

# Noble Energy

Weld County, CO (NAD 83)

Sec. 14-T6N-R63W (Wells Ranch 16 North Middle PAD)

Wells Ranch State USX AA16-66-1HNL

Design: MWD Survey

## Sperry Drilling Services

### Final Survey Report

15 April, 2013

Well Coordinates: 1,422,721.12 N, 3,302,456.76 E (40° 29' 19.25" N, 104° 24' 45.25" W)

Ground Level: 4,777.00 ft

Local Coordinate Origin: Centered on Well Wells Ranch State USX AA16-66-1

Viewing Datum: KB=24' @ 4801.00ft (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 State USX AA16-66-1HNL - 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
665.00	0.00	0.00	665.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 665.00ft							
796.00	0.69	34.60	796.00	0.65	0.45	-0.48	0.53
First MWD Survey							
891.00	0.63	90.58	890.99	1.11	1.29	-1.35	0.65
981.00	0.73	104.78	980.99	0.96	2.34	-2.39	0.22
1,071.00	0.79	97.42	1,070.98	0.74	3.51	-3.55	0.13
1,348.00	0.79	90.54	1,347.95	0.47	7.32	-7.33	0.03
1,443.00	1.37	83.51	1,442.93	0.59	9.10	-9.12	0.63
1,538.00	1.33	80.29	1,537.91	0.91	11.32	-11.35	0.09
1,633.00	1.42	75.26	1,632.88	1.39	13.54	-13.59	0.16
1,728.00	1.99	150.30	1,727.85	0.26	15.50	-15.49	2.24
1,822.00	3.13	182.24	1,821.76	-3.72	16.20	-16.00	1.90
1,916.00	3.96	205.10	1,915.58	-9.23	14.73	-14.26	1.73
2,011.00	5.47	212.90	2,010.26	-16.00	10.88	-10.08	1.72
2,106.00	6.82	222.14	2,104.71	-23.98	4.63	-3.45	1.76
2,201.00	8.12	224.54	2,198.90	-32.95	-3.86	5.47	1.41
2,295.00	11.16	220.93	2,291.57	-44.56	-14.48	16.65	3.30
2,390.00	12.71	225.03	2,384.51	-58.89	-27.90	30.76	1.86
2,485.00	14.02	221.71	2,476.94	-74.87	-42.95	46.58	1.60
2,579.00	13.15	221.38	2,568.31	-91.39	-57.59	62.02	0.93
2,674.00	14.37	220.69	2,660.58	-108.44	-72.42	77.67	1.30
2,769.00	13.06	221.87	2,752.87	-125.37	-87.27	93.33	1.41
2,863.00	14.52	218.48	2,844.16	-142.50	-101.69	108.58	1.77
2,958.00	13.97	217.28	2,936.24	-160.95	-116.05	123.82	0.66
3,052.00	14.96	217.54	3,027.26	-179.60	-130.32	138.99	1.06
3,147.00	13.33	217.43	3,119.37	-198.02	-144.44	154.01	1.72
3,241.00	13.97	215.49	3,210.72	-215.86	-157.62	168.04	0.84
3,335.00	12.93	217.19	3,302.14	-233.48	-170.56	181.84	1.18
3,430.00	13.31	217.41	3,394.66	-250.63	-183.63	195.73	0.40
3,525.00	13.67	217.54	3,487.04	-268.22	-197.11	210.07	0.38
3,618.00	14.03	221.08	3,577.34	-285.43	-211.22	225.00	0.99
3,713.00	16.14	219.66	3,669.06	-304.28	-227.21	241.90	2.25
3,807.00	16.90	217.92	3,759.18	-325.12	-243.95	259.64	0.96
3,902.00	15.47	219.49	3,850.41	-345.79	-260.49	277.18	1.57
3,996.00	13.75	218.17	3,941.37	-364.25	-275.37	292.95	1.86
4,090.00	9.37	218.31	4,033.44	-379.04	-287.03	305.32	4.66
4,185.00	7.12	218.13	4,127.45	-389.74	-295.46	314.26	2.37
4,280.00	4.17	223.27	4,221.98	-396.89	-301.46	320.61	3.15
4,374.00	1.53	197.44	4,315.86	-400.58	-304.18	323.51	3.05
4,469.00	1.24	189.45	4,410.83	-402.80	-304.73	324.17	0.37
4,563.00	1.25	166.64	4,504.81	-404.80	-304.66	324.20	0.52
4,657.00	1.94	137.99	4,598.77	-406.98	-303.36	323.00	1.10
4,752.00	2.74	123.96	4,693.69	-409.45	-300.40	320.17	1.03
4,846.00	1.87	118.50	4,787.62	-411.43	-297.18	317.06	0.95
4,940.00	1.52	141.68	4,881.58	-413.14	-295.06	315.02	0.81
5,035.00	1.96	132.50	4,976.53	-415.23	-293.08	313.15	0.55
5,129.00	1.34	127.88	5,070.49	-416.99	-291.03	311.19	0.67
5,224.00	0.99	147.11	5,165.47	-418.36	-289.71	309.93	0.55

## Design Report for Wells Ranch State USX AA16-66-1HNL - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,319.00	0.93	148.88	5,260.46	-419.71	-288.87	309.16	0.07
5,413.00	1.07	141.35	5,354.45	-421.05	-287.92	308.28	0.20
5,507.00	1.15	136.17	5,448.43	-422.42	-286.72	307.15	0.14
5,602.00	0.83	116.32	5,543.41	-423.41	-285.44	305.92	0.49
5,696.00	1.21	115.50	5,637.40	-424.14	-283.94	304.45	0.40
5,791.00	0.70	108.43	5,732.39	-424.75	-282.48	303.03	0.55
5,888.00	1.01	91.16	5,829.37	-424.96	-281.07	301.62	0.41
5,983.00	0.59	31.17	5,924.37	-424.56	-279.98	300.51	0.92
6,030.00	4.20	289.66	5,971.33	-423.77	-281.47	301.97	9.27
6,077.00	9.31	275.00	6,017.99	-422.86	-286.88	307.33	11.39
6,124.00	13.10	266.97	6,064.08	-422.81	-295.99	316.43	8.70
6,172.00	16.50	266.10	6,110.49	-423.56	-308.23	328.69	7.10
6,219.00	19.93	265.75	6,155.12	-424.61	-322.88	343.37	7.30
6,266.00	23.51	265.72	6,198.78	-425.90	-340.22	360.76	7.62
6,313.00	26.79	268.96	6,241.32	-426.79	-360.17	380.72	7.57
6,361.00	30.28	272.63	6,283.49	-426.43	-383.08	403.59	8.13
6,408.00	33.20	276.41	6,323.46	-424.45	-407.71	428.09	7.51
6,455.00	33.77	273.15	6,362.66	-422.30	-433.55	453.79	4.01
6,502.00	37.71	269.07	6,400.81	-421.81	-460.98	481.16	9.79
6,549.00	43.14	269.50	6,436.57	-422.19	-491.44	511.61	11.57
6,596.00	47.89	269.02	6,469.50	-422.63	-524.96	545.11	10.13
6,644.00	54.07	269.30	6,499.70	-423.17	-562.23	582.36	12.88
6,691.00	59.25	269.04	6,525.53	-423.74	-601.48	621.59	11.03
6,738.00	60.84	268.65	6,548.99	-424.56	-642.19	662.29	3.46
6,785.00	63.76	269.27	6,570.84	-425.31	-683.79	703.88	6.32
6,833.00	68.54	269.59	6,590.24	-425.75	-727.68	747.73	9.98
6,880.00	72.16	270.88	6,606.04	-425.56	-771.93	791.92	8.12
6,927.00	75.33	271.01	6,619.20	-424.82	-817.04	836.94	6.75
6,974.00	77.39	270.81	6,630.28	-424.09	-862.71	882.52	4.40
7,022.00	81.94	269.61	6,638.89	-423.92	-909.91	929.66	9.79
7,047.00	84.26	269.10	6,641.89	-424.20	-934.73	954.46	9.50
7,093.00	85.46	268.41	6,646.01	-425.20	-980.53	1,000.26	3.01
<b>Estimated 7" Casing Point: 2304' FNL, 745' FEL (Not a Survey Point)</b>							
7,209.00	88.49	266.68	6,652.14	-430.16	-1,096.25	1,116.07	3.01
7,303.00	91.36	269.54	6,652.26	-433.26	-1,190.18	1,210.04	4.31
7,398.00	88.67	267.85	6,652.23	-435.42	-1,285.14	1,305.00	3.34
7,492.00	91.17	269.44	6,652.36	-437.65	-1,379.10	1,398.95	3.15
7,587.00	90.68	269.51	6,650.83	-438.52	-1,474.09	1,493.87	0.52
7,682.00	91.08	272.02	6,649.37	-437.25	-1,569.06	1,588.66	2.68
7,777.00	91.51	271.09	6,647.22	-434.67	-1,664.00	1,683.36	1.08
7,871.00	89.20	270.99	6,646.64	-432.97	-1,757.97	1,777.14	2.46
7,966.00	89.26	270.07	6,647.92	-432.09	-1,852.96	1,871.97	0.97
8,061.00	90.00	270.41	6,648.53	-431.69	-1,947.96	1,966.83	0.86
8,155.00	87.47	268.87	6,650.61	-432.28	-2,041.92	2,060.71	3.15
8,250.00	90.80	269.84	6,652.04	-433.35	-2,136.89	2,155.61	3.65
8,344.00	91.02	268.85	6,650.55	-434.42	-2,230.87	2,249.53	1.08
8,439.00	90.31	269.35	6,649.45	-435.91	-2,325.85	2,344.47	0.91
8,533.00	89.94	269.22	6,649.24	-437.09	-2,419.84	2,438.41	0.42
8,627.00	90.28	270.19	6,649.06	-437.57	-2,513.84	2,532.32	1.09
8,722.00	88.31	268.56	6,650.23	-438.61	-2,608.82	2,627.23	2.69
8,816.00	87.85	267.80	6,653.38	-441.59	-2,702.72	2,721.16	0.94

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8,910.00	88.92	269.02	6,656.03	-444.20	-2,796.64	2,815.10	1.73
9,005.00	89.08	270.32	6,657.69	-444.74	-2,891.62	2,910.00	1.38
9,100.00	89.32	269.92	6,659.01	-444.55	-2,986.61	3,004.86	0.49
9,194.00	89.08	270.26	6,660.33	-444.40	-3,080.61	3,098.73	0.44
9,289.00	88.74	270.05	6,662.13	-444.14	-3,175.59	3,193.59	0.42
9,384.00	89.01	268.12	6,664.00	-445.66	-3,270.55	3,288.51	2.05
9,478.00	91.20	268.71	6,663.83	-448.26	-3,364.51	3,382.48	2.41
9,572.00	90.40	268.68	6,662.51	-450.40	-3,458.48	3,476.44	0.85
9,667.00	88.12	267.63	6,663.74	-453.46	-3,553.41	3,571.41	2.64
9,761.00	89.23	268.99	6,665.91	-456.23	-3,647.34	3,665.36	1.87
9,856.00	89.44	268.87	6,667.02	-458.00	-3,742.32	3,760.31	0.25
9,950.00	89.48	268.75	6,667.90	-459.95	-3,836.29	3,854.27	0.13
10,044.00	89.82	268.59	6,668.48	-462.13	-3,930.27	3,948.24	0.40
10,139.00	89.66	269.13	6,668.91	-464.02	-4,025.25	4,043.20	0.59
10,233.00	89.51	269.04	6,669.59	-465.53	-4,119.23	4,137.14	0.19
10,328.00	89.38	270.05	6,670.51	-466.28	-4,214.22	4,232.05	1.07
10,420.00	89.72	269.89	6,671.23	-466.33	-4,306.22	4,323.94	0.41
10,512.00	89.54	269.56	6,671.83	-466.77	-4,398.22	4,415.85	0.41
10,603.00	89.75	268.64	6,672.39	-468.20	-4,489.20	4,506.80	1.04
10,694.00	89.69	268.47	6,672.83	-470.49	-4,580.17	4,597.77	0.20
10,785.00	89.23	269.72	6,673.69	-471.93	-4,671.16	4,688.71	1.46
10,876.00	89.32	269.70	6,674.84	-472.39	-4,762.15	4,779.62	0.10
10,968.00	90.71	270.77	6,674.82	-472.01	-4,854.14	4,871.48	1.91
11,059.00	90.15	271.97	6,674.14	-469.84	-4,945.11	4,962.23	1.46
11,150.00	89.54	272.17	6,674.38	-466.55	-5,036.05	5,052.90	0.71
11,240.00	88.83	270.30	6,675.66	-464.61	-5,126.02	5,142.66	2.22
11,330.00	90.86	269.90	6,675.91	-464.46	-5,216.01	5,232.54	2.30
11,421.00	89.20	268.71	6,675.86	-465.56	-5,307.00	5,323.47	2.24
11,513.00	88.58	268.15	6,677.64	-468.08	-5,398.95	5,415.43	0.91
11,605.00	89.54	268.72	6,679.15	-470.59	-5,490.90	5,507.40	1.21
11,699.00	89.63	267.49	6,679.83	-473.70	-5,584.84	5,601.38	1.31
11,794.00	89.44	267.94	6,680.60	-477.49	-5,679.77	5,696.37	0.51
11,888.00	89.14	266.97	6,681.77	-481.66	-5,773.66	5,790.36	1.08
11,982.00	89.41	268.34	6,682.96	-485.51	-5,867.58	5,884.35	1.49
12,077.00	89.26	267.95	6,684.06	-488.58	-5,962.52	5,979.33	0.44
12,172.00	89.72	269.61	6,684.90	-490.60	-6,057.49	6,074.29	1.81
12,267.00	90.80	270.09	6,684.47	-490.85	-6,152.49	6,169.18	1.24
12,362.00	89.26	270.05	6,684.42	-490.74	-6,247.48	6,264.06	1.62
12,456.00	89.72	270.92	6,685.26	-489.94	-6,341.48	6,357.90	1.05
12,551.00	90.19	270.23	6,685.33	-488.99	-6,436.47	6,452.73	0.88
12,645.00	89.69	270.80	6,685.43	-488.14	-6,530.47	6,546.57	0.81
12,739.00	89.91	273.86	6,685.76	-484.32	-6,624.38	6,640.18	3.26
12,834.00	88.64	272.72	6,686.96	-478.87	-6,719.21	6,734.63	1.80
12,928.00	89.60	270.50	6,688.41	-476.23	-6,813.15	6,828.33	2.57
13,023.00	90.83	270.46	6,688.05	-475.43	-6,908.15	6,923.17	1.30
13,117.00	91.57	270.79	6,686.08	-474.41	-7,002.12	7,016.98	0.86
13,211.00	90.28	269.73	6,684.56	-473.98	-7,096.10	7,110.83	1.78
13,305.00	89.72	270.73	6,684.56	-473.60	-7,190.10	7,204.69	1.22
13,399.00	88.21	269.61	6,686.26	-473.33	-7,284.08	7,298.55	2.00
13,494.00	89.35	269.10	6,688.28	-474.39	-7,379.05	7,393.45	1.31
13,588.00	89.85	269.61	6,688.94	-475.45	-7,473.04	7,487.38	0.76

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13,682.00	89.75	268.56	6,689.27	-476.95	-7,567.03	7,581.33	1.12
13,777.00	89.54	267.38	6,689.86	-480.32	-7,661.97	7,676.32	1.26
13,871.00	89.57	268.45	6,690.59	-483.74	-7,755.90	7,770.30	1.14
13,965.00	89.69	268.85	6,691.20	-485.95	-7,849.87	7,864.27	0.44
14,059.00	89.85	268.48	6,691.57	-488.14	-7,943.85	7,958.24	0.43
14,153.00	89.10	266.06	6,692.43	-492.62	-8,037.73	8,052.23	2.70
14,248.00	90.92	266.35	6,692.42	-498.91	-8,132.51	8,147.21	1.94
14,342.00	91.11	269.01	6,690.75	-502.71	-8,226.41	8,241.18	2.84
14,437.00	89.75	269.20	6,690.04	-504.20	-8,321.40	8,336.12	1.45
14,531.00	89.63	265.93	6,690.55	-508.19	-8,415.30	8,430.11	3.48
14,592.00	89.60	265.77	6,690.96	-512.60	-8,476.14	8,491.09	0.27
14,626.00	89.69	268.25	6,691.17	-514.38	-8,510.09	8,525.09	7.30
14,673.00	90.68	269.82	6,691.02	-515.17	-8,557.08	8,572.06	3.95
14,719.00	89.05	272.25	6,691.12	-514.34	-8,603.07	8,617.95	6.36
14,766.00	90.43	273.33	6,691.34	-512.05	-8,650.01	8,664.72	3.73
14,813.00	89.11	272.43	6,691.53	-509.69	-8,696.95	8,711.49	3.40
14,860.00	88.59	272.60	6,692.47	-507.63	-8,743.89	8,758.28	1.16
14,907.00	89.38	272.70	6,693.30	-505.45	-8,790.83	8,805.05	1.69
14,954.00	88.06	273.93	6,694.35	-502.74	-8,837.74	8,851.77	3.84
15,002.00	87.97	275.31	6,696.02	-498.87	-8,885.56	8,899.34	2.88
15,049.00	87.47	274.28	6,697.89	-494.95	-8,932.35	8,945.89	2.43
15,097.00	88.95	274.08	6,699.38	-491.45	-8,980.20	8,993.50	3.11
15,191.00	89.81	274.09	6,700.40	-484.75	-9,073.96	9,086.82	0.91
15,286.00	90.96	273.42	6,699.76	-478.53	-9,168.75	9,181.19	1.40
15,333.00	91.91	274.04	6,698.59	-475.48	-9,215.63	9,227.87	2.41
15,380.00	89.14	272.26	6,698.16	-472.89	-9,262.55	9,274.60	7.01
15,427.00	90.31	273.68	6,698.38	-470.46	-9,309.49	9,321.36	3.91
15,475.00	89.38	270.79	6,698.51	-468.59	-9,357.45	9,369.17	6.32
15,522.00	90.46	272.60	6,698.58	-467.20	-9,404.42	9,416.02	4.48
15,570.00	90.31	272.30	6,698.25	-465.15	-9,452.38	9,463.82	0.70
15,665.00	86.39	271.51	6,700.99	-461.99	-9,547.27	9,558.43	4.21
15,759.00	86.33	269.55	6,706.96	-461.12	-9,641.07	9,652.08	2.08
15,854.00	86.60	267.86	6,712.82	-463.26	-9,735.86	9,746.86	1.80
15,949.00	88.03	266.29	6,717.27	-468.11	-9,830.63	9,841.75	2.23
16,042.00	87.84	265.28	6,720.62	-474.94	-9,923.31	9,934.66	1.10
16,136.00	90.34	265.47	6,722.11	-482.52	-10,016.99	10,028.60	2.67
16,231.00	90.86	264.34	6,721.11	-490.95	-10,111.61	10,123.51	1.31
<b>Final MWD Survey</b>							
16,294.00	90.86	264.34	6,720.17	-497.16	-10,174.29	10,186.43	0.00
<b>Survey Projection to TD - Estimated BHL: 2305' FNL, 553' FWL</b>							

## Design Report for Wells Ranch State USX AA16-66-1HNL - MWD Survey

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
665.00	665.00	0.00	0.00	Surface Casing Assumed Vertical at 665.00ft
796.00	796.00	0.65	0.45	First MWD Survey
7,093.00	6,646.01	-425.20	-980.53	Estimated 7" Casing Point: 2304' FNL, 745' FEL (Not a Survey Point)
16,231.00	6,721.11	-490.95	-10,111.61	Final MWD Survey
16,294.00	6,720.17	-497.16	-10,174.29	Survey Projection to TD
16,294.00	6,720.17	-497.16	-10,174.29	Estimated BHL: 2305' FNL, 553' FWL

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Wells Ranch AA16-66-1HNL_PlanA - Rev0_ BHL Tgt	267.18	Slot	0.00	0.00	0.00

### Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
665.00	7,093.00	Sperry MWD Surveys	MWD
7,093.00	16,294.00	Sperry MWD Surveys	MWD

### Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,093.00	6,646.01	7" Csg	7	8-3/4

## Design Report for Wells Ranch State USX AA16-66-1HNL - 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	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				-5,569.00	1,831.00	1,424,552.06	3,296,887.95		
Point 2				-5,563.00	-3,474.00	1,419,247.24	3,296,893.95		
Point 3				-10,791.00	-3,496.00	1,419,225.24	3,291,666.13		
Point 4				-10,645.00	1,806.00	1,424,527.06	3,291,812.13		
Point 5				-5,569.00	1,831.00	1,424,552.06	3,296,887.95		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				-251.00	1,888.00	1,424,609.06	3,302,205.77		
Point 2				5,086.00	1,947.00	1,424,668.05	3,307,542.59		
Point 3				5,113.00	-3,358.00	1,419,363.24	3,307,569.58		
Point 4				-217.00	-3,413.00	1,419,308.24	3,302,239.77		
Point 5				-251.00	1,888.00	1,424,609.06	3,302,205.77		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				-711.00	1,427.00	1,424,148.07	3,301,745.79		
Point 2				-677.00	-2,953.00	1,419,768.22	3,301,779.78		
Point 3				-5,103.00	-3,014.00	1,419,707.22	3,297,353.94		
Point 4				-5,109.00	1,371.00	1,424,092.07	3,297,347.94		
Point 5				-711.00	1,427.00	1,424,148.07	3,301,745.79		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				-6,029.00	1,371.00	1,424,092.07	3,296,427.97		
Point 2				-6,023.00	-3,014.00	1,419,707.22	3,296,433.97		
Point 3				-10,331.00	-3,036.00	1,419,685.23	3,292,126.12		
Point 4				-10,185.00	1,346.00	1,424,067.07	3,292,272.11		
Point 5				-6,029.00	1,371.00	1,424,092.07	3,296,427.97		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				209.00	1,428.00	1,424,149.07	3,302,665.75		
Point 2				4,626.00	1,487.00	1,424,208.07	3,307,082.60		
Point 3				4,653.00	-2,898.00	1,419,823.22	3,307,109.60		
Point 4				243.00	-2,953.00	1,419,768.22	3,302,699.75		
Point 5				209.00	1,428.00	1,424,149.07	3,302,665.75		
Wells Ranch USX	0.00	0.00	0.00	0.00	0.00	1,422,721.12	3,302,456.76	40.488680	-104.412570
- actual wellpath hits target center									
- Polygon									
Point 1				-251.00	1,887.00	1,424,608.06	3,302,205.77		
Point 2				-217.00	-3,413.00	1,419,308.24	3,302,239.77		
Point 3				-5,563.00	-3,474.00	1,419,247.24	3,296,893.95		
Point 4				-5,569.00	1,831.00	1,424,552.06	3,296,887.95		
Point 5				-251.00	1,887.00	1,424,608.06	3,302,205.77		
Wells Ranch	0.00	0.00	6,709.01	-501.80	-10,191.96	1,422,219.34	3,292,265.16	40.487640	-104.449230
- actual wellpath misses target center by 21.40ft at 16294.00ft MD (6720.17 TVD, -497.16 N, -10174.29 E)									
- Point									

## North Reference Sheet for Sec. 14-T6N-R63W (Wells Ranch 16 North Middle PAD) - Wells Ranch State USX AA16-66-1HNL

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' @ 4801.00ft (H&P 343). Northing and Easting are relative to Wells Ranch State USX AA16-66-1HNL - 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 -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996545

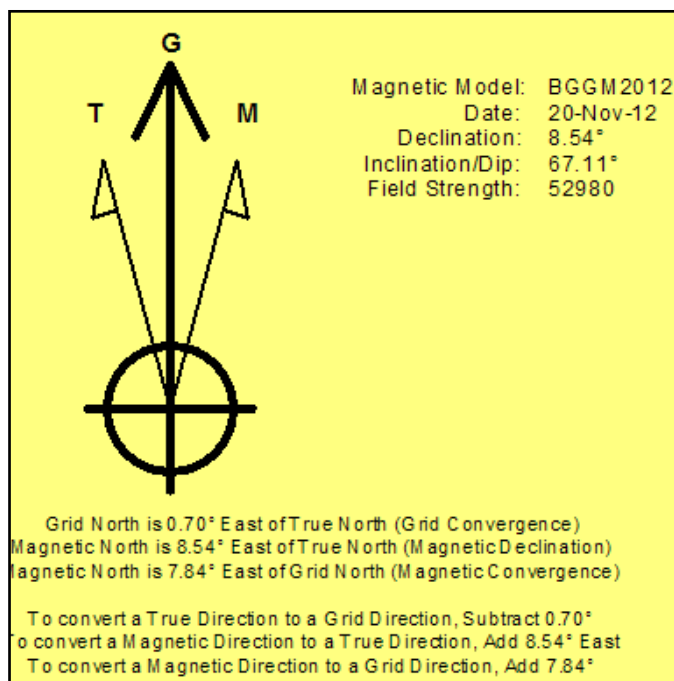
Grid Coordinates of Well: 1,422,721.12 ft N, 3,302,456.76 ft E

Geographical Coordinates of Well: 40° 29' 19.25" N, 104° 24' 45.25" W

Grid Convergence at Surface is: 0.70°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,294.00ft  
the Bottom Hole Displacement is 10,186.43ft in the Direction of 267.20° (Grid).

Magnetic Convergence at surface is: -7.84° (20 November 2012, , BGGM2012)



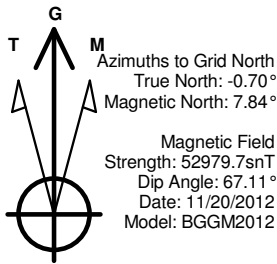


Project: Weld County, CO (NAD 83)  
Site: Sec. 14-T6N-R63W (Wells Ranch 16 North Middle PAD)  
Well: Wells Ranch State USX AA16-66-1HNL

# Noble Energy

HALLIBURTON

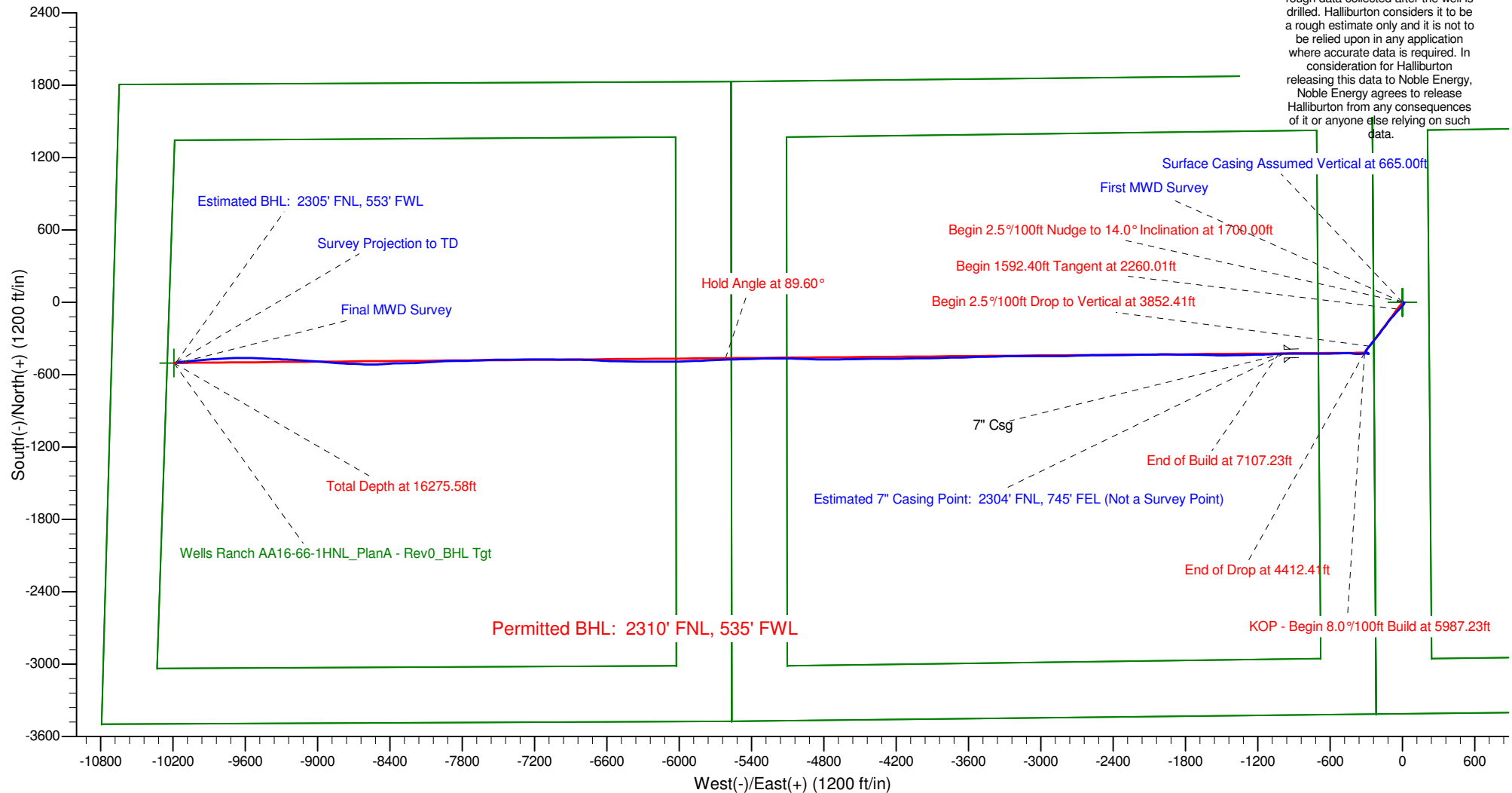
Sperry Drilling



## LEGEND

- Wells Ranch State USX AA16-66-1HNL, 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 State USX AA16-66-1HNL 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.

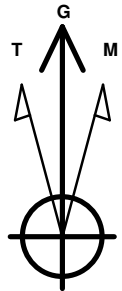


Project: Weld County, CO (NAD 83)  
Site: Sec. 14-T6N-R63W (Wells Ranch 16 North Middle PAD)  
Well: Wells Ranch State USX AA16-66-1HNL

# Noble Energy

**HALLIBURTON**

Sperry Drilling



Azimuths to Grid North  
True North:  $-0.70^\circ$   
Magnetic North:  $7.84^\circ$

Magnetic Field  
Strength: 52979.7snT  
Dip Angle:  $67.11^\circ$   
Date: 11/20/2012  
Model: BGGM2012

## LEGEND

- Wells Ranch State USX AA16-66-1HNL, 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 State USX AA16-66-1HNL 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.

