Noble Energy

Weld County, CO (NAD 83)
Sec. 13-T6N-R63W
Wells Ranch USX AA13-67HN

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

31 December, 2012

Well Coordinates: 1,423,476.68 N, 3,307,868.82 E (40° 29' 26.05" N, 104° 23' 35.09" W)
Ground Level: 4,836.00 ft

Local Coordinate Origin:	Centered on Well Wells Ranch USX AA13-67HN
Viewing Datum:	KB @ 4860.00ft (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: 43I

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Design Report for Wells Ranch USX AA13-67HN - 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
598.00	0.00	0.00	598.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 598.00ft							
615.00	0.37	162.93	615.00	-0.05	0.02	0.02	2.18
First MWD Survey							
891.00	0.81	177.14	890.98	-2.85	0.38	0.42	0.17
1,075.00	0.87	171.96	1,074.96	-5.53	0.64	0.73	0.05
1,357.00	0.75	181.06	1,356.94	-9.50	0.90	1.06	0.06
1,642.00	0.70	190.00	1,641.91	-13.08	0.56	0.79	0.04
1,928.00	0.33	187.46	1,927.90	-15.62	0.15	0.42	0.13
2,023.00	1.79	264.55	2,022.89	-16.03	-1.36	-1.08	1.84
2,118.00	3.46	249.54	2,117.78	-17.17	-5.52	-5.23	1.89
2,213.00	5.34	257.36	2,212.50	-19.14	-12.52	-12.19	2.07
2,309.00	6.34	253.03	2,308.00	-21.67	-21.95	-21.57	1.14
2,404.00	7.55	258.80	2,402.30	-24.41	-33.09	-32.67	1.47
2,499.00	10.12	262.63	2,496.17	-26.69	-47.49	-47.03	2.77
2,594.00	11.98	258.02	2,589.41	-29.81	-65.42	-64.89	2.17
2,689.00	12.09	248.96	2,682.33	-35.43	-84.35	-83.73	1.99
2,784.00	11.71	243.34	2,775.29	-43.33	-102.25	-101.49	1.28
2,880.00	12.82	238.61	2,869.10	-53.25	-120.05	-119.12	1.56
2,975.00	12.23	238.09	2,961.84	-64.05	-137.59	-136.47	0.63
3,070.00	11.74	235.63	3,054.77	-74.83	-154.11	-152.80	0.74
3,165.00	10.17	235.31	3,148.03	-85.06	-168.98	-167.49	1.65
3,261.00	10.18	235.35	3,242.52	-94.71	-182.93	-181.27	0.01
3,356.00	8.78	235.99	3,336.22	-103.54	-195.85	-194.04	1.48
3,451.00	6.39	233.85	3,430.38	-110.71	-206.13	-204.19	2.53
3,546.00	5.56	244.88	3,524.87	-115.78	-214.56	-212.54	1.49
3,641.00	6.59	241.37	3,619.34	-120.35	-223.52	-221.41	1.15
3,737.00	7.35	238.02	3,714.63	-126.24	-233.56	-231.35	0.90
3,832.00	6.26	241.89	3,808.96	-131.90	-243.28	-240.98	1.24
3,927.00	5.30	251.30	3,903.47	-135.75	-252.01	-249.63	1.42
4,022.00	3.66	254.18	3,998.18	-137.98	-259.08	-256.67	1.74
4,117.00	2.04	275.03	4,093.06	-138.66	-263.68	-261.26	2.00
4,213.00	0.53	89.54	4,189.05	-138.51	-264.94	-262.52	2.68
4,498.00	0.72	114.57	4,474.03	-139.24	-262.00	-259.56	0.12
4,784.00	0.85	145.50	4,760.00	-141.74	-259.16	-256.68	0.15
5,070.00	0.54	160.36	5,045.98	-144.75	-257.51	-254.97	0.12
5,165.00	0.68	95.84	5,140.98	-145.23	-256.79	-254.25	0.70
5,451.00	0.78	296.05	5,426.97	-144.55	-256.85	-254.33	0.50
5,810.00	1.84	278.03	5,785.87	-142.67	-264.76	-262.26	0.31
5,872.00	2.36	285.57	5,847.83	-142.19	-266.97	-264.48	0.95
5,970.00	4.77	91.93	5,945.74	-141.79	-264.84	-262.36	7.23
6,018.00	11.34	96.70	5,993.24	-142.40	-258.15	-255.66	13.75
6,066.00	16.44	95.97	6,039.83	-143.66	-246.70	-244.19	10.63
6,113.00	18.84	92.85	6,084.61	-144.73	-232.51	-229.98	5.49
6,161.00	20.75	92.11	6,129.77	-145.43	-216.27	-213.73	4.01
6,208.00	22.43	91.00	6,173.48	-145.89	-198.98	-196.44	3.68
6,256.00	24.98	91.90	6,217.42	-146.39	-179.69	-177.14	5.37
6,303.00	28.24	93.77	6,259.44	-147.45	-158.67	-156.11	7.16
6,351.00	31.94	88.45	6,300.97	-147.85	-134.64	-132.07	9.50

Design Report for Wells Ranch USX AA13-67HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,399.00	36.85	85.66	6,340.57	-146.42	-107.57	-105.03	10.74
6,447.00	41.92	87.57	6,377.66	-144.65	-77.18	-74.68	10.86
6,494.00	45.81	86.59	6,411.54	-142.98	-44.66	-42.19	8.40
6,542.00	50.41	87.72	6,443.58	-141.22	-8.98	-6.55	9.74
6,589.00	54.99	87.90	6,472.05	-139.79	28.37	30.77	9.75
6,637.00	58.70	88.44	6,498.30	-138.51	68.53	70.90	7.79
6,684.00	62.13	87.88	6,521.50	-137.20	109.37	111.72	7.37
6,732.00	65.35	87.14	6,542.74	-135.32	152.37	154.68	6.85
6,780.00	67.90	86.97	6,561.78	-133.06	196.37	198.63	5.32
6,828.00	71.19	87.08	6,578.55	-130.73	241.28	243.49	6.86
6,875.00	75.30	88.22	6,592.10	-128.89	286.23	288.41	9.05
6,949.00	78.13	87.65	6,609.10	-126.29	358.20	360.32	3.90
7,023.00	83.97	87.34	6,620.61	-123.09	431.19	433.25	7.90
7,118.00	86.46	87.97	6,628.53	-119.22	525.78	527.75	2.70
7,213.00	87.57	88.61	6,633.48	-116.39	620.60	622.52	1.35
7,309.00	86.20	89.11	6,638.70	-114.48	716.44	718.31	1.52
7,404.00	90.18	89.62	6,641.70	-113.43	811.37	813.20	4.22
7,499.00	90.46	91.07	6,641.17	-114.00	906.36	908.19	1.55
7,594.00	92.59	89.12	6,638.64	-114.16	1,001.32	1,003.14	3.04
7,690.00	91.73	88.82	6,635.02	-112.44	1,097.23	1,099.01	0.95
7,785.00	89.60	88.48	6,633.92	-110.20	1,192.19	1,193.92	2.27
7,880.00	91.02	88.31	6,633.40	-107.54	1,287.15	1,288.81	1.51
7,975.00	89.57	90.39	6,632.91	-106.46	1,382.14	1,383.77	2.67
8,071.00	90.03	90.19	6,633.25	-106.95	1,478.14	1,479.76	0.52
8,166.00	88.49	89.84	6,634.47	-106.97	1,573.12	1,574.73	1.66
8,261.00	88.06	88.66	6,637.33	-105.73	1,668.07	1,669.65	1.32
8,356.00	91.88	88.59	6,637.38	-103.45	1,763.03	1,764.55	4.02
8,452.00	90.59	88.63	6,635.32	-101.12	1,858.97	1,860.44	1.34
8,547.00	88.55	88.69	6,636.03	-98.90	1,953.94	1,955.35	2.15
8,642.00	89.08	89.61	6,637.99	-97.49	2,048.91	2,050.28	1.12
8,737.00	88.98	89.61	6,639.60	-96.85	2,143.89	2,145.24	0.11
8,833.00	88.86	89.91	6,641.41	-96.44	2,239.87	2,241.20	0.34
8,928.00	91.23	90.35	6,641.34	-96.66	2,334.87	2,336.19	2.54
9,023.00	90.18	89.30	6,640.17	-96.37	2,429.86	2,431.16	1.56
9,118.00	90.37	88.73	6,639.71	-94.74	2,524.84	2,526.10	0.63
9,213.00	87.78	89.53	6,641.24	-93.29	2,619.81	2,621.03	2.85
9,309.00	90.12	89.29	6,643.00	-92.31	2,715.78	2,716.97	2.45
9,404.00	91.45	89.36	6,641.70	-91.19	2,810.76	2,811.92	1.40
9,499.00	89.07	89.89	6,641.27	-90.56	2,905.75	2,906.88	2.57
9,594.00	89.35	89.45	6,642.58	-90.02	3,000.74	3,001.85	0.55
9,690.00	92.06	90.55	6,641.40	-90.02	3,096.72	3,097.82	3.05
9,785.00	90.56	88.82	6,639.23	-89.49	3,191.69	3,192.76	2.41
9,851.00	91.70	88.26	6,637.93	-87.81	3,257.66	3,258.69	1.92
9,946.00	89.29	89.21	6,637.11	-85.72	3,352.62	3,353.60	2.73
10,042.00	90.22	89.65	6,637.52	-84.76	3,448.61	3,449.56	1.07
10,137.00	89.85	89.74	6,637.46	-84.26	3,543.61	3,544.54	0.40
10,232.00	88.86	90.67	6,638.53	-84.60	3,638.60	3,639.52	1.43
10,327.00	86.42	91.38	6,642.44	-86.29	3,733.50	3,734.43	2.67
10,423.00	87.32	91.58	6,647.68	-88.77	3,829.32	3,830.29	0.96
10,518.00	87.01	90.73	6,652.38	-90.68	3,924.19	3,925.17	0.95
10,613.00	88.86	91.03	6,655.80	-92.14	4,019.11	4,020.10	1.97

Design Report for Wells Ranch USX AA13-67HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
10,708.00	90.06	89.77	6,656.70	-92.80	4,114.10	4,115.09	1.83
10,804.00	90.31	89.11	6,656.39	-91.86	4,210.10	4,211.05	0.74
10,938.00	92.78	89.02	6,652.78	-89.68	4,344.02	4,344.92	1.84
Final MWD Survey							
10,993.00	92.78	89.02	6,650.11	-88.74	4,398.95	4,399.82	0.00
Survey Projection to TD - Estimated BHL: 1333' FNL, 538' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
598.00	598.00	0.00	0.00	Surface Casing Assumed Vertical at 598.00ft
615.00	615.00	-0.05	0.02	First MWD Survey
10,938.00	6,652.78	-89.68	4,344.02	Final MWD Survey
10,993.00	6,650.11	-88.74	4,398.95	Survey Projection to TD
10,993.00	6,650.11	-88.74	4,398.95	Estimated BHL: 1333' FNL, 538' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Wells Ranch USX AA13-67HN_PlanA - Rev1_BHL Tgt	90.99	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
598.00	10,993.00	Sperry MWD Surveys	MWD

Design Report for Wells Ranch USX AA13-67HN - MWD Survey

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 USX	0.00	0.00	0.00	0.00	0.00	1,423,476.68	3,307,868.82	40° 29' 26.052 N	104° 23' 35.088 W
- actual wellpath hits target center									
- Polygon									
Point 1				134.00	731.00	1,424,207.65	3,308,002.81		
Point 2				4,467.00	790.00	1,424,266.65	3,312,335.66		
Point 3				4,498.00	-3,598.00	1,419,878.80	3,312,366.66		
Point 4				161.00	-3,654.00	1,419,822.80	3,308,029.81		
Point 5				134.00	731.00	1,424,207.65	3,308,002.81		
Wells Ranch USX	0.00	0.00	6,625.00	-75.82	4,401.61	1,423,400.85	3,312,270.28	40° 29' 24.756 N	104° 22' 38.136 W
- actual wellpath misses target center by 28.36ft at 10993.00ft MD (6650.11 TVD, -88.74 N, 4398.95 E)									
- Point									
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,423,476.68	3,307,868.82	40° 29' 26.052 N	104° 23' 35.088 W
- actual wellpath hits target center									
- Polygon									
Point 1				-326.00	1,191.00	1,424,667.63	3,307,542.83		
Point 2				4,927.00	1,250.00	1,424,726.63	3,312,795.65		
Point 3				4,958.00	-4,058.00	1,419,418.82	3,312,826.65		
Point 4				-299.00	-4,114.00	1,419,362.82	3,307,569.83		
Point 5				-326.00	1,191.00	1,424,667.63	3,307,542.83		

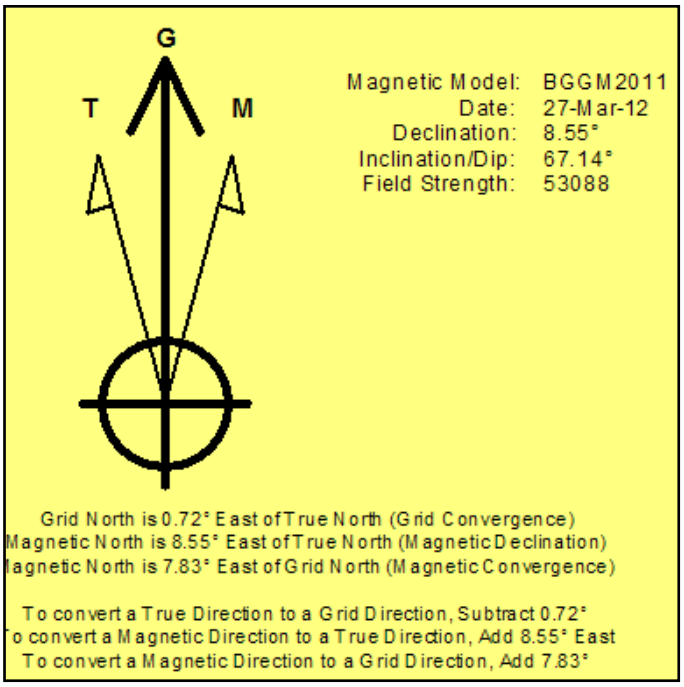
North Reference Sheet for Sec. 13-T6N-R63W - Wells Ranch USX AA13-67HN

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
Vertical Depths are relative to KB @ 4860.00ft (H&P 315). Northing and Easting are relative to Wells Ranch USX AA13-67HN
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: 0.99996558

Grid Coordinates of Well: 1,423,476.68 ft N, 3,307,868.82 ft E
Geographical Coordinates of Well: 40° 29' 26.05" N, 104° 23' 35.09" W
Grid Convergence at Surface is: 0.72°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,993.00ft
the Bottom Hole Displacement is 4,399.84ft in the Direction of 91.16° (Grid).

Magnetic Convergence at surface is: -7.83° (27 March 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)
Site: Sec. 13-T6N-R63W
Well: Wells Ranch USX AA13-67HN

Noble Energy

HALLIBURTON
Sperry Drilling

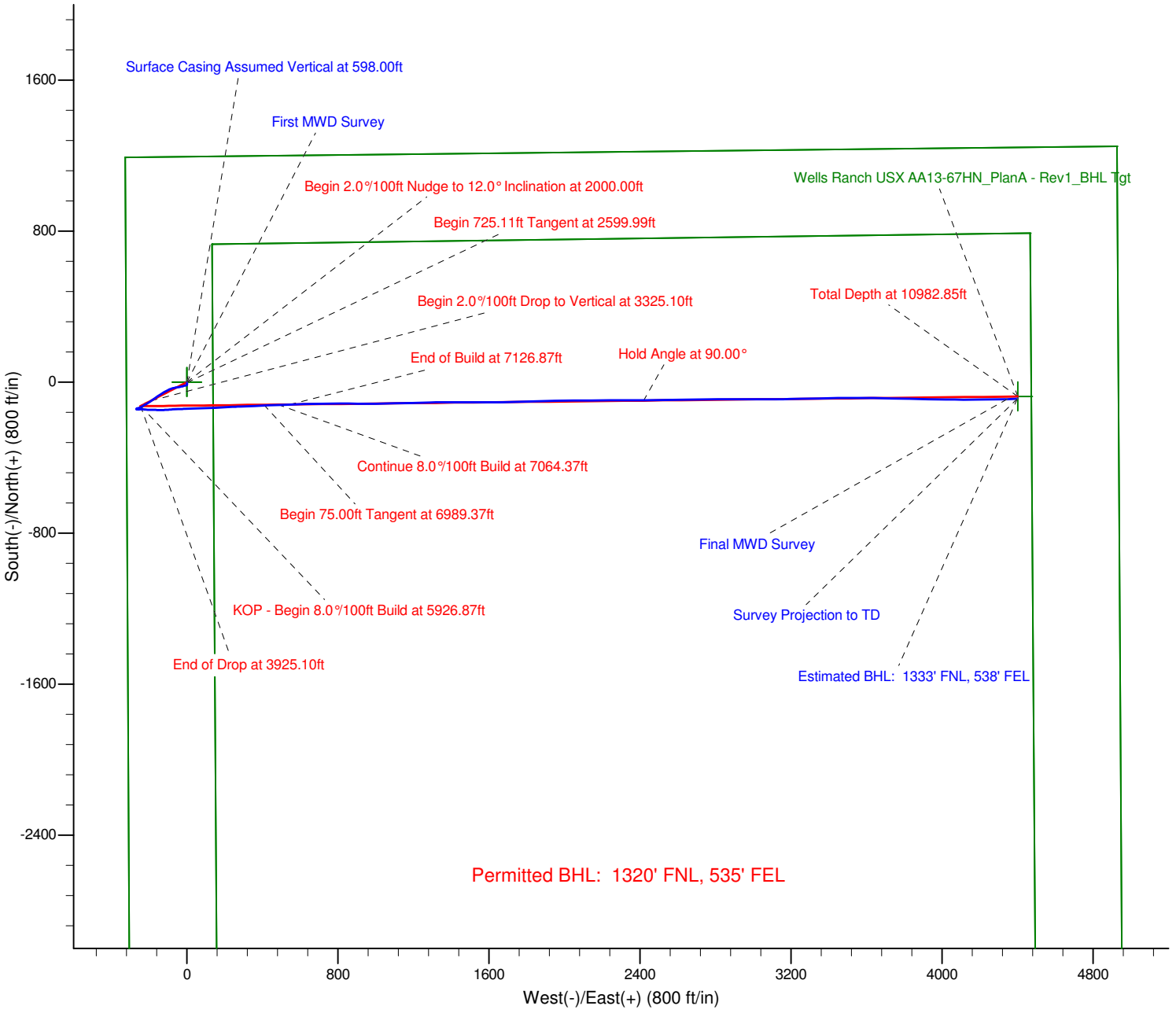
Azimuths to Grid North
True North: -0.71°
Magnetic North: 7.83°

Magnetic Field
Strength: 53087.5snT
Dip Angle: 67.14°
Date: 3/27/2012
Model: BGGM2011

LEGEND

Wells Ranch USX AA13-67HN, Plan A, Plan A - Rev 1 Proposa
MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch USX AA13-67HN 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. 13-T6N-R63W
Well: Wells Ranch USX AA13-67HN

Noble Energy

HALLIBURTON
Sperry Drilling

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

Magnetic Field
Strength: 53087.5snT
Dip Angle: 67.14°
Date: 3/27/2012
Model: BGGM2011

LEGEND

Wells Ranch USX AA13-67HN, Plan A, Plan A - Rev 1 Proposal V0
MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Wells Ranch USX AA13-67HN 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.