Noble Energy

Weld County, CO (NAD 83)
Sec. 25-T4N-R65W (Shelton 25 PAD)
Shelton PC G25-74-1HN

Design: MWD Surveys

Sperry Drilling Services

Final Survey Report

13 April, 2013

Well Coordinates: 1,349,615.34 N, 3,248,053.04 E (40° 17' 22.85" N, 104° 36' 38.84" W)
Ground Level: 4,795.00 ft

Local Coordinate Origin:	Centered on Well Shelton PC G25-74-1HN - Slot A1
Viewing Datum:	KB=30' @ 4825.00ft (H&P 321)
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 Shelton PC G25-74-1HN - MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
652.00	0.00	0.00	652.00	0.00	0.00	0.00	0.00
717.00	0.85	253.84	717.00	-0.13	-0.46	0.05	1.31
First Survey							
994.00	0.75	234.20	993.97	-1.77	-3.91	1.05	0.10
1,271.00	1.29	91.42	1,270.95	-2.90	-2.26	2.46	0.70
1,363.00	3.91	69.02	1,362.85	-1.81	1.70	2.08	3.00
1,456.00	6.53	71.14	1,455.46	1.04	9.67	0.69	2.82
1,551.00	9.36	66.22	1,549.54	5.90	21.85	-1.94	3.06
1,646.00	10.83	65.27	1,643.06	12.75	37.03	-6.00	1.56
1,740.00	13.46	66.42	1,734.95	20.82	55.08	-10.76	2.81
1,835.00	13.70	74.60	1,827.30	28.23	76.06	-14.35	2.04
1,930.00	14.06	80.15	1,919.53	33.20	98.28	-15.30	1.45
2,025.00	13.86	79.47	2,011.73	37.25	120.84	-15.31	0.27
2,120.00	14.22	75.63	2,103.89	42.22	143.33	-16.23	1.05
2,215.00	15.52	75.89	2,195.71	48.22	166.96	-17.95	1.37
2,310.00	12.27	72.19	2,287.92	54.41	188.90	-20.16	3.54
2,404.00	14.53	75.66	2,379.35	60.38	209.84	-22.35	2.55
2,499.00	15.02	74.61	2,471.21	66.60	233.25	-24.33	0.59
2,594.00	15.72	74.28	2,562.81	73.36	257.51	-26.69	0.74
2,689.00	16.40	73.67	2,654.11	80.61	282.77	-29.37	0.74
2,784.00	15.98	72.71	2,745.34	88.27	308.12	-32.42	0.52
2,879.00	15.44	71.63	2,836.79	96.14	332.61	-35.84	0.65
2,974.00	15.59	70.12	2,928.33	104.47	356.62	-39.80	0.45
3,068.00	14.16	75.05	3,019.18	111.73	379.61	-42.88	2.03
3,163.00	15.63	75.42	3,110.98	117.95	403.22	-44.83	1.55
3,258.00	14.77	76.01	3,202.66	124.10	427.36	-46.61	0.92
3,353.00	13.25	73.92	3,294.83	130.04	449.57	-48.54	1.69
3,448.00	14.27	76.90	3,387.11	135.71	471.44	-50.25	1.31
3,543.00	14.96	76.38	3,479.03	141.25	494.76	-51.58	0.74
3,638.00	14.47	76.48	3,570.92	146.91	518.21	-53.01	0.52
3,732.00	14.74	74.25	3,661.88	152.91	541.14	-54.85	0.66
3,827.00	15.52	76.57	3,753.59	159.14	565.14	-56.75	1.04
3,922.00	17.92	73.52	3,844.56	166.24	591.52	-59.07	2.69
4,017.00	18.24	72.83	3,934.87	174.77	619.74	-62.49	0.41
4,113.00	15.73	73.85	4,026.68	182.83	646.60	-65.67	2.63
4,207.00	11.85	70.22	4,117.95	189.64	667.93	-68.61	4.23
4,302.00	10.33	71.54	4,211.18	195.64	685.19	-71.46	1.62
4,397.00	7.81	67.66	4,304.98	200.79	699.24	-74.05	2.73
4,492.00	6.32	72.19	4,399.26	204.85	710.19	-76.10	1.67
4,587.00	4.74	65.64	4,493.82	208.06	718.74	-77.76	1.79
4,682.00	3.25	54.11	4,588.58	211.26	724.50	-79.89	1.77
4,777.00	2.81	29.70	4,683.45	214.86	727.83	-82.84	1.42
4,871.00	0.83	356.81	4,777.40	217.55	728.94	-85.29	2.30
5,156.00	2.06	335.21	5,062.31	224.26	726.68	-92.29	0.46
5,251.00	0.79	348.43	5,157.28	226.45	725.83	-94.60	1.37
5,535.00	0.67	344.59	5,441.26	229.97	724.99	-98.21	0.05
5,820.00	1.40	305.58	5,726.21	233.60	721.72	-102.36	0.34
6,105.00	2.32	291.12	6,011.06	237.70	713.51	-107.85	0.36
6,246.00	0.62	330.56	6,152.01	239.40	710.47	-110.06	1.34
6,304.00	0.72	358.06	6,210.01	240.03	710.30	-110.71	0.57

Design Report for Shelton PC G25-74-1HN - MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,387.00	3.74	164.35	6,292.96	237.95	711.02	-108.53	5.35
6,435.00	10.91	166.90	6,340.53	232.01	712.47	-102.43	14.95
6,482.00	15.18	171.52	6,386.31	221.59	714.39	-91.83	9.35
6,530.00	18.37	172.96	6,432.26	207.86	716.24	-78.00	6.70
6,577.00	22.55	170.94	6,476.29	191.60	718.57	-61.58	9.02
6,625.00	25.98	170.02	6,520.04	172.15	721.84	-41.86	7.19
6,671.00	28.21	172.69	6,560.99	151.44	724.97	-20.92	5.52
6,719.00	30.69	174.65	6,602.79	127.99	727.56	2.62	5.54
6,766.00	33.24	177.12	6,642.66	103.18	729.32	27.35	6.10
6,814.00	37.01	179.28	6,681.91	75.58	730.17	54.66	8.27
6,861.00	41.74	178.86	6,718.23	45.78	730.66	84.08	10.08
6,909.00	44.71	178.11	6,753.21	12.92	731.53	116.58	6.28
6,956.00	48.71	176.71	6,785.43	-21.25	733.09	150.48	8.78
7,004.00	51.76	177.04	6,816.13	-58.08	735.10	187.09	6.38
7,051.00	54.35	178.64	6,844.38	-95.62	736.50	224.28	6.15
7,099.00	58.20	177.35	6,871.02	-135.50	737.91	263.79	8.33
7,146.00	62.51	178.43	6,894.26	-176.31	739.41	304.22	9.39
7,194.00	66.02	178.78	6,915.10	-219.53	740.46	346.95	7.34
7,241.00	69.72	179.01	6,932.80	-263.05	741.29	389.93	7.89
7,289.00	73.14	181.03	6,948.09	-308.55	741.27	434.70	8.16
7,336.00	77.70	181.22	6,959.92	-354.01	740.37	479.29	9.71
7,388.00	81.87	180.60	6,969.14	-405.17	739.56	529.50	8.11
7,443.00	85.64	179.50	6,975.12	-459.83	739.51	583.30	7.14
7" Casing Point Estimated from Section Lines 733' FNL 1646' FEL (Not a survey point)							
7,463.00	87.01	179.10	6,976.40	-479.79	739.75	602.98	7.14
7,500.00	87.68	179.75	6,978.12	-516.75	740.13	639.42	2.51
7,595.00	85.25	180.26	6,983.97	-611.56	740.12	732.74	2.61
7,689.00	87.34	179.08	6,990.05	-705.35	740.67	825.16	2.55
7,784.00	89.91	179.38	6,992.33	-800.31	741.94	918.84	2.72
7,879.00	89.45	177.73	6,992.86	-895.27	744.34	1,012.74	1.81
7,973.00	91.97	180.29	6,991.69	-989.24	745.96	1,105.51	3.82
8,068.00	89.35	180.00	6,990.60	-1,084.22	745.73	1,198.96	2.78
8,163.00	88.74	179.23	6,992.18	-1,179.21	746.37	1,292.56	1.03
8,258.00	90.89	180.49	6,992.49	-1,274.20	746.60	1,386.10	2.62
8,352.00	90.28	178.74	6,991.53	-1,368.19	747.23	1,478.72	1.97
8,447.00	92.22	180.83	6,989.46	-1,463.15	747.59	1,572.25	3.00
8,542.00	91.32	179.92	6,986.52	-1,558.10	746.97	1,665.60	1.35
8,637.00	90.49	178.10	6,985.02	-1,653.07	748.62	1,759.36	2.11
8,732.00	90.49	179.53	6,984.21	-1,748.05	750.59	1,853.19	1.51
8,827.00	92.21	181.86	6,981.97	-1,843.00	749.44	1,946.45	3.05
8,921.00	91.73	181.37	6,978.74	-1,936.91	746.79	2,038.41	0.73
9,016.00	92.07	180.51	6,975.59	-2,031.84	745.23	2,131.57	0.98
9,111.00	88.98	180.33	6,974.72	-2,126.83	744.53	2,224.93	3.26
9,206.00	88.12	180.62	6,977.12	-2,221.79	743.75	2,318.27	0.96
9,301.00	89.01	177.95	6,979.50	-2,316.75	744.94	2,411.93	2.96
9,395.00	91.26	177.90	6,979.28	-2,410.68	748.34	2,504.99	2.39
9,490.00	92.56	181.06	6,976.11	-2,505.61	749.21	2,598.58	3.59
9,585.00	92.28	179.42	6,972.10	-2,600.52	748.81	2,691.92	1.74
9,680.00	92.68	180.95	6,967.99	-2,695.42	748.50	2,785.28	1.66
9,775.00	90.31	180.25	6,965.51	-2,790.38	747.52	2,878.57	2.60
9,870.00	89.97	180.76	6,965.28	-2,885.38	746.68	2,971.92	0.65

Design Report for Shelton PC G25-74-1HN - MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,965.00	89.41	178.62	6,965.79	-2,980.37	747.19	3,065.51	2.33
10,060.00	91.36	178.27	6,965.16	-3,075.33	749.76	3,159.43	2.09
10,154.00	91.33	180.92	6,962.95	-3,169.29	750.42	3,252.03	2.82
10,248.00	91.14	180.60	6,960.92	-3,263.26	749.18	3,344.30	0.40
10,343.00	91.82	179.68	6,958.47	-3,358.22	748.95	3,437.73	1.20
10,437.00	92.38	177.93	6,955.03	-3,452.14	750.91	3,530.51	1.95
10,532.00	93.21	181.42	6,950.39	-3,547.01	751.44	3,623.98	3.77
10,627.00	90.22	182.23	6,947.55	-3,641.91	748.42	3,716.85	3.26
10,721.00	90.65	184.09	6,946.83	-3,735.76	743.24	3,808.31	2.04
10,816.00	89.11	183.62	6,947.03	-3,830.54	736.85	3,900.47	1.70
10,911.00	88.40	179.43	6,949.10	-3,925.46	734.33	3,993.45	4.47
11,006.00	91.02	178.84	6,949.58	-4,020.44	735.76	4,087.19	2.83
11,101.00	91.39	177.94	6,947.58	-4,115.38	738.42	4,181.10	1.03
11,195.00	91.60	176.51	6,945.13	-4,209.23	742.97	4,274.28	1.54
11,290.00	89.29	174.30	6,944.39	-4,303.91	750.57	4,368.82	3.36
11,382.00	89.26	174.12	6,945.56	-4,395.44	759.85	4,460.54	0.21
Final MWD Survey							
11,438.00	89.26	174.12	6,946.28	-4,451.14	765.59	4,516.38	0.01
Bit Projection - Estimated BHL 543' FSL 1646' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
717.00	717.00	-0.13	-0.46	First Survey
7,443.00	6,975.12	-459.83	739.51	7" Casing Point Estimated from Section Lines 733' FNL 1646' FEL (Not a survey point)
11,382.00	6,945.56	-4,395.44	759.85	Final MWD Survey
11,438.00	6,946.28	-4,451.14	765.59	Bit Projection
11,438.00	6,946.28	-4,451.14	765.59	Estimated BHL 543' FSL 1646' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	Shelton PC G25-74-1HN_PlanB - Rev0_BHL Tgt	169.82	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
717.00	11,438.00	MWD Surveys	MWD
7,443.00	11,438.00	MWD Surveys	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,443.00	6,975.12	7"	7	7-1/2

Design Report for Shelton PC G25-74-1HN - MWD Surveys

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
Shelton PC	0.00	0.00	0.00	0.00	0.00	1,349,615.34	3,248,053.04	40.28968	-104.61079
- actual wellpath misses target center by 652.00ft at 652.00ft MD (652.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2,380.00	301.00	1,349,916.33	3,250,432.94		
Point 2				-2,882.00	266.00	1,349,881.33	3,245,171.16		
Point 3				-2,843.00	5,633.00	1,355,248.10	3,245,210.16		
Point 4				2,356.00	5,642.00	1,355,257.10	3,250,408.94		
Point 5				2,380.00	301.00	1,349,916.33	3,250,432.94		
Shelton PC	0.00	0.00	6,972.07	-4,451.74	753.40	1,345,163.79	3,248,806.41	40.27744	-104.60825
- actual wellpath misses target center by 28.53ft at 11437.68ft MD (6946.27 TVD, -4450.82 N, 765.56 E)									
- Point									
Shelton PC	0.00	0.00	0.00	0.00	0.00	1,349,615.34	3,248,053.04	40.28968	-104.61079
- actual wellpath misses target center by 652.00ft at 652.00ft MD (652.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2,380.00	301.00	1,349,916.33	3,250,432.94		
Point 2				2,405.00	-4,971.00	1,344,644.55	3,250,457.94		
Point 3				-2,824.00	-5,023.00	1,344,592.55	3,245,229.16		
Point 4				-2,882.00	266.00	1,349,881.33	3,245,171.16		
Point 5				2,380.00	301.00	1,349,916.33	3,250,432.94		
Shelton PC	0.00	0.00	0.00	0.00	0.00	1,349,615.34	3,248,053.04	40.28968	-104.61079
- actual wellpath misses target center by 652.00ft at 652.00ft MD (652.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				1,920.00	761.00	1,350,376.31	3,249,972.96		
Point 2				-2,422.00	726.00	1,350,341.31	3,245,631.14		
Point 3				-2,388.00	5,173.00	1,354,788.12	3,245,665.14		
Point 4				1,896.00	5,182.00	1,354,797.12	3,249,948.96		
Point 5				1,920.00	761.00	1,350,376.31	3,249,972.96		
Shelton PC	0.00	0.00	0.00	0.00	0.00	1,349,615.34	3,248,053.04	40.28968	-104.61079
- actual wellpath misses target center by 652.00ft at 652.00ft MD (652.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				1,920.00	-159.00	1,349,456.34	3,249,972.96		
Point 2				1,945.00	-4,511.00	1,345,104.53	3,249,997.96		
Point 3				-2,364.00	-4,563.00	1,345,052.53	3,245,689.14		
Point 4				-2,422.00	-194.00	1,349,421.35	3,245,631.14		
Point 5				1,920.00	-159.00	1,349,456.34	3,249,972.96		

North Reference Sheet for Sec. 25-T4N-R65W (Shelton 25 PAD) - Shelton PC G25-74-1HN

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

Vertical Depths are relative to KB=30' @ 4825.00ft (H&P 321). Northing and Easting are relative to Shelton PC G25-74-1HN - 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 -105.50000°, Longitude Origin:0 .00000°, Latitude Origin:40.78333°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995708

Grid Coordinates of Well: 1,349,615.34 ft N, 3,248,053.04 ft E

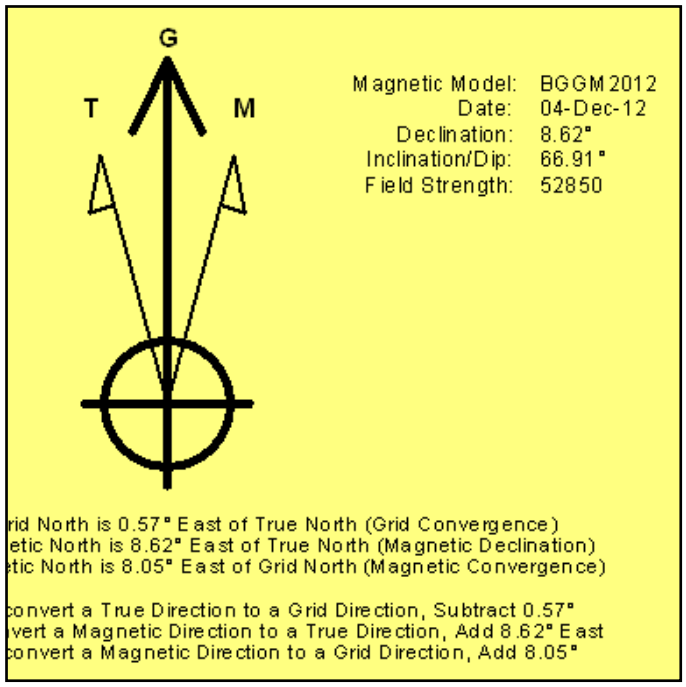
Geographical Coordinates of Well: 40°17' 22.85" N, 104°36' 38.84" W

Grid Convergence at Surface is: 0.57°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,438.00ft

the Bottom Hole Displacement is 4,516.50ft in the Direction of 170.24°(Grid).

Magnetic Convergence at surface is: -8.05°(4 Dece mber 2012, , BGGM2012)



Project: Weld County, CO (NAD 83)
Site: Sec. 25-T4N-R65W (Shelton 25 PAD)
Well: Shelton PC G25-74-1HN

Noble Energy

HALLIBURTON
Sperry Drilling

G
T M

Azimuths to Grid North
True North: -0.57°
Magnetic North: 8.05°

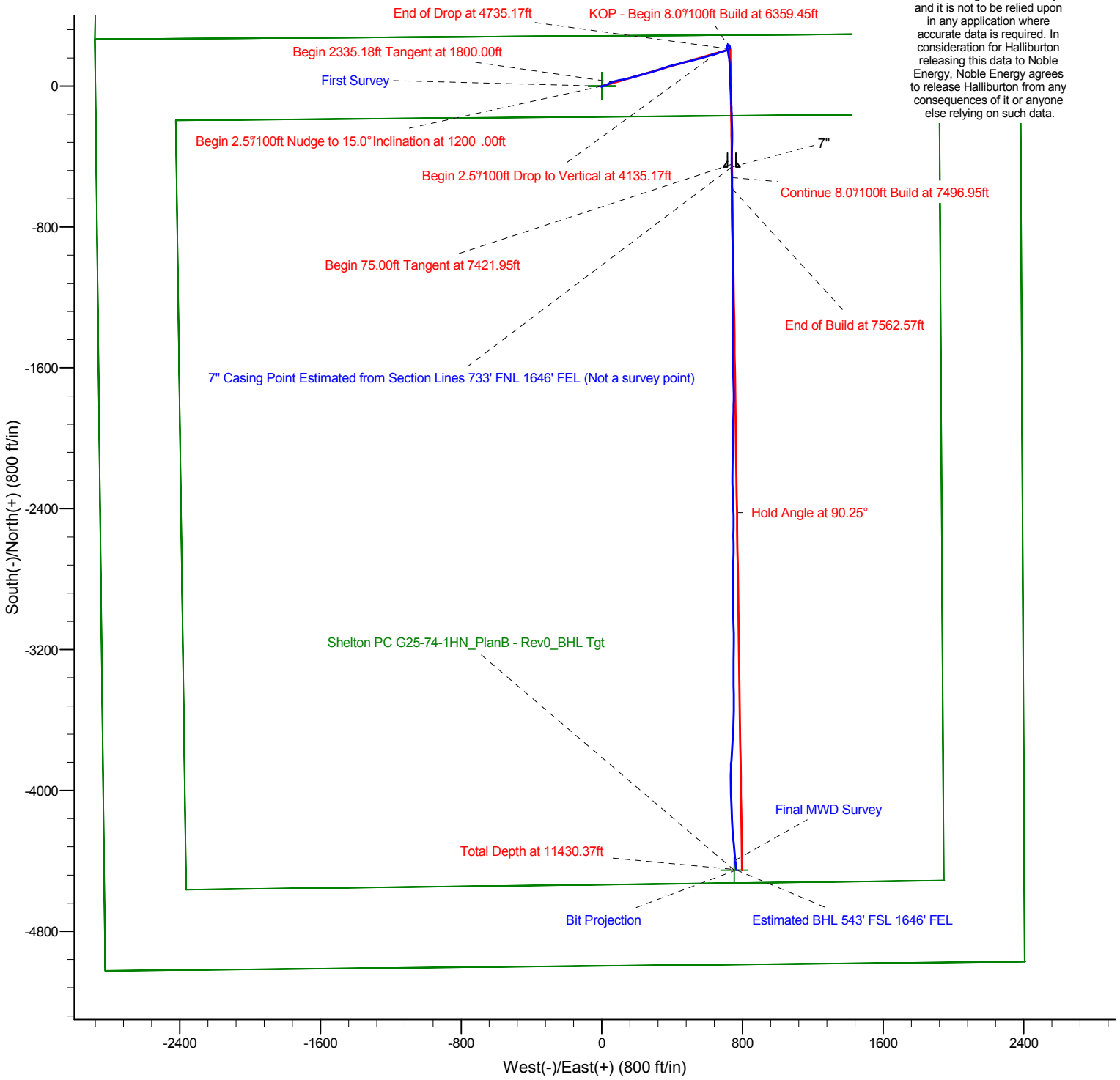
Magnetic Field
Strength: 52849.8snT
Dip Angle: 66.91°
Date: 12/4/2012
Model: BGGM2012

LEGEND

Shelton PC G25-74-1HN, Plan B, Plan B - Rev 0 Proposal V0
MWD Surveys

Permitted BHL: 535' FSL, 1650' FEL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Shelton PC G25-74-1HN 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. 25-T4N-R65W (Shelton 25 PAD)
Well: Shelton PC G25-74-1HN

Noble Energy

HALLIBURTON
Sperry Drilling

Azimuths to Grid North
True North: -0.57°
Magnetic North: 8.05°

Magnetic Field
Strength: 52849.8snT
Dip Angle: 66.91°
Date: 12/4/2012
Model: BGGM2012

LEGEND

Shelton PC G25-74-1HN, Plan B, Plan B - Rev 0 Proposal V0
MWD Surveys

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Shelton PC G25-74-1HN 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.