Noble Energy

Weld County, CO (NAD 83)
Sec. 15-T3N-R64W (Chandler - Guttersen PAD)
Chandler D23-79HN

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

06 January, 2013

Well Coordinates: 1,324,295.58 N, 3,270,941.44 E (40° 13' 10.27" N, 104° 31' 47.06" W)
Ground Level: 4,817.00 ft

Local Coordinate Origin:	Centered on Well Chandler D23-79HN - Slot A1
Viewing Datum:	KB @ 4830.00ft (Ensign 132)
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 Chandler D23-79HN - 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
791.00	0.00	0.00	791.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 791.00ft							
921.00	0.59	300.68	921.00	0.34	-0.58	-0.41	0.45
First MWD Survey							
1,112.00	0.59	311.64	1,111.99	1.50	-2.16	-1.74	0.06
1,206.00	1.11	53.17	1,205.98	2.36	-1.79	-2.56	1.44
1,298.00	2.50	70.57	1,297.93	3.57	0.82	-3.44	1.61
1,390.00	4.59	69.82	1,389.75	5.50	6.16	-4.74	2.27
1,482.00	7.34	72.19	1,481.25	8.57	15.22	-6.71	3.00
1,573.00	9.43	65.73	1,571.27	13.41	27.55	-10.06	2.52
1,665.00	11.14	64.41	1,661.79	20.35	42.44	-15.19	1.88
1,757.00	14.70	62.80	1,751.44	29.53	60.84	-22.13	3.89
1,849.00	15.78	60.13	1,840.21	41.09	82.07	-31.11	1.40
1,941.00	13.43	63.44	1,929.23	52.10	102.48	-39.63	2.71
2,034.00	13.19	62.79	2,019.73	61.78	121.57	-46.98	0.30
2,125.00	14.17	59.03	2,108.15	72.26	140.36	-55.17	1.45
2,217.00	15.55	54.65	2,197.08	85.19	160.07	-65.68	1.93
2,311.00	13.65	59.57	2,288.04	98.10	179.92	-76.15	2.41
2,406.00	14.06	65.63	2,380.28	108.54	200.09	-84.13	1.59
2,501.00	15.19	64.78	2,472.20	118.61	221.87	-91.56	1.21
2,596.00	15.70	62.01	2,563.77	129.94	244.48	-100.14	0.94
2,691.00	15.11	61.68	2,655.36	141.85	266.73	-109.33	0.63
2,786.00	15.76	66.49	2,746.94	152.87	289.46	-117.59	1.51
2,881.00	17.09	67.05	2,838.06	163.46	314.14	-125.19	1.41
2,976.00	17.90	67.42	2,928.66	174.51	340.48	-133.05	0.86
3,070.00	16.26	61.61	3,018.52	186.32	365.40	-141.82	2.52
3,166.00	14.23	62.09	3,111.14	198.23	387.65	-151.03	2.12
3,261.00	15.67	61.06	3,202.92	209.90	409.20	-160.07	1.54
3,355.00	16.34	60.71	3,293.27	222.52	431.84	-169.92	0.72
3,450.00	13.67	60.96	3,385.03	234.51	453.31	-179.29	2.81
3,546.00	13.76	69.44	3,478.30	244.02	473.92	-186.30	2.09
3,641.00	11.56	70.69	3,570.98	251.14	493.49	-191.06	2.33
3,736.00	10.85	65.79	3,664.17	257.95	510.62	-195.80	1.25
3,831.00	12.53	60.48	3,757.20	266.70	527.75	-202.46	2.10
3,926.00	14.58	57.68	3,849.55	278.17	546.82	-211.59	2.27
4,021.00	16.41	56.80	3,941.10	291.91	568.16	-222.72	1.94
4,116.00	13.73	60.10	4,032.82	304.88	589.16	-233.11	2.96
4,211.00	10.45	68.05	4,125.71	313.73	606.94	-239.80	3.86
4,306.00	6.51	57.57	4,219.66	319.84	619.48	-244.38	4.44
4,401.00	2.99	72.72	4,314.32	323.46	626.39	-247.16	3.90
4,496.00	0.72	43.92	4,409.27	324.63	629.17	-247.99	2.51
4,591.00	1.13	31.60	4,504.25	325.86	630.08	-249.11	0.48
4,686.00	0.77	282.97	4,599.25	326.80	629.95	-250.06	1.64
4,971.00	2.05	341.18	4,884.16	332.05	626.43	-255.69	0.62
5,066.00	0.99	285.19	4,979.13	333.88	625.09	-257.66	1.80
5,161.00	1.33	259.82	5,074.11	333.90	623.22	-257.90	0.64
5,257.00	0.97	259.57	5,170.09	333.55	621.32	-257.78	0.38
5,542.00	0.21	72.22	5,455.08	333.28	619.45	-257.73	0.41
5,637.00	1.46	352.81	5,550.07	334.53	619.46	-258.97	1.51

Design Report for Chandler D23-79HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,731.00	1.36	41.27	5,644.05	336.56	620.05	-260.92	1.23
5,827.00	1.05	312.41	5,740.03	338.01	620.15	-262.34	1.77
5,922.00	0.87	324.39	5,835.02	339.18	619.09	-263.63	0.28
6,113.00	0.63	22.08	6,026.01	341.33	618.64	-265.82	0.39
6,161.00	0.41	9.67	6,074.00	341.75	618.76	-266.22	0.51
6,207.00	3.67	181.20	6,119.98	340.43	618.76	-264.92	8.86
6,255.00	6.58	183.00	6,167.78	336.15	618.58	-260.69	6.07
6,302.00	8.69	185.56	6,214.36	329.93	618.10	-254.56	4.55
6,350.00	11.10	190.99	6,261.64	321.78	616.87	-246.62	5.38
6,397.00	14.46	191.46	6,307.47	311.59	614.84	-236.74	7.15
6,445.00	18.09	186.67	6,353.54	298.31	612.78	-223.79	8.06
6,492.00	21.47	183.48	6,397.76	282.47	611.41	-208.23	7.55
6,540.00	25.42	181.71	6,441.79	263.39	610.57	-189.39	8.36
6,587.00	28.83	182.30	6,483.62	241.98	609.81	-168.21	7.28
6,634.00	33.27	185.76	6,523.88	217.82	608.06	-144.43	10.18
6,681.00	37.53	187.36	6,562.18	190.78	604.94	-117.95	9.28
6,729.00	42.51	184.67	6,598.93	160.10	601.74	-87.86	10.98
6,776.00	46.64	176.69	6,632.43	127.17	601.43	-55.20	14.79
6,824.00	48.70	169.67	6,664.77	91.99	605.68	-19.76	11.63
6,871.00	54.52	168.37	6,693.95	55.84	612.71	16.96	12.57
6,919.00	61.86	168.57	6,719.23	15.90	620.85	57.59	15.30
6,966.00	70.33	171.01	6,738.26	-26.35	628.43	100.44	18.63
7,014.00	74.74	176.61	6,752.68	-71.84	633.34	146.19	14.43
7,061.00	75.52	178.32	6,764.74	-117.22	635.35	191.49	3.89
7,109.00	74.58	179.32	6,777.12	-163.58	636.30	237.64	2.81
7,157.00	76.11	179.23	6,789.26	-210.02	636.89	283.82	3.19
7,216.00	82.06	179.37	6,800.43	-267.92	637.60	341.40	10.09
7,290.00	87.60	180.40	6,807.10	-341.59	637.74	414.57	7.61
7,385.00	88.49	180.94	6,810.34	-436.52	636.63	508.71	1.10
7,480.00	89.75	181.77	6,811.80	-531.48	634.38	602.74	1.59
7,575.00	91.11	181.66	6,811.08	-626.44	631.54	696.69	1.44
7,670.00	91.02	182.81	6,809.32	-721.35	627.84	790.49	1.21
7,765.00	89.11	184.21	6,809.21	-816.16	622.02	883.96	2.49
7,860.00	90.31	185.65	6,809.69	-910.80	613.86	976.97	1.97
7,955.00	88.27	186.29	6,810.87	-1,005.28	603.98	1,069.61	2.25
8,050.00	87.81	185.13	6,814.12	-1,099.75	594.53	1,162.31	1.31
8,145.00	89.66	186.14	6,816.21	-1,194.26	585.21	1,255.05	2.22
8,240.00	88.49	181.39	6,817.75	-1,289.01	578.97	1,348.41	5.15
8,335.00	89.17	180.14	6,819.69	-1,383.98	577.70	1,442.56	1.50
8,430.00	90.15	181.42	6,820.25	-1,478.97	576.41	1,536.73	1.70
8,525.00	89.94	179.26	6,820.18	-1,573.96	575.85	1,630.99	2.28
8,620.00	90.80	177.33	6,819.56	-1,668.91	578.67	1,725.61	2.22
8,715.00	91.75	176.66	6,817.45	-1,763.76	583.65	1,820.38	1.22
8,810.00	90.98	177.77	6,815.19	-1,858.62	588.26	1,915.12	1.42
8,905.00	89.81	178.48	6,814.53	-1,953.56	591.37	2,009.76	1.44
9,000.00	88.24	177.29	6,816.15	-2,048.48	594.88	2,104.43	2.07
9,095.00	89.07	177.36	6,818.38	-2,143.35	599.31	2,199.16	0.88
9,190.00	90.71	177.29	6,818.56	-2,238.24	603.74	2,293.91	1.73
9,285.00	91.17	178.35	6,817.00	-2,333.16	607.36	2,388.59	1.22
9,380.00	90.80	179.60	6,815.37	-2,428.13	609.06	2,483.09	1.37
9,476.00	90.25	178.62	6,814.49	-2,524.11	610.55	2,578.58	1.17

Design Report for Chandler D23-79HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,570.00	87.00	180.26	6,816.75	-2,618.06	611.47	2,671.98	3.87
9,665.00	87.97	180.98	6,820.91	-2,712.96	610.44	2,766.09	1.27
9,761.00	88.99	181.49	6,823.46	-2,808.90	608.37	2,861.12	1.19
9,856.00	88.74	180.99	6,825.34	-2,903.86	606.32	2,955.17	0.59
9,951.00	89.57	180.21	6,826.74	-2,998.85	605.32	3,049.37	1.20
10,045.00	89.51	179.61	6,827.50	-3,092.84	605.47	3,142.72	0.64
10,140.00	90.52	179.35	6,827.47	-3,187.84	606.33	3,237.16	1.10
10,235.00	91.33	179.97	6,825.94	-3,282.82	606.89	3,331.54	1.07
10,330.00	90.12	178.93	6,824.74	-3,377.81	607.81	3,425.97	1.68
10,425.00	91.75	179.12	6,823.19	-3,472.78	609.42	3,520.46	1.73
10,520.00	90.89	178.13	6,821.00	-3,567.72	611.70	3,615.01	1.38
10,615.00	90.37	177.81	6,819.95	-3,662.66	615.07	3,709.68	0.64
10,710.00	88.71	178.56	6,820.72	-3,757.60	618.08	3,804.32	1.92
10,805.00	89.91	178.34	6,821.86	-3,852.56	620.64	3,898.91	1.28
10,900.00	89.51	179.58	6,822.34	-3,947.54	622.37	3,993.43	1.37
10,995.00	89.72	179.34	6,822.98	-4,042.53	623.26	4,087.86	0.34
11,090.00	90.86	179.86	6,822.50	-4,137.53	623.93	4,182.27	1.32
11,185.00	92.37	179.94	6,819.82	-4,232.49	624.09	4,276.58	1.59
11,280.00	91.88	181.08	6,816.30	-4,327.42	623.25	4,370.75	1.31
11,375.00	90.28	180.41	6,814.51	-4,422.39	622.01	4,464.91	1.83
11,470.00	86.21	180.90	6,817.42	-4,517.32	620.93	4,559.04	4.32
11,565.00	85.40	181.44	6,824.37	-4,612.04	618.99	4,652.87	1.02
11,660.00	87.87	181.07	6,829.94	-4,706.85	616.92	4,746.77	2.63
11,755.00	89.01	180.86	6,832.53	-4,801.80	615.32	4,840.87	1.22
11,850.00	90.43	181.61	6,832.99	-4,896.77	613.27	4,934.93	1.69
11,945.00	90.86	180.59	6,831.92	-4,991.75	611.45	5,029.03	1.17
12,040.00	92.65	180.73	6,829.01	-5,086.69	610.35	5,123.18	1.89
12,135.00	91.79	179.67	6,825.33	-5,181.62	610.02	5,217.40	1.44
12,145.00	91.85	180.53	6,825.02	-5,191.61	610.00	5,227.32	8.62
Final MWD Survey							
12,200.00	91.85	180.53	6,823.24	-5,246.58	609.50	5,281.84	0.00

Survey Projection to TD - Estimated BHL: 535' FSL, 60' FWL

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
791.00	791.00	0.00	0.00	Surface Casing Assumed Vertical at 791.00ft
921.00	921.00	0.34	-0.58	First MWD Survey
12,145.00	6,825.02	-5,191.61	610.00	Final MWD Survey
12,200.00	6,823.24	-5,246.58	609.50	Survey Projection to TD
12,200.00	6,823.24	-5,246.58	609.50	Estimated BHL: 535' FSL, 60' FWL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Chandler D23-79HN_PlanA - Rev1_BHL	173.21	Slot	0.00	0.00	0.00

Design Report for Chandler D23-79HN - MWD Survey

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
791.00	12,200.00	Sperry MWD Surveys	MWD

Design Report for Chandler D23-79HN - 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
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				528.00	-493.00	1,323,802.61	3,271,469.42		
Point 2				5,806.00	-515.00	1,323,780.61	3,276,747.19		
Point 3				5,870.00	-5,724.00	1,318,571.83	3,276,811.19		
Point 4				552.00	-5,783.00	1,318,512.83	3,271,493.42		
Point 5				528.00	-493.00	1,323,802.61	3,271,469.42		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				988.00	-33.00	1,324,262.59	3,271,929.40		
Point 2				938.00	4,332.00	1,328,627.40	3,271,879.40		
Point 3				5,279.00	4,347.00	1,328,642.40	3,276,220.22		
Point 4				5,346.00	-55.00	1,324,240.59	3,276,287.21		
Point 5				988.00	-33.00	1,324,262.59	3,271,929.40		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				68.00	-953.00	1,323,342.62	3,271,009.44		
Point 2				92.00	-5,323.00	1,318,972.81	3,271,033.44		
Point 3				-4,283.00	-5,388.00	1,318,907.82	3,266,658.63		
Point 4				-4,276.00	-1,029.00	1,323,266.63	3,266,665.63		
Point 5				68.00	-953.00	1,323,342.62	3,271,009.44		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				68.00	-33.00	1,324,262.59	3,271,009.44		
Point 2				-4,276.00	-109.00	1,324,186.59	3,266,665.63		
Point 3				-4,328.00	4,286.00	1,328,581.40	3,266,613.63		
Point 4				18.00	4,332.00	1,328,627.40	3,270,959.44		
Point 5				68.00	-33.00	1,324,262.59	3,271,009.44		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				528.00	-493.00	1,323,802.61	3,271,469.42		
Point 2				552.00	-5,783.00	1,318,512.83	3,271,493.42		
Point 3				-4,743.00	-5,848.00	1,318,447.84	3,266,198.65		
Point 4				-4,736.00	-569.00	1,323,726.61	3,266,205.65		
Point 5				528.00	-493.00	1,323,802.61	3,271,469.42		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				528.00	-493.00	1,323,802.61	3,271,469.42		
Point 2				478.00	4,792.00	1,329,087.38	3,271,419.42		
Point 3				5,739.00	4,807.00	1,329,102.38	3,276,680.20		
Point 4				5,806.00	-515.00	1,323,780.61	3,276,747.19		
Point 5				528.00	-493.00	1,323,802.61	3,271,469.42		
Chandler	0.00	0.00	6,826.00	-5,246.67	624.47	1,319,049.14	3,271,565.89	40° 12' 18.360 N	104° 31' 39.756 W
- actual wellpath misses target center by 15.23ft at 12199.87ft MD (6823.25 TVD, -5246.45 N, 609.50 E)									
- Point									
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W
- actual wellpath hits target center									
- Polygon									
Point 1				988.00	-953.00	1,323,342.62	3,271,929.40		
Point 2				5,346.00	-975.00	1,323,320.63	3,276,287.21		
Point 3				5,410.00	-5,264.00	1,319,031.81	3,276,351.21		
Point 4				1,012.00	-5,323.00	1,318,972.81	3,271,953.40		
Point 5				988.00	-953.00	1,323,342.62	3,271,929.40		
Chandler	0.00	0.00	0.00	0.00	0.00	1,324,295.58	3,270,941.44	40° 13' 10.272 N	104° 31' 47.064 W

Design Report for Chandler D23-79HN - MWD Survey

- actual wellpath hits target center				
- Polygon				
Point 1	528.00	-493.00	1,323,802.61	3,271,469.42
Point 2	-4,736.00	-569.00	1,323,726.61	3,266,205.65
Point 3	-4,788.00	4,746.00	1,329,041.38	3,266,153.65
Point 4	478.00	4,792.00	1,329,087.38	3,271,419.42
Point 5	528.00	-493.00	1,323,802.61	3,271,469.42

North Reference Sheet for Sec. 15-T3N-R64W (Chandler - Guttersen PAD) - Chandler D23-79HN

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

Vertical Depths are relative to KB @ 4830.00ft (Ensign 132). Northing and Easting are relative to Chandler D23-79HN - 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: 0.99995699

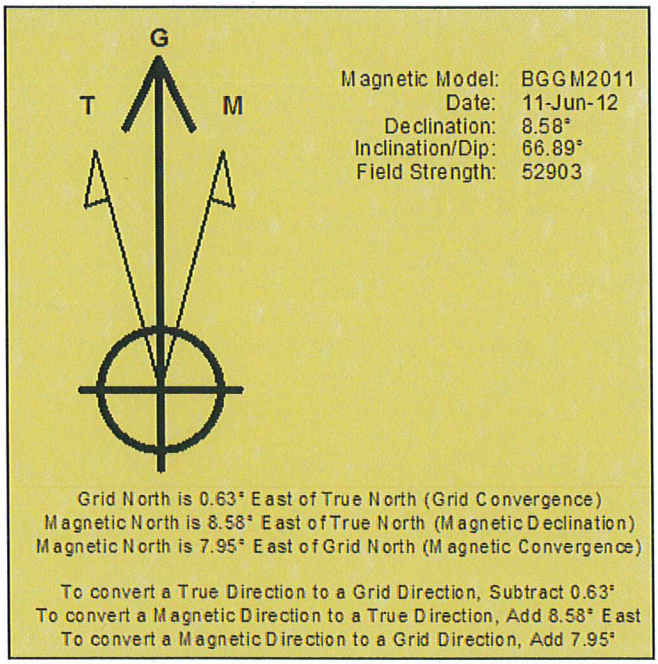
Grid Coordinates of Well: 1,324,295.58 ft N, 3,270,941.44 ft E

Geographical Coordinates of Well: 40° 13' 10.27" N, 104° 31' 47.06" W

Grid Convergence at Surface is: 0.63°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,200.00ft
the Bottom Hole Displacement is 5,281.86ft in the Direction of 173.37° (Grid).

Magnetic Convergence at surface is: -7.95° (11 June 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)
Site: Sec. 15-T3N-R64W (Chandler - Guttersen PAD)
Well: Chandler D23-79HN

Noble Energy

HALLIBURTON
Sperry Drilling

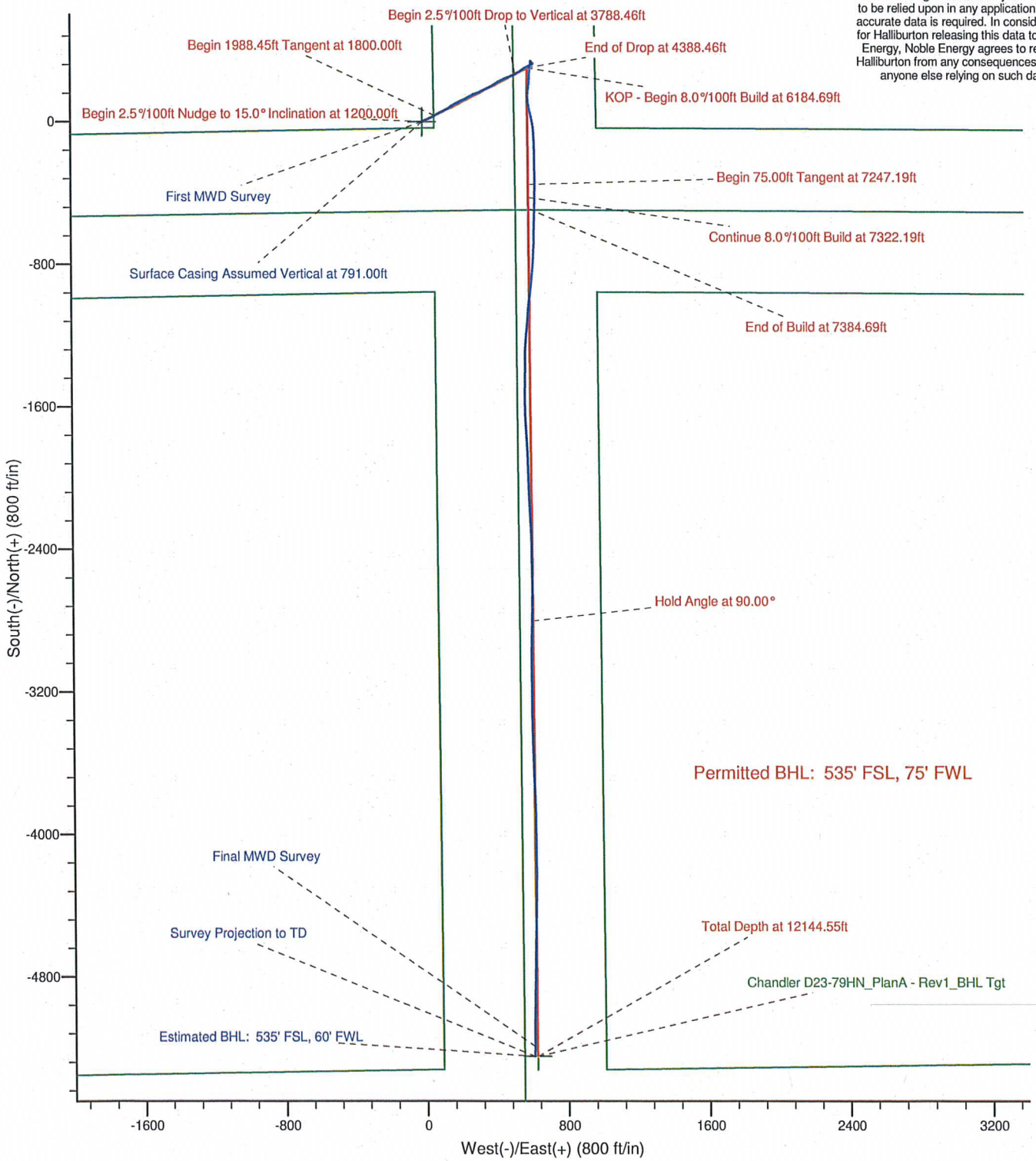
Azimuths to Grid North
True North: -0.63°
Magnetic North: 7.95°

Magnetic Field
Strength: 52903.2snT
Dip Angle: 66.89°
Date: 6/11/2012
Model: BGGM2011

LEGEND

Chandler D23-79HN, Plan A, Plan A - Rev 1 Proposal V0
MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Chandler D23-79HN 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.



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Chandler D23-79HN, Plan A, Plan A - Rev 1 Proposal V0
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