

EnCana Oil & Gas (USA) Inc.

Garfield County, CO
Sec. 15-T7S-R101W
DHS1C-15 G15 7101

Plan B Rev 1

Design: Actual Field Surveys

Sperry Drilling Services Standard Report

10 May, 2012

Well Coordinates: 1,602,911.66 N, 2,111,637.93 E (39° 26' 47.49" N, 108° 38' 47.04" W)
Ground Level: 6,377.00 ft

Local Coordinate Origin:	Centered on Well DHS1C-15 G15 7101
Viewing Datum:	RKB (32') @ 6409.00ft (Patterson #326)
TVDs to System:	N
North Reference:	True
Unit System:	API - US Survey Feet - Custom
Geodetic Scale Factor Applied	
Version: 2003.16 Build: 431	

HALLIBURTON

Design Report for DHS1C-15 G15 7101 - Actual Field Surveys

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
208.00	1.50	29.90	207.98	2.36	1.36	2.69	0.72
First Cathedral Survey							
300.00	2.70	40.10	299.91	5.06	3.35	6.04	1.36
392.00	4.50	43.60	391.73	9.33	7.24	11.81	1.97
484.00	7.30	42.30	483.23	16.27	13.66	21.24	3.05
576.00	9.10	39.50	574.29	26.21	22.22	34.36	2.00
671.00	10.90	40.70	667.84	38.82	32.86	50.85	1.91
766.00	11.90	40.90	760.97	53.03	45.13	69.62	1.05
861.00	11.40	37.50	854.01	67.88	57.26	88.80	0.89
970.00	12.00	37.80	960.74	85.38	70.76	110.89	0.55
1,056.00	12.10	36.10	1,044.85	99.73	81.55	128.83	0.43
1,151.00	11.60	36.40	1,137.82	115.46	93.09	148.31	0.53
1,246.00	11.50	40.70	1,230.90	130.33	104.93	167.32	0.91
1,340.00	11.20	41.40	1,323.06	144.28	117.08	185.81	0.35
1,434.00	11.60	39.70	1,415.21	158.40	129.15	204.38	0.56
1,529.00	11.60	38.10	1,508.27	173.27	141.15	223.48	0.34
1,624.00	11.30	35.10	1,601.38	188.40	152.39	242.31	0.70
1,719.00	10.80	39.50	1,694.62	202.88	163.41	260.50	1.03
1,812.00	10.40	40.00	1,786.03	216.03	174.34	277.60	0.44
1,907.00	10.90	39.70	1,879.40	229.51	185.59	295.16	0.53
2,002.00	10.60	40.10	1,972.73	243.11	196.96	312.88	0.33
2,096.00	10.40	38.70	2,065.15	256.34	207.83	330.01	0.34
2,191.00	11.10	36.40	2,158.49	270.39	218.62	347.71	0.86
2,286.00	11.50	38.20	2,251.65	285.20	229.90	366.31	0.56
2,381.00	11.40	36.60	2,344.75	300.18	241.36	385.16	0.35
2,475.00	11.60	37.80	2,436.87	315.10	252.69	403.89	0.33
2,570.00	11.50	41.70	2,529.95	329.72	264.84	422.90	0.83
2,665.00	11.20	40.60	2,623.09	343.80	277.15	441.58	0.39
2,760.00	11.10	40.40	2,716.29	357.77	289.08	459.95	0.11
2,855.00	10.80	38.20	2,809.57	371.72	300.51	477.99	0.54
2,950.00	10.70	40.20	2,902.90	385.45	311.71	495.71	0.41
3,044.00	11.40	42.70	2,995.16	398.95	323.64	513.71	0.90
3,139.00	11.00	41.70	3,088.35	412.61	336.04	532.14	0.47
3,234.00	10.80	44.30	3,181.63	425.75	348.28	550.06	0.56
3,328.00	11.50	43.00	3,273.86	438.91	360.82	568.18	0.79
3,423.00	10.90	40.10	3,367.05	452.70	373.07	586.61	0.87
3,518.00	10.00	34.80	3,460.47	466.35	383.56	603.82	1.39
3,613.00	10.20	34.80	3,554.00	480.03	393.07	620.43	0.21
3,708.00	10.30	39.40	3,647.49	493.50	403.26	637.31	0.87
3,802.00	11.20	41.80	3,739.84	506.80	414.68	654.83	1.07
3,897.00	11.30	43.30	3,833.01	520.45	427.21	673.33	0.33
3,992.00	11.80	42.50	3,926.09	534.39	440.16	692.32	0.55
4,087.00	11.50	43.00	4,019.13	548.47	453.18	711.46	0.33
4,181.00	11.50	39.30	4,111.25	562.58	465.50	730.19	0.78
4,275.00	11.40	37.50	4,203.38	577.20	477.09	748.84	0.39
4,370.00	11.50	39.00	4,296.48	592.01	488.77	767.70	0.33
4,465.00	12.60	36.30	4,389.39	607.72	500.86	787.51	1.30
4,560.00	11.30	33.40	4,482.33	623.84	512.12	807.12	1.51
4,654.00	11.10	35.10	4,574.54	638.93	522.39	825.31	0.41

Design Report for DHS1C-15 G15 7101 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,749.00	11.00	39.40	4,667.78	653.42	533.41	843.49	0.87
4,844.00	11.30	40.00	4,760.99	667.55	545.14	861.86	0.34
4,939.00	11.80	39.80	4,854.06	682.14	557.34	880.88	0.53
5,025.00	11.00	41.80	4,938.37	695.02	568.44	897.87	1.04
Final Cathedral Survey - Tie on to Cathedral Surveys at 5025.00ft							
5,140.00	9.07	39.29	5,051.60	710.21	581.49	917.90	1.72
First Sperry MWD Survey							
5,172.00	8.38	38.50	5,083.23	713.99	584.54	922.75	2.19
5,204.00	7.86	35.45	5,114.91	717.60	587.26	927.27	2.11
5,235.00	7.34	41.30	5,145.64	720.81	589.80	931.36	3.01
5,267.00	7.64	61.52	5,177.37	723.36	593.02	935.37	8.25
5,299.00	9.79	82.34	5,209.01	724.74	597.59	939.33	11.83
5,330.00	10.08	87.44	5,239.54	725.21	602.91	943.07	2.99
5,362.00	8.63	84.67	5,271.12	725.56	608.10	946.62	4.74
5,394.00	7.09	90.58	5,302.82	725.76	612.46	949.54	5.43
5,425.00	5.33	103.64	5,333.64	725.40	615.78	951.36	7.25
5,457.00	4.46	110.52	5,365.52	724.62	618.39	952.40	3.28
5,488.00	3.64	109.43	5,396.44	723.87	620.44	953.13	2.66
5,520.00	2.95	108.55	5,428.39	723.27	622.18	953.76	2.16
5,552.00	3.52	119.65	5,460.34	722.52	623.82	954.22	2.64
5,583.00	7.08	128.61	5,491.20	720.86	626.14	954.40	11.76
5,615.00	9.24	138.00	5,522.88	717.72	629.40	954.03	7.91
5,646.00	11.27	143.68	5,553.38	713.43	632.86	952.90	7.31
5,678.00	13.21	146.49	5,584.65	707.86	636.73	951.04	6.34
5,710.00	15.18	148.95	5,615.67	701.22	640.91	948.55	6.44
5,741.00	18.27	151.68	5,645.36	693.46	645.31	945.33	10.28
5,773.00	21.61	151.62	5,675.44	683.86	650.49	941.18	10.44
5,804.00	24.98	151.70	5,703.90	673.07	656.31	936.51	10.87
5,836.00	28.26	153.17	5,732.51	660.36	662.93	930.86	10.45
5,868.00	30.35	156.18	5,760.41	646.20	669.62	924.14	7.99
5,899.00	33.19	157.12	5,786.77	631.21	676.08	916.63	9.30
5,931.00	37.28	158.72	5,812.90	614.11	683.01	907.77	13.10
5,963.00	40.86	160.21	5,837.74	595.22	690.07	897.62	11.57
5,994.00	44.34	159.92	5,860.55	575.50	697.23	886.89	11.24
6,023.00	48.03	160.84	5,880.63	555.79	704.25	876.08	12.93
6,048.00	51.23	162.95	5,896.82	537.69	710.16	865.81	14.32
6,080.00	52.99	165.13	5,916.47	513.41	717.09	851.40	7.69
6,111.00	55.33	167.09	5,934.63	489.01	723.12	836.34	9.12
6,143.00	57.14	169.19	5,952.41	462.98	728.58	819.64	7.86
6,175.00	58.88	171.64	5,969.37	436.22	733.09	801.79	8.47
6,206.00	59.87	173.55	5,985.16	409.77	736.53	783.49	6.19
6,238.00	61.54	175.83	6,000.82	381.99	739.11	763.61	8.11
6,270.00	63.54	176.97	6,015.57	353.65	740.89	742.80	7.00
6,301.00	66.56	177.84	6,028.65	325.58	742.16	721.88	10.07
6,333.00	71.16	178.69	6,040.19	295.75	743.06	699.36	14.59
6,364.00	74.27	179.72	6,049.40	266.16	743.46	676.71	10.52
6,396.00	77.93	180.30	6,057.08	235.10	743.46	652.67	11.57
6,428.00	80.28	181.31	6,063.13	203.68	743.02	628.07	7.97
6,459.00	83.04	182.01	6,067.63	173.03	742.13	603.77	9.18
6,491.00	85.46	182.58	6,070.83	141.22	740.85	578.34	7.77
6,522.00	86.17	183.00	6,073.09	110.34	739.35	553.49	2.66

Design Report for DHS1C-15 G15 7101 - Actual Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,554.00	86.27	183.42	6,075.20	78.46	737.56	527.68	1.35
6,586.00	86.40	183.23	6,077.25	46.57	735.71	501.83	0.72
6,617.00	86.10	183.50	6,079.28	15.69	733.89	476.77	1.30
6,649.00	85.93	183.68	6,081.50	-16.17	731.89	450.85	0.77
6,681.00	85.93	183.87	6,083.77	-48.02	729.79	424.86	0.59
6,744.00	89.70	183.64	6,086.17	-110.82	725.67	373.63	6.00
6,775.00	90.60	183.03	6,086.09	-141.77	723.86	348.54	3.51
6,807.00	90.34	183.39	6,085.83	-173.72	722.07	322.67	1.39
6,839.00	91.04	182.71	6,085.44	-205.67	720.37	296.86	3.05
6,870.00	92.08	181.24	6,084.60	-236.64	719.30	272.21	5.81
6,965.00	92.85	180.59	6,080.51	-331.54	717.79	197.79	1.06
7,060.00	92.22	180.56	6,076.31	-426.44	716.83	123.73	0.66
7,155.00	91.98	180.87	6,072.83	-521.37	715.65	49.50	0.41
7,250.00	92.99	181.56	6,068.71	-616.26	713.64	-25.22	1.29
7,344.00	90.37	181.93	6,065.96	-710.16	710.78	-99.73	2.81
7,439.00	91.11	181.19	6,064.73	-805.12	708.19	-174.87	1.10
7,534.00	92.02	180.72	6,062.14	-900.07	706.61	-249.37	1.08
7,629.00	91.65	180.71	6,059.09	-995.01	705.42	-323.61	0.39
7,724.00	91.44	180.47	6,056.53	-1,089.97	704.44	-397.74	0.34
7,818.00	92.85	180.32	6,053.01	-1,183.90	703.80	-470.85	1.51
7,913.00	92.45	180.29	6,048.62	-1,278.80	703.29	-544.63	0.42
8,008.00	91.34	180.30	6,045.48	-1,373.75	702.80	-618.43	1.17
8,102.00	90.37	179.95	6,044.08	-1,467.73	702.60	-691.32	1.10
8,197.00	90.74	179.71	6,043.16	-1,562.73	702.88	-764.67	0.46
8,292.00	91.08	179.66	6,041.65	-1,657.71	703.40	-837.87	0.36
8,387.00	91.64	178.07	6,039.39	-1,752.67	705.28	-910.18	1.77
8,482.00	91.21	176.75	6,037.03	-1,847.54	709.57	-980.90	1.46
8,576.00	90.77	176.93	6,035.41	-1,941.38	714.76	-1,050.26	0.51
8,671.00	91.41	177.29	6,033.60	-2,036.24	719.54	-1,120.66	0.77
8,766.00	91.44	178.23	6,031.24	-2,131.14	723.26	-1,191.76	0.99
8,874.00	91.08	178.87	6,028.86	-2,239.08	725.99	-1,273.58	0.68
8,924.00	91.91	179.52	6,027.56	-2,289.05	726.69	-1,311.83	2.11
8,956.00	92.72	178.91	6,026.26	-2,321.02	727.13	-1,336.30	3.17
9,051.00	92.45	180.33	6,021.98	-2,415.92	727.76	-1,409.36	1.52
9,146.00	92.32	180.17	6,018.03	-2,510.84	727.34	-1,483.09	0.22
9,240.00	92.15	180.47	6,014.36	-2,604.77	726.82	-1,556.13	0.37
9,311.00	92.31	178.18	6,011.60	-2,675.70	727.65	-1,610.51	3.23
Final Sperry MWD Survey							
9,371.00	92.31	178.18	6,009.18	-2,735.62	729.56	-1,655.69	0.00
Straight Line Projection to Bit							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
208.00	207.98	2.36	1.36	First Cathedral Survey
5,025.00	4,938.37	695.02	568.44	Final Cathedral Survey
5,025.00	4,938.37	695.02	568.44	Tie on to Cathedral Surveys at 5025.00ft
5,140.00	5,051.60	710.21	581.49	First Sperry MWD Survey
9,311.00	6,011.60	-2,675.70	727.65	Final Sperry MWD Survey
9,371.00	6,009.18	-2,735.62	729.56	Straight Line Projection to Bit

Design Report for DHS1C-15 G15 7101 - Actual Field Surveys**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	39.28	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
208.00	5,025.00	Cathedral MWD Surveys	MWD
5,140.00	9,371.00	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
DHS1C-15 G15_Plan I	0.00	0.00	6,012.00	-2,739.43	710.91	1,600,149.38	2,112,253.53	39° 26' 20.415 N	108° 38' 37.979 W
- actual wellpath misses target center by 19.24ft at 9371.00ft MD (6009.18 TVD, -2735.62 N, 729.56 E)									
- Point									
DHS1C-15 G15_Plan /	0.00	0.00	6,085.00	17.20	712.30	1,602,904.19	2,112,350.37	39° 26' 47.660 N	108° 38' 37.960 W
- actual wellpath misses target center by 22.39ft at 6617.25ft MD (6079.29 TVD, 15.45 N, 733.88 E)									
- Point									
DHS1C-15 G15_Plan /	0.00	0.00	10.00	0.00	0.00	1,602,911.66	2,111,637.93	39° 26' 47.490 N	108° 38' 47.040 W
- actual wellpath hits target center									
- Polygon									
Point 1				304.20	-2,740.52	1,600,162.38	2,111,847.04		
Point 2				1,505.13	-2,735.38	1,600,125.93	2,113,047.38		
Point 3				1,508.64	-120.06	1,602,739.44	2,113,141.44		
Point 4				2,809.44	-143.26	1,602,671.22	2,114,440.60		
Point 5				2,789.81	1,056.02	1,603,870.40	2,114,462.51		
Point 6				284.67	1,032.56	1,603,933.70	2,111,958.17		
DHS1C-15 G15_Plan /	0.00	0.00	10.00	0.00	0.00	1,602,911.66	2,111,637.93	39° 26' 47.490 N	108° 38' 47.040 W
- actual wellpath hits target center									
- Polygon									
Point 1				254.20	-2,790.52	1,600,114.14	2,111,795.35		
Point 2				1,555.13	-2,785.38	1,600,074.23	2,113,095.61		
Point 3				1,558.64	-170.06	1,602,687.74	2,113,189.68		
Point 4				2,859.44	-193.26	1,602,619.52	2,114,488.84		
Point 5				2,839.81	1,106.02	1,603,918.64	2,114,514.21		
Point 6				234.67	1,082.56	1,603,985.40	2,111,909.94		

North Reference Sheet for Sec. 15-T7S-R101W - DHS1C-15 G15 7101 - Plan B Rev**1**

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

Vertical Depths are relative to RKB (32') @ 6409.00ft (Patterson #326). Northing and Easting are relative to DHS1C-15 G15 7101

Coordinate System is US State Plane 1983, Colorado Central 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:39° 45' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995405

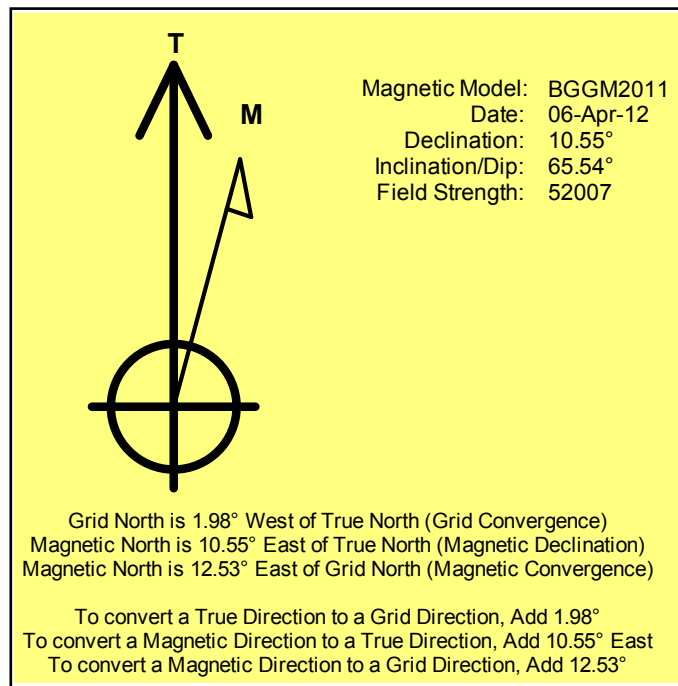
Grid Coordinates of Well: 1,602,911.66 ft N, 2,111,637.93 ft E

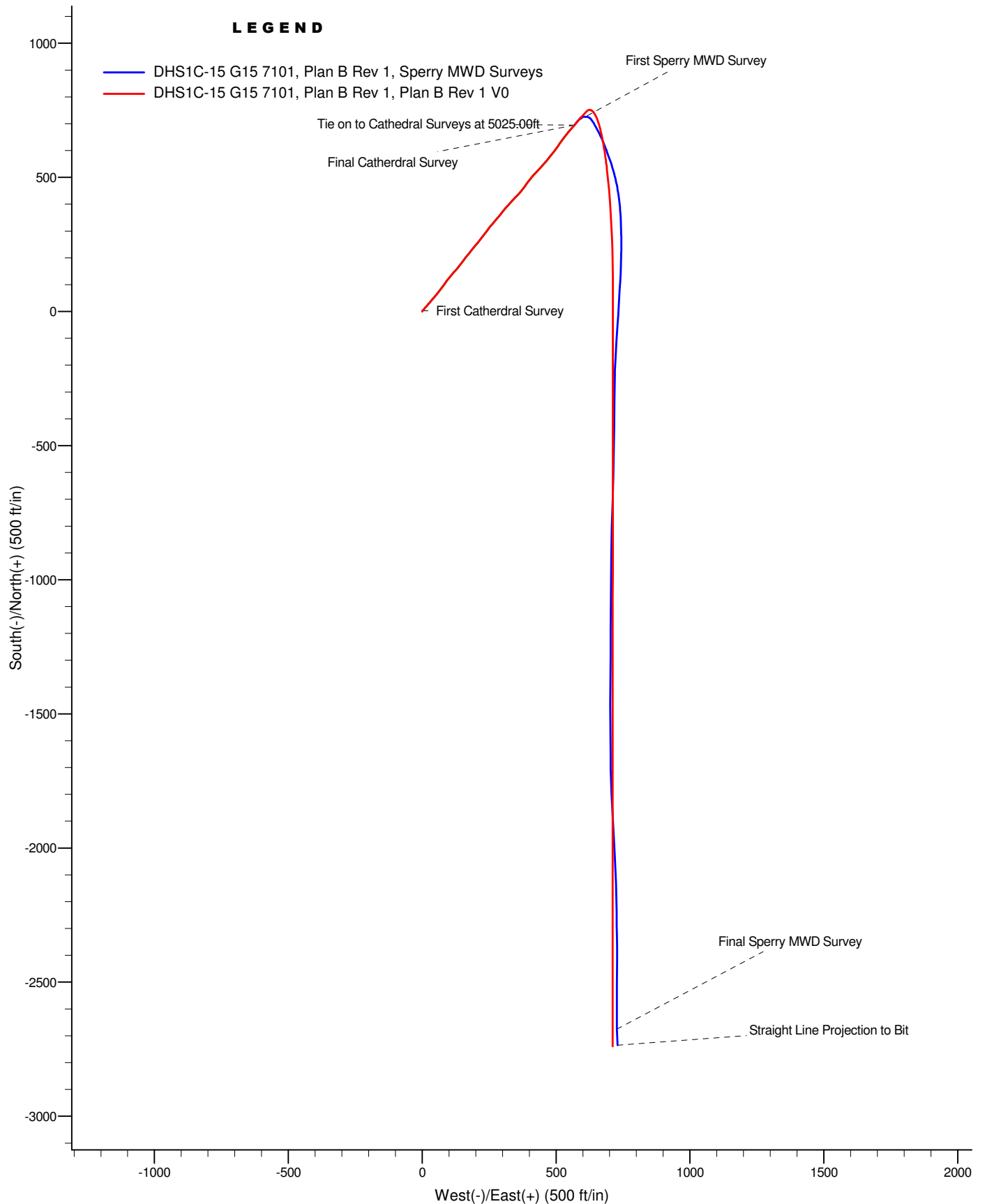
Geographical Coordinates of Well: 39° 26' 47.49" N, 108° 38' 47.04" W

Grid Convergence at Surface is: -1.98°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,371.00ft
the Bottom Hole Displacement is 2,831.24ft in the Direction of 165.07° (True).

Magnetic Convergence at surface is: -12.53° (6 April 2012, , BGGM2011)





LEGEND

- DHS1C-15 G15 7101, Plan B Rev 1, Sperry MWD Surveys
- DHS1C-15 G15 7101, Plan B Rev 1, Plan B Rev 1 V0

