

# Whiting Oil and Gas Corporation

Weld County, CO

Sec. 27-T10N-R58W (Razor #27J Pad)

Razor #27J-3411A

Plan C

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

19 November, 2014

Well Coordinates: 1,541,694.39 N, 3,457,103.12 E (40° 48' 31.14" N, 103° 50' 55.35" W)

Ground Level: 4,767.00 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 #27J-3411A

KB 22 ft @ 4789.00usft (Frontier 26)

N

True

API - US Survey Feet - Custom

## HALLIBURTON

# SPERRY-SUN DRILLING SERVICES

## CERTIFIED SURVEY WORK SHEET




OPERATOR:	Whiting Oil and Gas
WELL:	Razor 27J-3411A
FIELD:	Red Tail
RIG:	Frontier 26
LEGALS:	Sec. 27-T10N-R58W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	7.51
VERTICAL SEC. DIR. :	178.00

SSDS Job Number :	901620723
Start Date of Job :	10/19/2014
End Date of Job :	10/26/2014
Lead Directional Driller:	Randy Bernatow
Directional Driller	Steve Krueger
Other SSDS DD's :	0
SSDS MWD Engineers :	Cody Wurdeman
MWD :	Brian Thomas
MWD	0

Geo Pilot Engineer :

	Main Hole =====>	1st Side Track =====>	2nd Side Track =====>	3rd Side Track =====>	4th Side Track =====>
First MWD Survey Depth	176.00	MWD	Tie On	Tie On	Tie On
		ESS	MWD		
Last Wireline Survey		Gyro			
	5105.00	KOP	KOP-ST1	KOP-ST2	KOP-ST3
					KOP-ST4
		MWD	MWD	MWD	MWD
Last MWD Survey Depth	13142.00	MWD	MWD	MWD	MWD
Bit Extrapolation @ TD	13185.00	T.D.	T.D.	T.D.	T.D.

The following Sperry Drilling Services personnel, certify the above survey information to be accurate to the best of our knowledge:

Print Name :	Randy Bernatow	Print Name :	Cody Wurdeman	Print Name :	
Sign Name :		Sign Name :		Sign Name :	
Print Name :	Steve Krueger	Print Name :	Brian Thomas	Print Name :	0
Sign Name :		Sign Name :		Sign Name :	

### Examples of Survey Types:

Tie On	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
MWD	Sperry-Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
ESS	Sperry-Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry-Sun Drilling Services (SSDS)
SS	Single Shot (SS) Survey's ; Provided by Sperry-Sun Drilling Services (SSDS) or third party vendor.

**Design Report for Razor #27J-3411A - 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
176.00	0.46	275.88	176.00	0.07	-0.70	-0.10	0.26
<b>First Sperry MWD Survey @ 176.00 ft</b>							
267.00	1.26	276.89	266.99	0.23	-2.06	-0.30	0.88
358.00	1.65	275.43	357.96	0.47	-4.36	-0.63	0.43
450.00	0.55	299.53	449.94	0.82	-6.06	-1.03	1.27
543.00	1.46	13.24	542.93	2.19	-6.18	-2.40	1.51
634.00	4.01	20.49	633.82	6.30	-4.80	-6.46	2.82
726.00	6.27	21.13	725.44	14.00	-1.86	-14.06	2.46
818.00	7.85	22.08	816.74	24.51	2.31	-24.41	1.72
910.00	9.25	14.79	907.72	37.48	6.56	-37.23	1.92
1,002.00	9.66	15.14	998.47	52.08	10.47	-51.68	0.45
1,093.00	10.66	13.80	1,088.04	67.63	14.47	-67.08	1.13
1,185.00	11.85	12.87	1,178.27	85.10	18.60	-84.40	1.31
1,277.00	13.08	14.51	1,268.10	104.39	23.31	-103.51	1.39
1,461.00	15.07	17.19	1,446.57	147.40	35.60	-146.07	1.14
1,531.00	16.25	17.47	1,513.97	165.44	41.23	-163.90	1.69
1,582.00	16.43	17.15	1,562.91	179.13	45.50	-177.44	0.39
<b>9 5/8" Casing Pt.</b>							
1,641.00	16.63	16.78	1,619.47	195.19	50.40	-193.31	0.39
1,732.00	14.65	13.06	1,707.10	218.87	56.76	-216.75	2.44
1,824.00	13.17	10.66	1,796.40	240.50	61.32	-238.22	1.73
1,915.00	12.00	10.65	1,885.21	259.99	64.99	-257.56	1.29
2,007.00	10.99	9.94	1,975.37	278.02	68.27	-275.47	1.11
2,190.00	10.21	6.28	2,155.24	311.33	73.06	-308.59	0.56
2,373.00	8.89	2.27	2,335.71	341.58	75.39	-338.74	0.81
2,465.00	10.49	19.12	2,426.41	356.60	78.42	-353.65	3.52
2,647.00	11.58	16.85	2,605.04	389.74	89.14	-386.39	0.64
2,739.00	11.42	17.49	2,695.19	407.26	94.55	-403.72	0.22
2,830.00	10.83	17.64	2,784.48	424.00	99.85	-420.26	0.65
2,921.00	9.66	17.10	2,874.03	439.45	104.69	-435.53	1.29
3,013.00	9.48	12.09	2,964.75	454.23	108.54	-450.17	0.93
3,105.00	8.45	14.01	3,055.63	468.20	111.77	-464.02	1.17
3,196.00	7.76	13.81	3,145.72	480.65	114.85	-476.36	0.76
3,288.00	8.56	21.75	3,236.79	493.05	118.87	-488.60	1.50
3,471.00	8.77	29.46	3,417.71	517.84	130.78	-512.97	0.64
3,655.00	8.32	27.95	3,599.66	541.82	143.92	-536.47	0.27
3,746.00	7.36	25.69	3,689.81	552.89	149.53	-547.33	1.11
3,837.00	6.93	28.70	3,780.11	562.95	154.70	-557.21	0.63
3,929.00	7.77	34.42	3,871.35	572.95	160.88	-566.99	1.21
4,020.00	10.08	33.09	3,961.24	584.70	168.70	-578.46	2.55
4,112.00	9.13	32.26	4,051.95	597.62	176.99	-591.08	1.04
4,294.00	9.75	33.67	4,231.49	622.65	193.25	-615.54	0.36
4,385.00	10.11	32.07	4,321.12	635.84	201.76	-628.41	0.50
4,478.00	10.37	30.30	4,412.64	649.98	210.31	-642.25	0.44
4,568.00	10.01	27.26	4,501.22	663.93	217.98	-655.92	0.72
4,660.00	8.86	20.46	4,591.98	677.67	224.12	-669.44	1.74
4,752.00	8.93	16.94	4,682.87	691.14	228.68	-682.74	0.60
4,844.00	7.44	14.67	4,773.93	703.74	232.27	-695.21	1.66
4,935.00	4.88	18.10	4,864.40	713.12	234.96	-704.49	2.84

**Design Report for Razor #27J-3411A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,027.00	2.08	21.89	4,956.22	718.39	236.80	-709.69	3.05
5,058.00	2.03	22.49	4,987.20	719.41	237.22	-710.70	0.18
5,089.00	1.55	114.61	5,018.19	719.75	237.81	-711.01	8.38
5,119.00	5.96	154.60	5,048.12	718.17	238.85	-709.40	16.25
5,150.00	12.55	168.52	5,078.71	713.41	240.21	-704.60	22.30
5,181.00	14.09	168.75	5,108.87	706.41	241.62	-697.55	4.97
5,211.00	14.35	170.00	5,137.95	699.17	242.98	-690.26	1.34
5,242.00	13.94	171.51	5,168.01	691.69	244.20	-682.75	1.78
5,273.00	15.90	174.82	5,197.97	683.77	245.13	-674.80	6.89
5,303.00	17.21	174.83	5,226.72	675.25	245.90	-666.26	4.37
5,334.00	18.70	171.60	5,256.21	665.77	247.04	-656.75	5.78
5,364.00	21.78	173.58	5,284.36	655.48	248.37	-646.42	10.52
5,394.00	24.32	177.99	5,311.96	643.77	249.21	-634.69	10.23
5,425.00	29.26	182.82	5,339.63	629.81	249.06	-620.74	17.40
5,456.00	31.34	184.84	5,366.39	614.21	248.00	-605.19	7.47
5,486.00	34.75	186.34	5,391.54	597.94	246.40	-588.98	11.69
5,517.00	38.44	185.29	5,416.42	579.55	244.54	-570.67	12.07
5,548.00	42.36	186.23	5,440.03	559.57	242.51	-550.77	12.80
5,578.00	48.55	186.73	5,461.06	538.33	240.10	-529.63	20.67
5,610.00	53.95	183.60	5,481.09	513.49	237.88	-504.88	18.52
5,642.00	56.52	182.61	5,499.33	487.24	236.46	-478.70	8.42
5,674.00	56.89	182.94	5,516.90	460.53	235.16	-452.05	1.44
5,705.00	56.78	182.69	5,533.86	434.61	233.89	-426.19	0.76
5,737.00	59.59	182.84	5,550.72	407.45	232.58	-399.09	8.79
5,768.00	62.48	181.75	5,565.74	380.35	231.49	-372.05	9.82
5,800.00	65.79	181.36	5,579.69	351.58	230.71	-343.31	10.40
5,832.00	69.46	183.09	5,591.87	322.01	229.56	-313.81	12.51
5,863.00	73.53	182.39	5,601.71	292.66	228.16	-284.52	13.30
5,895.00	76.59	180.92	5,609.96	261.76	227.27	-253.67	10.54
5,926.00	77.35	180.11	5,616.95	231.56	227.00	-223.50	3.53
5,958.00	78.78	179.54	5,623.57	200.25	227.09	-192.21	4.80
5,989.00	82.37	178.94	5,628.64	169.67	227.50	-161.64	11.74
6,033.00	85.03	178.98	5,633.47	125.95	228.29	-117.91	6.05
6,069.00	85.87	178.03	5,636.33	90.08	229.23	-82.03	3.51
<b>7" Casing Pt.</b>							
6,089.00	86.33	177.50	5,637.69	70.14	230.01	-62.07	3.51
6,183.00	88.18	177.04	5,642.19	-23.64	234.48	31.81	2.03
6,278.00	90.43	180.15	5,643.34	-118.59	236.81	126.78	4.04
6,373.00	91.60	179.79	5,641.66	-213.57	236.86	221.70	1.29
6,467.00	92.00	181.07	5,638.71	-307.52	236.15	315.57	1.43
6,562.00	90.25	179.13	5,636.84	-402.49	235.99	410.48	2.75
6,656.00	89.35	177.21	5,637.17	-496.44	238.99	504.47	2.26
6,751.00	90.00	179.64	5,637.71	-591.39	241.60	599.46	2.65
6,846.00	89.04	178.59	5,638.51	-686.38	243.07	694.44	1.50
6,940.00	88.89	182.36	5,640.20	-780.34	242.29	788.32	4.01
7,035.00	86.79	181.32	5,643.78	-875.22	239.24	883.03	2.47
7,129.00	86.33	180.14	5,649.42	-969.04	238.04	976.75	1.35
7,224.00	87.41	180.14	5,654.61	-1,063.90	237.81	1,071.54	1.14
7,318.00	88.89	178.98	5,657.65	-1,157.84	238.53	1,165.46	2.00
7,413.00	89.32	178.98	5,659.13	-1,252.81	240.22	1,260.43	0.45
7,508.00	91.51	179.53	5,658.44	-1,347.80	241.46	1,355.40	2.38

**Design Report for Razor #27J-3411A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7,602.00	91.29	179.14	5,656.15	-1,441.76	242.55	1,449.35	0.48
7,697.00	91.48	178.56	5,653.85	-1,536.72	244.46	1,544.31	0.64
7,791.00	88.95	178.01	5,653.50	-1,630.66	247.27	1,638.30	2.75
7,886.00	89.85	178.99	5,654.49	-1,725.62	249.76	1,733.29	1.40
7,981.00	89.69	178.88	5,654.87	-1,820.61	251.52	1,828.27	0.20
8,076.00	90.09	179.49	5,655.06	-1,915.60	252.87	1,923.25	0.77
8,168.00	89.88	180.55	5,655.08	-2,007.60	252.84	2,015.19	1.17
8,263.00	90.65	179.75	5,654.64	-2,102.59	252.59	2,110.12	1.17
8,354.00	90.31	178.38	5,653.88	-2,193.58	254.08	2,201.10	1.55
8,446.00	90.80	179.19	5,652.99	-2,285.55	256.03	2,293.09	1.03
8,537.00	91.91	180.90	5,650.83	-2,376.52	255.96	2,384.00	2.24
8,628.00	89.66	181.96	5,649.59	-2,467.47	253.69	2,474.82	2.73
8,719.00	90.09	182.29	5,649.79	-2,558.41	250.31	2,565.59	0.60
8,810.00	89.85	178.95	5,649.83	-2,649.39	249.33	2,656.48	3.68
8,901.00	90.31	175.38	5,649.71	-2,740.27	253.83	2,747.45	3.96
8,992.00	90.15	178.27	5,649.34	-2,831.12	258.87	2,838.42	3.18
9,083.00	89.82	178.97	5,649.37	-2,922.09	261.06	2,929.42	0.85
9,175.00	90.74	181.08	5,648.92	-3,014.08	261.02	3,021.35	2.50
9,266.00	90.40	179.93	5,648.01	-3,105.07	260.22	3,112.26	1.32
9,358.00	89.66	181.28	5,647.96	-3,197.07	259.24	3,204.16	1.67
9,450.00	91.42	181.97	5,647.10	-3,289.02	256.64	3,295.97	2.05
9,541.00	90.99	181.29	5,645.18	-3,379.96	254.05	3,386.77	0.88
9,632.00	91.36	181.24	5,643.32	-3,470.92	252.04	3,477.60	0.41
9,722.00	89.72	181.08	5,642.47	-3,560.90	250.22	3,567.46	1.83
9,813.00	87.84	179.84	5,644.40	-3,651.87	249.49	3,658.35	2.47
9,905.00	88.00	179.61	5,647.74	-3,743.80	249.93	3,750.24	0.30
9,997.00	87.75	178.11	5,651.16	-3,835.72	251.76	3,842.17	1.65
10,088.00	89.63	179.79	5,653.24	-3,926.67	253.42	3,933.12	2.77
10,180.00	90.71	179.82	5,652.96	-4,018.67	253.74	4,025.08	1.17
10,271.00	90.18	179.85	5,652.26	-4,109.67	254.00	4,116.03	0.58
10,363.00	89.97	179.77	5,652.14	-4,201.67	254.30	4,207.98	0.24
10,454.00	90.09	180.25	5,652.09	-4,292.67	254.29	4,298.92	0.54
10,546.00	89.17	179.49	5,652.68	-4,384.66	254.50	4,390.87	1.30
10,637.00	89.14	180.16	5,654.02	-4,475.65	254.77	4,481.82	0.74
10,729.00	91.39	181.69	5,653.60	-4,567.63	253.29	4,573.69	2.96
10,820.00	91.14	181.58	5,651.59	-4,658.57	250.69	4,664.48	0.30
10,911.00	90.98	180.88	5,649.91	-4,749.53	248.74	4,755.32	0.79
11,003.00	91.05	179.58	5,648.28	-4,841.52	248.37	4,847.23	1.41
11,095.00	91.32	181.38	5,646.37	-4,933.49	247.60	4,939.12	1.98
11,186.00	89.94	181.65	5,645.37	-5,024.45	245.20	5,029.95	1.55
11,277.00	89.04	181.64	5,646.18	-5,115.41	242.58	5,120.76	0.99
11,370.00	87.75	182.25	5,648.79	-5,208.32	239.43	5,213.50	1.53
11,460.00	87.81	181.75	5,652.27	-5,298.19	236.29	5,303.21	0.56
11,557.00	88.43	181.57	5,655.46	-5,395.10	233.48	5,399.96	0.67
11,644.00	88.80	181.43	5,657.56	-5,482.04	231.20	5,486.77	0.45
11,736.00	91.48	180.85	5,657.33	-5,574.02	229.37	5,578.63	2.98
11,828.00	92.25	180.81	5,654.34	-5,665.96	228.04	5,670.46	0.84
11,919.00	91.05	180.12	5,651.72	-5,756.92	227.30	5,761.34	1.52
12,012.00	87.90	178.90	5,652.57	-5,849.89	228.10	5,854.29	3.63
12,103.00	87.81	177.28	5,655.98	-5,940.78	231.13	5,945.22	1.78
12,195.00	88.86	177.38	5,658.65	-6,032.64	235.41	6,037.18	1.15

**Design Report for Razor #27J-3411A - Actual Field Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,286.00	89.42	178.49	5,660.02	-6,123.57	238.69	6,128.17	1.37
12,379.00	88.77	178.49	5,661.49	-6,216.52	241.14	6,221.15	0.70
12,471.00	89.63	179.08	5,662.77	-6,308.49	243.09	6,313.13	1.13
12,563.00	89.75	180.21	5,663.27	-6,400.49	243.66	6,405.09	1.24
12,654.00	90.92	180.35	5,662.74	-6,491.48	243.22	6,496.02	1.29
12,746.00	91.94	179.81	5,660.44	-6,583.45	243.09	6,587.92	1.25
12,838.00	93.27	179.56	5,656.26	-6,675.35	243.60	6,679.79	1.47
12,929.00	90.80	178.21	5,653.03	-6,766.27	245.37	6,770.71	3.09
13,020.00	90.31	179.76	5,652.15	-6,857.25	246.98	6,861.69	1.79
13,112.00	91.11	179.31	5,651.01	-6,949.24	247.72	6,953.65	1.00
13,142.00	91.08	179.07	5,650.43	-6,979.23	248.15	6,983.64	0.81
<b>Final Sperry MWD Survey @ 13142.00 ft</b>							
13,185.00	91.08	179.07	5,649.62	-7,022.21	248.85	7,026.62	0.00
<b>Straight Line Projection to TD @ 13185.00 ft</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
176.00	176.00	0.07	-0.70	First Sperry MWD Survey @ 176.00 ft
13,142.00	5,650.43	-6,979.23	248.15	Final Sperry MWD Survey @ 13142.00 ft
13,185.00	5,649.62	-7,022.21	248.85	Straight Line Projection to TD @ 13185.00 ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Razor #27J-3411A_Rev C0_BHL Tgt	178.00	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
176.00	1,531.00	Surface_Sperry MWD+IFR1+MS+sag	MWD+IFR1+MS+sag
1,641.00	6,033.00	Vertical & Build_Sperry MWD+IFR1+MS+sag	MWD+IFR1+MS+sag
6,089.00	13,142.00	Lateral_Sperry MWD+IFR1+MS+sag	MWD+IFR1+MS+sag
13,185.00	13,185.00	Projection to Bit_BLIND	BLIND

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,582.00		9 5/8" Casing Pt.	9-5/8	13-1/2
6,069.00		7" Casing Pt.	7	8-3/4



**Design Report for Razor #27J-3411A - 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 #27J_Sec 27_N	0.00	0.00	3.00	0.03	-33.22	1,541,693.80	3,457,069.90	40° 48' 31.140 N	103° 50' 55.781 W
- actual wellpath misses target center by 33.22usft at 3.13usft MD (3.13 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				3.00	278.58	-3,304.21	1,541,910.81	3,453,761.07	
Point 2				3.00	361.51	1,974.88	1,542,092.02	3,459,037.72	
Razor #27J_Sec 27_1	0.00	0.00	3.00	0.03	-33.22	1,541,693.80	3,457,069.90	40° 48' 31.140 N	103° 50' 55.781 W
- actual wellpath misses target center by 33.22usft at 3.13usft MD (3.13 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				3.00	178.58	-3,304.21	1,541,810.82	3,453,762.93	
Point 2				3.00	261.51	1,974.88	1,541,992.04	3,459,039.58	
Razor #27J_Southern	0.00	0.00	3.00	0.02	-65.33	1,541,693.19	3,457,037.80	40° 48' 31.140 N	103° 50' 56.198 W
- actual wellpath misses target center by 65.33usft at 3.26usft MD (3.26 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				3.00	-2,286.12	1,949.29	1,539,443.76	3,459,029.33	
Point 2				3.00	-7,023.63	2,035.30	1,534,708.65	3,459,203.54	
Point 3				3.00	-7,041.73	-3,081.49	1,534,595.28	3,454,087.95	
Point 4				3.00	-2,373.07	-3,133.14	1,539,262.18	3,453,949.38	
Point 5				3.00	2,330.24	-3,211.05	1,543,963.25	3,453,783.90	
Point 6				3.00	2,369.37	-662.93	1,544,049.82	3,456,330.86	
Point 7				3.00	2,408.06	1,863.59	1,544,135.55	3,458,856.23	
Point 8				3.00	-2,286.12	1,949.29	1,539,443.76	3,459,029.33	
Razor #27J_Southern	0.00	0.00	3.00	0.02	-65.33	1,541,693.19	3,457,037.80	40° 48' 31.140 N	103° 50' 56.198 W
- actual wellpath misses target center by 65.33usft at 3.26usft MD (3.26 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				3.00	-2,373.07	-3,233.14	1,539,260.32	3,453,849.39	
Point 2				3.00	-2,286.12	2,049.29	1,539,445.62	3,459,129.31	
Point 3				3.00	-7,623.63	2,135.30	1,534,110.62	3,459,314.70	
Point 4				3.00	-7,641.73	-3,181.49	1,533,993.52	3,453,999.14	
Point 5				3.00	-2,373.07	-3,233.14	1,539,260.32	3,453,849.39	
Point 6				3.00	2,930.24	-3,311.05	1,544,561.28	3,453,672.74	
Point 7				3.00	2,969.37	-662.93	1,544,649.72	3,456,319.69	
Point 8				3.00	3,008.06	1,963.59	1,544,737.31	3,458,945.04	
Point 9				3.00	-2,286.12	2,049.29	1,539,445.62	3,459,129.31	
Razor #27J-3411A_Re	0.00	0.00	5,645.00	-7,029.47	245.34	1,534,670.68	3,457,479.31	40° 47' 21.682 N	103° 50' 52.159 W
- actual wellpath misses target center by 9.29usft at 13185.00usft MD (5649.62 TVD, -7022.21 N, 248.85 E)									
- Point									

**Directional Difficulty Index**

Average Dogleg over Survey:	2.01 °/100usft	Maximum Dogleg over Survey:	22.30 °/100usft at 5,150.00 usft
Net Tortousity applicable to Plans:	1.15 °/100usft	Directional Difficulty Index:	6.721

**Audit Info**

# North Reference Sheet for Sec. 27-T10N-R58W (Razor #27J Pad) - Razor #27J-3411A - Plan C

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 @ 4789.00usft (Frontier 26). Northing and Easting are relative to Razor #27J-3411A

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: 1.00000421

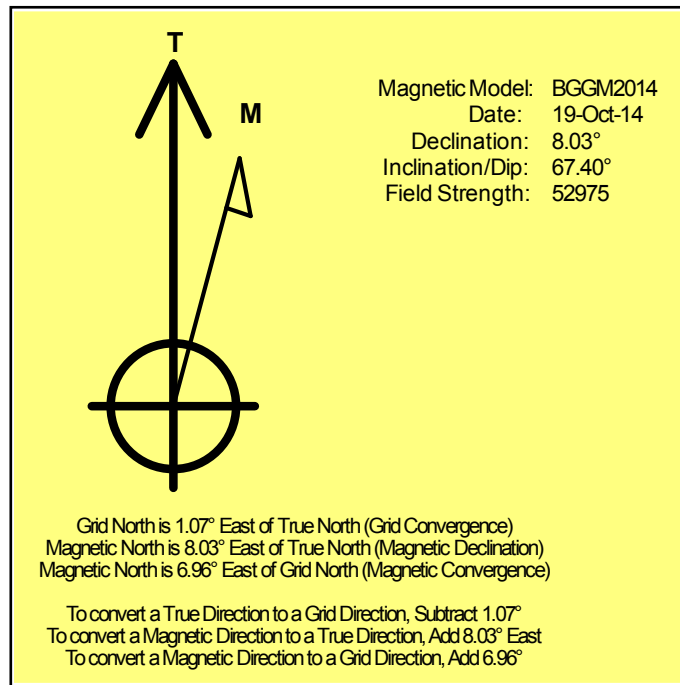
Grid Coordinates of Well: 1,541,694.39 usft N, 3,457,103.12 usft E

Geographical Coordinates of Well: 40° 48' 31.14" N, 103° 50' 55.35" W

Grid Convergence at Surface is: 1.07°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,185.00usft the Bottom Hole Displacement is 7,026.62usft in the Direction of 177.97° ( True).

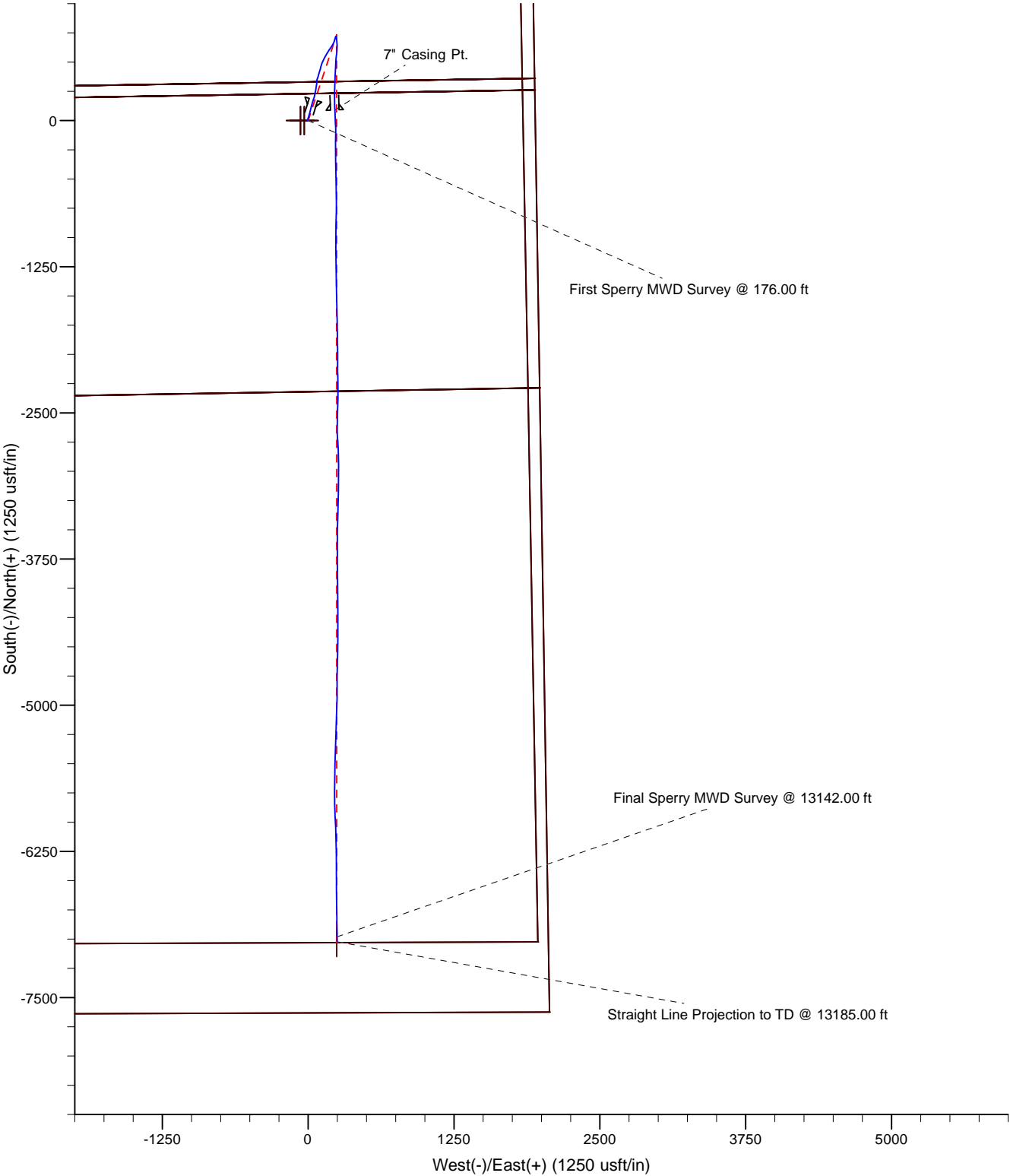
Magnetic Convergence at surface is: -6.96° (19 October 2014, , BGGM2014)





LEGEND

- Razor #27J-3411A, Plan C
- Actual Field Surveys



Project: Weld County, CO  
Site: Sec. 27-T10N-R58W (Razor #27J Pad)  
Well: Razor #27J-3411A

# Whiting Oil and Gas Corporation

