

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Razor #20B-2012B
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-2012B	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-2012B					
Well Position	+N/-S	0.0 usft	Northing:	1,549,310.71 usft	Latitude:	40.830094
	+E/-W	0.0 usft	Easting:	3,446,350.75 usft	Longitude:	-103.887042
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) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	174.50

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	
818.0	6.36	77.81	817.3	3.7	17.2	2.00	2.00	0.00	77.81	
4,776.8	6.36	77.81	4,751.8	96.3	445.9	0.00	0.00	0.00	0.00	
5,094.8	0.00	0.00	5,069.1	100.0	463.1	2.00	-2.00	0.00	180.00	Razor #20B-2012B V
5,394.8	0.00	0.00	5,369.1	100.0	463.1	0.00	0.00	0.00	0.00	
6,212.9	90.00	180.00	5,890.0	-420.9	463.1	11.00	11.00	-22.00	180.00	
10,605.4	90.00	180.00	5,890.0	-4,813.3	463.1	0.00	0.00	0.00	0.00	Razor #20B-2012B F

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Project:	Weld County, CO	MD Reference:	KB=17' @ 4924.8usft (Cade #23)
Site:	S20-T10N-R58W	North Reference:	True
Well:	Razor #20B-2012B	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, 1890' 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	77.81	600.0	0.4	1.7	-0.2	2.00	2.00	
700.0	4.00	77.81	699.8	1.5	6.8	-0.8	2.00	2.00	
800.0	6.00	77.81	799.5	3.3	15.3	-1.8	2.00	2.00	
818.0	6.36	77.81	817.3	3.7	17.2	-2.1	2.00	2.00	EOB @ 6.36° INC
900.0	6.36	77.81	898.8	5.6	26.1	-3.1	0.00	0.00	
1,000.0	6.36	77.81	998.2	8.0	36.9	-4.4	0.00	0.00	
1,100.0	6.36	77.81	1,097.6	10.3	47.8	-5.7	0.00	0.00	
1,200.0	6.36	77.81	1,197.0	12.7	58.6	-7.0	0.00	0.00	
1,300.0	6.36	77.81	1,296.4	15.0	69.4	-8.3	0.00	0.00	
1,400.0	6.36	77.81	1,395.8	17.3	80.2	-9.6	0.00	0.00	
1,500.0	6.36	77.81	1,495.2	19.7	91.1	-10.9	0.00	0.00	
1,600.0	6.36	77.81	1,594.5	22.0	101.9	-12.1	0.00	0.00	
1,700.0	6.36	77.81	1,693.9	24.3	112.7	-13.4	0.00	0.00	
1,800.0	6.36	77.81	1,793.3	26.7	123.6	-14.7	0.00	0.00	
1,900.0	6.36	77.81	1,892.7	29.0	134.4	-16.0	0.00	0.00	
2,000.0	6.36	77.81	1,992.1	31.4	145.2	-17.3	0.00	0.00	
2,100.0	6.36	77.81	2,091.5	33.7	156.0	-18.6	0.00	0.00	
2,200.0	6.36	77.81	2,190.8	36.0	166.9	-19.9	0.00	0.00	
2,300.0	6.36	77.81	2,290.2	38.4	177.7	-21.2	0.00	0.00	
2,400.0	6.36	77.81	2,389.6	40.7	188.5	-22.5	0.00	0.00	
2,500.0	6.36	77.81	2,489.0	43.0	199.3	-23.8	0.00	0.00	
2,600.0	6.36	77.81	2,588.4	45.4	210.2	-25.0	0.00	0.00	
2,700.0	6.36	77.81	2,687.8	47.7	221.0	-26.3	0.00	0.00	
2,800.0	6.36	77.81	2,787.2	50.1	231.8	-27.6	0.00	0.00	
2,900.0	6.36	77.81	2,886.5	52.4	242.7	-28.9	0.00	0.00	
3,000.0	6.36	77.81	2,985.9	54.7	253.5	-30.2	0.00	0.00	
3,100.0	6.36	77.81	3,085.3	57.1	264.3	-31.5	0.00	0.00	
3,200.0	6.36	77.81	3,184.7	59.4	275.1	-32.8	0.00	0.00	
3,300.0	6.36	77.81	3,284.1	61.8	286.0	-34.1	0.00	0.00	
3,400.0	6.36	77.81	3,383.5	64.1	296.8	-35.4	0.00	0.00	
3,500.0	6.36	77.81	3,482.8	66.4	307.6	-36.7	0.00	0.00	
3,600.0	6.36	77.81	3,582.2	68.8	318.4	-38.0	0.00	0.00	
3,700.0	6.36	77.81	3,681.6	71.1	329.3	-39.2	0.00	0.00	
3,800.0	6.36	77.81	3,781.0	73.4	340.1	-40.5	0.00	0.00	
3,900.0	6.36	77.81	3,880.4	75.8	350.9	-41.8	0.00	0.00	
4,000.0	6.36	77.81	3,979.8	78.1	361.7	-43.1	0.00	0.00	
4,100.0	6.36	77.81	4,079.2	80.5	372.6	-44.4	0.00	0.00	
4,200.0	6.36	77.81	4,178.5	82.8	383.4	-45.7	0.00	0.00	
4,300.0	6.36	77.81	4,277.9	85.1	394.2	-47.0	0.00	0.00	
4,400.0	6.36	77.81	4,377.3	87.5	405.1	-48.3	0.00	0.00	
4,500.0	6.36	77.81	4,476.7	89.8	415.9	-49.6	0.00	0.00	
4,600.0	6.36	77.81	4,576.1	92.1	426.7	-50.9	0.00	0.00	
4,700.0	6.36	77.81	4,675.5	94.5	437.5	-52.1	0.00	0.00	
4,776.8	6.36	77.81	4,751.8	96.3	445.9	-53.1	0.00	0.00	Start 2° Drop
4,800.0	5.90	77.81	4,774.9	96.8	448.3	-53.4	2.00	-2.00	

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Well:	Razor #20B-2012B	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
4,900.0	3.90	77.81	4,874.5	98.6	456.6	-54.4	2.00	-2.00	
5,000.0	1.90	77.81	4,974.4	99.7	461.6	-55.0	2.00	-2.00	
5,094.8	0.00	0.00	5,069.1	100.0	463.1	-55.2	2.00	-2.00	EOD @ 0°
5,100.0	0.00	0.00	5,074.3	100.0	463.1	-55.2	0.00	0.00	
5,200.0	0.00	0.00	5,174.3	100.0	463.1	-55.2	0.00	0.00	
5,300.0	0.00	0.00	5,274.3	100.0	463.1	-55.2	0.00	0.00	
5,394.8	0.00	0.00	5,369.1	100.0	463.1	-55.2	0.00	0.00	Start 11° Build
5,400.0	0.58	180.00	5,374.3	100.0	463.1	-55.2	11.00	11.00	
5,450.0	6.08	180.00	5,424.2	97.1	463.1	-52.3	11.00	11.00	
5,500.0	11.58	180.00	5,473.6	89.4	463.1	-44.6	11.00	11.00	
5,550.0	17.08	180.00	5,522.0	77.0	463.1	-32.3	11.00	11.00	
5,600.0	22.58	180.00	5,569.1	60.1	463.1	-15.5	11.00	11.00	
5,650.0	28.08	180.00	5,614.2	38.7	463.1	5.8	11.00	11.00	
5,700.0	33.58	180.00	5,657.2	13.1	463.1	31.3	11.00	11.00	
5,750.0	39.08	180.00	5,697.4	-16.5	463.1	60.8	11.00	11.00	
5,800.0	44.58	180.00	5,734.7	-49.8	463.1	94.0	11.00	11.00	
5,850.0	50.08	180.00	5,768.6	-86.6	463.1	130.5	11.00	11.00	
5,900.0	55.58	180.00	5,798.8	-126.4	463.1	170.2	11.00	11.00	
5,950.0	61.08	180.00	5,825.0	-169.0	463.1	212.5	11.00	11.00	
6,000.0	66.58	180.00	5,847.0	-213.8	463.1	257.2	11.00	11.00	
6,050.0	72.08	180.00	5,864.7	-260.6	463.1	303.7	11.00	11.00	
6,100.0	77.58	180.00	5,877.8	-308.8	463.1	351.7	11.00	11.00	
6,150.0	83.08	180.00	5,886.2	-358.1	463.1	400.8	11.00	11.00	
6,200.0	88.58	180.00	5,889.8	-407.9	463.1	450.4	11.00	11.00	
6,212.9	89.99	180.00	5,890.0	-420.8	463.1	463.2	11.00	11.00	LP @ 5,890' TVD, 90° INC - 7" - 737' FNL, 143°
6,300.0	90.00	180.00	5,890.0	-507.9	463.1	549.9	0.01	0.01	
6,400.0	90.00	180.00	5,890.0	-607.9	463.1	649.5	0.00	0.00	
6,500.0	90.00	180.00	5,890.0	-707.9	463.1	749.0	0.00	0.00	
6,600.0	90.00	180.00	5,890.0	-807.9	463.1	848.6	0.00	0.00	
6,700.0	90.00	180.00	5,890.0	-907.9	463.1	948.1	0.00	0.00	
6,800.0	90.00	180.00	5,890.0	-1,007.9	463.1	1,047.6	0.00	0.00	
6,900.0	90.00	180.00	5,890.0	-1,107.9	463.1	1,147.2	0.00	0.00	
7,000.0	90.00	180.00	5,890.0	-1,207.9	463.1	1,246.7	0.00	0.00	
7,100.0	90.00	180.00	5,890.0	-1,307.9	463.1	1,346.3	0.00	0.00	
7,200.0	90.00	180.00	5,890.0	-1,407.9	463.1	1,445.8	0.00	0.00	
7,300.0	90.00	180.00	5,890.0	-1,507.9	463.1	1,545.3	0.00	0.00	
7,400.0	90.00	180.00	5,890.0	-1,607.9	463.1	1,644.9	0.00	0.00	
7,500.0	90.00	180.00	5,890.0	-1,707.9	463.1	1,744.4	0.00	0.00	
7,600.0	90.00	180.00	5,890.0	-1,807.9	463.1	1,844.0	0.00	0.00	
7,700.0	90.00	180.00	5,890.0	-1,907.9	463.1	1,943.5	0.00	0.00	
7,800.0	90.00	180.00	5,890.0	-2,007.9	463.1	2,043.0	0.00	0.00	
7,900.0	90.00	180.00	5,890.0	-2,107.9	463.1	2,142.6	0.00	0.00	
8,000.0	90.00	180.00	5,890.0	-2,207.9	463.1	2,242.1	0.00	0.00	
8,100.0	90.00	180.00	5,890.0	-2,307.9	463.1	2,341.7	0.00	0.00	
8,200.0	90.00	180.00	5,890.0	-2,407.9	463.1	2,441.2	0.00	0.00	
8,300.0	90.00	180.00	5,890.0	-2,507.9	463.1	2,540.7	0.00	0.00	
8,400.0	90.00	180.00	5,890.0	-2,607.9	463.1	2,640.3	0.00	0.00	
8,500.0	90.00	180.00	5,890.0	-2,707.9	463.1	2,739.8	0.00	0.00	
8,600.0	90.00	180.00	5,890.0	-2,807.9	463.1	2,839.4	0.00	0.00	
8,700.0	90.00	180.00	5,890.0	-2,907.9	463.1	2,938.9	0.00	0.00	
8,800.0	90.00	180.00	5,890.0	-3,007.9	463.1	3,038.4	0.00	0.00	
8,900.0	90.00	180.00	5,890.0	-3,107.9	463.1	3,138.0	0.00	0.00	

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Well:	Razor #20B-2012B	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
9,000.0	90.00	180.00	5,890.0	-3,207.9	463.1	3,237.5	0.00	0.00	
9,100.0	90.00	180.00	5,890.0	-3,307.9	463.1	3,337.1	0.00	0.00	
9,200.0	90.00	180.00	5,890.0	-3,407.9	463.1	3,436.6	0.00	0.00	
9,300.0	90.00	180.00	5,890.0	-3,507.9	463.1	3,536.1	0.00	0.00	
9,400.0	90.00	180.00	5,890.0	-3,607.9	463.1	3,635.7	0.00	0.00	
9,500.0	90.00	180.00	5,890.0	-3,707.9	463.1	3,735.2	0.00	0.00	
9,600.0	90.00	180.00	5,890.0	-3,807.9	463.1	3,834.8	0.00	0.00	
9,700.0	90.00	180.00	5,890.0	-3,907.9	463.1	3,934.3	0.00	0.00	
9,800.0	90.00	180.00	5,890.0	-4,007.9	463.1	4,033.9	0.00	0.00	
9,900.0	90.00	180.00	5,890.0	-4,107.9	463.1	4,133.4	0.00	0.00	
10,000.0	90.00	180.00	5,890.0	-4,207.9	463.1	4,232.9	0.00	0.00	
10,100.0	90.00	180.00	5,890.0	-4,307.9	463.1	4,332.5	0.00	0.00	
10,200.0	90.00	180.00	5,890.0	-4,407.9	463.1	4,432.0	0.00	0.00	
10,300.0	90.00	180.00	5,890.0	-4,507.9	463.1	4,531.6	0.00	0.00	
10,400.0	90.00	180.00	5,890.0	-4,607.9	463.1	4,631.1	0.00	0.00	
10,500.0	90.00	180.00	5,890.0	-4,707.9	463.1	4,730.6	0.00	0.00	
10,605.4	90.00	180.00	5,890.0	-4,813.3	463.1	4,835.5	0.00	0.00	100' FSL, 1485' FEL - TD @ 10,605.4' MD

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-2012B PBI	0.00	0.00	5,890.0	-4,813.3	463.1	1,544,506.64	3,446,901.31	40.816883	-103.885369
- plan hits target center									
- Point									
Razor #20B-2012B VP	0.00	0.00	5,069.1	100.0	463.1	1,549,419.11	3,446,811.94	40.830368	-103.885369
- plan hits target center									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,212.9	5,890.0	7" - 737' FNL, 1432' FEL	0	0

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.5	0.5	0.0	0.0	320' FNL, 1890' FEL
500.0	500.0	0.0	0.0	KOP @ 500'
818.0	817.3	3.7	17.2	EOB @ 6.36° INC
4,776.8	4,751.8	96.3	445.9	Start 2° Drop
5,094.8	5,069.1	100.0	463.1	EOD @ 0°
5,394.8	5,369.1	100.0	463.1	Start 11° Build
6,212.9	5,890.0	-420.9	463.1	LP @ 5,890' TVD, 90° INC
10,605.4	5,890.0	-4,813.3	463.1	100' FSL, 1485' FEL
10,605.4	5,890.0	-4,813.3	463.1	TD @ 10,605.4' MD

Whiting Petroleum Corporation

Weld County, CO

S20-T10N-R58W

Razor #20B-2012B

HZ

Plan #1

Anticollision Report

15 October, 2014

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2012B
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-2012B	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	10,605.4	Plan #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

Summary							
		Reference	Offset	Distance			
Site Name		Measured	Measured	Between	Between	Separation	Warning
Offset Well - Wellbore - Design		Depth	Depth	Centres	Ellipses	Factor	
		(usft)	(usft)	(usft)	(usft)		
S20-T10N-R58W							
Razor #20B-2009A - HZ - Plan #1		500.0	500.0	89.9	88.0	45.318	CC, ES
Razor #20B-2009A - HZ - Plan #1		700.0	693.2	103.3	100.5	36.138	SF
Razor #20B-2011A - HZ - Plan #1		500.0	500.0	29.9	27.9	15.059	CC, ES
Razor #20B-2011A - HZ - Plan #1		700.0	699.8	36.7	33.9	12.760	SF

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2012B
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-2012B	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												Offset Site Error:	0.0 usft
S20-T10N-R58W - Razor #20B-2009A - HZ - Plan #1												Offset Well Error:	0.0 usft
Survey Program: 0-ISCWSA MWD													
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	-89.99	0.0	-89.9	89.9				
100.0	100.0	100.0	100.0	0.1	0.1	-89.99	0.0	-89.9	89.9	89.8	0.19	482.116	
200.0	200.0	200.0	200.0	0.3	0.3	-89.99	0.0	-89.9	89.9	89.3	0.64	141.398	
300.0	300.0	300.0	300.0	0.5	0.5	-89.99	0.0	-89.9	89.9	88.9	1.09	82.848	
400.0	400.0	400.0	400.0	0.8	0.8	-89.99	0.0	-89.9	89.9	88.4	1.54	58.588	
500.0	500.0	500.0	500.0	1.0	1.0	-89.99	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	-167.79	0.4	-91.5	93.3	90.9	2.42	38.584	
700.0	699.8	693.2	693.0	1.4	1.4	-167.73	1.5	-96.3	103.3	100.5	2.86	36.138	SF
800.0	799.5	788.2	787.7	1.7	1.6	-167.65	3.2	-104.1	120.0	116.7	3.32	36.191	
900.0	898.8	885.2	884.2	1.9	1.9	-167.64	5.5	-114.1	141.0	137.2	3.76	37.519	
1,000.0	998.2	983.0	981.4	2.2	2.1	-167.64	7.9	-124.2	162.0	157.8	4.19	38.639	
1,100.0	1,097.6	1,080.8	1,078.6	2.5	2.4	-167.64	10.2	-134.4	183.1	178.5	4.64	39.502	

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2012B
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-2012B	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	-89.98	0.0	-29.9	29.9						
100.0	100.0	100.0	100.0	0.1	0.1	-89.98	0.0	-29.9	29.9	29.7	0.19	160.211			
200.0	200.0	200.0	200.0	0.3	0.3	-89.98	0.0	-29.9	29.9	29.3	0.64	46.988			
300.0	300.0	300.0	300.0	0.5	0.5	-89.98	0.0	-29.9	29.9	28.8	1.09	27.531			
400.0	400.0	400.0	400.0	0.8	0.8	-89.98	0.0	-29.9	29.9	28.4	1.54	19.469			
500.0	500.0	500.0	500.0	1.0	1.0	-89.98	0.0	-29.9	29.9	27.9	1.98	15.059	CC, ES		
600.0	600.0	600.0	600.0	1.2	1.2	-168.46	0.0	-29.9	31.6	29.2	2.43	12.998			
700.0	699.8	699.8	699.8	1.4	1.4	-170.08	0.0	-29.9	36.7	33.9	2.88	12.760	SF		
800.0	799.5	800.8	800.8	1.7	1.7	-170.91	0.9	-28.4	43.8	40.5	3.33	13.170			
900.0	898.8	901.0	900.9	1.9	1.9	-170.49	3.3	-24.6	50.8	47.0	3.75	13.530			
1,000.0	998.2	1,000.8	1,000.5	2.2	2.1	-170.11	5.7	-20.7	57.7	53.5	4.19	13.764			
1,100.0	1,097.6	1,100.5	1,100.2	2.5	2.3	-169.81	8.0	-16.8	64.6	60.0	4.64	13.936			
1,200.0	1,197.0	1,200.3	1,199.9	2.8	2.6	-169.57	10.4	-12.9	71.6	66.5	5.09	14.066			
1,300.0	1,296.4	1,300.0	1,299.5	3.0	2.8	-169.37	12.8	-9.0	78.5	72.9	5.54	14.166			
1,400.0	1,395.8	1,399.8	1,399.2	3.3	3.0	-169.20	15.2	-5.1	85.4	79.4	5.99	14.246			
1,500.0	1,495.2	1,499.6	1,498.8	3.6	3.2	-169.06	17.6	-1.1	92.3	85.9	6.45	14.310			
1,600.0	1,594.5	1,599.3	1,598.5	3.9	3.5	-168.93	20.0	2.8	99.2	92.3	6.91	14.363			
1,700.0	1,693.9	1,699.1	1,698.1	4.2	3.7	-168.83	22.4	6.7	106.2	98.8	7.37	14.407			
1,800.0	1,793.3	1,798.8	1,797.8	4.5	3.9	-168.74	24.8	10.6	113.1	105.3	7.83	14.443			
1,900.0	1,892.7	1,898.6	1,897.4	4.8	4.2	-168.65	27.2	14.5	120.0	111.7	8.29	14.475			
2,000.0	1,992.1	1,998.4	1,997.1	5.1	4.4	-168.58	29.6	18.4	126.9	118.2	8.75	14.502			
2,100.0	2,091.5	2,098.1	2,096.7	5.4	4.7	-168.51	32.0	22.3	133.8	124.6	9.21	14.526			
2,200.0	2,190.8	2,197.9	2,196.4	5.7	4.9	-168.45	34.4	26.2	140.8	131.1	9.68	14.546			
2,300.0	2,290.2	2,297.6	2,296.1	6.0	5.1	-168.40	36.8	30.1	147.7	137.6	10.14	14.565			
2,400.0	2,389.6	2,397.4	2,395.7	6.3	5.4	-168.35	39.2	34.0	154.6	144.0	10.60	14.581			
2,500.0	2,489.0	2,497.2	2,495.4	6.6	5.6	-168.31	41.6	37.9	161.5	150.5	11.07	14.596			
2,600.0	2,588.4	2,596.9	2,595.0	6.9	5.8	-168.26	44.0	41.8	168.5	156.9	11.53	14.609			
2,700.0	2,687.8	2,696.7	2,694.7	7.2	6.1	-168.23	46.4	45.8	175.4	163.4	12.00	14.621			
2,800.0	2,787.2	2,796.4	2,794.3	7.5	6.3	-168.19	48.8	49.7	182.3	169.9	12.46	14.633			
2,900.0	2,886.5	2,896.2	2,894.0	7.8	6.5	-168.16	51.2	53.6	189.2	176.3	12.92	14.643			
3,000.0	2,985.9	2,996.0	2,993.6	8.2	6.8	-168.13	53.6	57.5	196.2	182.8	13.39	14.653			

Cathedral Energy Services

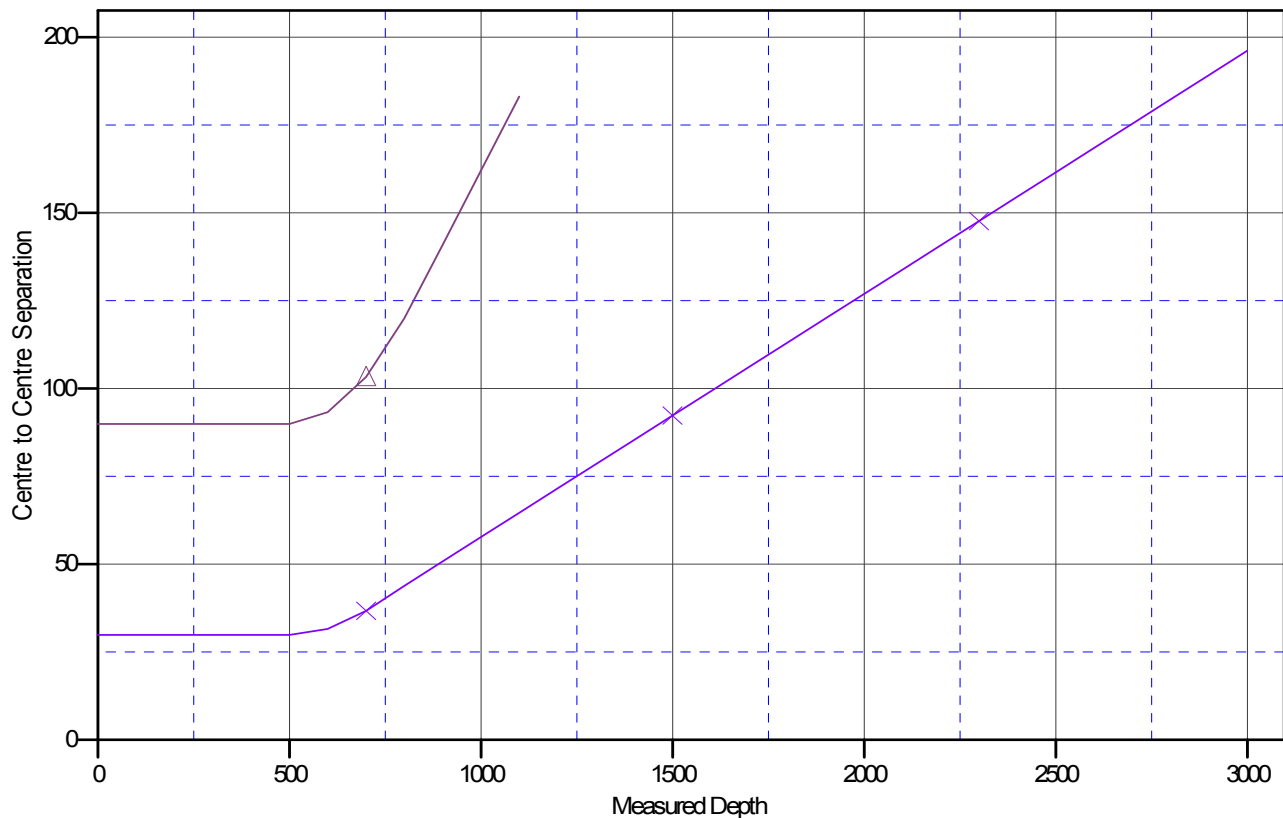
Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #20B-2012B
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-2012B	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-2012B
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 1.04°

Ladder Plot



LEGEND

✕ Razor #20B-2011A, HZ, Plan #1 V0 ▲ Razor #20B-2009A, HZ, Plan #1 V0