

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Company:</b>	Whiting Petroleum Corporation	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Project:</b>	Weld County, CO	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site:</b>	S20-T10N-R58W	<b>North Reference:</b>	True
<b>Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

<b>Project</b>	Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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-2010B					
Well Position	+N/-S	0.0 usft	Northing:	1,549,309.63 usft	Latitude:	40.830094
	+E/-W	0.0 usft	Easting:	3,446,290.99 usft	Longitude:	-103.887258
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,907.8 usft

<b>Wellbore</b>	HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
			(°)	(°)	(nT)
	IGRF2010	10/23/2014	7.96	67.42	53,088

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	181.63

<b>Plan Sections</b>										
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	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
711.5	2.23	306.12	711.4	1.3	-1.8	2.00	2.00	0.00	306.12	
4,960.9	2.23	306.12	4,957.7	98.7	-135.3	0.00	0.00	0.00	0.00	
5,072.4	0.00	0.00	5,069.1	100.0	-137.0	2.00	-2.00	0.00	180.00	Razor #20B-2010B V
5,372.4	0.00	0.00	5,369.1	100.0	-137.0	0.00	0.00	0.00	0.00	
6,190.6	90.00	180.00	5,890.0	-420.9	-137.0	11.00	11.00	22.00	180.00	
10,592.1	90.00	180.00	5,890.0	-4,822.4	-137.0	0.00	0.00	0.00	0.00	Razor #20B-2010B F

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<b>Project:</b>	Weld County, CO	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site:</b>	S20-T10N-R58W	<b>North Reference:</b>	True
<b>Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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	SH - 320' FNL, 1950' 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	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	KOP @ 600'
700.0	2.00	306.12	700.0	1.0	-1.4	-1.0	2.00	2.00	
711.5	2.23	306.12	711.4	1.3	-1.8	-1.2	2.00	2.00	EOB @ 2.23° INC
800.0	2.23	306.12	799.9	3.3	-4.5	-3.2	0.00	0.00	
900.0	2.23	306.12	899.8	5.6	-7.7	-5.4	0.00	0.00	
1,000.0	2.23	306.12	999.8	7.9	-10.8	-7.6	0.00	0.00	
1,100.0	2.23	306.12	1,099.7	10.2	-14.0	-9.8	0.00	0.00	
1,200.0	2.23	306.12	1,199.6	12.5	-17.1	-12.0	0.00	0.00	
1,300.0	2.23	306.12	1,299.5	14.8	-20.2	-14.2	0.00	0.00	
1,400.0	2.23	306.12	1,399.5	17.1	-23.4	-16.4	0.00	0.00	
1,473.6	2.23	306.12	1,473.0	18.8	-25.7	-18.0	0.00	0.00	Pierre
1,500.0	2.23	306.12	1,499.4	19.4	-26.5	-18.6	0.00	0.00	
1,550.0	2.23	306.12	1,549.3	20.5	-28.1	-19.7	0.00	0.00	SURFACE CASING
1,600.0	2.23	306.12	1,599.3	21.7	-29.7	-20.8	0.00	0.00	
1,700.0	2.23	306.12	1,699.2	23.9	-32.8	-23.0	0.00	0.00	
1,800.0	2.23	306.12	1,799.1	26.2	-36.0	-25.2	0.00	0.00	
1,900.0	2.23	306.12	1,899.1	28.5	-39.1	-27.4	0.00	0.00	
2,000.0	2.23	306.12	1,999.0	30.8	-42.2	-29.6	0.00	0.00	
2,100.0	2.23	306.12	2,098.9	33.1	-45.4	-31.8	0.00	0.00	
2,200.0	2.23	306.12	2,198.8	35.4	-48.5	-34.0	0.00	0.00	
2,300.0	2.23	306.12	2,298.8	37.7	-51.7	-36.2	0.00	0.00	
2,400.0	2.23	306.12	2,398.7	40.0	-54.8	-38.4	0.00	0.00	
2,500.0	2.23	306.12	2,498.6	42.3	-57.9	-40.6	0.00	0.00	
2,600.0	2.23	306.12	2,598.5	44.6	-61.1	-42.8	0.00	0.00	
2,700.0	2.23	306.12	2,698.5	46.9	-64.2	-45.0	0.00	0.00	
2,800.0	2.23	306.12	2,798.4	49.2	-67.4	-47.2	0.00	0.00	
2,900.0	2.23	306.12	2,898.3	51.5	-70.5	-49.4	0.00	0.00	
3,000.0	2.23	306.12	2,998.2	53.8	-73.7	-51.6	0.00	0.00	
3,100.0	2.23	306.12	3,098.2	56.0	-76.8	-53.8	0.00	0.00	
3,200.0	2.23	306.12	3,198.1	58.3	-79.9	-56.0	0.00	0.00	
3,300.0	2.23	306.12	3,298.0	60.6	-83.1	-58.3	0.00	0.00	
3,400.0	2.23	306.12	3,397.9	62.9	-86.2	-60.5	0.00	0.00	
3,500.0	2.23	306.12	3,497.9	65.2	-89.4	-62.7	0.00	0.00	
3,600.0	2.23	306.12	3,597.8	67.5	-92.5	-64.9	0.00	0.00	
3,700.0	2.23	306.12	3,697.7	69.8	-95.6	-67.1	0.00	0.00	
3,800.0	2.23	306.12	3,797.6	72.1	-98.8	-69.3	0.00	0.00	
3,900.0	2.23	306.12	3,897.6	74.4	-101.9	-71.5	0.00	0.00	
4,000.0	2.23	306.12	3,997.5	76.7	-105.1	-73.7	0.00	0.00	
4,100.0	2.23	306.12	4,097.4	79.0	-108.2	-75.9	0.00	0.00	
4,200.0	2.23	306.12	4,197.3	81.3	-111.4	-78.1	0.00	0.00	
4,300.0	2.23	306.12	4,297.3	83.6	-114.5	-80.3	0.00	0.00	
4,400.0	2.23	306.12	4,397.2	85.9	-117.6	-82.5	0.00	0.00	
4,500.0	2.23	306.12	4,497.1	88.2	-120.8	-84.7	0.00	0.00	
4,600.0	2.23	306.12	4,597.0	90.4	-123.9	-86.9	0.00	0.00	
4,700.0	2.23	306.12	4,697.0	92.7	-127.1	-89.1	0.00	0.00	

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<b>Project:</b>	Weld County, CO	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site:</b>	S20-T10N-R58W	<b>North Reference:</b>	True
<b>Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
4,800.0	2.23	306.12	4,796.9	95.0	-130.2	-91.3	0.00	0.00	
4,900.0	2.23	306.12	4,896.8	97.3	-133.3	-93.5	0.00	0.00	
4,960.9	2.23	306.12	4,957.7	98.7	-135.3	-94.8	0.00	0.00	Start 2° Drop
5,000.0	1.45	306.12	4,996.7	99.5	-136.3	-95.6	2.00	-2.00	
5,072.4	0.00	0.00	5,069.1	100.0	-137.0	-96.1	2.00	-2.00	EOD @ 0° INC
5,100.0	0.00	0.00	5,096.7	100.0	-137.0	-96.1	0.00	0.00	
5,200.0	0.00	0.00	5,196.7	100.0	-137.0	-96.1	0.00	0.00	
5,300.0	0.00	0.00	5,296.7	100.0	-137.0	-96.1	0.00	0.00	
5,372.4	0.00	0.00	5,369.1	100.0	-137.0	-96.1	0.00	0.00	Start 11° Build
5,400.0	3.04	180.00	5,396.7	99.3	-137.0	-95.3	11.00	11.00	
5,450.0	8.54	180.00	5,446.4	94.2	-137.0	-90.3	11.00	11.00	
5,500.0	14.04	180.00	5,495.5	84.4	-137.0	-80.5	11.00	11.00	
5,550.0	19.54	180.00	5,543.3	70.0	-137.0	-66.1	11.00	11.00	
5,600.0	25.04	180.00	5,589.6	51.0	-137.0	-47.1	11.00	11.00	
5,650.0	30.54	180.00	5,633.8	27.7	-137.0	-23.8	11.00	11.00	
5,700.0	36.04	180.00	5,675.5	0.3	-137.0	3.6	11.00	11.00	
5,750.0	41.54	180.00	5,714.5	-31.0	-137.0	34.9	11.00	11.00	
5,800.0	47.04	180.00	5,750.3	-65.9	-137.0	69.8	11.00	11.00	
5,808.5	47.97	180.00	5,756.0	-72.1	-137.0	76.0	11.00	11.00	Niobrara
5,850.0	52.54	180.00	5,782.6	-104.1	-137.0	107.9	11.00	11.00	
5,900.0	58.04	180.00	5,811.0	-145.2	-137.0	149.0	11.00	11.00	
5,950.0	63.54	180.00	5,835.4	-188.8	-137.0	192.6	11.00	11.00	
6,000.0	69.04	180.00	5,855.5	-234.5	-137.0	238.3	11.00	11.00	
6,050.0	74.54	180.00	5,871.1	-282.0	-137.0	285.8	11.00	11.00	
6,100.0	80.04	180.00	5,882.1	-330.8	-137.0	334.5	11.00	11.00	
6,150.0	85.54	180.00	5,888.4	-380.4	-137.0	384.1	11.00	11.00	
6,190.6	90.00	180.00	5,890.0	-420.9	-137.0	424.6	10.99	10.99	LP @ 5890' TVD, 90° INC - 7" - 743' FNL, 2092
6,200.0	90.00	180.00	5,890.0	-430.3	-137.0	434.0	0.00	0.00	
6,300.0	90.00	180.00	5,890.0	-530.3	-137.0	534.0	0.00	0.00	
6,400.0	90.00	180.00	5,890.0	-630.3	-137.0	634.0	0.00	0.00	
6,500.0	90.00	180.00	5,890.0	-730.3	-137.0	733.9	0.00	0.00	
6,600.0	90.00	180.00	5,890.0	-830.3	-137.0	833.9	0.00	0.00	
6,700.0	90.00	180.00	5,890.0	-930.3	-137.0	933.8	0.00	0.00	
6,800.0	90.00	180.00	5,890.0	-1,030.3	-137.0	1,033.8	0.00	0.00	
6,900.0	90.00	180.00	5,890.0	-1,130.3	-137.0	1,133.8	0.00	0.00	
7,000.0	90.00	180.00	5,890.0	-1,230.3	-137.0	1,233.7	0.00	0.00	
7,100.0	90.00	180.00	5,890.0	-1,330.3	-137.0	1,333.7	0.00	0.00	
7,200.0	90.00	180.00	5,890.0	-1,430.3	-137.0	1,433.6	0.00	0.00	
7,300.0	90.00	180.00	5,890.0	-1,530.3	-137.0	1,533.6	0.00	0.00	
7,400.0	90.00	180.00	5,890.0	-1,630.3	-137.0	1,633.6	0.00	0.00	
7,500.0	90.00	180.00	5,890.0	-1,730.3	-137.0	1,733.5	0.00	0.00	
7,600.0	90.00	180.00	5,890.0	-1,830.3	-137.0	1,833.5	0.00	0.00	
7,700.0	90.00	180.00	5,890.0	-1,930.3	-137.0	1,933.4	0.00	0.00	
7,800.0	90.00	180.00	5,890.0	-2,030.3	-137.0	2,033.4	0.00	0.00	
7,900.0	90.00	180.00	5,890.0	-2,130.3	-137.0	2,133.3	0.00	0.00	
8,000.0	90.00	180.00	5,890.0	-2,230.3	-137.0	2,233.3	0.00	0.00	
8,100.0	90.00	180.00	5,890.0	-2,330.3	-137.0	2,333.3	0.00	0.00	
8,200.0	90.00	180.00	5,890.0	-2,430.3	-137.0	2,433.2	0.00	0.00	
8,300.0	90.00	180.00	5,890.0	-2,530.3	-137.0	2,533.2	0.00	0.00	
8,400.0	90.00	180.00	5,890.0	-2,630.3	-137.0	2,633.1	0.00	0.00	
8,500.0	90.00	180.00	5,890.0	-2,730.3	-137.0	2,733.1	0.00	0.00	
8,600.0	90.00	180.00	5,890.0	-2,830.3	-137.0	2,833.1	0.00	0.00	

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<b>Site:</b>	S20-T10N-R58W	<b>North Reference:</b>	True
<b>Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
8,700.0	90.00	180.00	5,890.0	-2,930.3	-137.0	2,933.0	0.00	0.00	
8,800.0	90.00	180.00	5,890.0	-3,030.3	-137.0	3,033.0	0.00	0.00	
8,900.0	90.00	180.00	5,890.0	-3,130.3	-137.0	3,132.9	0.00	0.00	
9,000.0	90.00	180.00	5,890.0	-3,230.3	-137.0	3,232.9	0.00	0.00	
9,100.0	90.00	180.00	5,890.0	-3,330.3	-137.0	3,332.9	0.00	0.00	
9,200.0	90.00	180.00	5,890.0	-3,430.3	-137.0	3,432.8	0.00	0.00	
9,300.0	90.00	180.00	5,890.0	-3,530.3	-137.0	3,532.8	0.00	0.00	
9,400.0	90.00	180.00	5,890.0	-3,630.3	-137.0	3,632.7	0.00	0.00	
9,500.0	90.00	180.00	5,890.0	-3,730.3	-137.0	3,732.7	0.00	0.00	
9,600.0	90.00	180.00	5,890.0	-3,830.3	-137.0	3,832.7	0.00	0.00	
9,700.0	90.00	180.00	5,890.0	-3,930.3	-137.0	3,932.6	0.00	0.00	
9,800.0	90.00	180.00	5,890.0	-4,030.3	-137.0	4,032.6	0.00	0.00	
9,900.0	90.00	180.00	5,890.0	-4,130.3	-137.0	4,132.5	0.00	0.00	
10,000.0	90.00	180.00	5,890.0	-4,230.3	-137.0	4,232.5	0.00	0.00	
10,100.0	90.00	180.00	5,890.0	-4,330.3	-137.0	4,332.5	0.00	0.00	
10,200.0	90.00	180.00	5,890.0	-4,430.3	-137.0	4,432.4	0.00	0.00	
10,300.0	90.00	180.00	5,890.0	-4,530.3	-137.0	4,532.4	0.00	0.00	
10,400.0	90.00	180.00	5,890.0	-4,630.3	-137.0	4,632.3	0.00	0.00	
10,500.0	90.00	180.00	5,890.0	-4,730.3	-137.0	4,732.3	0.00	0.00	
10,592.1	90.00	180.00	5,890.0	-4,822.4	-137.0	4,824.4	0.00	0.00	TD @ 10,592.1' MD - PBHL - 100' FSL, 2145' F

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	
- Shape									Latitude Longitude
Razor #20B-2010B VP	- plan hits target center	0.00	0.00	5,069.1	100.0	-137.0	1,549,407.12	3,446,152.18	40.830368 -103.887753
- Point									
Razor #20B-2010B PBI	- plan hits target center	0.00	0.00	5,890.0	-4,822.4	-137.0	1,544,485.53	3,446,241.70	40.816858 -103.887753
- Point									

6,190.6	5,890.0	7" - 743' FNL, 2092' FEL	0	0
1,550.0	1,549.3	SURFACE CASING	0	0

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,473.6	1,473.0	Pierre				
5,808.5	5,756.0	Niobrara				

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Company:</b>	Whiting Petroleum Corporation	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Project:</b>	Weld County, CO	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site:</b>	S20-T10N-R58W	<b>North Reference:</b>	True
<b>Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	Plan #1		

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	SH - 320' FNL, 1950' FEL
600.0	600.0	0.0	0.0	KOP @ 600'
711.5	711.4	1.3	-1.8	EOB @ 2.23° INC
4,960.9	4,957.7	98.7	-135.3	Start 2° Drop
5,072.4	5,069.1	100.0	-137.0	EOD @ 0° INC
5,372.4	5,369.1	100.0	-137.0	Start 11° Build
6,190.6	5,890.0	-420.9	-137.0	LP @ 5890' TVD, 90° INC
10,592.1	5,890.0	-4,822.4	-137.0	TD @ 10,592.1' MD
10,592.1	5,890.0	-4,822.4	-137.0	PBHL - 100' FSL, 2145' FEL

# **Whiting Petroleum Corporation**

**Weld County, CO**

**S20-T10N-R58W**

**Razor #20B-2010B**

**HZ**

**Plan #1**

## **Anticollision Report**

**23 October, 2014**

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.0usft	<b>Error Model:</b>	Systematic Ellipse
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,550.0usft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b>	10/23/2014		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	10,592.1	Plan #1 (HZ)	ISCWSA MWD	MWD - ISCWSA

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
S20-T10N-R58W						
Razor #20B-2009A - HZ - Plan #1	500.0	500.0	30.2	28.2	15.199	CC, ES
Razor #20B-2009A - HZ - Plan #1	10,592.1	10,532.1	339.2	156.0	1.852	SF
Razor #20B-2011A - HZ - Plan #1	600.0	600.0	29.9	27.5	12.278	CC, ES
Razor #20B-2011A - HZ - Plan #1	10,592.1	10,509.2	339.5	156.8	1.858	SF
Razor #20B-2012B - HZ - Plan #1	500.0	500.0	59.8	57.8	30.119	CC, ES
Razor #20B-2012B - HZ - Plan #1	10,592.1	10,605.4	659.9	472.7	3.525	SF
S29-T10N-R58W						
Razor 29F 2007A - HZ - Plan #1	5,800.0	12,348.7	1,037.4	889.3	7.004	SF
Razor 29F 2007A - HZ - Plan #1	6,000.0	12,180.1	1,030.2	883.9	7.042	ES
Razor 29F 2007A - HZ - Plan #1	6,059.4	12,123.5	1,030.1	884.4	7.070	CC
Razor 29F 2008B - HZ - Plan #1	6,000.0	12,283.9	706.4	562.3	4.902	SF
Razor 29F 2008B - HZ - Plan #1	6,100.0	12,187.6	703.3	560.1	4.909	ES
Razor 29F 2008B - HZ - Plan #1	6,199.6	12,088.5	702.6	560.2	4.935	CC



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S20-T10N-R58W - Razor #20B-2009A - 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							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	-30.2	30.2					
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-30.2	30.2	30.0	0.19	161.694		
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-30.2	30.2	29.5	0.64	47.423		
300.0	300.0	300.0	300.0	0.5	0.5	-90.00	0.0	-30.2	30.2	29.1	1.09	27.786		
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-30.2	30.2	28.6	1.54	19.650		
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	0.0	-30.2	30.2	28.2	1.98	15.199	CC, ES	
600.0	600.0	598.9	598.9	1.2	1.2	-89.31	0.4	-31.8	31.9	29.4	2.42	13.140		
700.0	700.0	697.7	697.6	1.4	1.4	-35.26	1.5	-36.8	35.5	32.6	2.86	12.430		
800.0	799.9	796.3	795.8	1.7	1.7	-35.86	3.4	-45.1	40.8	37.5	3.29	12.390		
900.0	899.8	895.9	894.8	1.9	1.9	-35.79	5.8	-55.4	48.0	44.3	3.73	12.855		
1,000.0	999.8	995.7	994.0	2.1	2.2	-35.74	8.2	-65.8	55.2	51.1	4.18	13.219		
1,100.0	1,099.7	1,095.4	1,093.2	2.3	2.5	-35.70	10.5	-76.1	62.5	57.9	4.63	13.500		
1,200.0	1,199.6	1,195.1	1,192.4	2.6	2.7	-35.67	12.9	-86.5	69.7	64.7	5.08	13.722		
1,300.0	1,299.5	1,294.9	1,291.5	2.8	3.0	-35.64	15.3	-96.8	77.0	71.4	5.54	13.903		
1,400.0	1,399.5	1,394.6	1,390.7	3.0	3.3	-35.62	17.6	-107.2	84.2	78.2	5.99	14.052		
1,500.0	1,499.4	1,494.4	1,489.9	3.3	3.6	-35.60	20.0	-117.5	91.5	85.0	6.45	14.177		
1,600.0	1,599.3	1,594.1	1,589.0	3.5	3.9	-35.59	22.4	-127.8	98.7	91.8	6.91	14.284		
1,700.0	1,699.2	1,693.8	1,688.2	3.7	4.2	-35.57	24.7	-138.2	106.0	98.6	7.37	14.376		
1,800.0	1,799.1	1,793.6	1,787.4	4.0	4.5	-35.56	27.1	-148.5	113.2	105.4	7.83	14.455		
1,900.0	1,899.1	1,893.3	1,886.5	4.2	4.8	-35.55	29.5	-158.9	120.5	112.2	8.29	14.525		
2,000.0	1,999.0	1,993.0	1,985.7	4.4	5.1	-35.54	31.9	-169.2	127.7	118.9	8.75	14.587		
2,100.0	2,098.9	2,092.8	2,084.9	4.7	5.4	-35.53	34.2	-179.6	134.9	125.7	9.22	14.643		
2,200.0	2,198.8	2,192.5	2,184.1	4.9	5.7	-35.53	36.6	-189.9	142.2	132.5	9.68	14.692		
2,300.0	2,298.8	2,292.3	2,283.2	5.1	6.0	-35.52	39.0	-200.3	149.4	139.3	10.14	14.737		
2,400.0	2,398.7	2,392.0	2,382.4	5.4	6.3	-35.51	41.3	-210.6	156.7	146.1	10.60	14.778		
2,500.0	2,498.6	2,491.7	2,481.6	5.6	6.6	-35.51	43.7	-221.0	163.9	152.9	11.06	14.816		
2,600.0	2,598.5	2,591.5	2,580.7	5.8	6.9	-35.50	46.1	-231.3	171.2	159.6	11.53	14.850		
2,700.0	2,698.5	2,691.2	2,679.9	6.1	7.2	-35.50	48.5	-241.7	178.4	166.4	11.99	14.882		
2,800.0	2,798.4	2,790.9	2,779.1	6.3	7.5	-35.49	50.8	-252.0	185.7	173.2	12.45	14.911		
2,900.0	2,898.3	2,890.7	2,878.3	6.5	7.8	-35.49	53.2	-262.4	192.9	180.0	12.91	14.938		
3,000.0	2,998.2	2,990.4	2,977.4	6.8	8.0	-35.49	55.6	-272.7	200.2	186.8	13.38	14.964		
3,100.0	3,098.2	3,090.2	3,076.6	7.0	8.3	-35.48	57.9	-283.1	207.4	193.6	13.84	14.987		
3,200.0	3,198.1	3,189.9	3,175.8	7.2	8.6	-35.48	60.3	-293.4	214.7	200.3	14.30	15.010		
3,300.0	3,298.0	3,289.6	3,274.9	7.5	8.9	-35.48	62.7	-303.8	221.9	207.1	14.76	15.031		
3,400.0	3,397.9	3,389.4	3,374.1	7.7	9.2	-35.48	65.1	-314.1	229.1	213.9	15.23	15.050		
3,500.0	3,497.9	3,489.1	3,473.3	7.9	9.5	-35.47	67.4	-324.5	236.4	220.7	15.69	15.066		
3,600.0	3,597.8	3,588.8	3,572.4	8.2	9.8	-35.47	69.8	-334.8	243.6	227.5	16.16	15.081		
3,700.0	3,697.7	3,688.6	3,671.6	8.4	10.1	-35.47	72.2	-345.2	250.9	234.3	16.62	15.095		
3,800.0	3,797.6	3,788.3	3,770.8	8.6	10.4	-35.47	74.5	-355.5	258.1	241.0	17.09	15.108		
3,900.0	3,897.6	3,888.1	3,870.0	8.9	10.7	-35.46	76.9	-365.9	265.4	247.8	17.55	15.121		
4,000.0	3,997.5	3,987.8	3,969.1	9.1	11.0	-35.46	79.3	-376.2	272.6	254.6	18.02	15.133		
4,100.0	4,097.4	4,087.5	4,068.3	9.3	11.4	-35.46	81.6	-386.5	279.9	261.4	18.48	15.144		
4,200.0	4,197.3	4,187.3	4,167.5	9.6	11.7	-35.46	84.0	-396.9	287.1	268.2	18.95	15.155		
4,300.0	4,297.3	4,287.0	4,266.6	9.8	12.0	-35.46	86.4	-407.2	294.4	274.9	19.41	15.165		
4,400.0	4,397.2	4,386.7	4,365.8	10.1	12.3	-35.46	88.8	-417.6	301.6	281.7	19.88	15.174		
4,500.0	4,497.1	4,486.5	4,465.0	10.3	12.6	-35.45	91.1	-427.9	308.8	288.5	20.34	15.184		
4,600.0	4,597.0	4,586.2	4,564.2	10.5	12.9	-35.45	93.5	-438.3	316.1	295.3	20.81	15.192		
4,700.0	4,697.0	4,685.9	4,663.3	10.8	13.2	-35.45	95.9	-448.6	323.3	302.1	21.27	15.201		
4,800.0	4,796.9	4,795.7	4,772.6	11.0	13.4	-35.50	98.2	-458.7	329.4	307.7	21.74	15.154		
4,900.0	4,896.8	4,908.3	4,885.0	11.2	13.6	-35.71	99.6	-464.8	331.7	309.5	22.17	14.961		
5,000.0	4,996.7	5,020.1	4,996.7	11.5	13.8	-36.04	100.0	-466.7	330.4	307.8	22.58	14.632		
5,100.0	5,096.7	5,120.0	5,096.7	11.6	14.0	-90.00	100.0	-466.7	329.7	306.7	22.99	14.338		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S20-T10N-R58W - Razor #20B-2009A - 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						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		
5,200.0	5,196.7	5,220.0	5,196.7	11.8	14.1	-90.00	100.0	-466.7	329.7	306.3	23.40	14.086		
5,265.5	5,262.2	5,285.5	5,262.2	12.0	14.3	-90.00	100.0	-466.7	329.7	306.0	23.67	13.926		
5,300.0	5,296.7	5,320.0	5,296.7	12.0	14.3	-90.01	99.9	-466.7	329.7	305.8	23.81	13.843		
5,400.0	5,396.7	5,418.7	5,394.6	12.3	14.5	88.23	89.2	-466.7	329.8	305.7	24.15	13.656		
5,500.0	5,495.5	5,514.4	5,486.0	12.4	14.6	85.72	61.3	-466.7	330.6	306.1	24.46	13.518		
5,600.0	5,589.6	5,607.7	5,568.8	12.5	14.7	83.38	18.5	-466.7	331.9	307.2	24.68	13.446		
5,700.0	5,675.5	5,700.0	5,641.9	12.7	14.8	81.29	-37.7	-466.7	333.5	308.6	24.92	13.387		
5,800.0	5,750.3	5,788.9	5,701.9	12.9	15.0	79.54	-103.2	-466.7	335.3	310.0	25.26	13.275		
5,900.0	5,811.0	5,877.5	5,749.7	13.2	15.2	78.14	-177.6	-466.7	336.9	311.0	25.86	13.027		
6,000.0	5,855.5	5,965.1	5,783.9	13.7	15.6	77.13	-258.1	-466.7	338.2	311.3	26.86	12.588		
6,100.0	5,882.1	6,050.0	5,803.7	14.5	16.2	76.54	-340.6	-466.7	339.0	310.7	28.33	11.967		
6,200.0	5,890.0	6,140.1	5,810.0	15.4	17.0	76.36	-430.3	-466.7	339.2	308.9	30.29	11.199		
6,300.0	5,890.0	6,240.1	5,810.0	16.6	18.0	76.36	-530.3	-466.7	339.2	306.7	32.53	10.427		
6,400.0	5,890.0	6,340.1	5,810.0	17.8	19.1	76.36	-630.3	-466.7	339.2	304.2	35.02	9.685		
6,500.0	5,890.0	6,440.1	5,810.0	19.2	20.4	76.36	-730.3	-466.7	339.2	301.5	37.72	8.992		
6,600.0	5,890.0	6,540.1	5,810.0	20.7	21.8	76.36	-830.3	-466.7	339.2	298.6	40.59	8.357		
6,700.0	5,890.0	6,640.1	5,810.0	22.2	23.3	76.36	-930.3	-466.7	339.2	295.6	43.59	7.782		
6,800.0	5,890.0	6,740.1	5,810.0	23.8	24.8	76.36	-1,030.3	-466.7	339.2	292.5	46.70	7.264		
6,900.0	5,890.0	6,840.1	5,810.0	25.4	26.3	76.36	-1,130.3	-466.7	339.2	289.3	49.90	6.799		
7,000.0	5,890.0	6,940.1	5,810.0	27.1	28.0	76.36	-1,230.3	-466.7	339.2	286.1	53.17	6.381		
7,100.0	5,890.0	7,040.1	5,810.0	28.8	29.6	76.36	-1,330.3	-466.7	339.2	282.7	56.50	6.005		
7,200.0	5,890.0	7,140.1	5,810.0	30.5	31.3	76.36	-1,430.3	-466.7	339.2	279.4	59.87	5.666		
7,300.0	5,890.0	7,240.1	5,810.0	32.2	33.0	76.36	-1,530.3	-466.7	339.2	275.9	63.29	5.360		
7,400.0	5,890.0	7,340.1	5,810.0	34.0	34.8	76.36	-1,630.3	-466.7	339.2	272.5	66.75	5.082		
7,500.0	5,890.0	7,440.1	5,810.0	35.8	36.5	76.36	-1,730.3	-466.7	339.2	269.0	70.24	4.830		
7,600.0	5,890.0	7,540.1	5,810.0	37.6	38.3	76.36	-1,830.3	-466.7	339.2	265.5	73.75	4.600		
7,700.0	5,890.0	7,640.1	5,810.0	39.4	40.1	76.36	-1,930.3	-466.7	339.2	261.9	77.28	4.390		
7,800.0	5,890.0	7,740.1	5,810.0	41.2	41.8	76.36	-2,030.3	-466.7	339.2	258.4	80.84	4.197		
7,900.0	5,890.0	7,840.1	5,810.0	43.1	43.7	76.36	-2,130.3	-466.7	339.2	254.8	84.41	4.019		
8,000.0	5,890.0	7,940.1	5,810.0	44.9	45.5	76.36	-2,230.3	-466.7	339.2	251.2	87.99	3.855		
8,100.0	5,890.0	8,040.1	5,810.0	46.7	47.3	76.36	-2,330.3	-466.7	339.2	247.6	91.59	3.704		
8,200.0	5,890.0	8,140.1	5,810.0	48.6	49.1	76.36	-2,430.3	-466.7	339.2	244.0	95.20	3.563		
8,300.0	5,890.0	8,240.1	5,810.0	50.4	51.0	76.36	-2,530.3	-466.7	339.2	240.4	98.82	3.433		
8,400.0	5,890.0	8,340.1	5,810.0	52.3	52.8	76.36	-2,630.3	-466.7	339.2	236.8	102.45	3.311		
8,500.0	5,890.0	8,440.1	5,810.0	54.2	54.6	76.36	-2,730.3	-466.7	339.2	233.1	106.09	3.198		
8,600.0	5,890.0	8,540.1	5,810.0	56.0	56.5	76.36	-2,830.3	-466.7	339.2	229.5	109.73	3.091		
8,700.0	5,890.0	8,640.1	5,810.0	57.9	58.4	76.36	-2,930.3	-466.7	339.2	225.8	113.38	2.992		
8,800.0	5,890.0	8,740.1	5,810.0	59.8	60.2	76.36	-3,030.3	-466.7	339.2	222.2	117.04	2.898		
8,900.0	5,890.0	8,840.1	5,810.0	61.6	62.1	76.36	-3,130.3	-466.7	339.2	218.5	120.70	2.810		
9,000.0	5,890.0	8,940.1	5,810.0	63.5	64.0	76.36	-3,230.3	-466.7	339.2	214.9	124.37	2.728		
9,100.0	5,890.0	9,040.1	5,810.0	65.4	65.8	76.36	-3,330.3	-466.7	339.2	211.2	128.05	2.649		
9,200.0	5,890.0	9,140.1	5,810.0	67.3	67.7	76.36	-3,430.3	-466.7	339.2	207.5	131.72	2.575		
9,300.0	5,890.0	9,240.1	5,810.0	69.2	69.6	76.36	-3,530.3	-466.7	339.2	203.8	135.41	2.505		
9,400.0	5,890.0	9,340.1	5,810.0	71.1	71.5	76.36	-3,630.3	-466.7	339.2	200.1	139.09	2.439		
9,500.0	5,890.0	9,440.1	5,810.0	72.9	73.3	76.36	-3,730.3	-466.7	339.2	196.5	142.78	2.376		
9,600.0	5,890.0	9,540.1	5,810.0	74.8	75.2	76.36	-3,830.3	-466.7	339.2	192.8	146.47	2.316		
9,700.0	5,890.0	9,640.1	5,810.0	76.7	77.1	76.36	-3,930.3	-466.7	339.2	189.1	150.17	2.259		
9,800.0	5,890.0	9,740.1	5,810.0	78.6	79.0	76.36	-4,030.3	-466.7	339.2	185.4	153.86	2.205		
9,900.0	5,890.0	9,840.1	5,810.0	80.5	80.9	76.36	-4,130.3	-466.7	339.2	181.7	157.56	2.153		
10,000.0	5,890.0	9,940.1	5,810.0	82.4	82.8	76.36	-4,230.3	-466.7	339.2	178.0	161.26	2.104		
10,100.0	5,890.0	10,040.1	5,810.0	84.3	84.7	76.36	-4,330.3	-466.7	339.2	174.3	164.97	2.056		
10,200.0	5,890.0	10,140.1	5,810.0	86.2	86.5	76.36	-4,430.3	-466.7	339.2	170.6	168.67	2.011		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> S20-T10N-R58W - Razor #20B-2009A - HZ - Plan #1												<b>Offset Site Error:</b>	0.0 usft
Survey Program: 0-ISCWSA MWD												<b>Offset Well Error:</b>	0.0 usft
Reference		Offset		Semi Major Axis		Distance							
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	Warning
10,300.0	5,890.0	10,240.1	5,810.0	88.1	88.4	76.36	-4,530.3	-466.7	339.2	166.9	172.38	1.968	
10,400.0	5,890.0	10,340.1	5,810.0	90.0	90.3	76.36	-4,630.3	-466.7	339.2	163.1	176.09	1.926	
10,500.0	5,890.0	10,440.1	5,810.0	91.9	92.2	76.36	-4,730.3	-466.7	339.2	159.4	179.80	1.887	
10,592.1	5,890.0	10,532.1	5,810.0	93.7	94.0	76.36	-4,822.4	-466.7	339.2	156.0	183.22	1.852 SF	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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	90.01	0.0	29.9	29.9					
100.0	100.0	100.0	100.0	0.1	0.1	90.01	0.0	29.9	29.9	29.7	0.19	160.211		
200.0	200.0	200.0	200.0	0.3	0.3	90.01	0.0	29.9	29.9	29.3	0.64	46.988		
300.0	300.0	300.0	300.0	0.5	0.5	90.01	0.0	29.9	29.9	28.8	1.09	27.531		
400.0	400.0	400.0	400.0	0.8	0.8	90.01	0.0	29.9	29.9	28.4	1.54	19.469		
500.0	500.0	500.0	500.0	1.0	1.0	90.01	0.0	29.9	29.9	27.9	1.98	15.059		
600.0	600.0	600.0	600.0	1.2	1.2	90.01	0.0	29.9	29.9	27.5	2.43	12.278 CC, ES		
700.0	700.0	700.0	700.0	1.4	1.4	145.75	0.0	29.9	31.3	28.4	2.88	10.866		
800.0	799.9	798.9	798.9	1.7	1.7	147.68	0.9	31.3	36.0	32.7	3.32	10.846		
900.0	899.8	898.3	898.2	1.9	1.9	147.05	3.2	35.1	42.9	39.1	3.75	11.418		
1,000.0	999.8	998.1	997.9	2.1	2.1	146.47	5.6	39.0	49.9	45.7	4.19	11.905		
1,100.0	1,099.7	1,097.8	1,097.5	2.3	2.3	146.04	8.0	42.9	56.9	52.3	4.63	12.291		
1,200.0	1,199.6	1,197.6	1,197.1	2.6	2.6	145.70	10.4	46.8	64.0	58.9	5.08	12.603		
1,300.0	1,299.5	1,297.3	1,296.8	2.8	2.8	145.43	12.8	50.7	71.0	65.5	5.52	12.861		
1,400.0	1,399.5	1,397.1	1,396.4	3.0	3.0	145.20	15.2	54.6	78.1	72.1	5.97	13.076		
1,500.0	1,499.4	1,496.8	1,496.1	3.3	3.2	145.02	17.6	58.5	85.1	78.7	6.42	13.260		
1,600.0	1,599.3	1,596.6	1,595.7	3.5	3.5	144.86	20.0	62.4	92.2	85.3	6.87	13.417		
1,700.0	1,699.2	1,696.3	1,695.4	3.7	3.7	144.73	22.4	66.3	99.2	91.9	7.32	13.554		
1,800.0	1,799.1	1,796.1	1,795.0	4.0	3.9	144.61	24.8	70.2	106.3	98.5	7.77	13.674		
1,900.0	1,899.1	1,895.8	1,894.7	4.2	4.2	144.51	27.1	74.2	113.3	105.1	8.22	13.780		
2,000.0	1,999.0	1,995.6	1,994.3	4.4	4.4	144.42	29.5	78.1	120.4	111.7	8.68	13.875		
2,100.0	2,098.9	2,095.3	2,094.0	4.7	4.6	144.33	31.9	82.0	127.4	118.3	9.13	13.960		
2,200.0	2,198.8	2,195.1	2,193.6	4.9	4.9	144.26	34.3	85.9	134.5	124.9	9.58	14.037		
2,300.0	2,298.8	2,294.8	2,293.2	5.1	5.1	144.20	36.7	89.8	141.6	131.5	10.04	14.106		
2,400.0	2,398.7	2,394.6	2,392.9	5.4	5.4	144.14	39.1	93.7	148.6	138.1	10.49	14.169		
2,500.0	2,498.6	2,494.3	2,492.5	5.6	5.6	144.09	41.5	97.6	155.7	144.7	10.94	14.227		
2,600.0	2,598.5	2,594.1	2,592.2	5.8	5.8	144.04	43.9	101.5	162.7	151.3	11.39	14.281		
2,700.0	2,698.5	2,693.8	2,691.8	6.1	6.1	143.99	46.3	105.4	169.8	157.9	11.85	14.330		
2,800.0	2,798.4	2,793.6	2,791.5	6.3	6.3	143.95	48.7	109.3	176.8	164.5	12.30	14.376		
2,900.0	2,898.3	2,893.3	2,891.1	6.5	6.5	143.91	51.1	113.2	183.9	171.1	12.75	14.418		
3,000.0	2,998.2	2,993.1	2,990.8	6.8	6.8	143.88	53.5	117.1	190.9	177.7	13.21	14.458		
3,100.0	3,098.2	3,092.8	3,090.4	7.0	7.0	143.84	55.9	121.0	198.0	184.3	13.66	14.495		
3,200.0	3,198.1	3,192.6	3,190.1	7.2	7.3	143.81	58.3	125.0	205.0	190.9	14.11	14.530		
3,300.0	3,298.0	3,292.3	3,289.7	7.5	7.5	143.79	60.7	128.9	212.1	197.5	14.57	14.561		
3,400.0	3,397.9	3,392.1	3,389.3	7.7	7.7	143.76	63.1	132.8	219.2	204.1	15.02	14.589		
3,500.0	3,497.9	3,491.8	3,489.0	7.9	8.0	143.73	65.5	136.7	226.2	210.7	15.48	14.616		
3,600.0	3,597.8	3,591.6	3,588.6	8.2	8.2	143.71	67.9	140.6	233.3	217.3	15.93	14.641		
3,700.0	3,697.7	3,691.3	3,688.3	8.4	8.4	143.69	70.3	144.5	240.3	223.9	16.39	14.665		
3,800.0	3,797.6	3,791.1	3,787.9	8.6	8.7	143.67	72.7	148.4	247.4	230.5	16.84	14.687		
3,900.0	3,897.6	3,890.9	3,887.6	8.9	8.9	143.65	75.1	152.3	254.4	237.1	17.30	14.708		
4,000.0	3,997.5	3,990.6	3,987.2	9.1	9.2	143.63	77.5	156.2	261.5	243.7	17.75	14.728		
4,100.0	4,097.4	4,090.4	4,086.9	9.3	9.4	143.61	79.9	160.1	268.5	250.3	18.21	14.747		
4,200.0	4,197.3	4,190.1	4,186.5	9.6	9.6	143.60	82.3	164.0	275.6	256.9	18.67	14.765		
4,300.0	4,297.3	4,289.9	4,286.2	9.8	9.9	143.58	84.7	167.9	282.7	263.5	19.12	14.782		
4,400.0	4,397.2	4,389.6	4,385.8	10.1	10.1	143.56	87.1	171.8	289.7	270.1	19.58	14.798		
4,500.0	4,497.1	4,489.4	4,485.4	10.3	10.3	143.55	89.5	175.8	296.8	276.7	20.03	14.813		
4,600.0	4,597.0	4,589.1	4,585.1	10.5	10.6	143.54	91.9	179.7	303.8	283.3	20.49	14.828		
4,700.0	4,697.0	4,688.9	4,684.7	10.8	10.8	143.52	94.3	183.6	310.9	289.9	20.95	14.842		
4,800.0	4,796.9	4,788.6	4,784.4	11.0	11.1	143.51	96.7	187.5	317.9	296.5	21.40	14.855		
4,900.0	4,896.8	4,891.2	4,886.9	11.2	11.3	143.51	99.0	191.4	324.9	303.0	21.86	14.864		
5,000.0	4,996.7	5,001.1	4,996.7	11.5	11.5	143.77	100.0	192.9	329.2	306.9	22.28	14.776		
5,100.0	5,096.7	5,101.1	5,096.7	11.6	11.7	90.00	100.0	192.9	329.9	307.2	22.75	14.505		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S20-T10N-R58W - Razor #20B-2011A - 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							
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	Warning
5,200.0	5,196.7	5,201.1	5,196.7	11.8	11.9	90.00	100.0	192.9	329.9	306.8	23.17	14.240	
5,265.3	5,262.0	5,266.3	5,262.0	12.0	12.0	90.00	100.0	192.9	329.9	306.5	23.45	14.072	
5,300.0	5,296.7	5,301.1	5,296.7	12.0	12.1	90.01	99.9	192.9	329.9	306.3	23.59	13.985	
5,400.0	5,396.7	5,400.0	5,394.9	12.3	12.3	-88.23	89.1	192.9	330.1	306.2	23.88	13.825	
5,500.0	5,495.5	5,495.4	5,486.0	12.4	12.4	-85.72	61.3	192.9	330.9	306.8	24.12	13.717	
5,600.0	5,589.6	5,588.8	5,568.8	12.5	12.5	-83.39	18.5	192.9	332.2	307.9	24.32	13.658	
5,700.0	5,675.5	5,680.1	5,641.2	12.7	12.7	-81.31	-37.1	192.9	333.8	309.3	24.55	13.595	
5,800.0	5,750.3	5,769.9	5,701.9	12.9	12.9	-79.55	-103.2	192.9	335.5	310.6	24.92	13.465	
5,900.0	5,811.0	5,858.5	5,749.7	13.2	13.3	-78.15	-177.6	192.9	337.2	311.6	25.53	13.205	
6,000.0	5,855.5	5,946.1	5,783.9	13.7	13.8	-77.14	-258.1	192.9	338.4	311.9	26.50	12.773	
6,100.0	5,882.1	6,033.1	5,804.1	14.5	14.5	-76.55	-342.6	192.9	339.3	311.4	27.87	12.172	
6,200.0	5,890.0	6,121.1	5,810.0	15.4	15.4	-76.37	-430.3	192.9	339.5	309.8	29.65	11.449	
6,300.0	5,890.0	6,221.1	5,810.0	16.6	16.5	-76.37	-530.3	192.9	339.5	307.6	31.89	10.645	
6,400.0	5,890.0	6,321.1	5,810.0	17.8	17.8	-76.37	-630.3	192.9	339.5	305.1	34.39	9.871	
6,500.0	5,890.0	6,421.1	5,810.0	19.2	19.2	-76.37	-730.3	192.9	339.5	302.4	37.10	9.150	
6,600.0	5,890.0	6,521.1	5,810.0	20.7	20.6	-76.37	-830.3	192.9	339.5	299.5	39.98	8.491	
6,700.0	5,890.0	6,621.1	5,810.0	22.2	22.2	-76.37	-930.3	192.9	339.5	296.5	43.00	7.896	
6,800.0	5,890.0	6,721.1	5,810.0	23.8	23.8	-76.37	-1,030.3	192.9	339.5	293.4	46.12	7.362	
6,900.0	5,890.0	6,821.1	5,810.0	25.4	25.4	-76.37	-1,130.3	192.9	339.5	290.2	49.33	6.883	
7,000.0	5,890.0	6,921.1	5,810.0	27.1	27.1	-76.37	-1,230.3	192.9	339.5	286.9	52.61	6.453	
7,100.0	5,890.0	7,021.1	5,810.0	28.8	28.8	-76.37	-1,330.3	192.9	339.5	283.6	55.95	6.068	
7,200.0	5,890.0	7,121.1	5,810.0	30.5	30.5	-76.37	-1,430.3	192.9	339.5	280.2	59.34	5.722	
7,300.0	5,890.0	7,221.1	5,810.0	32.2	32.3	-76.37	-1,530.3	192.9	339.5	276.7	62.77	5.409	
7,400.0	5,890.0	7,321.1	5,810.0	34.0	34.0	-76.37	-1,630.3	192.9	339.5	273.3	66.23	5.126	
7,500.0	5,890.0	7,421.1	5,810.0	35.8	35.8	-76.37	-1,730.3	192.9	339.5	269.8	69.73	4.869	
7,600.0	5,890.0	7,521.1	5,810.0	37.6	37.6	-76.37	-1,830.3	192.9	339.5	266.3	73.25	4.635	
7,700.0	5,890.0	7,621.1	5,810.0	39.4	39.4	-76.37	-1,930.3	192.9	339.5	262.7	76.79	4.421	
7,800.0	5,890.0	7,721.1	5,810.0	41.2	41.3	-76.37	-2,030.3	192.9	339.5	259.2	80.35	4.225	
7,900.0	5,890.0	7,821.1	5,810.0	43.1	43.1	-76.37	-2,130.3	192.9	339.5	255.6	83.92	4.045	
8,000.0	5,890.0	7,921.1	5,810.0	44.9	44.9	-76.37	-2,230.3	192.9	339.5	252.0	87.52	3.879	
8,100.0	5,890.0	8,021.1	5,810.0	46.7	46.8	-76.37	-2,330.3	192.9	339.5	248.4	91.12	3.726	
8,200.0	5,890.0	8,121.1	5,810.0	48.6	48.6	-76.37	-2,430.3	192.9	339.5	244.8	94.74	3.584	
8,300.0	5,890.0	8,221.1	5,810.0	50.4	50.5	-76.37	-2,530.3	192.9	339.5	241.1	98.36	3.452	
8,400.0	5,890.0	8,321.1	5,810.0	52.3	52.3	-76.37	-2,630.3	192.9	339.5	237.5	102.00	3.329	
8,500.0	5,890.0	8,421.1	5,810.0	54.2	54.2	-76.37	-2,730.3	192.9	339.5	233.9	105.64	3.214	
8,600.0	5,890.0	8,521.1	5,810.0	56.0	56.1	-76.37	-2,830.3	192.9	339.5	230.2	109.29	3.106	
8,700.0	5,890.0	8,621.1	5,810.0	57.9	57.9	-76.37	-2,930.3	192.9	339.5	226.6	112.95	3.006	
8,800.0	5,890.0	8,721.1	5,810.0	59.8	59.8	-76.37	-3,030.3	192.9	339.5	222.9	116.61	2.911	
8,900.0	5,890.0	8,821.1	5,810.0	61.6	61.7	-76.37	-3,130.3	192.9	339.5	219.2	120.28	2.823	
9,000.0	5,890.0	8,921.1	5,810.0	63.5	63.6	-76.37	-3,230.3	192.9	339.5	215.6	123.95	2.739	
9,100.0	5,890.0	9,021.1	5,810.0	65.4	65.4	-76.37	-3,330.3	192.9	339.5	211.9	127.63	2.660	
9,200.0	5,890.0	9,121.1	5,810.0	67.3	67.3	-76.37	-3,430.3	192.9	339.5	208.2	131.31	2.586	
9,300.0	5,890.0	9,221.1	5,810.0	69.2	69.2	-76.37	-3,530.3	192.9	339.5	204.5	134.99	2.515	
9,400.0	5,890.0	9,321.1	5,810.0	71.1	71.1	-76.37	-3,630.3	192.9	339.5	200.8	138.68	2.448	
9,500.0	5,890.0	9,421.1	5,810.0	72.9	73.0	-76.37	-3,730.3	192.9	339.5	197.1	142.37	2.385	
9,600.0	5,890.0	9,521.1	5,810.0	74.8	74.9	-76.37	-3,830.3	192.9	339.5	193.4	146.07	2.324	
9,700.0	5,890.0	9,621.1	5,810.0	76.7	76.8	-76.37	-3,930.3	192.9	339.5	189.7	149.77	2.267	
9,800.0	5,890.0	9,721.1	5,810.0	78.6	78.7	-76.37	-4,030.3	192.9	339.5	186.0	153.47	2.212	
9,900.0	5,890.0	9,821.1	5,810.0	80.5	80.6	-76.37	-4,130.3	192.9	339.5	182.3	157.17	2.160	
10,000.0	5,890.0	9,921.1	5,810.0	82.4	82.5	-76.37	-4,230.3	192.9	339.5	178.6	160.87	2.110	
10,100.0	5,890.0	10,021.1	5,810.0	84.3	84.4	-76.37	-4,330.3	192.9	339.5	174.9	164.58	2.063	
10,200.0	5,890.0	10,121.1	5,810.0	86.2	86.3	-76.37	-4,430.3	192.9	339.5	171.2	168.29	2.017	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> S20-T10N-R58W - Razor #20B-2011A - HZ - Plan #1												<b>Offset Site Error:</b>	0.0 usft
Survey Program: 0-ISCSWA MWD												<b>Offset Well Error:</b>	0.0 usft
Reference		Offset		Semi Major Axis			Distance						
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	Warning
10,300.0	5,890.0	10,221.1	5,810.0	88.1	88.2	-76.37	-4,530.3	192.9	339.5	167.5	172.00	1.974	
10,400.0	5,890.0	10,321.1	5,810.0	90.0	90.1	-76.37	-4,630.3	192.9	339.5	163.8	175.71	1.932	
10,500.0	5,890.0	10,421.1	5,810.0	91.9	92.0	-76.37	-4,730.3	192.9	339.5	160.1	179.42	1.892	
10,554.4	5,890.0	10,475.5	5,810.0	93.0	93.0	-76.37	-4,784.8	192.9	339.5	158.1	181.45	1.871	
10,592.1	5,890.0	10,509.2	5,810.0	93.7	93.6	-76.37	-4,818.4	192.9	339.5	156.8	182.77	1.858 SF	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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							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	90.02	0.0	59.8	59.8					
100.0	100.0	100.0	100.0	0.1	0.1	90.02	0.0	59.8	59.8	59.6	0.19	320.422		
200.0	200.0	200.0	200.0	0.3	0.3	90.02	0.0	59.8	59.8	59.1	0.64	93.975		
300.0	300.0	300.0	300.0	0.5	0.5	90.02	0.0	59.8	59.8	58.7	1.09	55.062		
400.0	400.0	400.0	400.0	0.8	0.8	90.02	0.0	59.8	59.8	58.2	1.54	38.939		
500.0	500.0	500.0	500.0	1.0	1.0	90.02	0.0	59.8	59.8	57.8	1.98	30.119 CC, ES		
600.0	600.0	598.0	597.9	1.2	1.2	89.68	0.3	61.4	61.4	59.0	2.42	25.389		
700.0	700.0	695.6	695.4	1.4	1.4	143.47	1.4	66.3	67.9	65.0	2.86	23.727		
800.0	799.9	792.5	792.0	1.7	1.6	143.85	3.1	74.4	79.3	76.0	3.30	24.044		
900.0	899.8	890.8	889.7	1.9	1.9	143.83	5.4	84.9	93.1	89.4	3.74	24.885		
1,000.0	999.8	989.9	988.2	2.1	2.2	143.80	7.7	95.6	107.1	102.9	4.18	25.591		
1,100.0	1,099.7	1,088.9	1,086.6	2.3	2.4	143.78	10.0	106.3	121.0	116.4	4.63	26.135		
1,200.0	1,199.6	1,187.9	1,185.0	2.6	2.7	143.77	12.4	117.1	135.0	129.9	5.08	26.566		
1,300.0	1,299.5	1,286.9	1,283.4	2.8	3.0	143.75	14.7	127.8	148.9	143.4	5.53	26.914		
1,400.0	1,399.5	1,386.0	1,381.8	3.0	3.3	143.74	17.0	138.5	162.8	156.9	5.99	27.201		
1,500.0	1,499.4	1,485.0	1,480.2	3.3	3.6	143.73	19.3	149.2	176.8	170.3	6.44	27.442		
1,600.0	1,599.3	1,584.0	1,578.6	3.5	3.9	143.72	21.6	159.9	190.7	183.8	6.90	27.647		
1,700.0	1,699.2	1,683.0	1,677.1	3.7	4.2	143.72	23.9	170.7	204.7	197.3	7.36	27.824		
1,800.0	1,799.1	1,782.1	1,775.5	4.0	4.5	143.71	26.2	181.4	218.6	210.8	7.81	27.978		
1,900.0	1,899.1	1,881.1	1,873.9	4.2	4.8	143.70	28.6	192.1	232.6	224.3	8.27	28.113		
2,000.0	1,999.0	1,980.1	1,972.3	4.4	5.1	143.70	30.9	202.8	246.5	237.8	8.73	28.234		
2,100.0	2,098.9	2,079.1	2,070.7	4.7	5.4	143.70	33.2	213.6	260.5	251.3	9.19	28.341		
2,200.0	2,198.8	2,178.1	2,169.1	4.9	5.7	143.69	35.5	224.3	274.4	264.8	9.65	28.438		
2,300.0	2,298.8	2,277.2	2,267.5	5.1	6.0	143.69	37.8	235.0	288.4	278.2	10.11	28.527		
2,400.0	2,398.7	2,376.2	2,366.0	5.4	6.3	143.68	40.1	245.7	302.3	291.7	10.57	28.607		
2,500.0	2,498.6	2,475.2	2,464.4	5.6	6.6	143.68	42.5	256.4	316.2	305.2	11.03	28.681		
2,600.0	2,598.5	2,574.2	2,562.8	5.8	6.9	143.68	44.8	267.2	330.2	318.7	11.49	28.749		
2,700.0	2,698.5	2,673.3	2,661.2	6.1	7.2	143.68	47.1	277.9	344.1	332.2	11.94	28.813		
2,800.0	2,798.4	2,772.3	2,759.6	6.3	7.5	143.67	49.4	288.6	358.1	345.7	12.40	28.872		
2,900.0	2,898.3	2,871.3	2,858.0	6.5	7.8	143.67	51.7	299.3	372.0	359.2	12.86	28.927		
3,000.0	2,998.2	2,970.3	2,956.4	6.8	8.1	143.67	54.0	310.0	386.0	372.6	13.32	28.979		
3,100.0	3,098.2	3,069.4	3,054.8	7.0	8.4	143.67	56.3	320.8	399.9	386.1	13.78	29.027		
3,200.0	3,198.1	3,168.4	3,153.3	7.2	8.7	143.67	58.7	331.5	413.9	399.6	14.23	29.073		
3,300.0	3,298.0	3,267.4	3,251.7	7.5	9.0	143.67	61.0	342.2	427.8	413.1	14.69	29.117		
3,400.0	3,397.9	3,366.4	3,350.1	7.7	9.3	143.66	63.3	352.9	441.7	426.6	15.15	29.153		
3,500.0	3,497.9	3,465.4	3,448.5	7.9	9.6	143.66	65.6	363.6	455.7	440.1	15.62	29.183		
3,600.0	3,597.8	3,564.5	3,546.9	8.2	9.9	143.66	67.9	374.4	469.6	453.6	16.08	29.211		
3,700.0	3,697.7	3,663.5	3,645.3	8.4	10.2	143.66	70.2	385.1	483.6	467.0	16.54	29.237		
3,800.0	3,797.6	3,762.5	3,743.7	8.6	10.5	143.66	72.6	395.8	497.5	480.5	17.00	29.262		
3,900.0	3,897.6	3,861.5	3,842.2	8.9	10.8	143.66	74.9	406.5	511.5	494.0	17.47	29.285		
4,000.0	3,997.5	3,960.6	3,940.6	9.1	11.1	143.66	77.2	417.3	525.4	507.5	17.93	29.307		
4,100.0	4,097.4	4,059.6	4,039.0	9.3	11.4	143.66	79.5	428.0	539.4	521.0	18.39	29.328		
4,200.0	4,197.3	4,158.6	4,137.4	9.6	11.7	143.66	81.8	438.7	553.3	534.5	18.85	29.347		
4,300.0	4,297.3	4,257.6	4,235.8	9.8	12.0	143.65	84.1	449.4	567.3	547.9	19.32	29.366		
4,400.0	4,397.2	4,356.7	4,334.2	10.1	12.3	143.65	86.4	460.1	581.2	561.4	19.78	29.383		
4,500.0	4,497.1	4,455.7	4,432.6	10.3	12.6	143.65	88.8	470.9	595.1	574.9	20.24	29.400		
4,600.0	4,597.0	4,554.7	4,531.1	10.5	12.9	143.65	91.1	481.6	609.1	588.4	20.71	29.416		
4,700.0	4,697.0	4,653.7	4,629.5	10.8	13.2	143.65	93.4	492.3	623.0	601.9	21.17	29.431		
4,800.0	4,796.9	4,752.7	4,727.9	11.0	13.5	143.65	95.7	503.0	637.0	615.3	21.63	29.446		
4,900.0	4,896.8	4,873.1	4,847.7	11.2	13.8	143.68	98.2	514.5	649.7	627.6	22.10	29.396		
5,000.0	4,996.7	5,001.4	4,975.8	11.5	14.0	143.82	99.7	521.4	658.0	635.4	22.56	29.161		
5,100.0	5,096.7	5,122.4	5,096.7	11.6	14.2	90.00	100.0	522.9	659.9	636.8	23.12	28.545		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	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						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		
5,200.0	5,196.7	5,222.4	5,196.7	11.8	14.4	90.00	100.0	522.9	659.9	636.3	23.53	28.049		
5,300.0	5,296.7	5,322.4	5,296.7	12.0	14.6	90.00	100.0	522.9	659.9	635.9	23.94	27.568		
5,353.9	5,350.7	5,376.3	5,350.7	12.2	14.6	-90.07	100.0	522.9	659.9	635.9	24.02	27.471		
5,400.0	5,396.7	5,422.4	5,396.7	12.3	14.7	-90.00	99.3	522.9	659.9	635.7	24.20	27.267		
5,500.0	5,495.5	5,522.4	5,495.5	12.4	14.8	-90.00	84.4	522.9	659.9	635.4	24.49	26.949		
5,600.0	5,589.6	5,622.4	5,589.5	12.5	15.0	-90.00	51.0	522.9	659.9	635.2	24.72	26.697		
5,700.0	5,675.5	5,722.4	5,675.5	12.7	15.1	-90.00	0.3	522.9	659.9	634.9	24.99	26.403		
5,800.0	5,750.3	5,822.4	5,750.3	12.9	15.2	-90.00	-65.9	522.9	659.9	634.4	25.44	25.938		
5,900.0	5,811.0	5,922.4	5,811.0	13.2	15.5	-90.00	-145.2	522.9	659.9	633.7	26.19	25.194		
6,000.0	5,855.5	6,022.4	5,855.5	13.7	15.9	-90.00	-234.5	522.9	659.9	632.5	27.34	24.137		
6,100.0	5,882.1	6,122.4	5,882.1	14.5	16.5	-90.00	-330.8	522.9	659.9	631.0	28.91	22.827		
6,200.0	5,890.0	6,222.4	5,890.0	15.4	17.3	-90.00	-430.3	522.9	659.9	629.0	30.85	21.389		
6,300.0	5,890.0	6,322.4	5,890.0	16.6	18.3	-90.00	-530.3	522.9	659.9	626.8	33.12	19.926		
6,400.0	5,890.0	6,422.4	5,890.0	17.8	19.5	-90.00	-630.3	522.9	659.9	624.2	35.65	18.511		
6,500.0	5,890.0	6,522.4	5,890.0	19.2	20.7	-90.00	-730.3	522.9	659.9	621.5	38.40	17.186		
6,600.0	5,890.0	6,622.4	5,890.0	20.7	22.1	-90.00	-830.3	522.9	659.9	618.6	41.32	15.970		
6,700.0	5,890.0	6,722.4	5,890.0	22.2	23.5	-90.00	-930.3	522.9	659.9	615.5	44.38	14.868		
6,800.0	5,890.0	6,822.4	5,890.0	23.8	25.0	-90.00	-1,030.3	522.9	659.9	612.3	47.56	13.875		
6,900.0	5,890.0	6,922.4	5,890.0	25.4	26.6	-90.00	-1,130.3	522.9	659.9	609.0	50.83	12.983		
7,000.0	5,890.0	7,022.4	5,890.0	27.1	28.2	-90.00	-1,230.3	522.9	659.9	605.7	54.17	12.181		
7,100.0	5,890.0	7,122.4	5,890.0	28.8	29.8	-90.00	-1,330.3	522.9	659.9	602.3	57.58	11.461		
7,200.0	5,890.0	7,222.4	5,890.0	30.5	31.5	-90.00	-1,430.3	522.9	659.9	598.8	61.04	10.811		
7,300.0	5,890.0	7,322.4	5,890.0	32.2	33.2	-90.00	-1,530.3	522.9	659.9	595.3	64.54	10.225		
7,400.0	5,890.0	7,422.4	5,890.0	34.0	34.9	-90.00	-1,630.3	522.9	659.9	591.8	68.08	9.693		
7,500.0	5,890.0	7,522.4	5,890.0	35.8	36.7	-90.00	-1,730.3	522.9	659.9	588.2	71.65	9.210		
7,600.0	5,890.0	7,622.4	5,890.0	37.6	38.4	-90.00	-1,830.3	522.9	659.9	584.6	75.24	8.770		
7,700.0	5,890.0	7,722.4	5,890.0	39.4	40.2	-90.00	-1,930.3	522.9	659.9	581.0	78.86	8.368		
7,800.0	5,890.0	7,822.4	5,890.0	41.2	42.0	-90.00	-2,030.3	522.9	659.9	577.4	82.50	7.998		
7,900.0	5,890.0	7,922.4	5,890.0	43.1	43.8	-90.00	-2,130.3	522.9	659.9	573.7	86.16	7.659		
8,000.0	5,890.0	8,022.4	5,890.0	44.9	45.6	-90.00	-2,230.3	522.9	659.9	570.0	89.83	7.346		
8,100.0	5,890.0	8,122.4	5,890.0	46.7	47.4	-90.00	-2,330.3	522.9	659.9	566.4	93.52	7.056		
8,200.0	5,890.0	8,222.4	5,890.0	48.6	49.3	-90.00	-2,430.3	522.9	659.9	562.7	97.21	6.788		
8,300.0	5,890.0	8,322.4	5,890.0	50.4	51.1	-90.00	-2,530.3	522.9	659.9	559.0	100.92	6.538		
8,400.0	5,890.0	8,422.4	5,890.0	52.3	52.9	-90.00	-2,630.3	522.9	659.9	555.2	104.64	6.306		
8,500.0	5,890.0	8,522.4	5,890.0	54.2	54.8	-90.00	-2,730.3	522.9	659.9	551.5	108.37	6.089		
8,600.0	5,890.0	8,622.4	5,890.0	56.0	56.6	-90.00	-2,830.3	522.9	659.9	547.8	112.10	5.886		
8,700.0	5,890.0	8,722.4	5,890.0	57.9	58.5	-90.00	-2,930.3	522.9	659.9	544.0	115.85	5.696		
8,800.0	5,890.0	8,822.4	5,890.0	59.8	60.3	-90.00	-3,030.3	522.9	659.9	540.3	119.59	5.518		
8,900.0	5,890.0	8,922.4	5,890.0	61.6	62.2	-90.00	-3,130.3	522.9	659.9	536.5	123.35	5.350		
9,000.0	5,890.0	9,022.4	5,890.0	63.5	64.1	-90.00	-3,230.3	522.9	659.9	532.8	127.11	5.192		
9,100.0	5,890.0	9,122.4	5,890.0	65.4	65.9	-90.00	-3,330.3	522.9	659.9	529.0	130.87	5.042		
9,200.0	5,890.0	9,222.4	5,890.0	67.3	67.8	-90.00	-3,430.3	522.9	659.9	525.2	134.64	4.901		
9,300.0	5,890.0	9,322.4	5,890.0	69.2	69.7	-90.00	-3,530.3	522.9	659.9	521.5	138.41	4.768		
9,400.0	5,890.0	9,422.4	5,890.0	71.1	71.6	-90.00	-3,630.3	522.9	659.9	517.7	142.19	4.641		
9,500.0	5,890.0	9,522.4	5,890.0	72.9	73.4	-90.00	-3,730.3	522.9	659.9	513.9	145.97	4.521		
9,600.0	5,890.0	9,622.4	5,890.0	74.8	75.3	-90.00	-3,830.3	522.9	659.9	510.1	149.75	4.407		
9,700.0	5,890.0	9,722.4	5,890.0	76.7	77.2	-90.00	-3,930.3	522.9	659.9	506.3	153.54	4.298		
9,800.0	5,890.0	9,822.4	5,890.0	78.6	79.1	-90.00	-4,030.3	522.9	659.9	502.6	157.32	4.194		
9,900.0	5,890.0	9,922.4	5,890.0	80.5	81.0	-90.00	-4,130.3	522.9	659.9	498.8	161.12	4.096		
10,000.0	5,890.0	10,022.4	5,890.0	82.4	82.9	-90.00	-4,230.3	522.9	659.9	495.0	164.91	4.002		
10,100.0	5,890.0	10,122.4	5,890.0	84.3	84.8	-90.00	-4,330.3	522.9	659.9	491.2	168.70	3.911		
10,200.0	5,890.0	10,222.4	5,890.0	86.2	86.6	-90.00	-4,430.3	522.9	659.9	487.4	172.50	3.825		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> S20-T10N-R58W - Razor #20B-2012B - HZ - Plan #1												<b>Offset Site Error:</b>	0.0 usft
Survey Program: 0-ISCSWA MWD												<b>Offset Well Error:</b>	0.0 usft
Reference		Offset		Semi Major Axis		Distance							
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	Warning
10,300.0	5,890.0	10,322.4	5,890.0	88.1	88.5	-90.00	-4,530.3	522.9	659.9	483.6	176.30	3.743	
10,400.0	5,890.0	10,422.4	5,890.0	90.0	90.4	-90.00	-4,630.3	522.9	659.9	479.8	180.10	3.664	
10,500.0	5,890.0	10,522.4	5,890.0	91.9	92.3	-90.00	-4,730.3	522.9	659.9	476.0	183.90	3.588	
10,552.5	5,890.0	10,574.8	5,890.0	92.9	93.3	-90.00	-4,782.8	522.9	659.9	474.0	185.90	3.550	
10,592.1	5,890.0	10,605.4	5,890.0	93.7	93.9	-90.00	-4,813.3	522.9	659.9	472.7	187.24	3.525 SF	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S29-T10N-R58W - Razor 29F 2007A - 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							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		
4,800.0	4,796.9	12,509.6	5,782.0	11.0	139.1	-37.55	95.1	-1,167.0	1,495.1	1,345.4	149.70	9.987		
4,900.0	4,896.8	12,511.9	5,782.0	11.2	139.1	-37.42	97.4	-1,167.0	1,422.5	1,272.5	149.98	9.485		
5,000.0	4,996.7	12,514.1	5,782.0	11.5	139.2	-36.87	99.6	-1,167.0	1,353.5	1,203.2	150.30	9.006		
5,100.0	5,096.7	12,514.6	5,782.0	11.6	139.2	-89.99	100.1	-1,167.0	1,290.4	1,134.5	155.83	8.281		
5,200.0	5,196.7	12,514.6	5,782.0	11.8	139.2	-89.99	100.1	-1,167.0	1,232.7	1,076.7	156.04	7.900		
5,300.0	5,296.7	12,514.6	5,782.0	12.0	139.2	-89.99	100.1	-1,167.0	1,180.8	1,024.5	156.26	7.556		
5,400.0	5,396.7	12,513.9	5,782.0	12.3	139.2	91.41	99.4	-1,167.0	1,135.2	984.1	151.12	7.512		
5,500.0	5,495.5	12,499.1	5,782.0	12.4	138.9	95.10	84.6	-1,167.0	1,097.4	946.9	150.51	7.291		
5,600.0	5,589.6	12,465.7	5,782.0	12.5	138.3	96.67	51.2	-1,167.0	1,068.6	919.0	149.61	7.142		
5,700.0	5,675.5	12,414.9	5,782.0	12.7	137.3	96.47	0.4	-1,167.0	1,049.0	900.1	148.84	7.048		
5,800.0	5,750.3	12,348.7	5,782.0	12.9	136.0	95.03	-65.8	-1,167.0	1,037.4	889.3	148.12	7.004 SF		
5,900.0	5,811.0	12,269.5	5,782.0	13.2	134.5	92.97	-145.0	-1,167.1	1,032.0	884.7	147.29	7.007		
6,000.0	5,855.5	12,180.1	5,782.0	13.7	132.8	90.96	-234.4	-1,167.1	1,030.2	883.9	146.29	7.042 ES		
6,059.4	5,873.6	12,123.5	5,782.0	14.2	131.7	90.03	-291.0	-1,167.1	1,030.1	884.4	145.69	7.070 CC		
6,100.0	5,882.1	12,083.8	5,782.0	14.5	131.0	89.56	-330.7	-1,167.1	1,030.1	884.8	145.25	7.092		
6,200.0	5,890.0	11,984.3	5,782.0	15.4	129.1	89.11	-430.2	-1,167.1	1,030.2	885.9	144.31	7.139		
6,300.0	5,890.0	11,884.3	5,782.0	16.6	127.1	89.11	-530.2	-1,167.1	1,030.2	886.7	143.54	7.177		
6,400.0	5,890.0	11,784.3	5,782.0	17.8	125.2	89.11	-630.2	-1,167.1	1,030.2	887.3	142.90	7.209		
6,500.0	5,890.0	11,684.3	5,782.0	19.2	123.3	89.11	-730.2	-1,167.1	1,030.2	887.9	142.37	7.236		
6,600.0	5,890.0	11,584.3	5,782.0	20.7	121.4	89.11	-830.2	-1,167.1	1,030.2	888.3	141.93	7.259		
6,700.0	5,890.0	11,484.3	5,782.0	22.2	119.5	89.11	-930.2	-1,167.1	1,030.3	888.7	141.56	7.278		
6,800.0	5,890.0	11,384.3	5,782.0	23.8	117.6	89.11	-1,030.2	-1,167.2	1,030.3	889.0	141.24	7.294		
6,900.0	5,890.0	11,284.3	5,782.0	25.4	115.7	89.11	-1,130.2	-1,167.2	1,030.3	889.3	140.97	7.308		
7,000.0	5,890.0	11,184.3	5,782.0	27.1	113.8	89.11	-1,230.2	-1,167.2	1,030.3	889.5	140.74	7.321		
7,100.0	5,890.0	11,084.3	5,782.0	28.8	111.9	89.11	-1,330.2	-1,167.2	1,030.3	889.8	140.54	7.331		
7,200.0	5,890.0	10,984.3	5,782.0	30.5	110.0	89.11	-1,430.2	-1,167.2	1,030.3	889.9	140.36	7.340		
7,300.0	5,890.0	10,884.3	5,782.0	32.2	108.1	89.11	-1,530.2	-1,167.2	1,030.3	890.1	140.21	7.348		
7,400.0	5,890.0	10,784.3	5,782.0	34.0	106.2	89.11	-1,630.2	-1,167.2	1,030.3	890.3	140.08	7.355		
7,500.0	5,890.0	10,684.3	5,782.0	35.8	104.2	89.11	-1,730.2	-1,167.2	1,030.3	890.4	139.96	7.362		
7,600.0	5,890.0	10,584.3	5,782.0	37.6	102.3	89.11	-1,830.2	-1,167.2	1,030.4	890.5	139.85	7.367		
7,700.0	5,890.0	10,484.3	5,782.0	39.4	100.4	89.11	-1,930.2	-1,167.3	1,030.4	890.6	139.76	7.372		
7,800.0	5,890.0	10,384.3	5,782.0	41.2	98.5	89.11	-2,030.2	-1,167.3	1,030.4	890.7	139.68	7.377		
7,900.0	5,890.0	10,284.3	5,782.0	43.1	96.6	89.11	-2,130.2	-1,167.3	1,030.4	890.8	139.61	7.381		
8,000.0	5,890.0	10,184.3	5,782.0	44.9	94.7	89.11	-2,230.2	-1,167.3	1,030.4	890.9	139.54	7.384		
8,100.0	5,890.0	10,084.3	5,782.0	46.7	92.8	89.11	-2,330.2	-1,167.3	1,030.4	890.9	139.48	7.387		
8,200.0	5,890.0	9,984.3	5,782.0	48.6	90.9	89.11	-2,430.2	-1,167.3	1,030.4	891.0	139.43	7.390		
8,300.0	5,890.0	9,884.3	5,782.0	50.4	89.0	89.11	-2,530.2	-1,167.3	1,030.4	891.0	139.39	7.393		
8,400.0	5,890.0	9,784.3	5,782.0	52.3	87.1	89.11	-2,630.2	-1,167.3	1,030.4	891.1	139.35	7.395		
8,500.0	5,890.0	9,684.3	5,782.0	54.2	85.2	89.11	-2,730.2	-1,167.3	1,030.5	891.1	139.32	7.397		
8,600.0	5,890.0	9,584.3	5,782.0	56.0	83.3	89.11	-2,830.2	-1,167.4	1,030.5	891.2	139.29	7.398		
8,700.0	5,890.0	9,484.3	5,782.0	57.9	81.4	89.11	-2,930.2	-1,167.4	1,030.5	891.2	139.26	7.400		
8,800.0	5,890.0	9,384.3	5,782.0	59.8	79.5	89.11	-3,030.2	-1,167.4	1,030.5	891.2	139.24	7.401		
8,900.0	5,890.0	9,284.3	5,782.0	61.6	77.6	89.11	-3,130.2	-1,167.4	1,030.5	891.3	139.23	7.402		
9,000.0	5,890.0	9,184.3	5,782.0	63.5	75.8	89.11	-3,230.2	-1,167.4	1,030.5	891.3	139.21	7.402		
9,100.0	5,890.0	9,084.3	5,782.0	65.4	73.9	89.11	-3,330.2	-1,167.4	1,030.5	891.2	139.31	7.398		
9,200.0	5,890.0	8,984.3	5,782.0	67.3	72.0	89.11	-3,430.2	-1,167.4	1,030.5	891.1	139.46	7.389		
9,300.0	5,890.0	8,884.3	5,782.0	69.2	70.1	89.11	-3,530.2	-1,167.4	1,030.5	890.9	139.62	7.381		
9,400.0	5,890.0	8,784.3	5,782.0	71.1	68.2	89.11	-3,630.2	-1,167.4	1,030.6	890.8	139.78	7.372		
9,500.0	5,890.0	8,684.3	5,782.0	72.9	66.3	89.11	-3,730.2	-1,167.5	1,030.6	890.6	139.95	7.364		
9,600.0	5,890.0	8,584.3	5,782.0	74.8	64.4	89.11	-3,830.2	-1,167.5	1,030.6	890.5	140.12	7.355		
9,700.0	5,890.0	8,484.3	5,782.0	76.7	62.6	89.11	-3,930.2	-1,167.5	1,030.6	890.3	140.29	7.346		
9,800.0	5,890.0	8,384.3	5,782.0	78.6	60.7	89.11	-4,030.2	-1,167.5	1,030.6	890.1	140.47	7.337		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> S29-T10N-R58W - Razor 29F 2007A - HZ - Plan #1													<b>Offset Site Error:</b> 0.0 usft
Survey Program: 0-ISCSWA MWD													<b>Offset Well Error:</b> 0.0 usft
Reference		Offset		Semi Major Axis			Distance						
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	Warning
9,900.0	5,890.0	8,284.3	5,782.0	80.5	58.8	89.11	-4,130.2	-1,167.5	1,030.6	890.0	140.65	7.327	
10,000.0	5,890.0	8,184.3	5,782.0	82.4	56.9	89.11	-4,230.2	-1,167.5	1,030.6	889.8	140.84	7.318	
10,100.0	5,890.0	8,084.3	5,782.0	84.3	55.1	89.11	-4,330.2	-1,167.5	1,030.6	889.6	141.03	7.308	
10,200.0	5,890.0	7,984.3	5,782.0	86.2	53.2	89.11	-4,430.2	-1,167.5	1,030.6	889.4	141.23	7.298	
10,300.0	5,890.0	7,884.3	5,782.0	88.1	51.3	89.11	-4,530.2	-1,167.5	1,030.7	889.2	141.43	7.288	
10,400.0	5,890.0	7,784.3	5,782.0	90.0	49.5	89.11	-4,630.2	-1,167.6	1,030.7	889.0	141.63	7.277	
10,500.0	5,890.0	7,684.3	5,782.0	91.9	47.6	89.11	-4,730.2	-1,167.6	1,030.7	888.8	141.84	7.266	
10,592.1	5,890.0	7,592.2	5,782.0	93.7	45.9	89.11	-4,822.3	-1,167.6	1,030.7	888.6	142.04	7.256	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design S29-T10N-R58W - Razor 29F 2008B - 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							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		
4,600.0	4,597.0	12,608.9	5,857.0	10.5	137.6	-38.79	90.5	-837.1	1,528.6	1,381.3	147.23	10.382		
4,700.0	4,697.0	12,611.2	5,857.0	10.8	137.6	-38.59	92.8	-837.1	1,439.4	1,291.8	147.54	9.756		
4,800.0	4,796.9	12,613.5	5,857.0	11.0	137.7	-38.40	95.1	-837.1	1,351.7	1,203.9	147.85	9.142		
4,900.0	4,896.8	12,615.7	5,857.0	11.2	137.7	-38.20	97.4	-837.1	1,265.9	1,117.7	148.16	8.544		
5,000.0	4,996.7	12,617.9	5,857.0	11.5	137.8	-37.32	99.5	-837.1	1,182.4	1,033.8	148.61	7.956		
5,100.0	5,096.7	12,618.4	5,857.0	11.6	137.8	-90.00	100.0	-837.1	1,103.0	950.0	153.02	7.208		
5,200.0	5,196.7	12,618.4	5,857.0	11.8	137.8	-90.00	100.0	-837.1	1,027.7	874.4	153.23	6.707		
5,300.0	5,296.7	12,618.4	5,857.0	12.0	137.8	-90.00	100.0	-837.1	956.9	803.4	153.45	6.236		
5,400.0	5,396.7	12,617.7	5,857.0	12.3	137.8	92.40	99.3	-837.1	891.7	742.0	149.72	5.956		
5,500.0	5,495.5	12,602.9	5,857.0	12.4	137.5	98.93	84.5	-837.1	834.2	685.5	148.69	5.610		
5,600.0	5,589.6	12,569.5	5,857.0	12.5	136.8	102.26	51.1	-837.2	787.0	640.0	147.00	5.354		
5,700.0	5,675.5	12,518.7	5,857.0	12.7	135.9	102.94	0.4	-837.2	751.6	605.8	145.82	5.155		
5,800.0	5,750.3	12,452.5	5,857.0	12.9	134.6	101.74	-65.9	-837.2	727.8	582.6	145.18	5.013		
5,900.0	5,811.0	12,373.3	5,857.0	13.2	133.1	99.49	-145.1	-837.2	713.6	568.9	144.71	4.931		
6,000.0	5,855.5	12,283.9	5,857.0	13.7	131.4	97.11	-234.5	-837.2	706.4	562.3	144.09	4.902 SF		
6,100.0	5,882.1	12,187.6	5,857.0	14.5	129.6	95.38	-330.7	-837.2	703.3	560.1	143.28	4.909 ES		
6,199.6	5,890.8	12,088.5	5,857.0	15.4	127.7	94.75	-429.8	-837.2	702.6	560.2	142.37	4.935 CC		
6,200.0	5,890.0	12,088.1	5,857.0	15.4	127.7	94.82	-430.3	-837.2	702.6	560.3	142.36	4.936		
6,300.0	5,890.0	11,988.1	5,857.0	16.6	125.8	94.82	-530.3	-837.2	702.7	561.1	141.59	4.963		
6,400.0	5,890.0	11,888.1	5,857.0	17.8	123.9	94.82	-630.3	-837.2	702.7	561.7	140.95	4.985		
6,500.0	5,890.0	11,788.1	5,857.0	19.2	122.0	94.82	-730.3	-837.2	702.7	562.2	140.43	5.004		
6,600.0	5,890.0	11,688.1	5,857.0	20.7	120.1	94.82	-830.3	-837.2	702.7	562.7	139.99	5.019		
6,700.0	5,890.0	11,588.1	5,857.0	22.2	118.1	94.82	-930.3	-837.2	702.7	563.0	139.63	5.032		
6,800.0	5,890.0	11,488.1	5,857.0	23.8	116.2	94.82	-1,030.3	-837.2	702.7	563.4	139.32	5.044		
6,900.0	5,890.0	11,388.1	5,857.0	25.4	114.3	94.82	-1,130.3	-837.2	702.7	563.6	139.06	5.053		
7,000.0	5,890.0	11,288.1	5,857.0	27.1	112.4	94.82	-1,230.3	-837.2	702.7	563.9	138.83	5.061		
7,100.0	5,890.0	11,188.1	5,857.0	28.8	110.5	94.82	-1,330.3	-837.2	702.7	564.1	138.64	5.069		
7,200.0	5,890.0	11,088.1	5,857.0	30.5	108.6	94.82	-1,430.3	-837.2	702.7	564.2	138.47	5.075		
7,300.0	5,890.0	10,988.1	5,857.0	32.2	106.7	94.82	-1,530.3	-837.2	702.7	564.4	138.32	5.080		
7,400.0	5,890.0	10,888.1	5,857.0	34.0	104.9	94.82	-1,630.3	-837.2	702.7	564.5	138.19	5.085		
7,500.0	5,890.0	10,788.1	5,857.0	35.8	103.0	94.82	-1,730.3	-837.3	702.7	564.6	138.08	5.089		
7,600.0	5,890.0	10,688.1	5,857.0	37.6	101.1	94.82	-1,830.3	-837.3	702.7	564.7	137.99	5.093		
7,700.0	5,890.0	10,588.1	5,857.0	39.4	99.2	94.82	-1,930.3	-837.3	702.7	564.8	137.90	5.096		
7,800.0	5,890.0	10,488.1	5,857.0	41.2	97.3	94.82	-2,030.3	-837.3	702.7	564.9	137.83	5.099		
7,900.0	5,890.0	10,388.1	5,857.0	43.1	95.4	94.82	-2,130.3	-837.3	702.7	565.0	137.76	5.101		
8,000.0	5,890.0	10,288.1	5,857.0	44.9	93.5	94.82	-2,230.3	-837.3	702.7	565.0	137.70	5.103		
8,100.0	5,890.0	10,188.1	5,857.0	46.7	91.6	94.82	-2,330.3	-837.3	702.8	565.1	137.65	5.105		
8,200.0	5,890.0	10,088.1	5,857.0	48.6	89.7	94.82	-2,430.3	-837.3	702.8	565.1	137.61	5.107		
8,300.0	5,890.0	9,988.1	5,857.0	50.4	87.8	94.82	-2,530.3	-837.3	702.8	565.1	137.65	5.105		
8,400.0	5,890.0	9,888.1	5,857.0	52.3	85.9	94.82	-2,630.3	-837.3	702.8	565.0	137.78	5.101		
8,500.0	5,890.0	9,788.1	5,857.0	54.2	84.1	94.82	-2,730.3	-837.3	702.8	564.9	137.92	5.096		
8,600.0	5,890.0	9,688.1	5,857.0	56.0	82.2	94.82	-2,830.3	-837.3	702.8	564.7	138.06	5.090		
8,700.0	5,890.0	9,588.1	5,857.0	57.9	80.3	94.82	-2,930.3	-837.3	702.8	564.6	138.20	5.085		
8,800.0	5,890.0	9,488.1	5,857.0	59.8	78.4	94.82	-3,030.3	-837.3	702.8	564.4	138.35	5.080		
8,900.0	5,890.0	9,388.1	5,857.0	61.6	76.5	94.82	-3,130.3	-837.3	702.8	564.3	138.51	5.074		
9,000.0	5,890.0	9,288.1	5,857.0	63.5	74.7	94.82	-3,230.3	-837.3	702.8	564.1	138.67	5.068		
9,100.0	5,890.0	9,188.1	5,857.0	65.4	72.8	94.82	-3,330.3	-837.3	702.8	564.0	138.83	5.062		
9,200.0	5,890.0	9,088.1	5,857.0	67.3	70.9	94.82	-3,430.3	-837.3	702.8	563.8	139.00	5.056		
9,300.0	5,890.0	8,988.1	5,857.0	69.2	69.1	94.82	-3,530.3	-837.4	702.8	563.6	139.17	5.050		
9,400.0	5,890.0	8,888.1	5,857.0	71.1	67.2	94.82	-3,630.3	-837.4	702.8	563.5	139.35	5.044		
9,500.0	5,890.0	8,788.1	5,857.0	72.9	65.3	94.82	-3,730.3	-837.4	702.8	563.3	139.53	5.037		
9,600.0	5,890.0	8,688.1	5,857.0	74.8	63.5	94.82	-3,830.3	-837.4	702.8	563.1	139.72	5.030		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> S29-T10N-R58W - Razor 29F 2008B - HZ - Plan #1												<b>Offset Site Error:</b>	0.0 usft
Survey Program: 0-ISCWSA MWD												<b>Offset Well Error:</b>	0.0 usft
Reference		Offset		Semi Major Axis		Distance							
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	Warning
9,700.0	5,890.0	8,588.1	5,857.0	76.7	61.6	94.82	-3,930.3	-837.4	702.8	562.9	139.91	5.024	
9,800.0	5,890.0	8,488.1	5,857.0	78.6	59.8	94.82	-4,030.3	-837.4	702.8	562.7	140.11	5.017	
9,900.0	5,890.0	8,388.1	5,857.0	80.5	57.9	94.82	-4,130.3	-837.4	702.9	562.5	140.31	5.009	
10,000.0	5,890.0	8,288.1	5,857.0	82.4	56.1	94.82	-4,230.3	-837.4	702.9	562.3	140.51	5.002	
10,100.0	5,890.0	8,188.1	5,857.0	84.3	54.3	94.82	-4,330.3	-837.4	702.9	562.1	140.73	4.995	
10,200.0	5,890.0	8,088.1	5,857.0	86.2	52.4	94.82	-4,430.3	-837.4	702.9	561.9	140.95	4.987	
10,300.0	5,890.0	7,988.1	5,857.0	88.1	50.6	94.82	-4,530.3	-837.4	702.9	561.7	141.17	4.979	
10,400.0	5,890.0	7,888.1	5,857.0	90.0	48.8	94.82	-4,630.3	-837.4	702.9	561.5	141.41	4.971	
10,500.0	5,890.0	7,788.1	5,857.0	91.9	47.0	94.82	-4,730.3	-837.4	702.9	561.2	141.65	4.962	
10,592.1	5,890.0	7,696.0	5,857.0	93.7	45.3	94.82	-4,822.4	-837.4	702.9	561.0	141.88	4.954	

# Cathedral Energy Services

## Anticollision Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #20B-2010B
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Reference Site:</b>	S20-T10N-R58W	<b>MD Reference:</b>	KB=17' @ 4924.8usft (Cade #23)
<b>Site Error:</b>	0.0usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Razor #20B-2010B	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HZ	<b>Database:</b>	USA EDM 5000 Multi Users DB
<b>Reference Design:</b>	Plan #1	<b>Offset TVD Reference:</b>	Offset Datum

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

Offset Depths are relative to Offset Datum

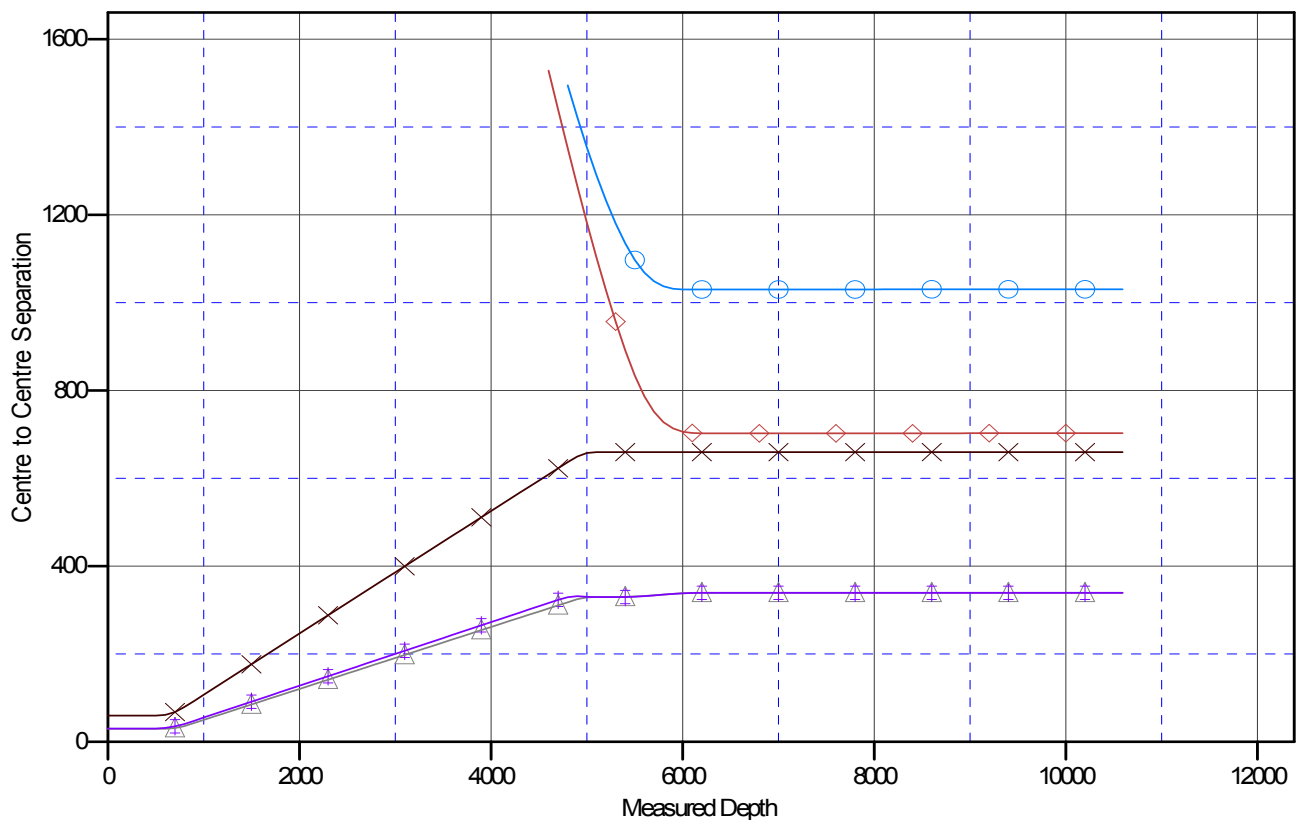
Central Meridian is -105.500000 °

Coordinates are relative to: Razor #20B-2010B

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-2009A, HZ, Plan #1 V0
- ◆ Razor 29F 2008B, HZ, Plan #1 V0
- Razor 29F 2007A, HZ, Plan #1 V0