

Continental Resources, Inc.

Weld County, CO
Sec. 4-T7N-R62W
Hahn 1-4H

Plan A

Design: Sperry MWD Survey

Sperry Drilling Services Final Survey Report

17 November, 2011

Well Coordinates: 1,462,563.41 N, 3,327,919.81 E (40° 35' 49.71" N, 104° 19' 08.85" W)
Ground Level: 4,848.00 ft

Local Coordinate Origin:	Centered on Well Hahn 1-4H
Viewing Datum:	RKB 16' @ 4864.00ft (Hahn 1-4H)
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 Hahn 1-4H - Sperry 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
637.00	0.31	68.64	637.00	0.63	1.60	0.62	0.05
First MWD Survey							
729.00	0.14	22.40	729.00	0.82	1.88	0.82	0.26
819.00	0.52	30.94	818.99	1.27	2.13	1.27	0.42
908.00	0.34	359.78	907.99	1.88	2.34	1.88	0.32
999.00	0.30	23.52	998.99	2.37	2.43	2.36	0.15
1,090.00	0.37	1.15	1,089.99	2.89	2.53	2.88	0.16
1,181.00	0.44	67.07	1,180.99	3.32	2.86	3.31	0.49
1,273.00	0.32	353.33	1,272.99	3.71	3.16	3.70	0.51
1,365.00	0.53	35.25	1,364.98	4.31	3.37	4.30	0.39
1,455.00	0.62	37.78	1,454.98	5.04	3.91	5.02	0.10
1,546.00	0.70	31.85	1,545.97	5.90	4.51	5.88	0.12
1,640.00	0.59	24.95	1,639.97	6.82	5.01	6.81	0.14
1,733.00	0.50	59.13	1,732.96	7.47	5.56	7.45	0.36
1,828.00	0.70	55.84	1,827.96	8.00	6.40	7.98	0.21
1,923.00	0.30	337.30	1,922.95	8.56	6.78	8.54	0.74
2,017.00	0.52	122.49	2,016.95	8.56	7.05	8.53	0.84
2,111.00	0.98	183.44	2,110.95	7.53	7.36	7.50	0.91
2,205.00	0.83	181.37	2,204.93	6.04	7.29	6.02	0.16
2,298.00	0.83	192.93	2,297.93	4.71	7.13	4.69	0.18
2,392.00	0.82	207.43	2,391.92	3.45	6.67	3.43	0.22
2,486.00	1.07	172.20	2,485.90	1.99	6.48	1.96	0.66
2,580.00	0.93	163.78	2,579.89	0.38	6.81	0.36	0.22
2,674.00	1.17	169.34	2,673.87	-1.29	7.20	-1.32	0.28
2,767.00	0.88	198.79	2,766.86	-2.90	7.14	-2.92	0.64
2,860.00	1.01	222.89	2,859.85	-4.18	6.36	-4.20	0.45
2,954.00	0.81	220.71	2,953.83	-5.29	5.36	-5.31	0.22
3,047.00	1.23	243.33	3,046.82	-6.23	4.04	-6.25	0.62
3,141.00	1.32	248.10	3,140.80	-7.09	2.13	-7.10	0.15
3,234.00	0.86	254.66	3,233.78	-7.68	0.46	-7.68	0.51
3,328.00	0.97	254.57	3,327.77	-8.07	-0.98	-8.07	0.12
3,421.00	1.53	251.42	3,420.75	-8.68	-2.92	-8.67	0.61
3,515.00	1.63	289.35	3,514.71	-8.64	-5.37	-8.62	1.10
3,608.00	1.28	295.45	3,607.68	-7.75	-7.56	-7.73	0.41
3,701.00	1.96	312.59	3,700.64	-6.23	-9.66	-6.20	0.89
3,795.00	0.58	272.17	3,794.62	-5.12	-11.32	-5.08	1.66
3,887.00	0.74	15.47	3,886.62	-4.53	-11.63	-4.49	1.13
3,981.00	0.64	346.97	3,980.61	-3.44	-11.59	-3.40	0.38
4,075.00	0.71	28.22	4,074.60	-2.41	-11.43	-2.37	0.51
4,168.00	0.55	52.70	4,167.60	-1.63	-10.80	-1.60	0.33
4,262.00	0.65	100.46	4,261.59	-1.46	-9.92	-1.42	0.53
4,354.00	1.31	77.06	4,353.58	-1.32	-8.38	-1.29	0.82
4,447.00	2.45	67.70	4,446.53	-0.32	-5.51	-0.30	1.27
4,541.00	1.33	85.55	4,540.48	0.52	-2.56	0.53	1.33
4,633.00	1.04	72.29	4,632.46	0.86	-0.70	0.86	0.43
4,727.00	1.03	60.96	4,726.44	1.53	0.85	1.53	0.22
4,821.00	0.52	65.79	4,820.43	2.12	1.98	2.11	0.55
4,916.00	0.98	47.61	4,915.43	2.84	2.97	2.83	0.54
5,009.00	1.05	51.17	5,008.41	3.91	4.22	3.90	0.10

Design Report for Hahn 1-4H - Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,103.00	0.77	45.85	5,102.40	4.89	5.35	4.87	0.31
5,197.00	0.20	135.81	5,196.40	5.21	5.92	5.19	0.85
5,291.00	0.34	111.83	5,290.39	4.99	6.29	4.97	0.19
5,384.00	0.13	126.89	5,383.39	4.83	6.63	4.80	0.23
5,477.00	0.22	277.82	5,476.39	4.79	6.54	4.76	0.37
5,571.00	0.06	336.99	5,570.39	4.86	6.34	4.83	0.21
5,664.00	0.32	281.32	5,663.39	4.95	6.07	4.93	0.31
5,758.00	0.25	179.82	5,757.39	4.80	5.81	4.78	0.47
5,850.00	0.41	333.94	5,849.39	4.89	5.67	4.87	0.70
5,944.00	0.47	128.92	5,943.39	4.95	5.82	4.93	0.91
6,038.00	0.53	186.39	6,037.39	4.28	6.07	4.26	0.51
6,080.00	0.54	154.13	6,079.39	3.91	6.13	3.89	0.71
6,100.00	0.09	128.31	6,099.39	3.81	6.19	3.79	2.30
6,132.00	1.01	328.54	6,131.38	4.04	6.06	4.02	3.42
6,163.00	4.90	340.32	6,162.34	5.52	5.47	5.50	12.63
6,195.00	9.14	349.20	6,194.09	9.30	4.53	9.29	13.64
6,226.00	13.15	351.02	6,224.50	15.21	3.52	15.20	12.98
6,257.00	17.10	354.28	6,254.42	23.23	2.52	23.22	13.03
6,288.00	19.43	352.39	6,283.86	32.88	1.38	32.87	7.75
6,320.00	22.41	347.24	6,313.75	44.10	-0.67	44.11	10.93
6,351.00	26.39	344.29	6,341.97	56.50	-3.85	56.52	13.42
6,382.00	30.58	345.10	6,369.21	70.76	-7.74	70.79	13.57
6,413.00	34.79	346.88	6,395.30	87.00	-11.78	87.04	13.93
6,444.00	39.43	346.86	6,420.02	105.21	-16.02	105.27	14.97
6,476.00	43.44	346.58	6,444.00	125.82	-20.89	125.89	12.54
6,507.00	46.79	347.82	6,465.88	147.24	-25.75	147.32	11.17
6,537.00	50.01	349.27	6,485.79	169.22	-30.20	169.32	11.33
6,569.00	52.50	349.12	6,505.82	193.73	-34.88	193.85	7.79
6,599.00	56.06	349.57	6,523.33	217.67	-39.38	217.80	11.93
6,630.00	59.74	350.81	6,539.80	243.54	-43.84	243.68	12.34
6,662.00	62.40	351.64	6,555.28	271.22	-48.11	271.37	8.62
6,693.00	66.57	352.95	6,568.63	298.93	-51.86	299.10	13.98
6,724.00	71.03	354.43	6,579.84	327.65	-55.03	327.83	15.06
6,754.00	76.37	353.93	6,588.25	356.29	-57.95	356.48	17.87
6,786.00	80.68	353.73	6,594.62	387.46	-61.32	387.66	13.48
6,817.00	82.46	354.67	6,599.16	417.97	-64.42	418.18	6.48
6,849.00	84.11	356.46	6,602.90	449.65	-66.87	449.87	7.58
6,880.00	84.91	356.68	6,605.87	480.45	-68.72	480.68	2.68
6,897.00	86.15	357.49	6,607.20	497.38	-69.58	497.61	8.70
6,973.00	89.81	359.41	6,609.87	573.29	-71.63	573.52	5.44
7,036.00	90.31	358.91	6,609.81	636.28	-72.56	636.52	1.12
7,100.00	90.62	0.15	6,609.29	700.27	-73.08	700.51	2.00
7,163.00	91.05	0.52	6,608.37	763.27	-72.71	763.50	0.90
7,226.00	90.31	0.93	6,607.62	826.26	-71.92	826.49	1.34
7,321.00	90.00	1.00	6,607.37	921.24	-70.32	921.47	0.33
7,385.00	90.62	0.93	6,607.02	985.23	-69.24	985.46	0.97
7,448.00	89.94	1.80	6,606.71	1,048.21	-67.74	1,048.43	1.75
7,511.00	89.57	1.40	6,606.98	1,111.19	-65.98	1,111.40	0.86
7,607.00	91.42	1.18	6,606.15	1,207.15	-63.82	1,207.36	1.94
7,671.00	90.12	1.67	6,605.29	1,271.13	-62.23	1,271.33	2.17
7,767.00	89.51	3.40	6,605.60	1,367.03	-57.98	1,367.21	1.91

Design Report for Hahn 1-4H - Sperry MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,829.00	91.11	2.79	6,605.27	1,428.93	-54.63	1,429.11	2.76
7,892.00	89.07	2.36	6,605.17	1,491.87	-51.80	1,492.03	3.31
7,956.00	89.13	2.50	6,606.17	1,555.80	-49.09	1,555.96	0.24
8,019.00	91.48	2.88	6,605.84	1,618.73	-46.13	1,618.87	3.78
8,083.00	91.42	3.19	6,604.22	1,682.62	-42.75	1,682.75	0.49
8,146.00	88.89	1.33	6,604.05	1,745.56	-40.26	1,745.68	4.98
8,208.00	89.63	1.47	6,604.85	1,807.54	-38.75	1,807.65	1.21
8,272.00	89.94	1.74	6,605.09	1,871.51	-36.95	1,871.62	0.64
8,335.00	89.13	359.97	6,605.60	1,934.50	-36.01	1,934.61	3.09
8,399.00	90.43	0.39	6,605.85	1,998.50	-35.81	1,998.60	2.13
8,462.00	90.74	359.00	6,605.20	2,061.49	-36.15	2,061.60	2.26
8,525.00	90.80	359.17	6,604.36	2,124.48	-37.15	2,124.59	0.29
8,588.00	89.07	358.22	6,604.43	2,187.46	-38.59	2,187.57	3.13
8,651.00	88.58	357.61	6,605.72	2,250.40	-40.88	2,250.52	1.24
8,714.00	89.32	357.84	6,606.87	2,313.34	-43.38	2,313.47	1.23
8,778.00	89.01	358.51	6,607.81	2,377.30	-45.42	2,377.44	1.15
8,841.00	90.25	358.28	6,608.21	2,440.27	-47.18	2,440.42	2.00
8,904.00	89.57	359.13	6,608.31	2,503.26	-48.61	2,503.40	1.73
8,967.00	89.63	359.45	6,608.75	2,566.25	-49.39	2,566.40	0.52
9,031.00	89.81	357.32	6,609.06	2,630.22	-51.19	2,630.38	3.34
9,094.00	90.43	357.02	6,608.93	2,693.14	-54.30	2,693.31	1.09
9,157.00	89.32	357.56	6,609.07	2,756.07	-57.28	2,756.25	1.96
9,220.00	90.25	357.78	6,609.31	2,819.02	-59.84	2,819.20	1.52
9,284.00	90.43	359.64	6,608.93	2,883.00	-61.28	2,883.18	2.92
9,347.00	88.58	359.71	6,609.47	2,945.99	-61.64	2,946.18	2.94
9,411.00	89.01	359.23	6,610.82	3,009.97	-62.23	3,010.16	1.01
9,474.00	90.37	359.07	6,611.16	3,072.96	-63.17	3,073.16	2.17
9,537.00	89.88	359.77	6,611.02	3,135.96	-63.80	3,136.16	1.36
9,600.00	92.04	1.42	6,609.96	3,198.94	-63.15	3,199.13	4.31
9,663.00	91.05	0.57	6,608.27	3,261.91	-62.06	3,262.10	2.07
9,726.00	90.93	3.80	6,607.18	3,324.84	-59.66	3,325.02	5.13
9,789.00	89.69	4.43	6,606.84	3,387.68	-55.14	3,387.84	2.21
9,853.00	89.20	4.85	6,607.46	3,451.47	-49.96	3,451.61	1.01
9,916.00	88.45	4.11	6,608.75	3,514.26	-45.04	3,514.39	1.67
9,979.00	89.26	3.69	6,610.01	3,577.10	-40.75	3,577.22	1.45
10,042.00	88.58	3.97	6,611.19	3,639.95	-36.55	3,640.05	1.17
10,106.00	89.88	4.16	6,612.05	3,703.78	-32.01	3,703.87	2.05
10,200.00	90.37	4.39	6,611.85	3,797.52	-25.00	3,797.58	0.58
10,263.00	89.20	4.16	6,612.09	3,860.34	-20.31	3,860.39	1.89
10,326.00	90.00	4.53	6,612.53	3,923.16	-15.53	3,923.19	1.40
10,389.00	89.69	3.83	6,612.70	3,985.99	-10.94	3,986.00	1.22
10,452.00	90.12	3.95	6,612.80	4,048.84	-6.67	4,048.84	0.71
10,504.00	91.17	4.24	6,612.22	4,100.71	-2.96	4,100.70	2.09
Last MWD Survey							
10,544.00	91.17	4.24	6,611.40	4,140.59	0.00	4,140.57	0.00
Straight Line Projection to TD							

Design Report for Hahn 1-4H - Sperry MWD Survey**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
637.00	637.00	0.63	1.60	First MWD Survey
10,504.00	6,612.22	4,100.71	-2.96	Last MWD Survey
10,544.00	6,611.40	4,140.59	0.00	Straight Line Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Hahn 1-4H Plan A BHL	359.81	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
637.00	10,544.00	Sperry MWD Surveys	MWD

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
Hahn 1-4H Section	0.00	0.00	0.00	0.00	0.00	1,462,563.41	3,327,919.81	40° 35' 49.708 N	104° 19' 8.850 W
- actual wellpath hits target center									
- Polygon									
Point 1				701.50	-474.60	1,462,088.82	3,328,621.29		
Point 2				692.78	2,166.22	1,464,729.57	3,328,612.57		
Point 3				683.87	4,807.10	1,467,370.39	3,328,603.66		
Point 4				-4,652.23	4,762.66	1,467,325.95	3,323,267.70		
Point 5				-4,598.14	-518.07	1,462,045.35	3,323,321.79		
Point 6				-1,948.30	-496.30	1,462,067.12	3,325,971.56		
Hahn 1-4H Setbacks	0.00	0.00	0.00	0.00	0.00	1,462,563.41	3,327,919.81	40° 35' 49.708 N	104° 19' 8.850 W
- actual wellpath hits target center									
- Polygon									
Point 1				101.50	125.40	1,462,688.80	3,328,021.31		
Point 2				92.78	2,166.22	1,464,729.57	3,328,012.59		
Point 3				83.87	4,207.10	1,466,770.40	3,328,003.68		
Point 4				-4,052.23	4,162.66	1,466,725.96	3,323,867.68		
Point 5				-3,998.14	81.93	1,462,645.34	3,323,921.77		
Point 6				-2,548.30	103.70	1,462,667.10	3,325,371.57		
Point 7				101.50	125.40	1,462,688.80	3,328,021.31		
Hahn 1-4H Plan A	0.00		6,660.00	4,141.46	-13.78	1,466,704.76	3,327,906.03	40° 36' 30.629 N	104° 19' 8.314 W
- actual wellpath misses target center by 50.51ft at 10542.86ft MD (6611.42 TVD, 4139.45 N, -0.08 E)									
- Point									

North Reference Sheet for Sec. 4-T7N-R62W - Hahn 1-4H - Plan A

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

Vertical Depths are relative to RKB 16' @ 4864.00ft (Hahn 1-4H). Northing and Easting are relative to Hahn 1-4H

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: 0.99997508

Grid Coordinates of Well: 1,462,563.41 ft N, 3,327,919.81 ft E

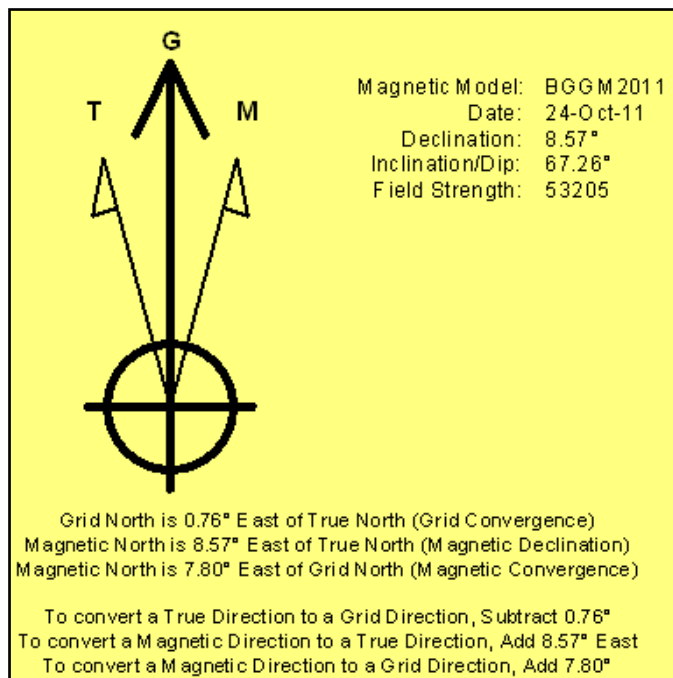
Geographical Coordinates of Well: 40° 35' 49.71" N, 104° 19' 08.85" W

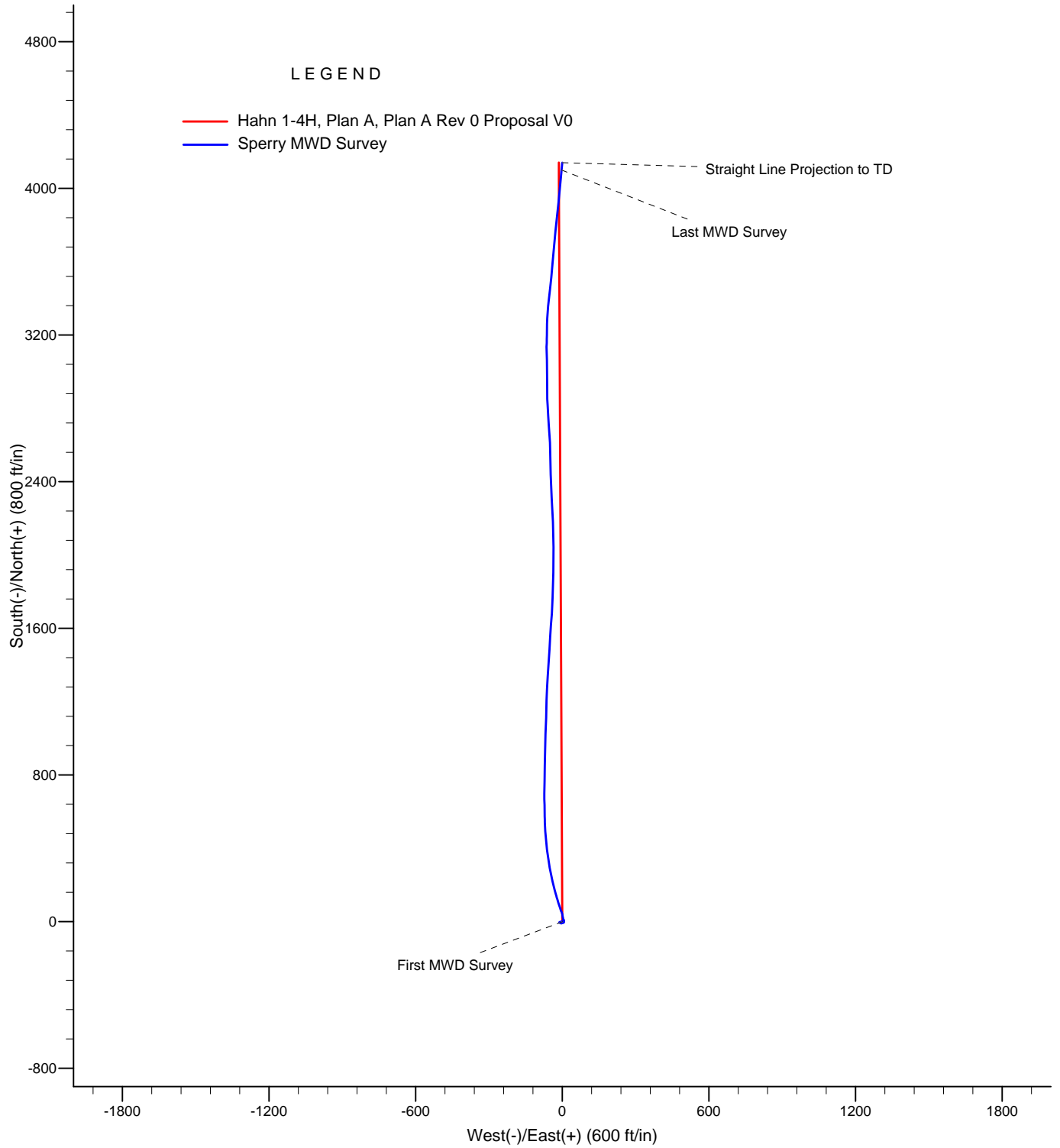
Grid Convergence at Surface is: 0.76°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,544.00ft

the Bottom Hole Displacement is 4,140.59ft in the Direction of 0.00° (Grid).

Magnetic Convergence at surface is: -7.80° (24 October 2011, , BGGM2011)





Project: Weld County, CO
Site: Sec. 4-T7N-R62W
Well: Hahn 1-4H

Continental Resources, Inc.

HALLIBURTON
Sperry Drilling

