

Whiting Oil and Gas Corporation

Weld County, CO
Sec. 26-T10N-R58W
Razor #26I-2316B

Plan D

Design: Actual Field Surveys

Sperry Drilling Services Standard Report

01 July, 2014

Well Coordinates: 1,541,696.32 N, 3,463,674.30 E (40° 48' 29.94" N, 103° 49' 29.91" W)
Ground Level: 4,712.00 usft

Local Coordinate Origin:

Centered on Well Razor #26I-2316B

Viewing Datum:

KB 21' @ 4733.00usft (Frontier 26)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

Design Report for Razor #26I-2316B - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170.00	0.49	293.83	170.00	0.29	-0.66	0.26	0.29
262.00	0.58	288.39	261.99	0.60	-1.47	0.53	0.11
352.00	0.62	307.62	351.99	1.04	-2.28	0.93	0.23
443.00	0.39	16.69	442.99	1.64	-2.59	1.52	0.66
535.00	1.50	78.07	534.97	2.19	-1.32	2.12	1.48
626.00	2.60	79.75	625.91	2.80	1.88	2.88	1.21
717.00	3.54	86.27	716.78	3.35	6.71	3.66	1.10
808.00	3.94	85.40	807.59	3.78	12.63	4.37	0.44
899.00	4.78	76.90	898.33	4.89	19.44	5.79	1.16
990.00	5.06	76.57	988.99	6.69	27.04	7.93	0.31
1,082.00	5.05	78.14	1,080.63	8.46	34.95	10.07	0.15
1,173.00	5.46	78.65	1,171.25	10.13	43.11	12.12	0.45
1,265.00	5.56	77.17	1,262.82	11.99	51.75	14.37	0.19
1,356.00	5.51	76.84	1,353.40	13.96	60.30	16.74	0.07
1,448.00	5.39	70.71	1,444.99	16.39	68.68	19.56	0.65
1,523.00	5.08	61.99	1,519.67	19.12	74.94	22.57	1.14
1,637.00	5.38	71.66	1,633.20	23.17	84.47	27.06	0.82
1,729.00	5.12	69.09	1,724.82	25.99	92.40	30.25	0.38
1,819.00	5.10	67.01	1,814.46	28.99	99.83	33.58	0.21
1,911.00	4.89	68.84	1,906.11	32.00	107.25	36.94	0.29
2,002.00	4.61	87.94	1,996.80	33.53	114.52	38.81	1.76
2,093.00	4.49	88.06	2,087.51	33.78	121.74	39.39	0.13
2,184.00	3.72	81.13	2,178.28	34.36	128.21	40.27	1.01
2,276.00	4.00	90.00	2,270.07	34.82	134.37	41.01	0.72
2,367.00	4.39	75.04	2,360.83	35.72	140.91	42.21	1.27
2,459.00	4.35	72.36	2,452.56	37.68	147.64	44.49	0.23
2,551.00	4.72	70.67	2,544.28	39.99	154.53	47.12	0.43
2,642.00	4.82	71.19	2,634.96	42.47	161.69	49.92	0.12
2,733.00	4.80	68.22	2,725.64	45.11	168.84	52.89	0.27
2,824.00	2.63	59.19	2,816.44	47.59	174.17	55.62	2.46
2,916.00	3.15	74.79	2,908.33	49.34	178.42	57.56	1.02
3,007.00	3.03	87.40	2,999.20	50.10	183.24	58.55	0.76
3,098.00	2.04	84.99	3,090.11	50.35	187.25	58.98	1.09
3,190.00	2.56	76.24	3,182.03	50.98	190.88	59.78	0.68
3,282.00	3.21	53.96	3,273.92	52.99	194.96	61.97	1.40
3,373.00	3.46	51.33	3,364.76	56.20	199.16	65.38	0.32
3,465.00	4.05	51.88	3,456.57	59.94	203.89	69.34	0.64
3,557.00	4.15	65.95	3,548.33	63.31	209.48	72.95	1.10
3,649.00	4.37	68.04	3,640.08	65.97	215.77	75.91	0.29
3,740.00	4.72	78.91	3,730.79	67.99	222.66	78.24	1.02
3,832.00	3.63	87.00	3,822.55	68.87	229.29	79.43	1.34
3,924.00	3.91	94.13	3,914.35	68.80	235.32	79.64	0.59
4,015.00	3.86	92.32	4,005.14	68.45	241.48	79.58	0.15
4,106.00	4.11	81.06	4,095.92	68.83	247.76	80.25	0.90
4,197.00	4.95	67.66	4,186.64	70.83	254.61	82.56	1.48
4,288.00	4.60	71.42	4,277.33	73.49	261.70	85.55	0.52
4,380.00	4.03	60.37	4,369.07	76.26	268.01	88.61	1.09
4,471.00	3.76	38.41	4,459.86	80.18	272.64	92.74	1.66
4,563.00	3.56	38.62	4,551.67	84.78	276.30	97.50	0.22

Design Report for Razor #26I-2316B - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,653.00	2.45	60.32	4,641.55	87.91	279.72	100.79	1.75
4,748.00	1.93	50.02	4,736.48	89.94	282.71	102.96	0.68
4,843.00	1.97	60.80	4,831.43	91.77	285.36	104.91	0.39
4,938.00	1.22	33.87	4,926.39	93.41	287.35	106.63	1.10
5,033.00	1.39	59.67	5,021.37	94.83	288.91	108.12	0.64
5,064.00	1.63	54.57	5,052.36	95.27	289.59	108.60	0.89
5,096.00	1.45	19.96	5,084.34	95.92	290.10	109.27	2.91
5,127.00	3.75	7.02	5,115.31	97.29	290.36	110.65	7.61
5,159.00	7.37	4.62	5,147.16	100.38	290.65	113.75	11.33
5,191.00	9.40	5.39	5,178.81	105.03	291.06	118.41	6.35
5,222.00	13.03	5.80	5,209.21	111.02	291.65	124.43	11.71
5,254.00	17.10	8.54	5,240.11	119.27	292.71	132.72	12.91
5,286.00	20.71	10.79	5,270.38	129.48	294.47	143.00	11.51
5,317.00	25.34	12.76	5,298.90	141.34	296.97	154.97	15.14
5,349.00	30.02	15.83	5,327.23	155.73	300.66	169.51	15.28
5,380.00	33.54	15.89	5,353.58	171.44	305.13	185.40	11.36
5,412.00	37.20	13.48	5,379.67	189.35	309.80	203.52	12.24
5,443.00	41.25	10.31	5,403.68	208.53	313.82	222.86	14.57
5,475.00	45.40	8.52	5,426.96	230.19	317.40	244.66	13.52
5,507.00	51.27	7.45	5,448.22	253.85	320.71	268.45	18.51
5,538.00	57.04	6.71	5,466.37	278.78	323.80	293.49	18.71
5,570.00	60.22	6.72	5,483.02	305.91	326.99	320.75	9.94
5,602.00	62.72	8.15	5,498.31	333.78	330.63	348.76	8.74
5,633.00	63.36	8.91	5,512.36	361.11	334.73	376.24	3.01
5,665.00	65.55	10.01	5,526.16	389.58	339.48	404.91	7.51
5,696.00	66.50	10.29	5,538.76	417.47	344.47	432.99	3.17
5,728.00	66.73	10.65	5,551.46	446.35	349.81	462.09	1.26
5,760.00	67.77	10.61	5,563.83	475.35	355.25	491.32	3.25
5,791.00	70.12	11.25	5,574.97	503.75	360.74	519.94	7.82
5,823.00	73.25	11.38	5,585.02	533.54	366.70	549.97	9.79
5,855.00	74.75	11.84	5,593.84	563.67	372.89	580.36	4.89
5,886.00	75.07	12.15	5,601.91	592.95	379.11	609.89	1.41
5,918.00	76.46	12.12	5,609.78	623.27	385.63	640.49	4.34
5,950.00	78.91	12.23	5,616.61	653.83	392.22	671.32	7.66
5,981.00	81.63	11.51	5,621.85	683.73	398.51	701.47	9.07
5,988.00	81.78	11.52	5,622.86	690.51	399.89	708.32	2.15
6,074.00	88.17	9.73	5,630.39	774.67	415.67	793.11	7.71
6,137.00	89.41	8.24	5,631.72	836.88	425.50	855.71	3.08
6,201.00	90.12	7.22	5,631.98	900.30	434.11	919.46	1.94
6,296.00	90.37	5.54	5,631.57	994.70	444.67	1,014.26	1.79
6,391.00	90.68	1.92	5,630.70	1,089.48	450.85	1,109.22	3.82
6,486.00	91.14	359.05	5,629.19	1,184.46	451.65	1,204.13	3.06
6,580.00	89.11	355.71	5,628.99	1,278.34	447.36	1,297.71	4.16
6,675.00	89.76	355.21	5,629.92	1,373.04	439.84	1,391.96	0.86
6,770.00	90.79	355.44	5,629.47	1,467.72	432.09	1,486.18	1.11
6,865.00	91.92	354.73	5,627.22	1,562.34	423.96	1,580.32	1.40
6,960.00	90.31	354.73	5,625.37	1,656.92	415.23	1,674.39	1.69
7,055.00	91.05	354.37	5,624.25	1,751.48	406.21	1,768.44	0.87
7,151.00	90.09	357.93	5,623.29	1,847.24	399.77	1,863.80	3.84
7,245.00	89.74	353.82	5,623.43	1,940.98	393.01	1,957.12	4.39

Design Report for Razor #26I-2316B - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7,340.00	89.41	355.31	5,624.13	2,035.55	384.01	2,051.17	1.61
7,435.00	89.66	356.71	5,624.91	2,130.31	377.40	2,145.52	1.50
7,530.00	90.42	358.84	5,624.84	2,225.23	373.71	2,240.17	2.38
7,625.00	88.67	359.37	5,625.59	2,320.21	372.23	2,334.98	1.92
7,719.00	91.20	2.19	5,625.70	2,414.19	373.51	2,428.91	4.03
7,814.00	89.99	1.24	5,624.71	2,509.14	376.35	2,523.89	1.62
7,909.00	90.36	2.00	5,624.42	2,604.10	379.04	2,618.88	0.89
8,004.00	89.63	2.29	5,624.43	2,699.03	382.59	2,713.87	0.83
8,099.00	90.89	2.77	5,624.00	2,793.93	386.78	2,808.87	1.42
8,194.00	88.32	0.32	5,624.66	2,888.88	389.35	2,903.83	3.74
8,289.00	88.81	359.81	5,627.03	2,983.85	389.45	2,998.70	0.74
8,384.00	88.71	359.18	5,629.09	3,078.83	388.62	3,093.54	0.67
8,479.00	88.43	358.46	5,631.46	3,173.78	386.66	3,188.29	0.81
8,574.00	88.46	358.23	5,634.04	3,268.70	383.92	3,282.99	0.24
8,665.00	88.17	359.16	5,636.71	3,359.64	381.85	3,373.73	1.07
8,756.00	89.23	357.96	5,638.78	3,450.58	379.56	3,464.47	1.76
8,847.00	91.39	358.20	5,638.29	3,541.52	376.51	3,555.18	2.39
8,938.00	89.35	358.61	5,637.70	3,632.48	373.98	3,645.92	2.29
9,030.00	91.22	0.82	5,637.24	3,724.47	373.52	3,737.79	3.15
9,121.00	94.06	0.80	5,633.05	3,815.35	374.81	3,828.63	3.12
9,181.00	93.32	0.83	5,629.19	3,875.22	375.66	3,888.48	1.23
9,242.00	92.23	2.06	5,626.24	3,936.13	377.19	3,949.39	2.69
9,303.00	88.70	3.74	5,625.74	3,997.04	380.28	4,010.37	6.41
9,394.00	89.37	1.84	5,627.27	4,087.91	384.71	4,101.36	2.21
9,485.00	87.35	359.04	5,629.88	4,178.86	385.41	4,192.24	3.79
9,577.00	87.41	358.35	5,634.08	4,270.74	383.31	4,283.92	0.75
9,668.00	87.92	359.48	5,637.79	4,361.65	381.59	4,374.65	1.36
9,759.00	87.46	0.60	5,641.46	4,452.57	381.66	4,465.48	1.33
9,851.00	89.99	358.83	5,643.51	4,544.53	381.20	4,557.32	3.36
9,943.00	90.86	358.58	5,642.82	4,636.51	379.12	4,649.10	0.98
10,034.00	91.70	358.11	5,640.79	4,727.45	376.49	4,739.82	1.06
10,125.00	90.77	358.37	5,638.83	4,818.38	373.70	4,830.53	1.06
10,217.00	89.63	0.28	5,638.51	4,910.37	372.61	4,922.37	2.42
10,308.00	90.93	359.40	5,638.06	5,001.36	372.36	5,013.25	1.73
10,399.00	90.11	1.00	5,637.24	5,092.36	372.68	5,104.16	1.98
10,490.00	87.47	0.75	5,639.16	5,183.32	374.07	5,195.09	2.91
10,581.00	87.72	0.46	5,642.98	5,274.23	375.03	5,285.95	0.42
10,673.00	90.43	0.33	5,644.46	5,366.21	375.66	5,377.86	2.95
10,764.00	91.42	359.00	5,642.99	5,457.19	375.13	5,468.72	1.82
10,855.00	90.90	0.59	5,641.15	5,548.17	374.80	5,559.58	1.84
10,947.00	90.12	2.90	5,640.33	5,640.12	377.61	5,651.56	2.65
11,039.00	91.30	1.98	5,639.19	5,732.02	381.52	5,743.55	1.63
11,130.00	89.46	2.76	5,638.59	5,822.94	385.28	5,834.54	2.20
11,222.00	90.39	2.09	5,638.71	5,914.85	389.18	5,926.54	1.25
11,313.00	89.82	359.10	5,638.54	6,005.84	390.12	6,017.47	3.34
11,404.00	88.95	359.32	5,639.52	6,096.82	388.87	6,108.30	0.99
11,496.00	90.74	1.32	5,639.77	6,188.81	389.38	6,200.21	2.92
11,588.00	93.43	2.22	5,636.42	6,280.70	392.22	6,292.13	3.08
11,680.00	90.14	0.28	5,633.56	6,372.62	394.22	6,384.04	4.15
11,773.00	89.69	359.54	5,633.69	6,465.62	394.08	6,476.93	0.93
11,865.00	89.54	358.85	5,634.31	6,557.60	392.79	6,568.76	0.77

Design Report for Razor #26I-2316B - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
11,956.00	90.00	355.08	5,634.68	6,648.46	387.97	6,659.30	4.17
12,049.00	88.30	358.38	5,636.06	6,741.28	382.66	6,751.77	3.99
12,140.00	88.12	358.38	5,638.90	6,832.20	380.09	6,842.48	0.20
12,231.00	89.04	357.78	5,641.16	6,923.12	377.05	6,933.16	1.21
12,323.00	90.32	359.13	5,641.67	7,015.08	374.56	7,024.90	2.02
12,415.00	90.23	357.13	5,641.23	7,107.03	371.56	7,116.61	2.18
12,506.00	90.25	355.34	5,640.85	7,197.82	365.59	7,207.03	1.97
12,598.00	90.77	358.30	5,640.03	7,289.67	360.48	7,298.54	3.27
12,690.00	91.67	1.92	5,638.07	7,381.63	360.66	7,390.42	4.05
12,782.00	88.68	1.44	5,637.79	7,473.58	363.36	7,482.39	3.29
12,873.00	88.42	1.54	5,640.09	7,564.52	365.72	7,573.34	0.31
12,965.00	89.94	3.11	5,641.41	7,656.43	369.46	7,665.33	2.38
13,057.00	91.11	4.01	5,640.56	7,748.25	375.17	7,757.31	1.60
13,148.00	90.20	2.99	5,639.52	7,839.07	380.72	7,848.29	1.50
13,239.00	89.78	3.94	5,639.54	7,929.90	386.22	7,939.28	1.14
13,330.00	89.65	2.64	5,639.99	8,020.75	391.44	8,030.27	1.44
13,422.00	92.35	1.84	5,638.39	8,112.65	395.04	8,122.25	3.06
13,513.00	90.74	0.36	5,635.93	8,203.60	396.79	8,213.17	2.40
13,604.00	91.26	0.38	5,634.34	8,294.58	397.37	8,304.09	0.57
13,662.00	90.50	359.19	5,633.45	8,352.57	397.16	8,362.01	2.43
13,711.00	90.50	359.19	5,633.03	8,401.57	396.46	8,410.91	0.00

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Razor 26I-2316B B0 BHL	2.66	Slot	0.00	0.00	5,633.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
170.00	1,523.00	Surface_Sperry MWD Surveys	MWD+IFR1+MS+sag
1,637.00	5,988.00	Vertical and Build_Sperry MWD Surveys	MWD+IFR1+MS+sag
6,074.00	13,662.00	Lateral_Sperry MWD Surveys	MWD+IFR1+MS+sag

Wellbore Targets

Target Name	Dip - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Razor 26I-2316B B0	0.00	0.00	0.00	5,633.00	8,362.32	388.26	1,550,064.52	3,463,904.54	40° 49' 52.568 N	103° 49' 24.859 W
	- actual wellpath misses target center by 13.20usft at 13662.00usft MD (5633.45 TVD, 8352.57 N, 397.16 E)									
	- Point									
Razor 26I-2316B TC	0.00	0.00	0.00	5,635.00	8,362.32	388.26	1,550,064.52	3,463,904.54	40° 49' 52.568 N	103° 49' 24.859 W
	- actual wellpath misses target center by 13.29usft at 13662.00usft MD (5633.45 TVD, 8352.57 N, 397.16 E)									
	- Point									



Design Report for Razor #26I-2316B - Actual Field Surveys

Directional Difficulty Index

Average Dogleg over Survey:	2.09 °/100usft	Maximum Dogleg over Survey:	18.71 °/100usft at 5,538.00 usft
Net Tortosity applicable to Plans:	1.03 °/100usft	Directional Difficulty Index:	6.780

Audit Info

North Reference Sheet for Sec. 26-T10N-R58W - Razor #26I-2316B - Plan D

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

Vertical Depths are relative to KB 21' @ 4733.00usft (Frontier 26). Northing and Easting are relative to Razor #26I-2316B

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 1.00000415

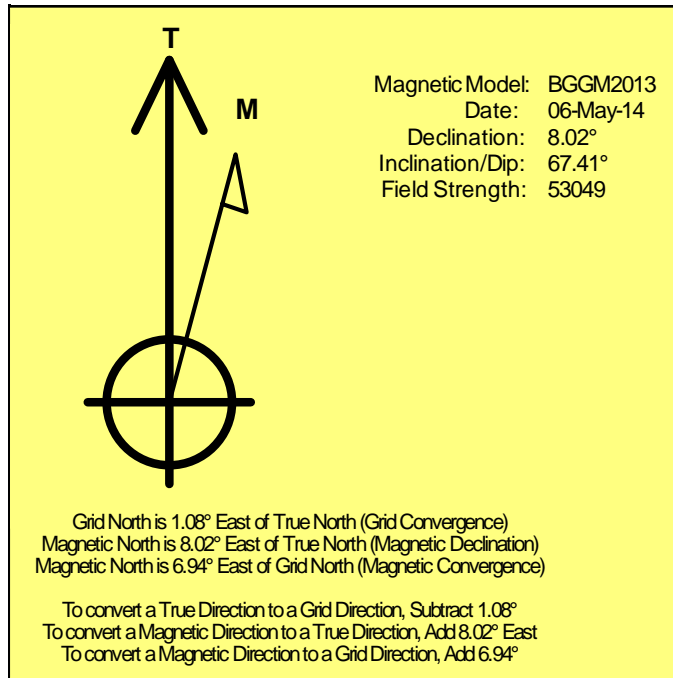
Grid Coordinates of Well: 1,541,696.32 usft N, 3,463,674.30 usft E

Geographical Coordinates of Well: 40° 48' 29.94" N, 103° 49' 29.91" W

Grid Convergence at Surface is: 1.08°

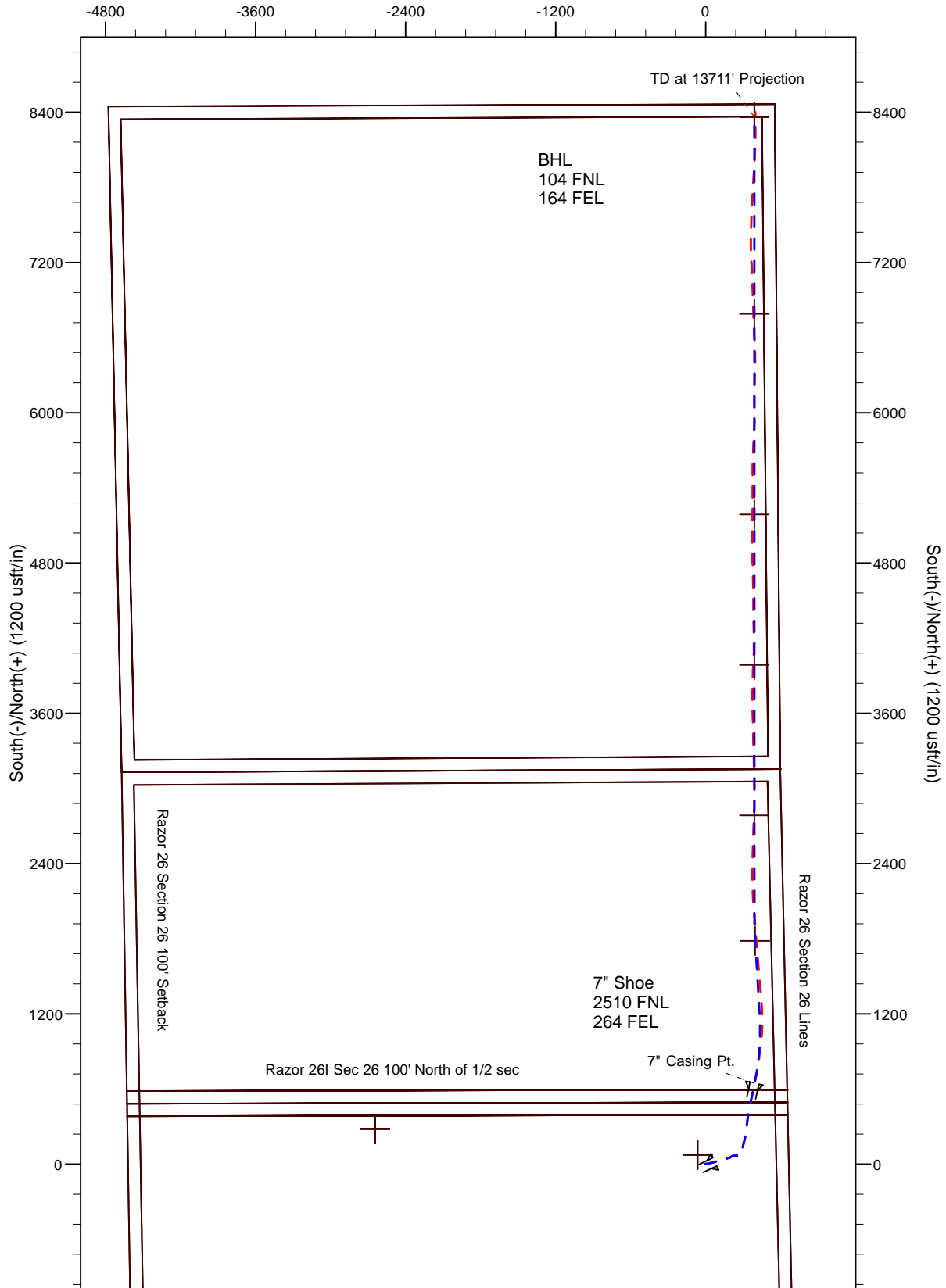
Based upon Minimum Curvature type calculations, at a Measured Depth of 13,711.00usft the Bottom Hole Displacement is 8,410.92usft in the Direction of 2.70° (True).

Magnetic Convergence at surface is: -6.94° (6 May 2014, , BGGM2013)



LEGEND

- - - Razor #26I-2316B, Plan D, Actual Field Surveys V0
- - - Rev D0
West(-)/East(+) (1200 usft/in)



LEGEND

- Razor #26I-2316B, Plan D, Actual Field Surveys V0
- Rev D0

