

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Razor #20B-2009A
Company:	Whiting Petroleum Corporation	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Project:	Weld County, CO	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site:	S20-T10N-R58W	North Reference:	True
Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Project	Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		S20-T10N-R58W			
Site Position:		Northing:	1,549,309.09 usft	Latitude:	40.830094
From:	Lat/Long	Easting:	3,446,260.83 usft	Longitude:	-103.887367
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.04 °

Well	Razor #20B-2009A					
Well Position	+N/-S	0.0 usft	Northing:	1,549,309.08 usft	Latitude:	40.830094
	+E/-W	0.0 usft	Easting:	3,446,260.83 usft	Longitude:	-103.887367
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,907.8 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	10/15/2014	7.96	67.42	53,091

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	185.17

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
805.5	6.11	282.90	804.9	3.6	-15.9	2.00	2.00	0.00	282.90	
4,706.9	6.11	282.90	4,684.2	96.4	-420.6	0.00	0.00	0.00	0.00	
5,012.4	0.00	0.00	4,989.1	100.0	-436.5	2.00	-2.00	0.00	180.00	Razor #20B-2009A VI
5,312.4	0.00	0.00	5,289.1	100.0	-436.5	0.00	0.00	0.00	0.00	
6,130.6	90.00	180.00	5,810.0	-420.9	-436.5	11.00	11.00	-22.00	180.00	
10,536.1	90.00	180.00	5,810.0	-4,826.4	-436.5	0.00	0.00	0.00	0.00	Razor #20B-2009A PI

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Razor #20B-2009A
Company:	Whiting Petroleum Corporation	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Project:	Weld County, CO	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site:	S20-T10N-R58W	North Reference:	True
Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
0.5	0.00	0.00	0.5	0.0	0.0	0.0	0.00	0.00	320' FNL, 1980' FEL
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	KOP @ 500'
600.0	2.00	282.90	600.0	0.4	-1.7	-0.2	2.00	2.00	
700.0	4.00	282.90	699.8	1.6	-6.8	-0.9	2.00	2.00	
805.5	6.11	282.90	804.9	3.6	-15.9	-2.2	2.00	2.00	EOB @ 6.11° INC
900.0	6.11	282.90	898.9	5.9	-25.7	-3.5	0.00	0.00	
1,000.0	6.11	282.90	998.3	8.3	-36.0	-5.0	0.00	0.00	
1,100.0	6.11	282.90	1,097.7	10.6	-46.4	-6.4	0.00	0.00	
1,200.0	6.11	282.90	1,197.2	13.0	-56.8	-7.8	0.00	0.00	
1,300.0	6.11	282.90	1,296.6	15.4	-67.2	-9.3	0.00	0.00	
1,400.0	6.11	282.90	1,396.0	17.8	-77.5	-10.7	0.00	0.00	
1,500.0	6.11	282.90	1,495.5	20.1	-87.9	-12.1	0.00	0.00	
1,600.0	6.11	282.90	1,594.9	22.5	-98.3	-13.6	0.00	0.00	
1,700.0	6.11	282.90	1,694.3	24.9	-108.7	-15.0	0.00	0.00	
1,800.0	6.11	282.90	1,793.8	27.3	-119.0	-16.4	0.00	0.00	
1,900.0	6.11	282.90	1,893.2	29.7	-129.4	-17.9	0.00	0.00	
2,000.0	6.11	282.90	1,992.6	32.0	-139.8	-19.3	0.00	0.00	
2,100.0	6.11	282.90	2,092.1	34.4	-150.2	-20.7	0.00	0.00	
2,200.0	6.11	282.90	2,191.5	36.8	-160.5	-22.2	0.00	0.00	
2,300.0	6.11	282.90	2,290.9	39.2	-170.9	-23.6	0.00	0.00	
2,400.0	6.11	282.90	2,390.4	41.5	-181.3	-25.0	0.00	0.00	
2,500.0	6.11	282.90	2,489.8	43.9	-191.7	-26.5	0.00	0.00	
2,600.0	6.11	282.90	2,589.2	46.3	-202.0	-27.9	0.00	0.00	
2,700.0	6.11	282.90	2,688.7	48.7	-212.4	-29.3	0.00	0.00	
2,800.0	6.11	282.90	2,788.1	51.0	-222.8	-30.8	0.00	0.00	
2,900.0	6.11	282.90	2,887.5	53.4	-233.2	-32.2	0.00	0.00	
3,000.0	6.11	282.90	2,987.0	55.8	-243.5	-33.6	0.00	0.00	
3,100.0	6.11	282.90	3,086.4	58.2	-253.9	-35.1	0.00	0.00	
3,200.0	6.11	282.90	3,185.8	60.6	-264.3	-36.5	0.00	0.00	
3,300.0	6.11	282.90	3,285.3	62.9	-274.7	-37.9	0.00	0.00	
3,400.0	6.11	282.90	3,384.7	65.3	-285.1	-39.4	0.00	0.00	
3,500.0	6.11	282.90	3,484.1	67.7	-295.4	-40.8	0.00	0.00	
3,600.0	6.11	282.90	3,583.5	70.1	-305.8	-42.2	0.00	0.00	
3,700.0	6.11	282.90	3,683.0	72.4	-316.2	-43.7	0.00	0.00	
3,800.0	6.11	282.90	3,782.4	74.8	-326.6	-45.1	0.00	0.00	
3,900.0	6.11	282.90	3,881.8	77.2	-336.9	-46.5	0.00	0.00	
4,000.0	6.11	282.90	3,981.3	79.6	-347.3	-48.0	0.00	0.00	
4,100.0	6.11	282.90	4,080.7	81.9	-357.7	-49.4	0.00	0.00	
4,200.0	6.11	282.90	4,180.1	84.3	-368.1	-50.8	0.00	0.00	
4,300.0	6.11	282.90	4,279.6	86.7	-378.4	-52.3	0.00	0.00	
4,400.0	6.11	282.90	4,379.0	89.1	-388.8	-53.7	0.00	0.00	
4,500.0	6.11	282.90	4,478.4	91.5	-399.2	-55.1	0.00	0.00	
4,600.0	6.11	282.90	4,577.9	93.8	-409.6	-56.6	0.00	0.00	
4,706.9	6.11	282.90	4,684.2	96.4	-420.6	-58.1	0.00	0.00	Start 2° Drop
4,800.0	4.25	282.90	4,776.9	98.2	-428.8	-59.2	2.00	-2.00	
4,900.0	2.25	282.90	4,876.7	99.5	-434.4	-60.0	2.00	-2.00	
5,000.0	0.25	282.90	4,976.7	100.0	-436.5	-60.3	2.00	-2.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Razor #20B-2009A
Company:	Whiting Petroleum Corporation	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Project:	Weld County, CO	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site:	S20-T10N-R58W	North Reference:	True
Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,012.4	0.00	0.00	4,989.1	100.0	-436.5	-60.3	2.00	-2.00	EOD @ 0°
5,100.0	0.00	0.00	5,076.7	100.0	-436.5	-60.3	0.00	0.00	
5,200.0	0.00	0.00	5,176.7	100.0	-436.5	-60.3	0.00	0.00	
5,300.0	0.00	0.00	5,276.7	100.0	-436.5	-60.3	0.00	0.00	
5,312.4	0.00	0.00	5,289.1	100.0	-436.5	-60.3	0.00	0.00	Start 11° Build
5,350.0	4.13	180.00	5,326.6	98.6	-436.5	-58.9	11.00	11.00	
5,400.0	9.63	180.00	5,376.3	92.7	-436.5	-53.0	11.00	11.00	
5,450.0	15.13	180.00	5,425.1	81.9	-436.5	-42.3	11.00	11.00	
5,500.0	20.63	180.00	5,472.7	66.6	-436.5	-27.0	11.00	11.00	
5,550.0	26.13	180.00	5,518.5	46.8	-436.5	-7.2	11.00	11.00	
5,600.0	31.63	180.00	5,562.3	22.6	-436.5	16.8	11.00	11.00	
5,650.0	37.13	180.00	5,603.5	-5.6	-436.5	44.9	11.00	11.00	
5,700.0	42.63	180.00	5,641.9	-37.7	-436.5	76.8	11.00	11.00	
5,750.0	48.13	180.00	5,677.0	-73.2	-436.5	112.3	11.00	11.00	
5,800.0	53.63	180.00	5,708.5	-112.0	-436.5	150.9	11.00	11.00	
5,850.0	59.13	180.00	5,736.2	-153.6	-436.5	192.3	11.00	11.00	
5,900.0	64.63	180.00	5,759.8	-197.7	-436.5	236.2	11.00	11.00	
5,950.0	70.13	180.00	5,779.0	-243.9	-436.5	282.2	11.00	11.00	
6,000.0	75.63	180.00	5,793.7	-291.6	-436.5	329.8	11.00	11.00	
6,050.0	81.13	180.00	5,803.7	-340.6	-436.5	378.5	11.00	11.00	
6,100.0	86.63	180.00	5,809.1	-390.3	-436.5	428.0	11.00	11.00	
6,130.6	90.00	180.00	5,810.0	-420.9	-436.5	458.5	11.00	11.00	LP @ 5,810' TVD, 90° INC - 7" - 745' FNL, 242'
6,200.0	90.00	180.00	5,810.0	-490.3	-436.5	527.6	0.00	0.00	
6,300.0	90.00	180.00	5,810.0	-590.3	-436.5	627.2	0.00	0.00	
6,400.0	90.00	180.00	5,810.0	-690.3	-436.5	726.8	0.00	0.00	
6,500.0	90.00	180.00	5,810.0	-790.3	-436.5	826.4	0.00	0.00	
6,600.0	90.00	180.00	5,810.0	-890.3	-436.5	926.0	0.00	0.00	
6,700.0	90.00	180.00	5,810.0	-990.3	-436.5	1,025.6	0.00	0.00	
6,800.0	90.00	180.00	5,810.0	-1,090.3	-436.5	1,125.2	0.00	0.00	
6,900.0	90.00	180.00	5,810.0	-1,190.3	-436.5	1,224.7	0.00	0.00	
7,000.0	90.00	180.00	5,810.0	-1,290.3	-436.5	1,324.3	0.00	0.00	
7,100.0	90.00	180.00	5,810.0	-1,390.3	-436.5	1,423.9	0.00	0.00	
7,200.0	90.00	180.00	5,810.0	-1,490.3	-436.5	1,523.5	0.00	0.00	
7,300.0	90.00	180.00	5,810.0	-1,590.3	-436.5	1,623.1	0.00	0.00	
7,400.0	90.00	180.00	5,810.0	-1,690.3	-436.5	1,722.7	0.00	0.00	
7,500.0	90.00	180.00	5,810.0	-1,790.3	-436.5	1,822.3	0.00	0.00	
7,600.0	90.00	180.00	5,810.0	-1,890.3	-436.5	1,921.9	0.00	0.00	
7,700.0	90.00	180.00	5,810.0	-1,990.3	-436.5	2,021.5	0.00	0.00	
7,800.0	90.00	180.00	5,810.0	-2,090.3	-436.5	2,121.1	0.00	0.00	
7,900.0	90.00	180.00	5,810.0	-2,190.3	-436.5	2,220.7	0.00	0.00	
8,000.0	90.00	180.00	5,810.0	-2,290.3	-436.5	2,320.3	0.00	0.00	
8,100.0	90.00	180.00	5,810.0	-2,390.3	-436.5	2,419.9	0.00	0.00	
8,200.0	90.00	180.00	5,810.0	-2,490.3	-436.5	2,519.5	0.00	0.00	
8,300.0	90.00	180.00	5,810.0	-2,590.3	-436.5	2,619.1	0.00	0.00	
8,400.0	90.00	180.00	5,810.0	-2,690.3	-436.5	2,718.6	0.00	0.00	
8,500.0	90.00	180.00	5,810.0	-2,790.3	-436.5	2,818.2	0.00	0.00	
8,600.0	90.00	180.00	5,810.0	-2,890.3	-436.5	2,917.8	0.00	0.00	
8,700.0	90.00	180.00	5,810.0	-2,990.3	-436.5	3,017.4	0.00	0.00	
8,800.0	90.00	180.00	5,810.0	-3,090.3	-436.5	3,117.0	0.00	0.00	
8,900.0	90.00	180.00	5,810.0	-3,190.3	-436.5	3,216.6	0.00	0.00	
9,000.0	90.00	180.00	5,810.0	-3,290.3	-436.5	3,316.2	0.00	0.00	
9,100.0	90.00	180.00	5,810.0	-3,390.3	-436.5	3,415.8	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Razor #20B-2009A
Company:	Whiting Petroleum Corporation	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Project:	Weld County, CO	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site:	S20-T10N-R58W	North Reference:	True
Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
9,200.0	90.00	180.00	5,810.0	-3,490.3	-436.5	3,515.4	0.00	0.00	
9,300.0	90.00	180.00	5,810.0	-3,590.3	-436.5	3,615.0	0.00	0.00	
9,400.0	90.00	180.00	5,810.0	-3,690.3	-436.5	3,714.6	0.00	0.00	
9,500.0	90.00	180.00	5,810.0	-3,790.3	-436.5	3,814.2	0.00	0.00	
9,600.0	90.00	180.00	5,810.0	-3,890.3	-436.5	3,913.8	0.00	0.00	
9,700.0	90.00	180.00	5,810.0	-3,990.3	-436.5	4,013.4	0.00	0.00	
9,800.0	90.00	180.00	5,810.0	-4,090.3	-436.5	4,113.0	0.00	0.00	
9,900.0	90.00	180.00	5,810.0	-4,190.3	-436.5	4,212.5	0.00	0.00	
10,000.0	90.00	180.00	5,810.0	-4,290.3	-436.5	4,312.1	0.00	0.00	
10,100.0	90.00	180.00	5,810.0	-4,390.3	-436.5	4,411.7	0.00	0.00	
10,200.0	90.00	180.00	5,810.0	-4,490.3	-436.5	4,511.3	0.00	0.00	
10,300.0	90.00	180.00	5,810.0	-4,590.3	-436.5	4,610.9	0.00	0.00	
10,400.0	90.00	180.00	5,810.0	-4,690.3	-436.5	4,710.5	0.00	0.00	
10,500.0	90.00	180.00	5,810.0	-4,790.3	-436.5	4,810.1	0.00	0.00	
10,536.1	90.00	180.00	5,810.0	-4,826.4	-436.5	4,846.1	0.00	0.00	100' FSL, 2475' FEL

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Razor #20B-2009A PBH - plan hits target center - Point	0.00	0.00	5,810.0	-4,826.4	-436.5	1,544,475.53	3,445,912.16	40.816847	-103.888944
Razor #20B-2009A VP - plan hits target center - Point	0.00	0.00	4,989.1	100.0	-436.5	1,549,401.13	3,445,822.57	40.830368	-103.888944

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,130.6	5,810.0	7" - 745' FNL, 2421' FEL	0	0

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
0.5	0.5	0.0	0.0	320' FNL, 1980' FEL
500.0	500.0	0.0	0.0	KOP @ 500'
805.5	804.9	3.6	-15.9	EOB @ 6.11° INC
4,706.9	4,684.2	96.4	-420.6	Start 2° Drop
5,012.4	4,989.1	100.0	-436.5	EOD @ 0°
5,312.4	5,289.1	100.0	-436.5	Start 11° Build
6,130.6	5,810.0	-420.9	-436.5	LP @ 5,810' TVD, 90° INC
10,536.1	5,810.0	-4,826.4	-436.5	100' FSL, 2475' FEL
10,536.1	5,810.0	-4,826.4	-436.5	TD @ 10,536.1' MD

Whiting Petroleum Corporation

Weld County, CO

S20-T10N-R58W

Razor #20B-2009A

HZ

Plan #1

Anticollision Report

15 October, 2014

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2009A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Reference Site:	S20-T10N-R58W	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0usft	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 200.0usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	10/15/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	10,536.1	Plan #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
S20-T10N-R58W						
Razor #20B-2011A - HZ - Plan #1	500.0	500.0	60.1	58.1	30.258	CC, ES
Razor #20B-2011A - HZ - Plan #1	800.0	797.3	76.8	73.5	23.084	SF
Razor #20B-2012B - HZ - Plan #1	500.0	500.0	89.9	88.0	45.318	CC, ES
Razor #20B-2012B - HZ - Plan #1	700.0	693.2	103.3	100.5	36.138	SF
S29-T10N-R58W						
Razor 29F 2006B - HZ - Plan #1						Out of range
Razor 29F 2007A - HZ - Plan #1						Out of range
Razor 29F 2008B - HZ - Plan #1						Out of range

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2009A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Reference Site:	S20-T10N-R58W	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S20-T10N-R58W - Razor #20B-2011A - HZ - Plan #1													Offset Site Error:	0.0 usft
Survey Program: 0-ISCSWA MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	60.1	60.1					
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	60.1	60.1	59.9	0.19	321.905		
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	60.1	60.1	59.4	0.64	94.410		
300.0	300.0	300.0	300.0	0.5	0.5	90.00	0.0	60.1	60.1	59.0	1.09	55.317		
400.0	400.0	400.0	400.0	0.8	0.8	90.00	0.0	60.1	60.1	58.5	1.54	39.119		
500.0	500.0	500.0	500.0	1.0	1.0	90.00	0.0	60.1	60.1	58.1	1.98	30.258 CC, ES		
600.0	600.0	600.0	600.0	1.2	1.2	167.45	0.0	60.1	61.8	59.3	2.43	25.403		
700.0	699.8	699.8	699.8	1.4	1.4	168.41	0.0	60.1	66.9	64.0	2.88	23.224		
800.0	799.5	797.3	797.3	1.7	1.7	168.98	0.9	61.5	76.8	73.5	3.33	23.084 SF		
900.0	898.9	895.5	895.4	1.9	1.9	168.73	3.1	65.1	90.9	87.1	3.77	24.144		
1,000.0	998.3	994.5	994.3	2.2	2.1	168.49	5.5	69.0	105.2	101.0	4.20	25.036		
1,100.0	1,097.7	1,093.5	1,093.1	2.5	2.3	168.31	7.9	72.9	119.4	114.8	4.64	25.729		
1,200.0	1,197.2	1,192.4	1,192.0	2.7	2.5	168.17	10.2	76.8	133.7	128.6	5.09	26.279		
1,300.0	1,296.6	1,291.4	1,290.9	3.0	2.8	168.05	12.6	80.6	147.9	142.4	5.54	26.725		
1,400.0	1,396.0	1,390.4	1,389.8	3.3	3.0	167.96	15.0	84.5	162.2	156.2	5.99	27.094		
1,500.0	1,495.5	1,489.4	1,488.6	3.6	3.2	167.88	17.4	88.4	176.5	170.0	6.44	27.403		
1,600.0	1,594.9	1,588.3	1,587.5	3.9	3.5	167.81	19.8	92.3	190.7	183.8	6.89	27.666		

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2009A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Reference Site:	S20-T10N-R58W	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S20-T10N-R58W - Razor #20B-2012B - HZ - Plan #1													Offset Site Error:	0.0 usft
Survey Program: 0-ISCWSA MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis			Distance					Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis			
0.0	0.0	0.0	0.0	0.0	0.0	90.01	0.0	89.9	89.9					
100.0	100.0	100.0	100.0	0.1	0.1	90.01	0.0	89.9	89.9	89.8	0.19	482.116		
200.0	200.0	200.0	200.0	0.3	0.3	90.01	0.0	89.9	89.9	89.3	0.64	141.398		
300.0	300.0	300.0	300.0	0.5	0.5	90.01	0.0	89.9	89.9	88.9	1.09	82.848		
400.0	400.0	400.0	400.0	0.8	0.8	90.01	0.0	89.9	89.9	88.4	1.54	58.588		
500.0	500.0	500.0	500.0	1.0	1.0	90.01	0.0	89.9	89.9	88.0	1.98	45.318 CC, ES		
600.0	600.0	596.9	596.9	1.2	1.2	167.11	0.3	91.5	93.3	90.9	2.42	38.584		
700.0	699.8	693.2	693.0	1.4	1.4	167.12	1.4	96.3	103.3	100.5	2.86	36.138 SF		
800.0	799.5	788.2	787.7	1.7	1.6	167.12	3.0	104.1	120.0	116.7	3.32	36.184		
900.0	898.9	884.7	883.6	1.9	1.9	167.13	5.3	114.4	140.9	137.1	3.76	37.506		
1,000.0	998.3	982.5	980.8	2.2	2.1	167.13	7.6	125.0	162.0	157.8	4.19	38.638		
1,100.0	1,097.7	1,080.2	1,077.9	2.5	2.4	167.13	9.8	135.6	183.1	178.4	4.63	39.500		

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2009A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4924.8usft (Cade #23)
Reference Site:	S20-T10N-R58W	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site Error:	0.0usft	North Reference:	True
Reference Well:	Razor #20B-2009A	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=17' @ 4924.8usft (Cade #23)

Offset Depths are relative to Offset Datum

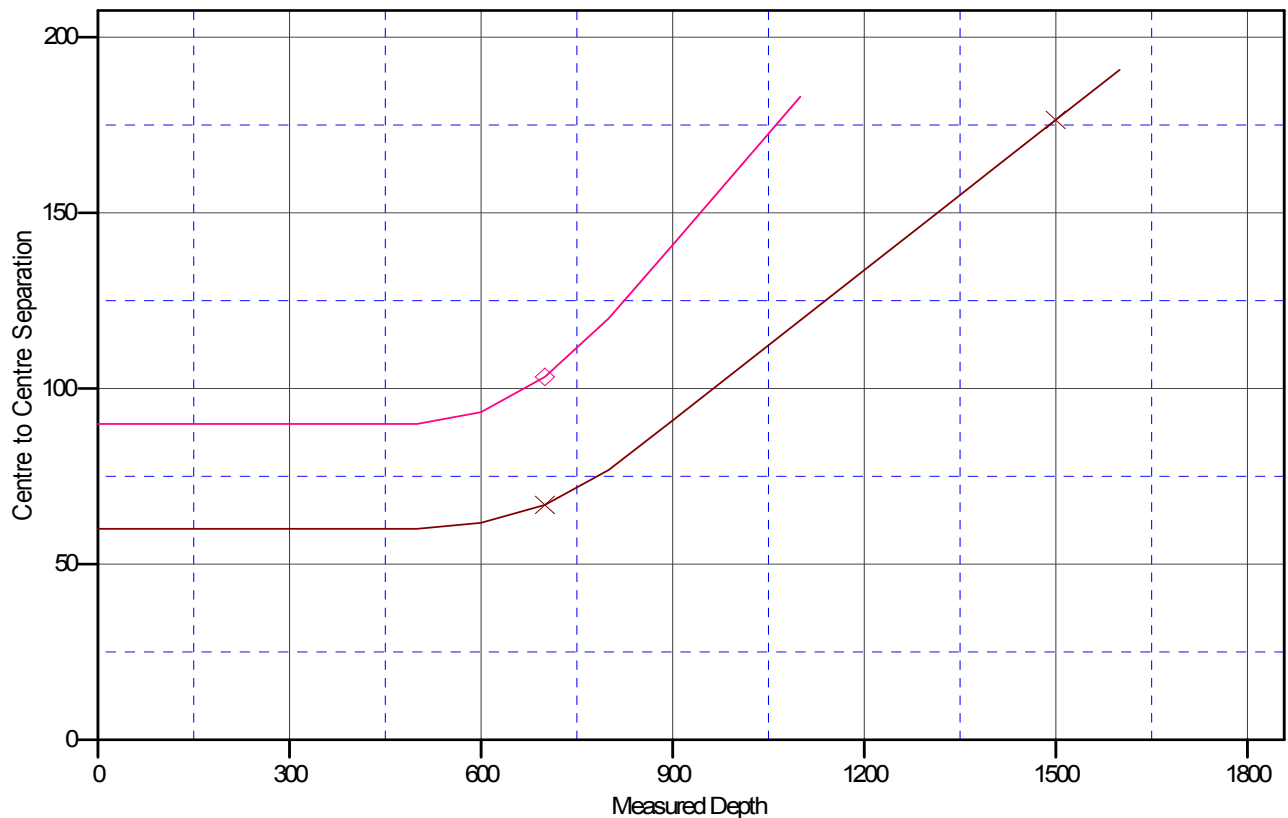
Central Meridian is -105.500000 °

Coordinates are relative to: Razor #20B-2009A

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 1.04°

Ladder Plot



LEGEND

◆ Razor #20B-2012B, HZ, Plan #1 V0
 ✕ Razor #20B-2011A, HZ, Plan #1 V0