0.00	0.00	0.00	1,466,748.11	3,297,107.59	40° 36' 34.920 N	104° 25' 47.604 W
- actual wellpath hits target center									
- Polygon									
Point 1				-311.00	240.00	1,466,988.11	3,296,796.59		
Point 2				4,994.00	349.00	1,467,097.10	3,302,101.47		
Point 3				4,801.00	-4,977.00	1,461,771.23	3,301,908.47		
Point 4				-514.00	-5,045.00	1,461,703.23	3,296,593.60		
Point 5				-311.00	240.00	1,466,988.11	3,296,796.59		
Ball Ranch	0.00	0.00	0.00	0.00	0.00	1,466,748.11	3,297,107.59	40° 36' 34.920 N	104° 25' 47.604 W
- actual wellpath hits target center									
- Polygon									
Point 1				-771.00	-220.00	1,466,528.12	3,296,336.61		
Point 2				-974.00	-4,585.00	1,462,163.22	3,296,133.61		
Point 3				-3,212.00	-4,585.00	1,462,163.22	3,293,895.66		
Point 4				-2,900.00	-220.00	1,466,528.12	3,294,207.66		
Point 5				-771.00	-220.00	1,466,528.12	3,296,336.61		

**North Reference Sheet for Sec. 3-T7N-R63W (Ball Ranch 3 PAD) - Ball Ranch
AC04-72HN**

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

Vertical Depths are relative to KB @ 4914.00ft (H&P 322). Northing and Easting are relative to Ball Ranch AC04-72HN - 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: 0.99997643

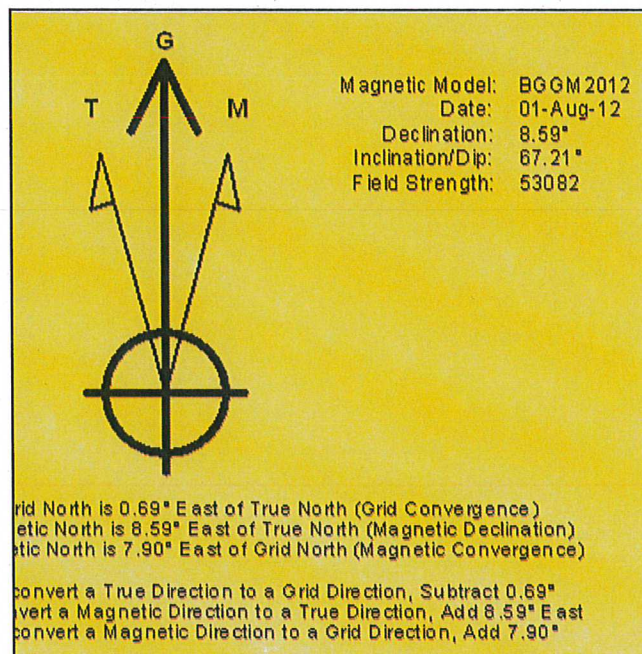
Grid Coordinates of Well: 1,466,748.11 ft N, 3,297,107.59 ft E

Geographical Coordinates of Well: 40° 36' 34.92" N, 104° 25' 47.60" W

Grid Convergence at Surface is: 0.69°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,303.00ft
the Bottom Hole Displacement is 4,657.60ft in the Direction of 194.50° (Grid).

Magnetic Convergence at surface is: -7.90° (1 August 2012, , BGGM2012)

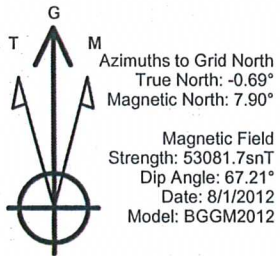


Project: Weld County, CO (NAD 83)
 Site: Sec. 3-T7N-R63W (Ball Ranch 3 PAD)
 Well: Ball Ranch AC04-72HN

Noble Energy

HALLIBURTON

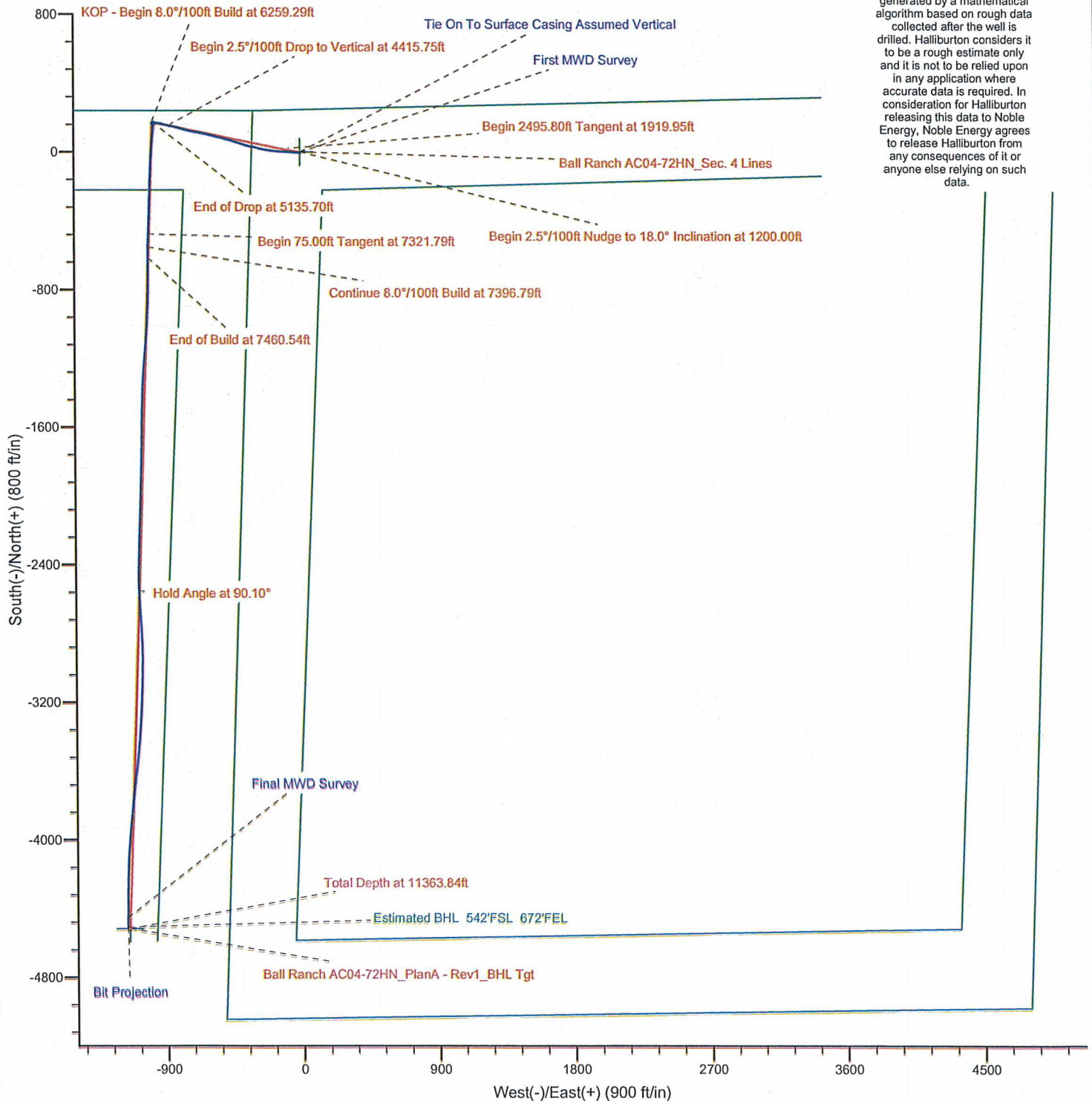
Sperry Drilling



LEGEND

- Ball Ranch AC04-72HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

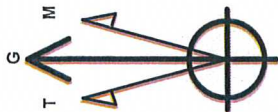
Permitted BHL: 535' FSL, 660' FEL



Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Ball Ranch AC04-72HN 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. 3-T7N-R63W (Ball Ranch 3 PAD)
 Well: Ball Ranch AC04-72HN

Noble Energy



Azimuths to Grid North
 True North: -0.69°
 Magnetic North: 7.90°
 Magnetic Field
 Strength: 53081.7nT
 Dip Angle: 67.21°
 Date: 8/1/2012
 Model: BGGM2012

LEGEND

- Ball Ranch AC04-72HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Ball Ranch AC04-72HN 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.

