



Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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		S21-T10N-R58W			
Site Position:		Northing:	1,549,389.38 usft	Latitude:	40.830125
From:	Lat/Long	Easting:	3,450,038.37 usft	Longitude:	-103.873714
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.05 °

Well		Razor #21B-0912B				
Well Position	+N/-S	0.0 usft	Northing:	1,549,443.15 usft	Latitude:	40.830200
	+E/-W	0.0 usft	Easting:	3,451,478.35 usft	Longitude:	-103.868508
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,837.3 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/14/2014	7.96	67.42	53,102

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	3.50	

Survey Program	Date	10/22/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
152.0	14,175.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
152.0	0.40	227.51	152.0	-0.4	-0.4	-0.4	0.26	0.26		
246.0	0.56	212.03	246.0	-1.0	-0.9	-1.0	0.22	0.17		
338.0	0.74	235.32	338.0	-1.7	-1.6	-1.8	0.34	0.20		
429.0	0.66	237.98	429.0	-2.3	-2.5	-2.5	0.09	-0.09		
520.0	0.99	67.99	520.0	-2.3	-2.2	-2.4	1.81	0.36		
611.0	1.14	72.91	611.0	-1.7	-0.7	-1.8	0.19	0.16		
704.0	1.12	76.89	703.9	-1.2	1.1	-1.2	0.09	-0.02		
799.0	1.18	74.99	798.9	-0.8	3.0	-0.6	0.07	0.06		
894.0	0.85	82.34	893.9	-0.4	4.6	-0.2	0.37	-0.35		
989.0	0.73	70.98	988.9	-0.1	5.9	0.2	0.21	-0.13		
1,083.0	3.18	91.01	1,082.8	0.0	9.1	0.6	2.67	2.61		
1,178.0	4.17	88.78	1,177.6	0.0	15.1	1.0	1.05	1.04		

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Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,273.0	5.05	87.99	1,272.3	0.3	22.8	1.6	0.93	0.93	
1,368.0	6.14	93.60	1,366.9	0.1	32.0	2.0	1.28	1.15	
1,463.0	6.77	98.34	1,461.3	-1.1	42.6	1.6	0.87	0.66	
1,558.0	6.55	98.08	1,555.6	-2.6	53.5	0.6	0.23	-0.23	
1,653.0	5.85	95.18	1,650.1	-3.8	63.7	0.1	0.81	-0.74	
1,712.0	5.42	97.03	1,708.8	-4.4	69.5	-0.2	0.79	-0.73	
1,871.0	5.76	107.01	1,867.0	-7.7	84.6	-2.5	0.65	0.21	
1,962.0	6.85	113.67	1,957.5	-11.2	93.9	-5.4	1.44	1.20	
2,053.0	8.03	104.39	2,047.7	-15.0	105.0	-8.5	1.85	1.30	
2,145.0	7.61	102.80	2,138.9	-17.9	117.2	-10.7	0.51	-0.46	
2,237.0	8.86	102.23	2,229.9	-20.8	130.1	-12.8	1.36	1.36	
2,328.0	7.83	97.81	2,320.0	-23.1	143.1	-14.3	1.33	-1.13	
2,419.0	8.43	106.52	2,410.0	-25.8	155.6	-16.3	1.50	0.66	
2,510.0	7.81	104.44	2,500.1	-29.3	168.0	-19.0	0.75	-0.68	
2,601.0	9.50	114.08	2,590.1	-33.9	180.8	-22.8	2.44	1.86	
2,693.0	9.06	113.97	2,680.9	-39.9	194.4	-28.0	0.48	-0.48	
2,784.0	8.78	109.98	2,770.8	-45.2	207.4	-32.4	0.75	-0.31	
2,875.0	8.86	108.98	2,860.7	-49.8	220.6	-36.3	0.19	0.09	
2,966.0	8.85	102.04	2,950.6	-53.6	234.1	-39.2	1.17	-0.01	
3,058.0	7.94	99.06	3,041.6	-56.1	247.3	-40.9	1.10	-0.99	
3,149.0	6.73	100.01	3,131.9	-58.0	258.7	-42.1	1.34	-1.33	
3,240.0	7.86	103.22	3,222.2	-60.3	270.0	-43.7	1.32	1.24	
3,331.0	9.64	103.21	3,312.1	-63.5	283.5	-46.1	1.96	1.96	
3,422.0	9.48	105.55	3,401.8	-67.2	298.1	-48.9	0.46	-0.18	
3,513.0	9.23	100.69	3,491.6	-70.6	312.5	-51.4	0.91	-0.27	
3,605.0	9.41	95.45	3,582.4	-72.7	327.3	-52.6	0.94	0.20	
3,695.0	9.61	94.16	3,671.2	-73.9	342.1	-52.9	0.32	0.22	
3,786.0	8.06	98.56	3,761.1	-75.4	356.0	-53.6	1.86	-1.70	
3,877.0	7.10	94.27	3,851.3	-76.8	367.9	-54.2	1.22	-1.05	
3,968.0	5.71	98.57	3,941.7	-77.9	378.0	-54.7	1.61	-1.53	
4,060.0	6.54	113.25	4,033.2	-80.6	387.3	-56.9	1.92	0.90	
4,151.0	7.86	121.12	4,123.5	-85.9	397.4	-61.5	1.81	1.45	
4,243.0	8.90	126.32	4,214.5	-93.4	408.5	-68.3	1.40	1.13	
4,334.0	7.74	122.23	4,304.6	-100.8	419.4	-75.0	1.43	-1.27	
4,425.0	8.50	124.45	4,394.6	-107.9	430.1	-81.4	0.90	0.84	
4,517.0	7.32	123.04	4,485.8	-114.9	440.6	-87.8	1.30	-1.28	
4,609.0	5.25	130.69	4,577.2	-120.9	448.7	-93.2	2.42	-2.25	
4,701.0	5.25	124.79	4,668.8	-126.0	455.4	-98.0	0.59	0.00	
4,792.0	4.08	115.35	4,759.5	-129.8	461.7	-101.3	1.53	-1.29	
4,883.0	3.19	104.40	4,850.3	-131.8	467.1	-103.0	1.24	-0.98	
4,974.0	2.14	109.04	4,941.2	-133.0	471.2	-104.0	1.18	-1.15	
5,065.0	1.32	108.18	5,032.2	-133.9	473.8	-104.7	0.90	-0.90	
5,157.0	1.22	76.51	5,124.2	-134.0	475.7	-104.7	0.76	-0.11	
5,249.0	0.80	101.77	5,216.2	-133.9	477.3	-104.5	0.65	-0.46	
5,339.0	4.75	23.20	5,306.0	-130.6	479.4	-101.1	5.18	4.39	
5,431.0	11.16	16.11	5,397.1	-118.5	483.4	-88.8	7.04	6.97	
5,523.0	17.12	14.16	5,486.3	-96.8	489.2	-66.7	6.50	6.48	
5,614.0	23.92	15.12	5,571.5	-66.0	497.3	-35.5	7.48	7.47	
5,706.0	28.41	23.50	5,654.0	-27.8	510.9	3.4	6.31	4.88	
5,797.0	37.81	22.84	5,730.2	17.8	530.4	50.2	10.34	10.33	
5,891.0	48.03	17.32	5,799.0	77.9	552.0	111.5	11.58	10.87	
5,936.0	55.67	12.88	5,826.7	112.1	561.2	146.1	18.66	16.98	
5,986.0	65.22	9.08	5,851.4	154.7	569.4	189.2	20.21	19.10	

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6,026.0	73.03	7.16	5,865.6	191.7	574.6	226.4	20.03	19.53	
6,081.0	83.89	4.95	5,876.6	245.2	580.3	280.1	20.13	19.75	
6,203.0	89.77	0.15	5,883.4	366.8	585.7	401.9	6.22	4.82	
6,298.0	92.81	359.09	5,881.2	461.7	585.0	496.6	3.39	3.20	
6,392.0	93.25	358.75	5,876.3	555.6	583.3	590.2	0.59	0.47	
6,487.0	91.74	357.40	5,872.1	650.4	580.1	684.6	2.13	-1.59	
6,582.0	92.87	357.39	5,868.3	745.3	575.8	779.0	1.19	1.19	
6,677.0	91.24	356.61	5,864.9	840.1	570.8	873.4	1.90	-1.72	
6,772.0	90.75	356.17	5,863.2	934.9	564.8	967.6	0.69	-0.52	
6,867.0	89.27	356.94	5,863.2	1,029.7	559.1	1,061.9	1.76	-1.56	
6,962.0	90.23	356.57	5,863.6	1,124.5	553.7	1,156.2	1.08	1.01	
7,057.0	91.43	356.89	5,862.3	1,219.4	548.3	1,250.6	1.31	1.26	
7,151.0	89.27	357.44	5,861.7	1,313.2	543.7	1,344.0	2.37	-2.30	
7,246.0	90.67	357.01	5,861.7	1,408.1	539.1	1,438.4	1.54	1.47	
7,341.0	87.85	355.08	5,863.0	1,502.9	532.5	1,532.6	3.60	-2.97	
7,436.0	88.49	355.04	5,866.0	1,597.5	524.3	1,626.5	0.67	0.67	
7,530.0	88.67	354.87	5,868.3	1,691.1	516.1	1,719.4	0.26	0.19	
7,625.0	87.72	357.32	5,871.3	1,785.8	509.6	1,813.6	2.76	-1.00	
7,720.0	91.71	358.99	5,871.8	1,880.7	506.6	1,908.2	4.55	4.20	
7,815.0	92.08	358.97	5,868.6	1,975.7	504.9	2,002.8	0.39	0.39	
7,910.0	90.47	0.04	5,866.5	2,070.6	504.0	2,097.6	2.03	-1.69	
8,005.0	90.27	358.85	5,865.9	2,165.6	503.1	2,192.3	1.27	-0.21	
8,100.0	89.47	2.73	5,866.1	2,260.6	504.4	2,287.2	4.17	-0.84	
8,194.0	90.08	3.22	5,866.5	2,354.5	509.3	2,381.2	0.83	0.65	
8,289.0	89.79	2.63	5,866.6	2,449.4	514.2	2,476.2	0.69	-0.31	
8,384.0	89.74	3.07	5,867.0	2,544.2	518.9	2,571.2	0.47	-0.05	
8,479.0	90.27	0.89	5,867.0	2,639.2	522.2	2,666.1	2.36	0.56	
8,574.0	90.45	0.23	5,866.4	2,734.2	523.1	2,761.0	0.72	0.19	
8,669.0	90.49	359.47	5,865.6	2,829.2	522.8	2,855.8	0.80	0.04	
8,762.0	91.22	358.69	5,864.2	2,922.1	521.4	2,948.5	1.15	0.78	
8,855.0	89.11	0.08	5,864.0	3,015.1	520.4	3,041.3	2.72	-2.27	
8,947.0	89.59	359.46	5,865.0	3,107.1	520.0	3,133.1	0.85	0.52	
9,039.0	89.90	359.04	5,865.4	3,199.1	518.8	3,224.8	0.57	0.34	
9,130.0	87.81	358.86	5,867.2	3,290.1	517.1	3,315.5	2.31	-2.30	
9,221.0	87.47	357.46	5,871.0	3,380.9	514.2	3,406.0	1.58	-0.37	
9,314.0	89.60	359.76	5,873.4	3,473.9	511.9	3,498.6	3.37	2.29	
9,405.0	89.30	359.43	5,874.2	3,564.9	511.3	3,589.4	0.49	-0.33	
9,497.0	89.71	0.03	5,875.0	3,656.9	510.9	3,681.2	0.79	0.45	
9,588.0	89.35	358.99	5,875.8	3,747.9	510.1	3,772.0	1.21	-0.40	
9,680.0	89.33	358.84	5,876.8	3,839.8	508.3	3,863.7	0.16	-0.02	
9,771.0	89.79	358.87	5,877.5	3,930.8	506.5	3,954.4	0.51	0.51	
9,863.0	89.61	358.35	5,878.0	4,022.8	504.3	4,046.1	0.60	-0.20	
9,954.0	89.80	0.79	5,878.5	4,113.8	503.6	4,136.8	2.69	0.21	
10,044.0	89.82	0.24	5,878.8	4,203.8	504.4	4,226.7	0.61	0.02	
10,136.0	89.76	0.03	5,879.1	4,295.8	504.6	4,318.6	0.24	-0.07	
10,227.0	90.40	0.57	5,879.0	4,386.8	505.1	4,409.4	0.92	0.70	
10,318.0	90.05	359.71	5,878.6	4,477.8	505.3	4,500.3	1.02	-0.38	
10,410.0	89.65	359.06	5,878.9	4,569.8	504.4	4,592.0	0.83	-0.43	
10,501.0	90.34	358.91	5,878.9	4,660.7	502.7	4,682.7	0.78	0.76	
10,592.0	89.25	357.48	5,879.2	4,751.7	499.9	4,773.3	1.98	-1.20	
10,684.0	88.86	355.28	5,880.7	4,843.5	494.1	4,864.6	2.43	-0.42	
10,775.0	89.24	357.56	5,882.2	4,934.3	488.4	4,954.9	2.54	0.42	
10,865.0	89.49	358.56	5,883.2	5,024.2	485.3	5,044.5	1.15	0.28	

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10,957.0	89.64	1.01	5,883.9	5,116.2	485.0	5,136.3	2.67	0.16	
11,048.0	89.67	0.18	5,884.5	5,207.2	485.9	5,227.2	0.91	0.03	
11,139.0	90.80	3.60	5,884.1	5,298.1	488.9	5,318.1	3.96	1.24	
11,230.0	90.15	1.65	5,883.4	5,389.0	493.1	5,409.1	2.26	-0.71	
11,321.0	90.46	1.36	5,882.9	5,480.0	495.5	5,500.0	0.47	0.34	
11,412.0	90.99	1.50	5,881.7	5,571.0	497.8	5,591.0	0.60	0.58	
11,503.0	87.72	1.55	5,882.7	5,661.9	500.2	5,681.9	3.59	-3.59	
11,594.0	89.21	1.91	5,885.2	5,752.8	502.9	5,772.8	1.68	1.64	
11,686.0	88.85	1.26	5,886.7	5,844.8	505.5	5,864.8	0.81	-0.39	
11,777.0	88.38	0.43	5,888.9	5,935.8	506.8	5,955.6	1.05	-0.52	
11,868.0	87.27	359.30	5,892.4	6,026.7	506.6	6,046.4	1.74	-1.22	
11,960.0	87.51	1.53	5,896.6	6,118.6	507.3	6,138.1	2.44	0.26	
12,051.0	86.66	1.43	5,901.2	6,209.4	509.6	6,229.0	0.94	-0.93	
12,143.0	88.64	1.86	5,905.0	6,301.3	512.3	6,320.8	2.20	2.15	
12,235.0	91.39	2.70	5,905.0	6,393.2	515.9	6,412.8	3.13	2.99	
12,327.0	91.30	2.02	5,902.8	6,485.1	519.7	6,504.8	0.75	-0.10	
12,418.0	91.73	1.39	5,900.4	6,576.1	522.4	6,595.7	0.84	0.47	
12,509.0	92.04	0.64	5,897.4	6,667.0	524.0	6,686.5	0.89	0.34	
12,600.0	92.75	0.32	5,893.6	6,757.9	524.8	6,777.3	0.86	0.78	
12,691.0	91.34	0.15	5,890.3	6,848.8	525.2	6,868.1	1.56	-1.55	
12,783.0	89.82	358.86	5,889.4	6,940.8	524.4	6,959.9	2.17	-1.65	
12,874.0	90.93	359.41	5,888.8	7,031.8	523.0	7,050.6	1.36	1.22	
12,965.0	87.59	358.04	5,890.0	7,122.8	521.0	7,141.3	3.97	-3.67	
13,058.0	87.62	357.13	5,893.9	7,215.6	517.0	7,233.7	0.98	0.03	
13,148.0	87.44	359.89	5,897.8	7,305.5	514.7	7,323.3	3.07	-0.20	
13,240.0	90.10	0.88	5,899.7	7,397.5	515.3	7,415.1	3.08	2.89	
13,335.0	90.36	359.69	5,899.4	7,492.5	515.8	7,510.0	1.28	0.27	
13,430.0	89.27	0.38	5,899.7	7,587.4	515.9	7,604.8	1.36	-1.15	
13,524.0	89.64	359.70	5,900.6	7,681.4	515.9	7,698.6	0.82	0.39	
13,619.0	88.70	1.01	5,901.9	7,776.4	516.5	7,793.5	1.70	-0.99	
13,714.0	88.91	0.24	5,903.9	7,871.4	517.6	7,888.3	0.84	0.22	
13,809.0	89.10	359.52	5,905.6	7,966.4	517.4	7,983.1	0.78	0.20	
13,904.0	90.00	359.43	5,906.3	8,061.4	516.5	8,077.9	0.95	0.95	
13,998.0	90.38	358.61	5,906.0	8,155.4	514.9	8,171.6	0.96	0.40	
14,120.0	89.53	354.73	5,906.1	8,277.2	507.8	8,292.7	3.25	-0.70	Last CES Survey @ 14,120' MD
14,175.0	89.53	354.73	5,906.5	8,331.9	502.7	8,347.0	0.00	0.00	PTB @ 14,175' - TD - 2612' FSL, 1480' FEL

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
21B-0912B TGT P2 - actual wellpath misses target center by 109.3usft at 13622.4usft MD (5902.0 TVD, 7779.8 N, 516.6 E) - Point	0.00	1.06	6,011.0	7,777.7	508.8	1,557,228.84	3,451,843.94	40.851547	-103.866669
21B-0912B BHL P2 - actual wellpath misses target center by 104.9usft at 14120.0usft MD (5906.1 TVD, 8277.2 N, 507.8 E) - Point	0.00	1.06	6,011.0	8,277.5	506.3	1,557,728.59	3,451,832.24	40.852919	-103.866678
21B-0912B TGT - actual wellpath misses target center by 24.7usft at 13619.6usft MD (5901.9 TVD, 7777.1 N, 516.5 E) - Point	0.00	1.06	5,878.5	7,777.7	508.8	1,557,228.84	3,451,843.94	40.851547	-103.866669
21B-0912B BHL - actual wellpath misses target center by 27.6usft at 14120.0usft MD (5906.1 TVD, 8277.2 N, 507.8 E) - Point	0.00	1.06	5,878.5	8,277.5	506.3	1,557,728.59	3,451,832.24	40.852919	-103.866678
21B-0912B VP P3 - actual wellpath misses target center by 44.8usft at 5223.5usft MD (5190.6 TVD, -133.8 N, 476.9 E) - Point	0.00	1.06	5,190.1	-100.0	506.3	1,549,352.48	3,451,986.37	40.829925	-103.866679
21B-0912B BHL P4 - actual wellpath misses target center by 50.1usft at 14120.0usft MD (5906.1 TVD, 8277.2 N, 507.8 E) - Point	0.00	1.06	5,856.0	8,277.5	506.3	1,557,728.59	3,451,832.24	40.852919	-103.866678
21B-0912B VP P4 - actual wellpath misses target center by 46.9usft at 5068.6usft MD (5035.8 TVD, -133.9 N, 473.8 E) - Point	0.00	1.06	5,035.1	-100.0	506.3	1,549,352.48	3,451,986.37	40.829925	-103.866679

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,135.0	5,881.1	7" - 42' FNL, 1475' FEL	0	0

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,120.0	5,906.1	8,277.2	507.8	Last CES Survey @ 14,120' MD
14,175.0	5,906.5	8,331.9	502.7	PTB @ 14,175'
14,175.0	5,906.5	8,331.9	502.7	TD - 2612' FSL, 1480' FEL

Checked By: _____ Approved By: _____ Date: _____

Whiting Petroleum Corporation

Weld County, CO

S21-T10N-R58W

Razor #21B-0912B

HZ

Design: FINAL

Survey Report - Geographic

22 October, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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	S21-T10N-R58W				
Site Position:		Northing:	1,549,389.39 usft	Latitude:	40.830125
From:	Lat/Long	Easting:	3,450,038.36 usft	Longitude:	-103.873714
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.05 °

Well	Razor #21B-0912B					
Well Position	+N-S	0.0 usft	Northing:	1,549,443.15 usft	Latitude:	40.830200
	+E-W	0.0 usft	Easting:	3,451,478.34 usft	Longitude:	-103.868508
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,837.3 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/14/2014	7.96	67.42	53,102

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	3.50	

Survey Program	Date	10/22/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
152.0	14,175.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	1,549,443.15	3,451,478.34	40.830200	-103.868508
152.0	0.40	227.51	152.0	-0.4	-0.4	1,549,442.79	3,451,477.96	40.830199	-103.868510
246.0	0.56	212.03	246.0	-1.0	-0.9	1,549,442.17	3,451,477.48	40.830197	-103.868511
338.0	0.74	235.32	338.0	-1.7	-1.6	1,549,441.43	3,451,476.77	40.830195	-103.868514
429.0	0.66	237.98	429.0	-2.3	-2.5	1,549,440.80	3,451,475.85	40.830194	-103.868517
520.0	0.99	67.99	520.0	-2.3	-2.2	1,549,440.83	3,451,476.14	40.830194	-103.868516
611.0	1.14	72.91	611.0	-1.7	-0.7	1,549,441.42	3,451,477.72	40.830195	-103.868511
704.0	1.12	76.89	703.9	-1.2	1.1	1,549,441.93	3,451,479.48	40.830197	-103.868504
799.0	1.18	74.99	798.9	-0.8	3.0	1,549,442.42	3,451,481.32	40.830198	-103.868498
894.0	0.85	82.34	893.9	-0.4	4.6	1,549,442.80	3,451,482.96	40.830199	-103.868492
989.0	0.73	70.98	988.9	-0.1	5.9	1,549,443.12	3,451,484.22	40.830200	-103.868487
1,083.0	3.18	91.01	1,082.8	0.0	9.1	1,549,443.32	3,451,487.39	40.830200	-103.868476

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,178.0	4.17	88.78	1,177.6	0.0	15.1	1,549,443.46	3,451,493.48	40.830200	-103.868454
1,273.0	5.05	87.99	1,272.3	0.3	22.8	1,549,443.82	3,451,501.11	40.830201	-103.868426
1,368.0	6.14	93.60	1,366.9	0.1	32.0	1,549,443.82	3,451,510.36	40.830200	-103.868393
1,463.0	6.77	98.34	1,461.3	-1.1	42.6	1,549,442.89	3,451,520.99	40.830197	-103.868354
1,558.0	6.55	98.08	1,555.6	-2.6	53.5	1,549,441.51	3,451,531.92	40.830193	-103.868315
1,653.0	5.85	95.18	1,650.1	-3.8	63.7	1,549,440.50	3,451,542.13	40.830190	-103.868278
1,712.0	5.42	97.03	1,708.8	-4.4	69.5	1,549,440.00	3,451,547.90	40.830188	-103.868257
1,871.0	5.76	107.01	1,867.0	-7.7	84.6	1,549,437.02	3,451,563.04	40.830179	-103.868203
1,962.0	6.85	113.67	1,957.5	-11.2	93.9	1,549,433.68	3,451,572.44	40.830169	-103.868169
2,053.0	8.03	104.39	2,047.7	-15.0	105.0	1,549,430.12	3,451,583.63	40.830159	-103.868129
2,145.0	7.61	102.80	2,138.9	-17.9	117.2	1,549,427.40	3,451,595.85	40.830151	-103.868085
2,237.0	8.86	102.23	2,229.9	-20.8	130.1	1,549,424.79	3,451,608.77	40.830143	-103.868038
2,328.0	7.83	97.81	2,320.0	-23.1	143.1	1,549,422.70	3,451,621.80	40.830137	-103.867991
2,419.0	8.43	106.52	2,410.0	-25.8	155.6	1,549,420.19	3,451,634.38	40.830129	-103.867946
2,510.0	7.81	104.44	2,500.1	-29.3	168.0	1,549,416.98	3,451,646.83	40.830120	-103.867901
2,601.0	9.50	114.08	2,590.1	-33.9	180.8	1,549,412.61	3,451,659.75	40.830107	-103.867855
2,693.0	9.06	113.97	2,680.9	-39.9	194.4	1,549,406.82	3,451,673.41	40.830090	-103.867806
2,784.0	8.78	109.98	2,770.8	-45.2	207.4	1,549,401.78	3,451,686.58	40.830076	-103.867759
2,875.0	8.86	108.98	2,860.7	-49.8	220.6	1,549,397.37	3,451,699.82	40.830063	-103.867711
2,966.0	8.85	102.04	2,950.6	-53.6	234.1	1,549,393.88	3,451,713.36	40.830053	-103.867662
3,058.0	7.94	99.06	3,041.6	-56.1	247.3	1,549,391.65	3,451,726.60	40.830046	-103.867615
3,149.0	6.73	100.01	3,131.9	-58.0	258.7	1,549,389.94	3,451,738.09	40.830041	-103.867573
3,240.0	7.86	103.22	3,222.2	-60.3	270.0	1,549,387.80	3,451,749.44	40.830034	-103.867533
3,331.0	9.64	103.21	3,312.1	-63.5	283.5	1,549,384.88	3,451,762.97	40.830026	-103.867484
3,422.0	9.48	105.55	3,401.8	-67.2	298.1	1,549,381.40	3,451,777.68	40.830015	-103.867431
3,513.0	9.23	100.69	3,491.6	-70.6	312.5	1,549,378.31	3,451,792.13	40.830006	-103.867379
3,605.0	9.41	95.45	3,582.4	-72.7	327.3	1,549,376.49	3,451,806.90	40.830001	-103.867326
3,695.0	9.61	94.16	3,671.2	-73.9	342.1	1,549,375.52	3,451,821.74	40.829997	-103.867272
3,786.0	8.06	98.56	3,761.1	-75.4	356.0	1,549,374.28	3,451,835.65	40.829993	-103.867222
3,877.0	7.10	94.27	3,851.3	-76.8	367.9	1,549,373.13	3,451,847.59	40.829989	-103.867179
3,968.0	5.71	98.57	3,941.7	-77.9	378.0	1,549,372.22	3,451,857.69	40.829986	-103.867142
4,060.0	6.54	113.25	4,033.2	-80.6	387.3	1,549,369.64	3,451,867.08	40.829979	-103.867109
4,151.0	7.86	121.12	4,123.5	-85.9	397.4	1,549,364.57	3,451,877.27	40.829964	-103.867072
4,243.0	8.90	126.32	4,214.5	-93.4	408.5	1,549,357.31	3,451,888.52	40.829944	-103.867032
4,334.0	7.74	122.23	4,304.6	-100.8	419.4	1,549,350.07	3,451,899.51	40.829923	-103.866993
4,425.0	8.50	124.45	4,394.6	-107.9	430.1	1,549,343.20	3,451,910.37	40.829904	-103.866954
4,517.0	7.32	123.04	4,485.8	-114.9	440.6	1,549,336.35	3,451,921.02	40.829885	-103.866916
4,609.0	5.25	130.69	4,577.2	-120.9	448.7	1,549,330.56	3,451,929.23	40.829868	-103.866887
4,701.0	5.25	124.79	4,668.8	-126.0	455.4	1,549,325.54	3,451,935.97	40.829854	-103.866863
4,792.0	4.08	115.35	4,759.5	-129.8	461.7	1,549,321.89	3,451,942.39	40.829844	-103.866840
4,883.0	3.19	104.40	4,850.3	-131.8	467.1	1,549,319.98	3,451,947.80	40.829838	-103.866820
4,974.0	2.14	109.04	4,941.2	-133.0	471.2	1,549,318.87	3,451,951.88	40.829835	-103.866806
5,065.0	1.32	108.18	5,032.2	-133.9	473.8	1,549,318.03	3,451,954.50	40.829833	-103.866796
5,157.0	1.22	76.51	5,124.2	-134.0	475.7	1,549,317.97	3,451,956.46	40.829832	-103.866789
5,249.0	0.80	101.77	5,216.2	-133.9	477.3	1,549,318.09	3,451,958.04	40.829833	-103.866784
5,339.0	4.75	23.20	5,306.0	-130.6	479.4	1,549,321.43	3,451,960.06	40.829842	-103.866776
5,431.0	11.16	16.11	5,397.1	-118.5	483.4	1,549,333.57	3,451,963.81	40.829875	-103.866762
5,523.0	17.12	14.16	5,486.3	-96.8	489.2	1,549,355.38	3,451,969.20	40.829934	-103.866741
5,614.0	23.92	15.12	5,571.5	-66.0	497.3	1,549,386.35	3,451,976.73	40.830019	-103.866711
5,706.0	28.41	23.50	5,654.0	-27.8	510.9	1,549,424.70	3,451,989.63	40.830124	-103.866662
5,797.0	37.81	22.84	5,730.2	17.8	530.4	1,549,470.72	3,452,008.29	40.830249	-103.866592
5,891.0	48.03	17.32	5,799.0	77.9	552.0	1,549,531.20	3,452,028.83	40.830414	-103.866514
5,936.0	55.67	12.88	5,826.7	112.1	561.2	1,549,565.51	3,452,037.34	40.830508	-103.866481
5,986.0	65.22	9.08	5,851.4	154.7	569.4	1,549,608.30	3,452,044.76	40.830625	-103.866451
6,026.0	73.03	7.16	5,865.6	191.7	574.6	1,549,645.36	3,452,049.34	40.830726	-103.866432

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,081.0	83.89	4.95	5,876.6	245.2	580.3	1,549,698.96	3,452,054.01	40.830873	-103.866411
6,203.0	89.77	0.15	5,883.4	366.8	585.7	1,549,820.65	3,452,057.17	40.831207	-103.866392
6,298.0	92.81	359.09	5,881.2	461.7	585.0	1,549,915.58	3,452,054.80	40.831467	-103.866394
6,392.0	93.25	358.75	5,876.2	555.6	583.3	1,550,009.38	3,452,051.30	40.831725	-103.866401
6,487.0	91.74	357.40	5,872.1	650.4	580.1	1,550,104.16	3,452,046.37	40.831985	-103.866412
6,582.0	92.87	357.39	5,868.3	745.3	575.8	1,550,198.89	3,452,040.31	40.832246	-103.866428
6,677.0	91.24	356.61	5,864.9	840.1	570.8	1,550,293.58	3,452,033.60	40.832506	-103.866446
6,772.0	90.75	356.17	5,863.2	934.9	564.8	1,550,388.25	3,452,025.87	40.832766	-103.866467
6,867.0	89.27	356.94	5,863.2	1,029.7	559.1	1,550,482.96	3,452,018.42	40.833026	-103.866488
6,962.0	90.23	356.57	5,863.6	1,124.5	553.7	1,550,577.69	3,452,011.30	40.833287	-103.866507
7,057.0	91.43	356.89	5,862.3	1,219.4	548.3	1,550,672.41	3,452,004.14	40.833547	-103.866527
7,151.0	89.27	357.44	5,861.7	1,313.2	543.7	1,550,766.18	3,451,997.76	40.833804	-103.866544
7,246.0	90.67	357.01	5,861.7	1,408.1	539.1	1,550,860.97	3,451,991.42	40.834065	-103.866560
7,341.0	87.85	355.08	5,863.0	1,502.9	532.5	1,550,955.58	3,451,983.13	40.834325	-103.866584
7,436.0	88.49	355.04	5,866.0	1,597.5	524.3	1,551,050.01	3,451,973.21	40.834585	-103.866613
7,530.0	88.67	354.87	5,868.3	1,691.1	516.1	1,551,143.45	3,451,963.23	40.834842	-103.866643
7,625.0	87.72	357.32	5,871.3	1,785.8	509.6	1,551,238.04	3,451,955.02	40.835102	-103.866667
7,720.0	91.71	358.99	5,871.8	1,880.7	506.6	1,551,332.90	3,451,950.21	40.835362	-103.866678
7,815.0	92.08	358.97	5,868.6	1,975.7	504.9	1,551,427.78	3,451,946.78	40.835623	-103.866684
7,910.0	90.47	0.04	5,866.5	2,070.6	504.0	1,551,522.72	3,451,944.21	40.835883	-103.866687
8,005.0	90.27	358.85	5,865.9	2,165.6	503.1	1,551,617.68	3,451,941.54	40.836144	-103.866690
8,100.0	89.47	2.73	5,866.1	2,260.6	504.4	1,551,712.66	3,451,941.11	40.836405	-103.866685
8,194.0	90.08	3.22	5,866.5	2,354.5	509.3	1,551,806.60	3,451,944.26	40.836662	-103.866668
8,289.0	89.79	2.63	5,866.6	2,449.4	514.2	1,551,901.55	3,451,947.36	40.836923	-103.866650
8,384.0	89.74	3.07	5,867.0	2,544.2	518.9	1,551,996.50	3,451,950.33	40.837183	-103.866633
8,479.0	90.27	0.89	5,867.0	2,639.2	522.2	1,552,091.48	3,451,951.87	40.837444	-103.866621
8,574.0	90.45	0.23	5,866.4	2,734.2	523.1	1,552,186.48	3,451,951.05	40.837704	-103.866618
8,669.0	90.49	359.47	5,865.6	2,829.2	522.8	1,552,281.45	3,451,949.05	40.837965	-103.866619
8,762.0	91.22	358.69	5,864.2	2,922.1	521.4	1,552,374.39	3,451,945.85	40.838220	-103.866624
8,855.0	89.11	0.08	5,864.0	3,015.1	520.4	1,552,467.34	3,451,943.14	40.838476	-103.866628
8,947.0	89.59	359.46	5,865.0	3,107.1	520.0	1,552,559.31	3,451,941.08	40.838728	-103.866629
9,039.0	89.90	359.04	5,865.4	3,199.1	518.8	1,552,651.26	3,451,938.18	40.838981	-103.866633
9,130.0	87.81	358.86	5,867.2	3,290.1	517.1	1,552,742.18	3,451,934.84	40.839230	-103.866639
9,221.0	87.47	357.46	5,871.0	3,380.9	514.2	1,552,832.98	3,451,930.25	40.839480	-103.866650
9,314.0	89.60	359.76	5,873.4	3,473.9	511.9	1,552,925.85	3,451,926.29	40.839735	-103.866658
9,405.0	89.30	359.43	5,874.2	3,564.9	511.3	1,553,016.82	3,451,923.97	40.839984	-103.866660
9,497.0	89.71	0.03	5,875.0	3,656.9	510.9	1,553,108.79	3,451,921.85	40.840237	-103.866662
9,588.0	89.35	358.99	5,875.8	3,747.9	510.1	1,553,199.75	3,451,919.39	40.840487	-103.866665
9,680.0	89.33	358.84	5,876.8	3,839.8	508.3	1,553,291.68	3,451,915.96	40.840739	-103.866671
9,771.0	89.79	358.87	5,877.5	3,930.8	506.5	1,553,382.61	3,451,912.47	40.840989	-103.866678
9,863.0	89.61	358.35	5,878.0	4,022.8	504.3	1,553,474.53	3,451,908.55	40.841241	-103.866686
9,954.0	89.80	0.79	5,878.5	4,113.8	503.6	1,553,565.49	3,451,906.19	40.841491	-103.866688
10,044.0	89.82	0.24	5,878.8	4,203.8	504.4	1,553,655.48	3,451,905.34	40.841738	-103.866685
10,136.0	89.76	0.03	5,879.1	4,295.8	504.6	1,553,747.47	3,451,903.87	40.841990	-103.866684
10,227.0	90.40	0.57	5,879.0	4,386.8	505.1	1,553,838.46	3,451,902.67	40.842240	-103.866683
10,318.0	90.05	359.71	5,878.6	4,477.8	505.3	1,553,929.45	3,451,901.22	40.842490	-103.866682
10,410.0	89.65	359.06	5,878.9	4,569.8	504.4	1,554,021.41	3,451,898.54	40.842742	-103.866685
10,501.0	90.34	358.91	5,878.9	4,660.7	502.7	1,554,112.35	3,451,895.25	40.842992	-103.866691
10,592.0	89.25	357.48	5,879.2	4,751.7	499.9	1,554,203.23	3,451,890.71	40.843242	-103.866702
10,684.0	88.86	355.28	5,880.7	4,843.5	494.1	1,554,294.91	3,451,883.22	40.843494	-103.866723
10,775.0	89.24	357.56	5,882.2	4,934.3	488.4	1,554,385.59	3,451,875.87	40.843743	-103.866743
10,865.0	89.49	358.56	5,883.2	5,024.2	485.3	1,554,475.46	3,451,871.17	40.843990	-103.866754
10,957.0	89.64	1.01	5,883.9	5,116.2	485.0	1,554,567.43	3,451,869.13	40.844242	-103.866755
11,048.0	89.67	0.18	5,884.5	5,207.2	485.9	1,554,658.42	3,451,868.40	40.844492	-103.866752
11,139.0	90.80	3.60	5,884.1	5,298.1	488.9	1,554,749.40	3,451,869.73	40.844742	-103.866741

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,230.0	90.15	1.65	5,883.4	5,389.0	493.1	1,554,840.35	3,451,872.22	40.844991	-103.866726
11,321.0	90.46	1.36	5,882.9	5,480.0	495.5	1,554,931.35	3,451,872.94	40.845241	-103.866717
11,412.0	90.99	1.50	5,881.7	5,571.0	497.8	1,555,022.34	3,451,873.53	40.845491	-103.866709
11,503.0	87.72	1.55	5,882.7	5,661.9	500.2	1,555,113.32	3,451,874.28	40.845740	-103.866700
11,594.0	89.21	1.91	5,885.2	5,752.8	502.9	1,555,204.28	3,451,875.35	40.845990	-103.866691
11,686.0	88.85	1.26	5,886.7	5,844.8	505.5	1,555,296.26	3,451,876.21	40.846242	-103.866681
11,777.0	88.38	0.43	5,888.9	5,935.8	506.8	1,555,387.23	3,451,875.87	40.846492	-103.866676
11,868.0	87.27	359.30	5,892.4	6,026.7	506.6	1,555,478.14	3,451,873.99	40.846741	-103.866677
11,960.0	87.51	1.53	5,896.6	6,118.6	507.3	1,555,570.03	3,451,872.96	40.846994	-103.866675
12,051.0	86.66	1.43	5,901.2	6,209.4	509.6	1,555,660.91	3,451,873.64	40.847243	-103.866666
12,143.0	88.64	1.86	5,905.0	6,301.3	512.3	1,555,752.83	3,451,874.59	40.847495	-103.866657
12,235.0	91.39	2.70	5,905.0	6,393.2	515.9	1,555,844.79	3,451,876.55	40.847747	-103.866644
12,327.0	91.30	2.02	5,902.8	6,485.1	519.7	1,555,936.74	3,451,878.65	40.848000	-103.866630
12,418.0	91.73	1.39	5,900.4	6,576.1	522.4	1,556,027.71	3,451,879.68	40.848249	-103.866620
12,509.0	92.04	0.64	5,897.4	6,667.0	524.0	1,556,118.66	3,451,879.62	40.848499	-103.866614
12,600.0	92.75	0.32	5,893.6	6,757.9	524.8	1,556,209.57	3,451,878.71	40.848748	-103.866611
12,691.0	91.34	0.15	5,890.3	6,848.8	525.2	1,556,300.50	3,451,877.41	40.848998	-103.866610
12,783.0	89.82	358.86	5,889.4	6,940.8	524.4	1,556,392.46	3,451,874.92	40.849250	-103.866613
12,874.0	90.93	359.41	5,888.8	7,031.8	523.0	1,556,483.40	3,451,871.88	40.849500	-103.866618
12,965.0	87.59	358.04	5,890.0	7,122.8	521.0	1,556,574.31	3,451,868.18	40.849750	-103.866625
13,058.0	87.62	357.13	5,893.9	7,215.6	517.0	1,556,667.05	3,451,862.56	40.850004	-103.866639
13,148.0	87.44	359.89	5,897.8	7,305.5	514.7	1,556,756.87	3,451,858.56	40.850251	-103.866648
13,240.0	90.10	0.88	5,899.7	7,397.5	515.3	1,556,848.83	3,451,857.49	40.850504	-103.866646
13,335.0	90.36	359.69	5,899.4	7,492.4	515.8	1,556,943.82	3,451,856.22	40.850764	-103.866644
13,430.0	89.27	0.38	5,899.7	7,587.4	515.9	1,557,038.81	3,451,854.53	40.851025	-103.866644
13,524.0	89.64	359.70	5,900.6	7,681.4	515.9	1,557,132.79	3,451,852.86	40.851283	-103.866643
13,619.0	88.70	1.01	5,901.9	7,776.4	516.5	1,557,227.77	3,451,851.70	40.851544	-103.866641
13,714.0	88.91	0.24	5,903.9	7,871.4	517.6	1,557,322.74	3,451,850.99	40.851804	-103.866638
13,809.0	89.10	359.52	5,905.6	7,966.4	517.4	1,557,417.71	3,451,849.05	40.852065	-103.866638
13,904.0	90.00	359.43	5,906.3	8,061.4	516.5	1,557,512.67	3,451,846.43	40.852326	-103.866641
13,998.0	90.38	358.61	5,906.0	8,155.4	514.9	1,557,606.60	3,451,843.09	40.852584	-103.866647
14,120.0	89.53	354.73	5,906.1	8,277.2	507.8	1,557,728.25	3,451,833.76	40.852918	-103.866673
Last CES Survey @ 14,120' MD									
14,175.0	89.53	354.73	5,906.5	8,331.9	502.7	1,557,782.89	3,451,827.71	40.853068	-103.866691
PTB @ 14,175' - TD - 2612' FSL, 1480' FEL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
21B-0912B VP P4	0.00	1.06	5,035.1	-100.0	506.3	1,549,352.49	3,451,986.37	40.829926	-103.866679
- hit/miss target									
- Shape									
- actual wellpath misses target center by 46.9usft at 5068.6usft MD (5035.8 TVD, -133.9 N, 473.8 E)									
- Point									
21B-0912B BHL P4	0.00	1.06	5,856.0	8,277.5	506.3	1,557,728.60	3,451,832.24	40.852919	-103.866678
- hit/miss target									
- Shape									
- actual wellpath misses target center by 50.1usft at 14120.0usft MD (5906.1 TVD, 8277.2 N, 507.8 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0912B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4854.3usft
Well:	Razor #21B-0912B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
6,135.0	5,881.1	7" - 42' FNL, 1475' FEL		0	0

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
14,120.0	5,906.1	8,277.2	507.8	Last CES Survey @ 14,120' MD	
14,175.0	5,906.5	8,331.9	502.7	PTB @ 14,175'	
14,175.0	5,906.5	8,331.9	502.7	TD - 2612' FSL, 1480' FEL	

Checked By: _____ Approved By: _____ Date: _____