

# Whiting Oil and Gas Corporation

Weld County, CO

Sec. 21-T10N-R58W

Razor 21B-2811A

Plan D

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

18 March, 2014

Well Coordinates: 1,549,446.35 N, 3,451,593.43 E (40° 49' 48.73" N, 103° 52' 05.13" W)

Ground Level: 4,837.30 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Razor 21B-2811A

KB 22 ft @ 4859.30usft (Frontier 26)

N

True

API - US Survey Feet - Custom

## HALLIBURTON

**Design Report for Razor 21B-2811A - 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
166.00	0.18	355.49	166.00	0.26	-0.02	-0.26	0.11
<b>First Sperry MWD Survey @ 166.00 ft</b>							
258.00	0.51	318.99	258.00	0.71	-0.30	-0.72	0.41
350.00	0.07	313.86	350.00	1.06	-0.61	-1.08	0.48
441.00	0.06	243.11	441.00	1.08	-0.69	-1.10	0.08
503.00	0.36	227.02	503.00	0.93	-0.86	-0.95	0.49
564.00	0.64	192.65	563.99	0.47	-1.08	-0.50	0.65
625.00	0.88	186.90	624.99	-0.33	-1.21	0.30	0.41
686.00	1.63	192.32	685.97	-1.64	-1.45	1.60	1.24
747.00	2.06	191.84	746.94	-3.56	-1.86	3.51	0.71
809.00	2.40	194.58	808.89	-5.91	-2.42	5.84	0.57
870.00	2.37	180.51	869.84	-8.41	-2.75	8.33	0.96
962.00	2.47	181.30	961.76	-12.29	-2.81	12.21	0.11
1,053.00	3.30	173.97	1,052.64	-16.86	-2.58	16.78	1.00
1,147.00	3.67	169.65	1,146.47	-22.51	-1.76	22.45	0.48
1,243.00	3.57	155.03	1,242.28	-28.24	0.06	28.23	0.96
1,370.00	4.15	157.16	1,368.99	-36.06	3.51	36.14	0.47
1,465.00	3.68	160.45	1,463.77	-42.10	5.87	42.25	0.55
1,560.00	3.23	145.98	1,558.60	-47.19	8.38	47.41	1.03
1,620.00	2.94	144.36	1,618.51	-49.84	10.23	50.11	0.50
1,730.00	2.73	141.40	1,728.38	-54.18	13.50	54.54	0.23
1,820.00	5.29	152.49	1,818.15	-59.54	16.76	59.99	2.96
1,911.00	4.94	159.63	1,908.79	-66.93	20.06	67.47	0.80
2,002.00	5.02	158.86	1,999.45	-74.32	22.86	74.94	0.11
2,094.00	5.06	159.85	2,091.09	-81.88	25.71	82.58	0.10
2,185.00	5.15	160.43	2,181.73	-89.50	28.46	90.27	0.11
2,277.00	5.07	159.13	2,273.36	-97.19	31.29	98.04	0.15
2,369.00	4.91	159.39	2,365.02	-104.67	34.12	105.60	0.18
2,460.00	5.04	160.23	2,455.67	-112.08	36.85	113.08	0.16
2,552.00	4.88	157.65	2,547.33	-119.50	39.70	120.58	0.30
2,644.00	5.04	158.46	2,638.98	-126.88	42.67	128.04	0.19
2,735.00	4.86	158.55	2,729.64	-134.18	45.55	135.42	0.20
2,826.00	4.74	153.74	2,820.33	-141.14	48.62	142.47	0.46
2,917.00	5.40	154.36	2,910.97	-148.37	52.14	149.80	0.73
3,009.00	3.45	131.61	3,002.70	-154.12	56.08	155.65	2.81
3,101.00	4.05	144.78	3,094.50	-158.61	60.03	160.25	1.14
3,192.00	2.96	143.90	3,185.33	-163.13	63.27	164.86	1.20
3,283.00	4.45	156.28	3,276.14	-168.26	66.07	170.07	1.85
3,375.00	3.91	187.26	3,367.90	-174.64	67.11	176.48	2.49
3,466.00	3.87	189.49	3,458.70	-180.75	66.21	182.56	0.17
3,558.00	3.94	193.41	3,550.48	-186.89	64.97	188.66	0.30
3,649.00	4.21	190.53	3,641.25	-193.21	63.63	194.94	0.37
3,740.00	3.64	186.27	3,732.04	-199.37	62.70	201.07	0.70
3,831.00	4.91	172.83	3,822.79	-206.10	62.88	207.81	1.77
3,923.00	3.40	173.04	3,914.54	-212.72	63.70	214.44	1.64
4,013.00	2.12	178.99	4,004.43	-217.03	64.05	218.76	1.46
4,106.00	4.03	150.47	4,097.30	-221.60	65.69	223.37	2.57
4,196.00	4.12	153.63	4,187.07	-227.24	68.69	229.10	0.27
4,288.00	4.37	151.39	4,278.82	-233.28	71.83	235.23	0.33

**Design Report for Razor 21B-2811A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,380.00	3.80	150.05	4,370.59	-239.00	75.03	241.03	0.63
4,472.00	3.46	156.19	4,462.40	-244.18	77.68	246.29	0.56
4,563.00	3.18	172.76	4,553.25	-249.20	79.10	251.34	1.09
4,655.00	3.25	174.04	4,645.11	-254.32	79.69	256.48	0.11
4,750.00	5.26	179.80	4,739.84	-261.36	79.99	263.52	2.16
4,844.00	3.79	174.85	4,833.55	-268.76	80.28	270.93	1.62
4,939.00	2.92	167.11	4,928.38	-274.25	81.11	276.44	1.03
5,034.00	2.65	169.06	5,023.27	-278.76	82.06	280.98	0.30
5,129.00	2.11	161.50	5,118.19	-282.58	83.03	284.82	0.66
5,192.00	2.96	168.91	5,181.13	-285.27	83.71	287.53	1.44
5,224.00	7.19	167.33	5,212.99	-288.04	84.31	290.32	13.22
5,256.00	12.17	176.13	5,244.53	-293.36	84.98	295.66	16.19
5,287.00	17.18	173.95	5,274.51	-301.18	85.68	303.49	16.26
5,319.00	22.50	171.56	5,304.60	-311.94	87.08	314.29	16.81
5,351.00	24.55	166.77	5,333.94	-324.47	89.50	326.88	8.76
5,382.00	26.81	163.42	5,361.88	-337.45	92.97	339.95	8.66
5,414.00	28.83	159.86	5,390.18	-351.61	97.69	354.24	8.17
5,445.00	31.48	160.40	5,416.98	-366.25	102.98	369.03	8.59
5,477.00	32.86	160.19	5,444.07	-382.29	108.72	385.23	4.33
5,509.00	33.99	160.73	5,470.78	-398.91	114.62	402.00	3.65
5,540.00	35.52	163.67	5,496.25	-415.73	120.01	418.97	7.32
5,572.00	37.45	164.83	5,521.97	-434.04	125.17	437.42	6.40
5,604.00	39.79	166.97	5,546.98	-453.41	130.03	456.92	8.42
5,635.00	43.53	169.25	5,570.13	-473.57	134.25	477.19	13.02
5,667.00	47.85	170.15	5,592.48	-496.10	138.34	499.82	13.65
5,699.00	50.94	172.70	5,613.31	-520.12	141.95	523.94	11.39
5,730.00	52.39	172.56	5,632.54	-544.23	145.07	548.13	4.69
5,762.00	53.96	172.47	5,651.71	-569.63	148.41	573.61	4.91
5,794.00	55.70	172.83	5,670.15	-595.57	151.75	599.64	5.51
5,825.00	58.23	172.79	5,687.04	-621.35	155.00	625.50	8.16
5,857.00	61.63	174.34	5,703.08	-648.86	158.10	653.09	11.42
5,889.00	63.21	174.58	5,717.89	-677.09	160.84	681.39	4.98
5,920.00	63.93	174.96	5,731.69	-704.74	163.37	709.09	2.57
5,952.00	66.31	175.68	5,745.15	-733.67	165.74	738.08	7.71
5,984.00	69.47	174.42	5,757.20	-763.20	168.30	767.67	10.53
6,015.00	75.76	170.84	5,766.46	-792.52	172.11	797.08	23.09
6,047.00	79.39	170.26	5,773.34	-823.34	177.24	828.04	11.48
6,078.00	82.25	169.19	5,778.29	-853.45	182.70	858.29	9.83
6,110.00	83.42	169.08	5,782.28	-884.63	188.68	889.63	3.67
6,141.00	87.13	168.36	5,784.83	-914.92	194.72	920.08	12.19
6,173.00	91.70	165.49	5,785.16	-946.08	201.96	951.43	16.86
6,205.00	92.90	164.76	5,783.87	-976.98	210.17	982.55	4.39
6,236.00	93.83	164.73	5,782.05	-1,006.84	218.31	1,012.63	3.00
6,306.00	95.68	164.49	5,776.25	-1,074.09	236.82	1,080.38	2.66
6,369.00	94.49	164.85	5,770.67	-1,134.61	253.41	1,141.34	1.97
6,400.00	92.50	165.23	5,768.78	-1,164.50	261.40	1,171.45	6.53
6,448.00	90.03	169.29	5,767.72	-1,211.29	271.98	1,218.53	9.90
6,495.00	89.17	168.91	5,768.04	-1,257.44	280.87	1,264.91	2.00
6,590.00	91.14	169.94	5,767.79	-1,350.82	298.30	1,358.75	2.34
6,685.00	90.00	172.01	5,766.84	-1,444.64	313.20	1,452.95	2.49
6,780.00	86.26	174.64	5,769.94	-1,538.92	324.23	1,547.50	4.81

**Design Report for Razor 21B-2811A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,875.00	84.01	179.15	5,778.00	-1,633.41	329.37	1,642.10	5.29
6,970.00	83.45	182.11	5,788.38	-1,727.82	328.33	1,736.44	3.15
7,065.00	83.44	181.56	5,799.23	-1,822.15	325.31	1,830.65	0.58
7,160.00	86.88	182.11	5,807.24	-1,916.75	322.28	1,925.12	3.67
7,255.00	90.28	182.37	5,809.59	-2,011.63	318.56	2,019.86	3.59
7,318.00	92.13	180.84	5,808.27	-2,074.59	316.80	2,082.75	3.81
7,382.00	94.56	181.50	5,804.53	-2,138.46	315.50	2,146.56	3.93
7,445.00	94.44	182.31	5,799.59	-2,201.23	313.41	2,209.24	1.30
7,477.00	95.07	182.15	5,796.94	-2,233.10	312.17	2,241.06	2.03
7,508.00	95.74	180.06	5,794.02	-2,263.95	311.57	2,271.88	7.05
7,540.00	96.27	179.31	5,790.67	-2,295.78	311.75	2,303.70	2.86
7,572.00	97.30	179.32	5,786.89	-2,327.55	312.13	2,335.47	3.22
7,603.00	96.33	179.38	5,783.21	-2,358.33	312.48	2,366.25	3.13
7,635.00	94.56	180.25	5,780.18	-2,390.18	312.58	2,398.09	6.16
7,665.00	92.52	181.87	5,778.32	-2,420.12	312.02	2,428.00	8.68
7,696.00	90.34	183.40	5,777.55	-2,451.07	310.60	2,458.90	8.59
7,726.00	88.64	184.11	5,777.82	-2,481.00	308.63	2,488.77	6.14
7,757.00	87.96	183.00	5,778.74	-2,511.93	306.71	2,519.63	4.20
7,818.00	88.34	183.15	5,780.71	-2,572.81	303.44	2,580.39	0.67
7,910.00	88.55	183.11	5,783.20	-2,664.64	298.42	2,672.04	0.23
8,001.00	88.43	182.26	5,785.60	-2,755.51	294.16	2,762.75	0.94
8,092.00	89.45	182.69	5,787.28	-2,846.41	290.23	2,853.50	1.22
8,184.00	89.63	183.97	5,788.02	-2,938.25	284.89	2,945.15	1.40
8,275.00	89.78	183.90	5,788.49	-3,029.03	278.64	3,035.72	0.18
8,367.00	88.80	181.83	5,789.63	-3,120.90	274.04	3,127.42	2.49
8,458.00	88.95	181.87	5,791.42	-3,211.84	271.11	3,218.24	0.17
8,550.00	90.37	180.55	5,791.96	-3,303.81	269.16	3,310.12	2.11
8,641.00	90.89	179.50	5,790.96	-3,394.80	269.12	3,401.07	1.29
8,732.00	90.59	177.60	5,789.79	-3,485.76	271.43	3,492.06	2.11
8,823.00	91.79	177.77	5,787.90	-3,576.67	275.10	3,583.03	1.33
8,914.00	91.63	180.08	5,785.18	-3,667.60	276.81	3,673.98	2.54
9,005.00	91.33	183.17	5,782.83	-3,758.53	274.23	3,764.80	3.41
9,097.00	93.51	185.82	5,778.95	-3,850.15	267.03	3,856.18	3.73
9,188.00	94.75	186.13	5,772.39	-3,940.42	257.58	3,946.14	1.40
9,279.00	95.50	186.07	5,764.26	-4,030.54	247.95	4,035.95	0.83
9,371.00	94.63	187.17	5,756.14	-4,121.57	237.38	4,126.64	1.52
9,461.00	92.28	186.54	5,750.72	-4,210.75	226.66	4,215.49	2.70
9,552.00	88.55	185.52	5,750.06	-4,301.23	217.11	4,305.66	4.25
9,644.00	90.25	186.76	5,751.02	-4,392.69	207.27	4,396.81	2.29
9,736.00	88.15	184.29	5,752.31	-4,484.24	198.41	4,488.07	3.52
9,766.00	88.27	184.07	5,753.24	-4,514.15	196.22	4,517.90	0.84
9,797.00	87.53	183.04	5,754.38	-4,545.07	194.30	4,548.75	4.09
9,827.00	86.76	182.59	5,755.87	-4,574.99	192.83	4,578.62	2.97
9,858.00	86.79	180.91	5,757.62	-4,605.93	191.89	4,609.52	5.41
9,888.00	88.15	178.44	5,758.94	-4,635.90	192.06	4,639.48	9.39
9,919.00	88.58	177.05	5,759.83	-4,666.86	193.28	4,670.47	4.69
9,949.00	88.58	177.31	5,760.57	-4,696.81	194.75	4,700.45	0.87
9,980.00	88.74	176.75	5,761.29	-4,727.76	196.36	4,731.43	1.88
10,010.00	88.89	176.17	5,761.92	-4,757.70	198.21	4,761.41	2.00
10,041.00	89.04	176.43	5,762.48	-4,788.63	200.21	4,792.38	0.97

**Design Report for Razor 21B-2811A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,071.00	88.80	176.38	5,763.04	-4,818.57	202.09	4,822.36	0.82
10,101.00	87.38	175.52	5,764.04	-4,848.47	204.21	4,852.32	5.53
10,193.00	85.86	176.76	5,769.46	-4,940.10	210.39	4,944.08	2.13
10,284.00	88.15	176.95	5,774.22	-5,030.83	215.38	5,034.92	2.53
10,376.00	88.95	177.79	5,776.55	-5,122.71	219.60	5,126.87	1.26
10,468.00	91.17	180.87	5,776.45	-5,214.68	220.67	5,218.85	4.13
10,560.00	91.94	179.69	5,773.95	-5,306.65	220.22	5,310.76	1.53
10,651.00	89.29	182.09	5,772.98	-5,397.61	218.81	5,401.65	3.93
10,681.00	89.72	181.68	5,773.24	-5,427.60	217.82	5,431.59	1.98
10,712.00	88.99	181.51	5,773.59	-5,458.58	216.96	5,462.54	2.42
10,743.00	87.38	182.50	5,774.57	-5,489.55	215.88	5,493.46	6.10
10,772.00	85.15	181.04	5,776.46	-5,518.47	214.98	5,522.35	9.19
10,833.00	85.00	180.85	5,781.69	-5,579.24	213.98	5,583.06	0.40
10,924.00	84.26	179.44	5,790.21	-5,669.83	213.75	5,673.62	1.74
11,016.00	86.15	178.99	5,797.90	-5,761.50	215.01	5,765.28	2.11
11,108.00	88.15	178.72	5,802.47	-5,853.36	216.84	5,857.16	2.19
11,199.00	91.42	180.43	5,802.82	-5,944.34	217.52	5,948.12	4.05
11,291.00	92.41	179.06	5,799.74	-6,036.29	217.93	6,040.04	1.84
11,382.00	92.38	179.88	5,795.94	-6,127.20	218.77	6,130.94	0.90
11,473.00	90.40	181.20	5,793.73	-6,218.16	217.91	6,221.84	2.61
11,564.00	91.76	181.25	5,792.02	-6,309.13	215.96	6,312.71	1.50
11,656.00	88.80	181.27	5,791.57	-6,401.09	213.94	6,404.59	3.22
11,747.00	89.20	180.84	5,793.15	-6,492.06	212.27	6,495.47	0.65
11,838.00	88.64	180.13	5,794.87	-6,583.04	211.50	6,586.39	0.99
11,930.00	88.18	179.44	5,797.42	-6,675.00	211.84	6,678.33	0.90
12,022.00	88.74	179.47	5,799.90	-6,766.97	212.71	6,770.28	0.61
12,114.00	89.41	179.19	5,801.38	-6,858.95	213.79	6,862.25	0.79
12,205.00	90.65	180.74	5,801.33	-6,949.94	213.85	6,953.21	2.18
12,299.00	88.06	178.56	5,802.39	-7,043.92	214.42	7,047.17	3.60
12,363.00	85.15	178.39	5,806.18	-7,107.78	216.12	7,111.05	4.55
12,426.00	85.53	178.90	5,811.30	-7,170.55	217.60	7,173.84	1.01
12,489.00	85.50	178.54	5,816.23	-7,233.35	219.01	7,236.65	0.57
12,584.00	86.30	180.62	5,823.02	-7,328.09	219.70	7,331.38	2.34
12,680.00	86.11	180.01	5,829.37	-7,423.88	219.17	7,427.11	0.66
<b>Final Sperry MWD Survey @ 12680.00 ft</b>							
12,727.00	86.11	180.01	5,832.56	-7,470.77	219.17	7,473.98	0.00
<b>Straight Line Projection to TD @ 12727.00 ft</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,680.00	5,829.37	-7,423.88	219.17	Final Sperry MWD Survey @ 12680.00 ft
12,727.00	5,832.56	-7,470.77	219.17	Straight Line Projection to TD @ 12727.00 ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Razor 21B-2811A WP6	178.37	Slot	0.00	0.00	0.00



Design Report for Razor 21B-2811A - Actual Field Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
166.00	1,560.00	Surface_Sperry MWD Surveys	MWD+IFR1+MS+sag
1,620.00	6,236.00	Vertical and Build_Sperry MWD Surveys	MWD+IFR1+MS+sag
6,306.00	12,727.00	Lateral_Sperry MWD Surveys	MWD+IFR1+MS+sag

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,075.91	5,778.00	7" Casing Pt.	7	8-3/4

**Design Report for Razor 21B-2811A - Actual Field Surveys****Wellbore Targets**

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Razor 21B-2811A_SB	0.00	0.00	0.00	0.02	0.00	1,549,446.37	3,451,593.43	40° 49' 48.731 N	103° 52' 5.131 W
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	-4,922.48	1,889.06	1,544,559.45	3,453,572.77	
Point 2				0.00	-10,125.75	1,968.11	1,539,358.47	3,453,747.56	
Point 3				0.00	-10,132.50	-3,133.70	1,539,257.84	3,448,646.70	
Point 4				0.00	-4,932.54	-3,196.09	1,544,455.81	3,448,488.63	
Point 5				0.00	164.38	-3,257.66	1,549,550.77	3,448,333.27	
Point 6				0.00	268.40	1,843.50	1,549,748.65	3,453,431.69	
Point 7				0.00	-4,922.50	1,889.10	1,544,559.43	3,453,572.81	
Nelson Ranches #E-1_	0.00	0.00	0.00	-2,959.45	-2,719.44	1,546,437.34	3,448,928.89	40° 49' 19.487 N	103° 52' 40.503 W
- actual wellpath misses target center by 4019.17usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Circle (radius 1,550.00)									
Razor 21B-2811A_SL	0.00	0.00	0.00	0.02	0.00	1,549,446.37	3,451,593.43	40° 49' 48.731 N	103° 52' 5.131 W
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	-4,932.54	-3,296.09	1,544,453.97	3,448,388.64	
Point 2				0.00	-4,906.52	-650.47	1,544,528.67	3,451,033.36	
Point 3				0.00	-4,922.48	1,989.06	1,544,561.29	3,453,672.76	
Point 4				0.00	-10,225.75	2,068.11	1,539,260.33	3,453,849.39	
Point 5				0.00	-10,232.54	-3,233.68	1,539,155.97	3,448,548.58	
Point 6				0.00	-4,932.54	-3,296.09	1,544,453.97	3,448,388.64	
Point 7				0.00	264.38	-3,357.66	1,549,648.92	3,448,231.45	
Point 8				0.00	368.43	1,943.52	1,549,850.51	3,453,529.86	
Point 9				0.00	-4,922.48	1,989.06	1,544,561.29	3,453,672.76	
Point 10				0.00	-4,906.52	-650.47	1,544,528.67	3,451,033.36	
Razor 21B-2811A WP <sub>4</sub>	0.00	0.00	5,765.00	-4,395.58	218.10	1,545,055.50	3,451,892.39	40° 49' 5.298 N	103° 52' 2.295 W
- actual wellpath misses target center by 17.86usft at 9646.03usft MD (5751.01 TVD, -4394.70 N, 207.03 E)									
- Point									
Razor 21B-2811A Rev	0.00	0.00	5,784.00	-7,476.91	212.32	1,541,974.56	3,451,943.31	40° 48' 34.852 N	103° 52' 2.370 W
- actual wellpath misses target center by 49.42usft at 12727.00usft MD (5832.56 TVD, -7470.77 N, 219.17 E)									
- Point									
Razor 21B-2811A WP <sub>4</sub>	0.00	0.00	5,790.00	-4,995.82	218.10	1,544,455.36	3,451,903.43	40° 48' 59.367 N	103° 52' 2.295 W
- actual wellpath misses target center by 17.76usft at 10250.05usft MD (5772.87 TVD, -4996.96 N, 213.55 E)									
- Point									
Razor 21B-2811A WP <sub>1</sub>	0.00	0.00	5,790.00	-1,791.41	328.02	1,547,661.27	3,451,954.37	40° 49' 31.030 N	103° 52' 0.864 W
- actual wellpath misses target center by 5.93usft at 7033.33usft MD (5795.61 TVD, -1790.70 N, 326.21 E)									
- Point									
Razor 21B-2811A WP <sub>3</sub>	0.00	0.00	5,790.00	-2,993.03	288.21	1,546,459.11	3,451,936.67	40° 49' 19.157 N	103° 52' 1.382 W
- actual wellpath misses target center by 7.28usft at 8238.43usft MD (5788.33 TVD, -2992.55 N, 281.14 E)									
- Point									
Razor 21B-2811A WP <sub>2</sub>	0.00	0.00	5,795.00	-2,191.65	325.18	1,547,261.05	3,451,958.89	40° 49' 27.075 N	103° 52' 0.901 W
- actual wellpath misses target center by 12.58usft at 7435.42usft MD (5800.33 TVD, -2191.69 N, 313.78 E)									
- Point									
Razor 21B-2811A WP <sub>5</sub>	0.00	0.00	5,810.00	-5,996.29	215.68	1,543,455.00	3,451,919.42	40° 48' 49.482 N	103° 52' 2.326 W
- actual wellpath misses target center by 8.90usft at 11250.67usft MD (5801.28 TVD, -5995.99 N, 217.48 E)									
- Point									
Razor 21B-2811A WP <sub>6</sub>	0.00	0.00	5,810.00	-7,476.91	212.32	1,541,974.56	3,451,943.31	40° 48' 34.852 N	103° 52' 2.370 W
- actual wellpath misses target center by 24.36usft at 12727.00usft MD (5832.56 TVD, -7470.77 N, 219.17 E)									
- Point									

**Directional Difficulty Index**

Average Dogleg over Survey:	2.35 °/100usft	Maximum Dogleg over Survey:	23.09 °/100usft at 6,015.00 usft
Net Tortosity applicable to Plans:	0.53 °/100usft	Directional Difficulty Index:	6.692

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Design Report for Razor 21B-2811A - Actual Field Surveys

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Audit Info



# North Reference Sheet for Sec. 21-T10N-R58W - Razor 21B-2811A - 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 22 ft @ 4859.30usft (Frontier 26). Northing and Easting are relative to Razor 21B- 2811A

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: 1.00000794

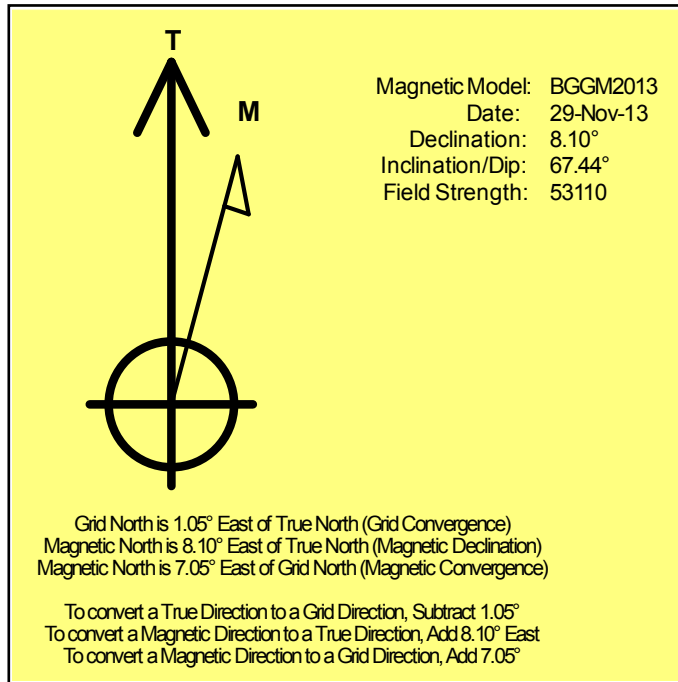
Grid Coordinates of Well: 1,549,446.35 usft N, 3,451,593.43 usft E

Geographical Coordinates of Well: 40° 49' 48.73" N, 103° 52' 05.13" W

Grid Convergence at Surface is: 1.05°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,727.00usft  
the Bottom Hole Displacement is 7,473.99usft in the Direction of 178.32° ( True).

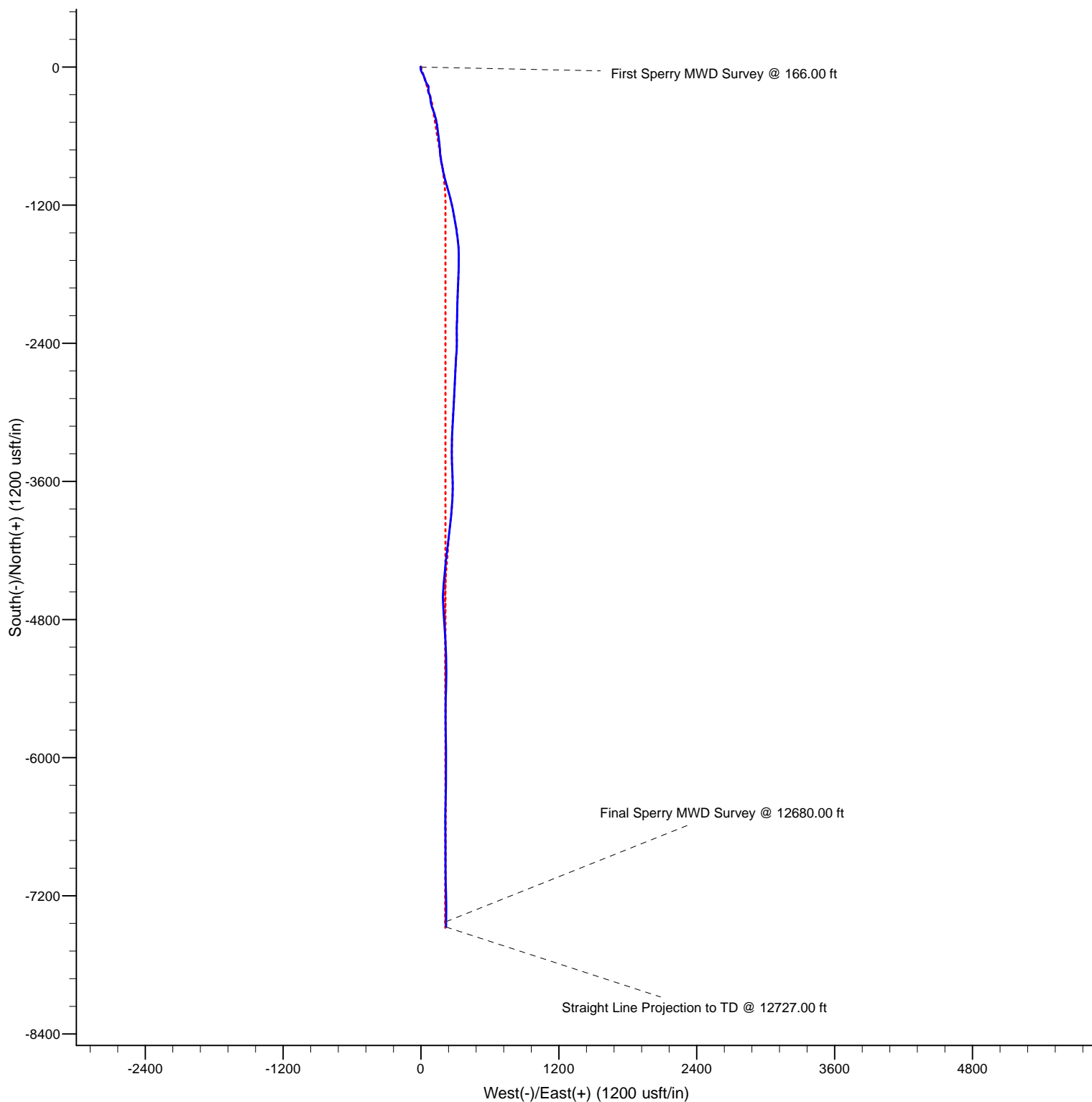
Magnetic Convergence at surface is: -7.05° (29 November 2013, , BGGM2013)



## LEGEND

..... Razor 21B-2811A, Plan D

— Actual Field Surveys



## LEGEND

- ..... Razor 21B-2811A, Plan D
- Actual Field Surveys

