

Noble Energy

Weld County, CO (NAD 83)

Sec. 14-T6N-R65W

Dinner PC E14-65HN

Design: MWD Survey

Sperry Drilling Services Final Survey Report

14 March, 2012

Well Coordinates: 1,420,782.86 N, 3,239,442.00 E (40° 29' 06.94" N, 104° 38' 21.05" W)

Ground Level: 4,719.00 ft

Local Coordinate Origin:

Centered on Well Dinner PC E14-65HN

Viewing Datum:

KB @ 4743.00ft (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: 43I

HALLIBURTON

Design Report for Dinner PC E14-65HN - 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
656.00	0.00	0.00	656.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 656.00ft							
726.00	0.48	243.28	726.00	-0.13	-0.26	-0.27	0.69
First MWD Survey							
820.00	0.46	294.08	820.00	-0.15	-0.96	-0.97	0.43
915.00	0.35	274.25	914.99	0.02	-1.60	-1.58	0.19
1,010.00	0.25	274.54	1,009.99	0.06	-2.09	-2.07	0.11
1,102.00	0.34	291.09	1,101.99	0.17	-2.55	-2.51	0.13
1,194.00	0.37	279.08	1,193.99	0.32	-3.09	-3.04	0.09
1,286.00	0.77	305.63	1,285.99	0.73	-3.89	-3.79	0.51
1,378.00	0.72	298.34	1,377.98	1.36	-4.90	-4.72	0.12
1,470.00	0.65	273.68	1,469.97	1.67	-5.93	-5.71	0.33
1,563.00	0.31	295.68	1,562.97	1.81	-6.68	-6.45	0.41
1,655.00	0.25	55.79	1,654.97	2.03	-6.74	-6.48	0.53
1,747.00	0.19	90.52	1,746.97	2.14	-6.42	-6.15	0.16
1,839.00	0.28	51.94	1,838.97	2.28	-6.09	-5.81	0.19
1,931.00	0.65	119.59	1,930.96	2.16	-5.46	-5.20	0.65
2,031.00	0.57	12.81	2,030.96	2.37	-4.86	-4.57	0.98
2,126.00	3.56	334.82	2,125.89	5.50	-6.01	-5.38	3.30
2,222.00	5.52	345.93	2,221.59	12.67	-8.40	-6.97	2.23
2,317.00	7.91	341.50	2,315.93	23.31	-11.59	-8.98	2.57
2,413.00	10.33	332.09	2,410.71	37.18	-17.71	-13.57	2.95
2,508.00	10.04	330.25	2,504.22	51.90	-25.81	-20.01	0.46
2,604.00	9.62	325.36	2,598.81	65.76	-34.52	-27.17	0.97
2,699.00	9.71	330.74	2,692.46	79.28	-42.95	-34.08	0.96
2,794.00	10.92	337.23	2,785.93	94.57	-50.35	-39.77	1.76
2,890.00	11.46	335.82	2,880.10	111.65	-57.77	-45.29	0.63
2,985.00	9.30	344.33	2,973.55	127.66	-63.71	-49.46	2.78
3,081.00	9.59	343.60	3,068.25	142.80	-68.07	-52.14	0.33
3,176.00	9.57	341.75	3,161.92	157.89	-72.77	-55.18	0.32
3,272.00	9.08	342.60	3,256.65	172.70	-77.54	-58.31	0.53
3,368.00	9.56	335.36	3,351.39	187.17	-83.13	-62.29	1.32
3,463.00	9.99	329.50	3,445.01	201.44	-90.60	-68.16	1.14
3,558.00	8.72	326.07	3,538.75	214.52	-98.80	-74.90	1.46
3,654.00	9.61	336.14	3,633.53	227.88	-106.10	-80.70	1.91
3,749.00	11.61	337.62	3,726.90	243.98	-112.95	-85.76	2.12
3,845.00	12.21	337.69	3,820.83	262.30	-120.48	-91.26	0.63
3,940.00	12.59	338.96	3,913.61	281.26	-128.02	-96.68	0.49
4,036.00	11.96	330.49	4,007.43	299.68	-136.67	-103.28	1.99
4,131.00	8.79	334.50	4,100.86	314.80	-144.65	-109.57	3.42
4,227.00	7.26	336.48	4,195.92	326.99	-150.23	-113.79	1.62
4,322.00	4.91	338.19	4,290.38	336.27	-154.13	-116.66	2.48
4,417.00	3.38	332.77	4,385.13	342.53	-156.93	-118.76	1.66
4,513.00	3.63	332.03	4,480.95	347.73	-159.65	-120.90	0.26
4,608.00	1.51	351.08	4,575.85	351.63	-161.25	-122.07	2.38
4,704.00	1.60	1.19	4,671.81	354.22	-161.42	-121.96	0.30
4,799.00	1.25	250.80	4,766.80	355.20	-162.37	-122.79	2.47
4,895.00	1.43	252.61	4,862.77	354.50	-164.50	-124.99	0.19
4,990.00	0.26	310.39	4,957.76	354.28	-165.80	-126.30	1.38

Design Report for Dinner PC E14-65HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,086.00	0.30	98.33	5,053.76	354.39	-165.71	-126.21	0.56
5,181.00	0.10	0.72	5,148.76	354.44	-165.47	-125.96	0.35
5,277.00	0.13	315.19	5,244.76	354.60	-165.54	-126.01	0.10
5,372.00	0.31	67.02	5,339.76	354.77	-165.38	-125.84	0.40
5,468.00	0.65	103.54	5,435.75	354.75	-164.61	-125.07	0.46
5,563.00	0.75	94.04	5,530.75	354.58	-163.47	-123.96	0.16
5,659.00	1.36	113.41	5,626.73	354.08	-161.80	-122.35	0.73
5,754.00	1.58	111.81	5,721.70	353.15	-159.55	-120.21	0.24
5,850.00	1.22	101.29	5,817.67	352.45	-157.32	-118.07	0.46
5,945.00	1.21	113.94	5,912.65	351.85	-155.41	-116.24	0.28
6,040.00	1.12	112.47	6,007.63	351.09	-153.63	-114.56	0.10
6,136.00	0.69	89.64	6,103.62	350.73	-152.19	-113.16	0.58
6,231.00	3.47	83.47	6,198.55	351.06	-148.76	-109.71	2.93
6,279.00	7.36	83.17	6,246.32	351.59	-144.26	-105.18	8.10
6,326.00	7.57	83.85	6,292.92	352.28	-138.19	-99.08	0.48
6,374.00	10.76	85.21	6,340.30	353.00	-130.58	-91.44	6.66
6,422.00	14.16	84.35	6,387.17	353.95	-120.27	-81.08	7.09
6,470.00	17.98	84.28	6,433.28	355.27	-107.05	-67.80	7.96
6,517.00	21.26	84.78	6,477.55	356.77	-91.35	-52.02	6.99
6,565.00	25.39	85.73	6,521.62	358.32	-72.41	-33.03	8.64
6,613.00	28.86	86.66	6,564.33	359.77	-50.58	-11.17	7.28
6,661.00	33.25	86.92	6,605.44	361.15	-25.86	13.55	9.15
6,708.00	36.98	87.26	6,643.88	362.52	1.14	40.54	7.95
6,756.00	42.08	86.14	6,680.89	364.29	31.62	71.04	10.73
6,804.00	44.94	90.54	6,715.71	365.21	64.64	103.96	8.68
6,852.00	48.80	94.07	6,748.52	363.77	99.62	138.58	9.67
6,899.00	52.65	93.92	6,778.27	361.24	135.91	174.38	8.20
6,947.00	56.91	90.30	6,805.95	359.83	175.08	213.16	10.80
6,995.00	61.67	88.49	6,830.46	360.28	216.33	254.21	10.43
7,043.00	67.71	87.03	6,850.97	361.99	259.67	297.48	12.88
7,090.00	73.81	86.26	6,866.45	364.59	303.94	341.78	13.07
7,138.00	77.74	86.83	6,878.24	367.39	350.38	388.24	8.27
7,186.00	80.78	88.50	6,887.19	369.31	397.49	435.28	7.20
7,191.00	81.44	88.55	6,887.96	369.44	402.43	440.21	13.24
7,304.00	86.61	88.82	6,899.72	372.01	514.75	552.14	4.58
7,399.00	87.29	88.81	6,904.78	373.98	609.59	646.64	0.72
7,494.00	88.43	89.02	6,908.32	375.77	704.51	741.18	1.22
7,590.00	89.45	89.22	6,910.10	377.25	800.48	836.75	1.08
7,685.00	90.03	89.42	6,910.53	378.37	895.47	931.30	0.65
7,781.00	91.02	89.65	6,909.65	379.15	991.46	1,026.80	1.06
7,876.00	92.46	88.25	6,906.77	380.89	1,086.40	1,121.37	2.11
7,972.00	93.27	87.37	6,901.97	384.56	1,182.21	1,217.01	1.25
8,066.00	92.41	88.24	6,897.31	388.15	1,276.02	1,310.65	1.30
8,162.00	90.43	85.78	6,894.93	393.16	1,371.85	1,406.46	3.29
8,257.00	89.97	86.34	6,894.60	399.69	1,466.62	1,501.38	0.76
8,353.00	90.71	86.63	6,894.03	405.57	1,562.44	1,597.27	0.83
8,448.00	89.88	86.81	6,893.54	411.01	1,657.28	1,692.14	0.89
8,543.00	91.51	86.55	6,892.39	416.51	1,752.11	1,787.01	1.74
8,639.00	91.48	87.12	6,889.88	421.81	1,847.93	1,882.83	0.59
8,734.00	90.25	88.60	6,888.45	425.35	1,942.85	1,977.58	2.03
8,830.00	90.74	88.40	6,887.62	427.87	2,038.81	2,073.24	0.55

Design Report for Dinner PC E14-65HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,925.00	90.59	88.34	6,886.52	430.57	2,133.77	2,167.93	0.17
9,021.00	90.09	87.84	6,885.95	433.77	2,229.71	2,263.65	0.74
9,116.00	89.69	89.11	6,886.13	436.30	2,324.68	2,358.33	1.40
9,211.00	91.42	89.42	6,885.21	437.51	2,419.66	2,452.88	1.85
9,307.00	91.33	88.73	6,882.91	439.06	2,515.62	2,548.44	0.72
9,403.00	91.66	88.48	6,880.40	441.40	2,611.56	2,644.07	0.43
9,498.00	91.30	88.56	6,877.95	443.85	2,706.50	2,738.71	0.39
9,594.00	91.88	88.90	6,875.28	445.98	2,802.43	2,834.31	0.70
9,689.00	92.22	88.31	6,871.89	448.29	2,897.35	2,928.91	0.72
9,785.00	91.88	86.11	6,868.45	452.96	2,993.16	3,024.67	2.32
9,880.00	91.79	88.99	6,865.41	457.02	3,088.02	3,119.40	3.03
9,975.00	91.05	88.77	6,863.05	458.88	3,182.97	3,213.99	0.81
10,071.00	90.19	88.92	6,862.02	460.81	3,278.94	3,309.61	0.91
10,166.00	91.76	89.00	6,860.40	462.53	3,373.91	3,404.20	1.65
10,262.00	91.60	89.69	6,857.58	463.63	3,469.86	3,499.70	0.74
10,357.00	90.77	88.19	6,855.62	465.39	3,564.82	3,594.29	1.80
10,453.00	89.20	88.34	6,855.64	468.29	3,660.78	3,689.99	1.64
10,548.00	88.92	88.58	6,857.20	470.85	3,755.73	3,784.66	0.39
10,644.00	89.29	88.28	6,858.70	473.48	3,851.68	3,880.33	0.50
10,739.00	89.35	87.90	6,859.83	476.64	3,946.62	3,975.05	0.40
10,834.00	89.29	87.59	6,860.96	480.38	4,041.54	4,069.81	0.33
10,930.00	90.31	88.02	6,861.29	484.06	4,137.47	4,165.57	1.15
11,025.00	90.43	87.52	6,860.68	487.75	4,232.39	4,260.34	0.54
11,121.00	89.66	88.37	6,860.60	491.20	4,328.33	4,356.08	1.19
11,216.00	91.33	88.65	6,859.78	493.67	4,423.29	4,450.74	1.78
11,275.00	92.34	88.77	6,857.89	494.99	4,482.25	4,509.49	1.72
Final MWD Survey							
11,330.00	92.34	88.77	6,855.65	496.17	4,537.19	4,564.24	0.00
Survey Projection to TD - Estimated BHL: 2565' FNL, 536' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
656.00	656.00	0.00	0.00	Surface Casing Assumed Vertical at 656.00ft
726.00	726.00	-0.13	-0.26	First MWD Survey
11,275.00	6,857.89	494.99	4,482.25	Final MWD Survey
11,330.00	6,855.65	496.17	4,537.19	Survey Projection to TD
11,330.00	6,855.65	496.17	4,537.19	Estimated BHL: 2565' FNL, 536' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Dinner PC E14-65HN_PlanA - Rev1_BHL Tgt	83.76	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
656.00	11,330.00	Sperry MWD Surveys	MWD

Design Report for Dinner PC E14-65HN - 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
Dinner PC	0.00	0.00	0.00	0.00	0.00	1,420,782.86	3,239,442.00	40° 29' 6.936 N	104° 38' 21.048 W
- actual wellpath hits target center									
- Polygon									
Point 1				235.00	-1,888.00	1,418,894.92	3,239,677.00		
Point 2				180.00	2,590.00	1,423,372.77	3,239,622.00		
Point 3				4,592.00	2,603.00	1,423,385.77	3,244,033.84		
Point 4				4,645.00	-1,858.00	1,418,924.92	3,244,086.84		
Point 5				235.00	-1,888.00	1,418,894.92	3,239,677.00		
Dinner PC	0.00	0.00	0.00	0.00	0.00	1,420,782.86	3,239,442.00	40° 29' 6.936 N	104° 38' 21.048 W
- actual wellpath hits target center									
- Polygon									
Point 1				-225.00	-2,348.00	1,418,434.94	3,239,217.01		
Point 2				-280.00	3,050.00	1,423,832.75	3,239,162.01		
Point 3				5,052.00	3,063.00	1,423,845.75	3,244,493.83		
Point 4				5,105.00	-2,318.00	1,418,464.94	3,244,546.83		
Point 5				-225.00	-2,348.00	1,418,434.94	3,239,217.01		
Dinner PC	0.00	0.00	6,867.47	496.25	4,537.83	1,421,279.09	3,243,979.67	40° 29' 11.400 N	104° 37' 22.260 W
- actual wellpath misses target center by 11.84ft at 11330.00ft MD (6855.65 TVD, 496.17 N, 4537.19 E)									
- Point									

North Reference Sheet for Sec. 14-T6N-R65W - Dinner PC E14-65HN

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

Vertical Depths are relative to KB @ 4743.00ft (H&P 343). Northing and Easting are relative to Dinner PC E14-65HN

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: 0.99996520

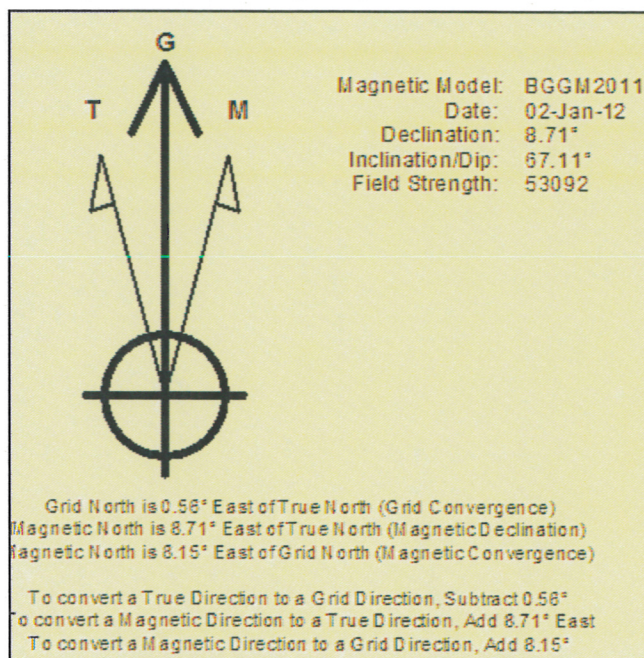
Grid Coordinates of Well: 1,420,782.86 ft N, 3,239,442.00 ft E

Geographical Coordinates of Well: 40° 29' 06.94" N, 104° 38' 21.05" W

Grid Convergence at Surface is: 0.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,330.00ft
the Bottom Hole Displacement is 4,564.24ft in the Direction of 83.76° (Grid).

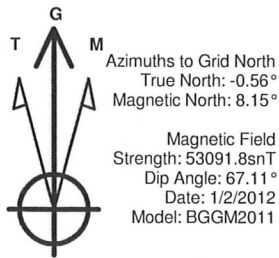
Magnetic Convergence at surface is: -8.15° (2 January 2012, , BGGM2011)



Noble Energy

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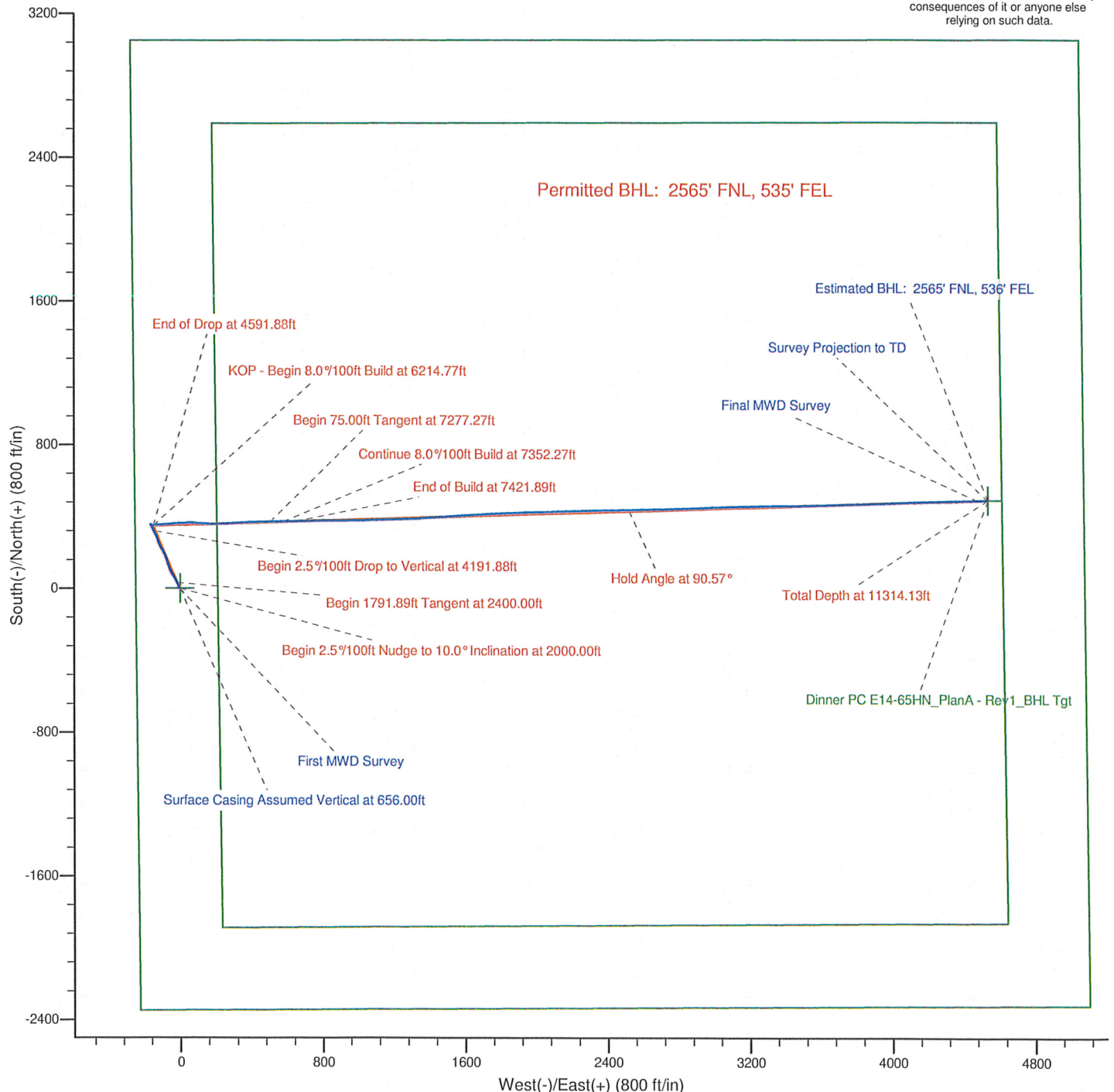
Sperry Drilling



LEGEND

- Dinner PC E14-65HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Dinner PC E14-65HN 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-R65W
 Well: Dinner PC E14-65HN

Noble Energy

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Sperry Drilling



Azimuths to Grid North
 True North: -0.56°
 Magnetic North: 8.15°

Magnetic Field
 Strength: 53091.8snT
 Dip Angle: 67.11°
 Date: 1/2/2012
 Model: BGGM2011

LEGEND

- Dinner PC E14-65HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Dinner PC E14-65HN 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.

