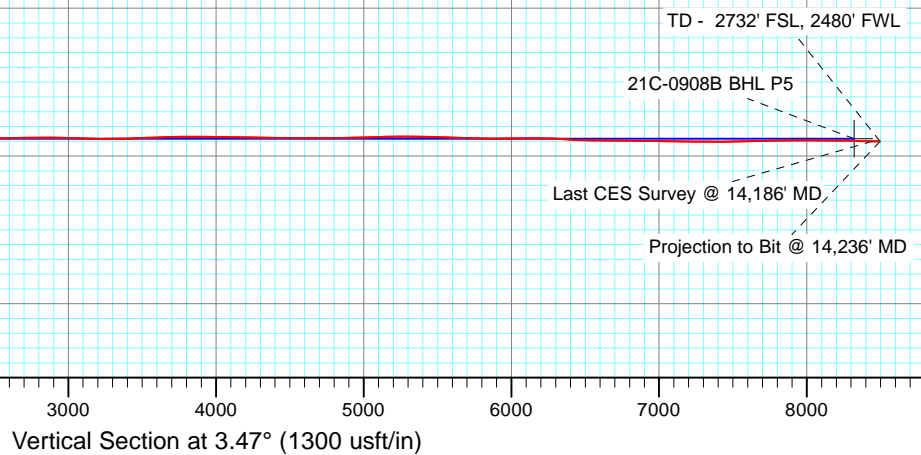
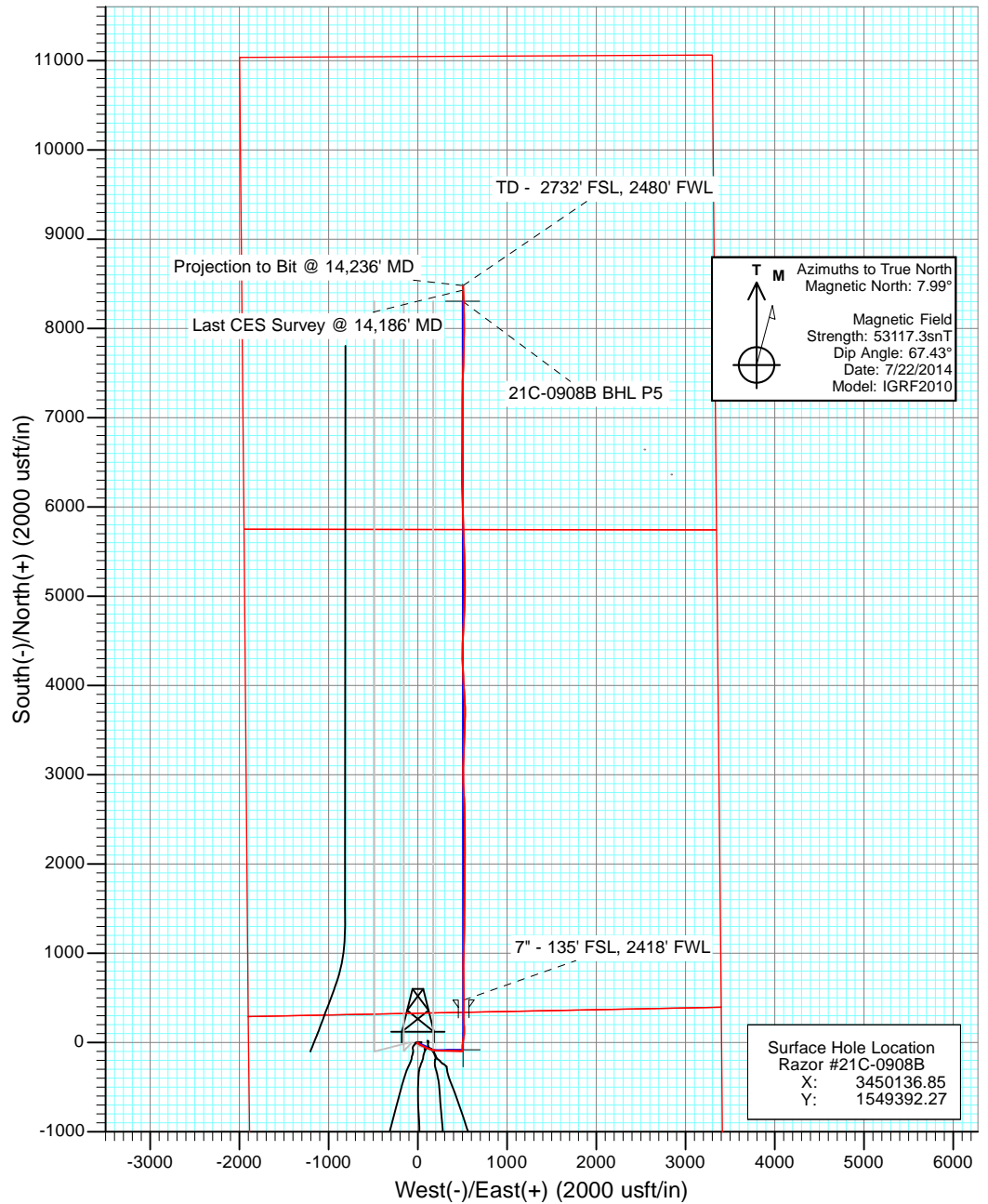
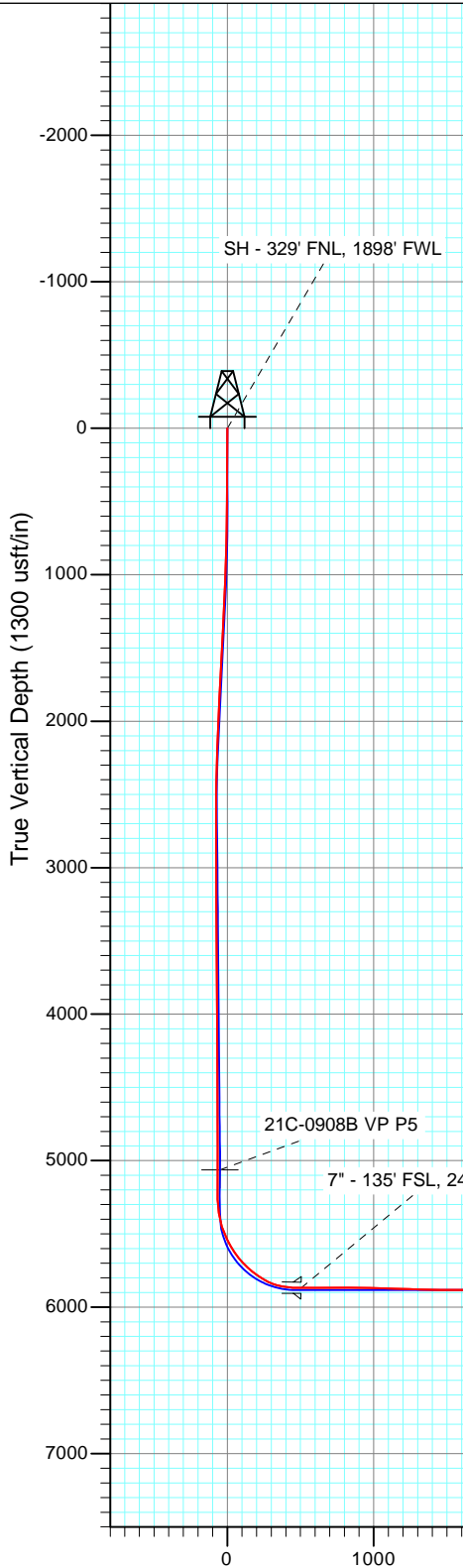
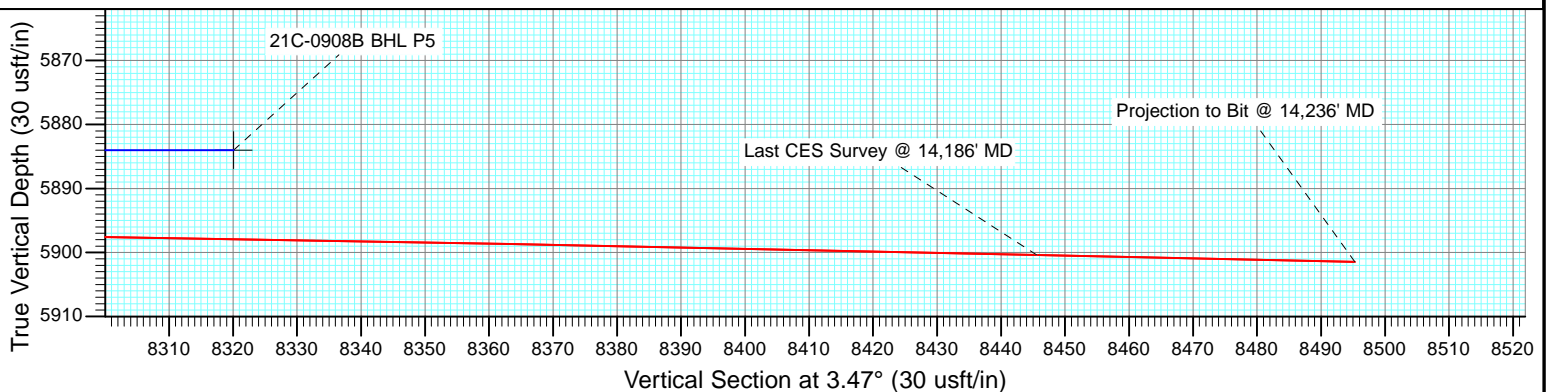
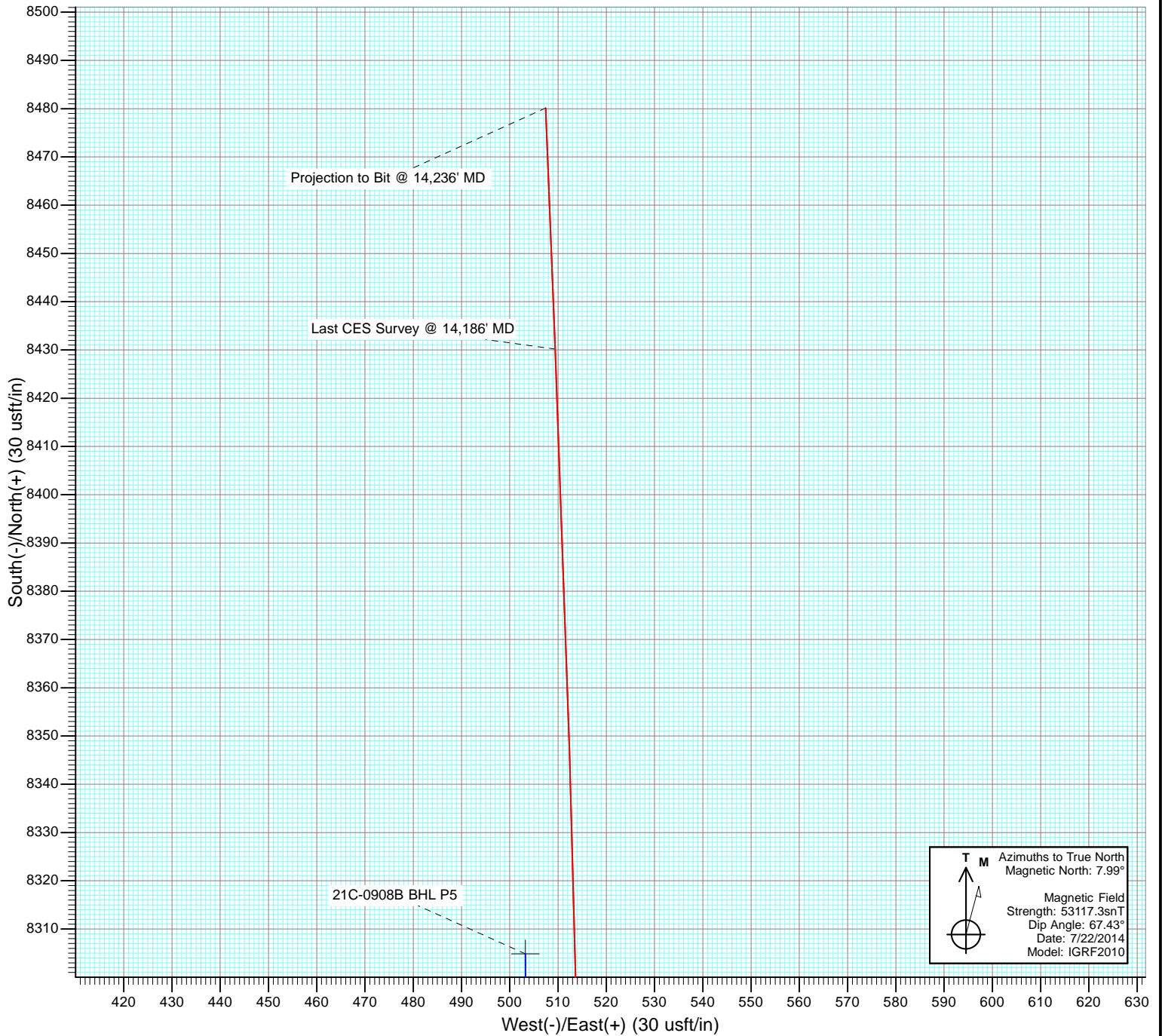


FINAL
 Razor #21C-0908B
 145251/23837; SC
 KB=17' @ 4861.0usft
 Ground Elevation @ 4844.0
 North American Datum 1983
 Well Razor #21C-0908B, True North





Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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 #21C-0908B				
Well Position	+N/-S	0.0 usft	Northing:	1,549,392.27 usft	Latitude:	40.830128
	+E/-W	0.0 usft	Easting:	3,450,136.85 usft	Longitude:	-103.873358
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,844.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/22/2014	7.99	67.43	53,117

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	3.47	

Survey Program	Date	9/9/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
507.0	14,236.0	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		
507.0	0.92	226.78	507.0	-2.8	-3.0	-3.0	0.18	0.18		
692.0	0.92	238.12	692.0	-4.6	-5.3	-4.9	0.10	0.00		
785.0	1.49	157.70	784.9	-6.1	-5.5	-6.4	1.74	0.61		
880.0	2.81	127.22	879.9	-8.7	-3.2	-8.8	1.79	1.39		
974.0	4.62	117.11	973.7	-11.8	2.0	-11.6	2.04	1.93		
1,066.0	6.15	116.54	1,065.3	-15.7	9.8	-15.0	1.66	1.66		
1,161.0	7.16	119.59	1,159.6	-20.9	19.5	-19.6	1.13	1.06		
1,256.0	7.65	118.89	1,253.8	-26.8	30.1	-25.0	0.52	0.52		
1,351.0	8.40	113.98	1,347.9	-32.7	42.0	-30.1	1.07	0.79		
1,446.0	8.18	112.73	1,441.9	-38.1	54.6	-34.8	0.30	-0.23		
1,678.0	5.76	120.45	1,672.2	-50.4	79.9	-45.5	1.12	-1.04		
1,800.0	4.92	126.19	1,793.6	-56.6	89.4	-51.1	0.82	-0.69		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,891.0	7.74	119.71	1,884.1	-62.0	97.8	-55.9	3.19	3.10	
1,983.0	9.85	107.49	1,975.0	-67.4	110.7	-60.6	3.05	2.29	
2,075.0	9.41	106.22	2,065.7	-71.9	125.4	-64.1	0.53	-0.48	
2,170.0	9.58	104.90	2,159.4	-76.1	140.5	-67.4	0.29	0.18	
2,264.0	9.01	105.17	2,252.2	-80.0	155.2	-70.5	0.61	-0.61	
2,359.0	8.00	101.85	2,346.1	-83.3	168.8	-72.9	1.18	-1.06	
2,454.0	7.21	101.60	2,440.3	-85.9	181.2	-74.7	0.83	-0.83	
2,549.0	6.90	100.54	2,534.6	-88.1	192.6	-76.3	0.35	-0.33	
2,644.0	9.10	93.78	2,628.6	-89.6	205.7	-77.0	2.51	2.32	
2,739.0	8.75	92.49	2,722.5	-90.5	220.4	-76.9	0.42	-0.37	
2,833.0	8.79	92.38	2,815.4	-91.1	234.8	-76.7	0.05	0.04	
2,928.0	8.66	91.14	2,909.3	-91.5	249.2	-76.3	0.24	-0.14	
3,023.0	8.18	89.79	3,003.3	-91.6	263.1	-75.5	0.55	-0.51	
3,118.0	6.90	88.86	3,097.4	-91.5	275.5	-74.6	1.35	-1.35	
3,213.0	6.29	93.38	3,191.8	-91.7	286.4	-74.2	0.84	-0.64	
3,307.0	5.93	91.49	3,285.3	-92.1	296.4	-74.0	0.44	-0.38	
3,402.0	8.26	94.16	3,379.5	-92.7	308.1	-73.9	2.48	2.45	
3,497.0	8.26	93.86	3,473.6	-93.7	321.8	-74.0	0.05	0.00	
3,592.0	8.44	92.17	3,567.6	-94.4	335.5	-73.9	0.32	0.19	
3,687.0	8.88	90.34	3,661.5	-94.7	349.8	-73.4	0.55	0.46	
3,782.0	8.75	88.81	3,755.4	-94.6	364.4	-72.4	0.28	-0.14	
3,876.0	7.03	82.35	3,848.5	-93.7	377.2	-70.7	2.06	-1.83	
3,971.0	7.69	91.67	3,942.7	-93.1	389.3	-69.4	1.43	0.69	
4,066.0	6.86	92.34	4,036.9	-93.5	401.4	-69.1	0.88	-0.87	
4,160.0	6.77	91.53	4,130.2	-93.9	412.5	-68.8	0.14	-0.10	
4,254.0	6.42	91.94	4,223.6	-94.2	423.3	-68.4	0.38	-0.37	
4,349.0	5.85	89.82	4,318.1	-94.4	433.5	-68.0	0.65	-0.60	
4,444.0	7.30	90.46	4,412.5	-94.4	444.3	-67.4	1.53	1.53	
4,539.0	6.73	90.76	4,506.7	-94.5	455.9	-66.8	0.60	-0.60	
4,634.0	5.63	92.25	4,601.2	-94.8	466.2	-66.4	1.17	-1.16	
4,728.0	4.70	94.58	4,694.8	-95.3	474.6	-66.4	1.01	-0.99	
4,823.0	3.91	97.73	4,789.5	-96.0	481.7	-66.7	0.87	-0.83	
4,918.0	3.56	96.85	4,884.3	-96.8	487.8	-67.1	0.37	-0.37	
5,013.0	2.73	97.00	4,979.2	-97.5	493.0	-67.4	0.87	-0.87	
5,108.0	1.89	81.43	5,074.1	-97.5	496.8	-67.2	1.10	-0.88	
5,203.0	1.54	70.21	5,169.1	-96.8	499.6	-66.4	0.51	-0.37	
5,298.0	0.70	64.39	5,264.1	-96.1	501.3	-65.6	0.89	-0.88	
5,392.0	7.91	2.24	5,357.7	-89.4	502.0	-58.9	8.09	7.67	
5,487.0	18.07	354.15	5,450.2	-68.2	500.8	-37.7	10.84	10.69	
5,582.0	27.34	4.35	5,537.8	-31.7	501.0	-1.3	10.57	9.76	
5,677.0	32.70	10.01	5,620.0	15.4	507.1	46.1	6.38	5.64	
5,772.0	42.02	7.94	5,695.4	72.3	515.9	103.4	9.90	9.81	
5,803.0	47.21	4.10	5,717.5	93.9	518.2	125.1	18.86	16.74	
5,835.0	50.20	0.89	5,738.6	117.9	519.2	149.1	12.00	9.34	
5,867.0	51.82	359.58	5,758.8	142.8	519.3	174.0	5.98	5.06	
5,898.0	53.36	357.19	5,777.6	167.4	518.6	198.5	7.88	4.97	
5,930.0	55.65	356.02	5,796.2	193.4	517.1	224.4	7.75	7.16	
5,962.0	60.31	356.87	5,813.1	220.5	515.4	251.3	14.74	14.56	
5,993.0	64.44	357.67	5,827.5	247.9	514.1	278.6	13.52	13.32	
6,025.0	68.97	359.07	5,840.2	277.3	513.3	307.8	14.72	14.16	
6,056.0	74.55	0.30	5,849.9	306.7	513.1	337.2	18.39	18.00	
6,088.0	79.43	0.96	5,857.1	337.9	513.5	368.3	15.38	15.25	
6,120.0	82.20	1.87	5,862.2	369.5	514.2	399.9	9.10	8.66	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
6,151.0	84.00	1.62	5,865.9	400.2	515.2	430.7	5.86	5.81	
6,175.0	86.81	0.58	5,867.8	424.1	515.6	454.6	12.48	11.71	
6,300.0	92.09	358.56	5,869.0	549.1	514.7	579.2	4.52	4.22	
6,395.0	90.68	359.35	5,866.7	644.0	513.0	673.9	1.70	-1.48	
6,490.0	89.41	359.63	5,866.6	739.0	512.1	768.7	1.37	-1.34	
6,585.0	89.45	359.47	5,867.6	834.0	511.4	863.4	0.17	0.04	
6,680.0	88.62	1.51	5,869.2	929.0	512.2	958.3	2.32	-0.87	
6,775.0	88.66	1.37	5,871.4	1,023.9	514.6	1,053.2	0.15	0.04	
6,870.0	88.40	1.25	5,873.9	1,118.9	516.7	1,148.1	0.30	-0.27	
6,965.0	88.09	1.10	5,876.8	1,213.8	518.7	1,243.0	0.36	-0.33	
7,060.0	87.60	0.98	5,880.4	1,308.7	520.4	1,337.8	0.53	-0.52	
7,155.0	90.02	0.90	5,882.3	1,403.7	522.0	1,432.7	2.55	2.55	
7,250.0	89.80	0.83	5,882.5	1,498.7	523.4	1,527.6	0.24	-0.23	
7,345.0	89.76	0.46	5,882.8	1,593.7	524.5	1,622.5	0.39	-0.04	
7,440.0	89.58	0.40	5,883.4	1,688.7	525.2	1,717.4	0.20	-0.19	
7,535.0	89.27	0.01	5,884.3	1,783.7	525.5	1,812.2	0.52	-0.33	
7,630.0	90.37	0.38	5,884.6	1,878.7	525.8	1,907.1	1.22	1.16	
7,725.0	90.07	0.25	5,884.3	1,973.7	526.4	2,001.9	0.34	-0.32	
7,820.0	90.20	0.23	5,884.1	2,068.7	526.8	2,096.8	0.14	0.14	
7,915.0	90.33	0.48	5,883.6	2,163.7	527.4	2,191.6	0.30	0.14	
8,010.0	89.85	0.02	5,883.5	2,258.7	527.8	2,286.5	0.70	-0.51	
8,105.0	91.16	359.52	5,882.6	2,353.7	527.4	2,381.3	1.48	1.38	
8,200.0	90.77	359.05	5,881.0	2,448.6	526.2	2,476.0	0.64	-0.41	
8,295.0	90.64	358.78	5,879.9	2,543.6	524.4	2,570.7	0.32	-0.14	
8,391.0	91.12	358.42	5,878.4	2,639.6	522.1	2,666.3	0.62	0.50	
8,486.0	91.08	357.70	5,876.6	2,734.5	518.8	2,760.9	0.76	-0.04	
8,581.0	89.45	358.30	5,876.1	2,829.4	515.5	2,855.5	1.83	-1.72	
8,676.0	88.92	357.67	5,877.5	2,924.4	512.2	2,950.0	0.87	-0.56	
8,768.0	88.57	357.51	5,879.5	3,016.3	508.3	3,041.5	0.42	-0.38	
8,860.0	87.43	1.74	5,882.7	3,108.2	507.7	3,133.2	4.76	-1.24	
8,953.0	90.20	3.30	5,884.6	3,201.1	511.8	3,226.2	3.42	2.98	
9,046.0	90.15	2.71	5,884.3	3,293.9	516.7	3,319.2	0.64	-0.05	
9,138.0	92.35	2.04	5,882.3	3,385.8	520.5	3,411.1	2.50	2.39	
9,230.0	92.09	1.75	5,878.8	3,477.7	523.5	3,503.0	0.42	-0.28	
9,322.0	91.96	1.41	5,875.5	3,569.6	526.1	3,594.9	0.40	-0.14	
9,414.0	92.04	1.07	5,872.3	3,661.5	528.1	3,686.8	0.38	0.09	
9,506.0	90.99	358.87	5,869.9	3,753.5	528.0	3,778.6	2.65	-1.14	
9,597.0	89.23	356.62	5,869.7	3,844.4	524.4	3,869.1	3.14	-1.93	
9,688.0	89.14	356.56	5,871.0	3,935.2	519.0	3,959.4	0.12	-0.10	
9,780.0	88.75	356.03	5,872.7	4,027.0	513.1	4,050.7	0.72	-0.42	
9,872.0	89.80	358.35	5,873.9	4,118.9	508.6	4,142.1	2.77	1.14	
9,963.0	89.76	357.93	5,874.2	4,209.9	505.6	4,232.8	0.46	-0.04	
10,054.0	89.14	357.33	5,875.1	4,300.8	501.8	4,323.3	0.95	-0.68	
10,145.0	87.96	1.00	5,877.4	4,391.7	500.5	4,413.9	4.24	-1.30	
10,236.0	89.63	2.41	5,879.3	4,482.6	503.2	4,504.9	2.40	1.84	
10,328.0	89.58	2.40	5,879.9	4,574.6	507.1	4,596.9	0.06	-0.05	
10,419.0	89.23	3.73	5,880.9	4,665.4	512.0	4,687.9	1.51	-0.38	
10,511.0	91.60	3.24	5,880.2	4,757.2	517.5	4,779.8	2.63	2.58	
10,603.0	91.21	3.13	5,877.9	4,849.1	522.7	4,871.8	0.44	-0.42	
10,695.0	91.69	0.87	5,875.6	4,941.0	525.9	4,963.7	2.51	0.52	
10,786.0	92.35	1.58	5,872.4	5,031.9	527.8	5,054.6	1.06	0.73	
10,877.0	90.46	358.86	5,870.2	5,122.9	528.2	5,145.4	3.64	-2.08	
10,968.0	91.03	359.66	5,869.0	5,213.8	527.0	5,236.2	1.08	0.63	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
11,059.0	88.88	358.46	5,869.1	5,304.8	525.5	5,326.9	2.71	-2.36	
11,150.0	88.75	358.52	5,871.0	5,395.8	523.1	5,417.5	0.16	-0.14	
11,242.0	88.44	358.01	5,873.2	5,487.7	520.3	5,509.1	0.65	-0.34	
11,334.0	88.31	357.89	5,875.8	5,579.6	517.0	5,600.7	0.19	-0.14	
11,425.0	88.13	357.93	5,878.6	5,670.5	513.7	5,691.2	0.20	-0.20	
11,516.0	87.87	357.63	5,881.8	5,761.4	510.2	5,781.7	0.44	-0.29	
11,608.0	90.73	359.14	5,882.9	5,853.3	507.6	5,873.3	3.52	3.11	
11,699.0	90.46	358.86	5,882.0	5,944.3	506.0	5,964.0	0.43	-0.30	
11,790.0	90.51	358.39	5,881.2	6,035.3	503.8	6,054.7	0.52	0.05	
11,882.0	90.07	358.04	5,880.8	6,127.2	501.0	6,146.3	0.61	-0.48	
11,973.0	89.32	358.24	5,881.2	6,218.2	498.0	6,236.9	0.85	-0.82	
12,064.0	85.85	359.15	5,885.1	6,309.1	495.9	6,327.5	3.94	-3.81	
12,156.0	87.03	359.65	5,890.8	6,400.9	495.0	6,419.1	1.39	1.28	
12,247.0	89.14	1.55	5,893.8	6,491.8	495.9	6,509.9	3.12	2.32	
12,339.0	89.27	1.03	5,895.1	6,583.8	498.0	6,601.9	0.58	0.14	
12,430.0	89.54	0.13	5,896.1	6,674.8	498.9	6,692.7	1.03	0.30	
12,523.0	89.63	359.35	5,896.7	6,767.8	498.5	6,785.5	0.84	0.10	
12,613.0	89.19	1.20	5,897.7	6,857.8	498.9	6,875.4	2.11	-0.49	
12,704.0	89.10	0.36	5,899.0	6,948.8	500.2	6,966.3	0.93	-0.10	
12,795.0	89.05	359.88	5,900.5	7,039.7	500.3	7,057.1	0.53	-0.05	
12,887.0	89.01	359.58	5,902.0	7,131.7	499.9	7,148.9	0.33	-0.04	
12,978.0	89.76	1.37	5,903.0	7,222.7	500.7	7,239.8	2.13	0.82	
13,069.0	89.63	1.09	5,903.5	7,313.7	502.6	7,330.7	0.34	-0.14	
13,160.0	89.32	0.61	5,904.3	7,404.7	504.0	7,421.6	0.63	-0.34	
13,251.0	91.82	2.62	5,903.4	7,495.6	506.5	7,512.5	3.52	2.75	
13,342.0	91.65	2.21	5,900.7	7,586.5	510.4	7,603.5	0.49	-0.19	
13,437.0	91.52	1.56	5,898.0	7,681.4	513.5	7,698.4	0.70	-0.14	
13,532.0	91.74	1.08	5,895.3	7,776.3	515.7	7,793.3	0.56	0.23	
13,627.0	89.10	0.00	5,894.7	7,871.3	516.6	7,888.2	3.00	-2.78	
13,722.0	90.11	0.77	5,895.3	7,966.3	517.2	7,983.0	1.34	1.06	
13,817.0	89.49	359.21	5,895.6	8,061.3	517.2	8,077.8	1.77	-0.65	
13,912.0	89.80	359.70	5,896.2	8,156.3	516.3	8,172.6	0.61	0.33	
14,008.0	89.19	358.65	5,897.1	8,252.3	514.9	8,268.3	1.26	-0.64	
14,103.0	88.88	358.25	5,898.7	8,347.3	512.3	8,363.0	0.53	-0.33	
14,186.0	88.75	357.71	5,900.4	8,430.2	509.4	8,445.6	0.67	-0.16	Last CES Survey @ 14,186' MD
14,236.0	88.75	357.71	5,901.5	8,480.1	507.4	8,495.3	0.00	0.00	Projection to Bit @ 14,236' MD - TD - 2732' FSL

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
21C-0908B VP P5	0.00	1.05	5,063.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 19.4usft at 5097.4usft MD (5063.6 TVD, -97.5 N, 496.4 E)									
- Point									
WP 2	0.00	0.00	5,880.0	2,974.9	506.2	1,552,375.95	3,450,588.40	40.838293	-103.871529
- survey misses target center by 4.2usft at 8726.8usft MD (5878.5 TVD, 2975.1 N, 510.1 E)									
- Point									
21C-0908B BHL	0.00	1.05	5,892.5	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 11.7usft at 14060.8usft MD (5897.9 TVD, 8305.0 N, 513.6 E)									
- Point									
WP 5	0.00	0.00	5,875.0	6,782.0	504.1	1,556,182.37	3,450,516.46	40.848742	-103.871536
- survey misses target center by 22.6usft at 12537.0usft MD (5896.8 TVD, 6781.8 N, 498.4 E)									
- Point									
21C-0908B BHL FP	0.00	1.05	5,885.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 16.5usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
WP 1	0.00	0.00	5,880.0	1,472.1	507.0	1,550,873.42	3,450,616.76	40.834168	-103.871526
- survey misses target center by 16.2usft at 7223.2usft MD (5882.4 TVD, 1471.9 N, 523.0 E)									
- Point									
21C-0908B BHL P7	0.00	0.00	5,884.0	8,460.2	503.1	1,557,860.23	3,450,484.72	40.853348	-103.871539
- survey misses target center by 17.8usft at 14215.8usft MD (5901.0 TVD, 8460.0 N, 508.2 E)									
- Point									
21C-0908B VP P4	0.00	1.05	5,203.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 16.5usft at 5237.3usft MD (5203.3 TVD, -96.5 N, 500.3 E)									
- Point									
21C-0908B VP	0.00	1.05	5,203.1	-520.9	507.9	1,548,880.77	3,450,654.22	40.828698	-103.871523
- survey misses target center by 424.4usft at 5234.1usft MD (5200.2 TVD, -96.6 N, 500.3 E)									
- Point									
21C-0908B BHL P2	0.00	1.05	6,024.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 126.5usft at 14063.0usft MD (5897.9 TVD, 8307.3 N, 513.5 E)									
- Point									
WP 3	0.00	0.00	5,875.0	3,976.7	505.6	1,553,377.57	3,450,569.42	40.841043	-103.871531
- survey misses target center by 11.3usft at 9730.3usft MD (5871.7 TVD, 3977.5 N, 516.4 E)									
- Point									
21C-0908B TGT	0.00	1.05	5,892.5	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 8.5usft at 13560.6usft MD (5894.7 TVD, 7804.9 N, 516.1 E)									
- Point									
21C-0908B BHL P5	0.00	1.05	5,884.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 17.3usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
21C-0908B TGT P2	0.00	1.05	6,024.0	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 129.6usft at 13559.6usft MD (5894.7 TVD, 7803.9 N, 516.1 E)									
- Point									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,225.0	5,869.7	7" - 135' FSL, 2418' FWL		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
21C-0908B VP P5	0.00	1.05	5,063.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 19.4usft at 5097.4usft MD (5063.6 TVD, -97.5 N, 496.4 E)									
- Point									
WP 2	0.00	0.00	5,880.0	2,974.9	506.2	1,552,375.95	3,450,588.40	40.838293	-103.871529
- survey misses target center by 4.2usft at 8726.8usft MD (5878.5 TVD, 2975.1 N, 510.1 E)									
- Point									
21C-0908B BHL	0.00	1.05	5,892.5	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 11.7usft at 14060.8usft MD (5897.9 TVD, 8305.0 N, 513.6 E)									
- Point									
WP 5	0.00	0.00	5,875.0	6,782.0	504.1	1,556,182.37	3,450,516.46	40.848742	-103.871536
- survey misses target center by 22.6usft at 12537.0usft MD (5896.8 TVD, 6781.8 N, 498.4 E)									
- Point									
21C-0908B BHL FP	0.00	1.05	5,885.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 16.5usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
WP 1	0.00	0.00	5,880.0	1,472.1	507.0	1,550,873.42	3,450,616.76	40.834168	-103.871526
- survey misses target center by 16.2usft at 7223.2usft MD (5882.4 TVD, 1471.9 N, 523.0 E)									
- Point									
21C-0908B BHL P7	0.00	0.00	5,884.0	8,460.2	503.1	1,557,860.23	3,450,484.72	40.853348	-103.871539
- survey misses target center by 17.8usft at 14215.8usft MD (5901.0 TVD, 8460.0 N, 508.2 E)									
- Point									
21C-0908B VP P4	0.00	1.05	5,203.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 16.5usft at 5237.3usft MD (5203.3 TVD, -96.5 N, 500.3 E)									
- Point									
21C-0908B VP	0.00	1.05	5,203.1	-520.9	507.9	1,548,880.77	3,450,654.22	40.828698	-103.871523
- survey misses target center by 424.4usft at 5234.1usft MD (5200.2 TVD, -96.6 N, 500.3 E)									
- Point									
21C-0908B BHL P2	0.00	1.05	6,024.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 126.5usft at 14063.0usft MD (5897.9 TVD, 8307.3 N, 513.5 E)									
- Point									
WP 3	0.00	0.00	5,875.0	3,976.7	505.6	1,553,377.57	3,450,569.42	40.841043	-103.871531
- survey misses target center by 11.3usft at 9730.3usft MD (5871.7 TVD, 3977.5 N, 516.4 E)									
- Point									
21C-0908B TGT	0.00	1.05	5,892.5	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 8.5usft at 13560.6usft MD (5894.7 TVD, 7804.9 N, 516.1 E)									
- Point									
21C-0908B BHL P5	0.00	1.05	5,884.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 17.3usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
21C-0908B TGT P2	0.00	1.05	6,024.0	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 129.6usft at 13559.6usft MD (5894.7 TVD, 7803.9 N, 516.1 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,225.0	5,869.7	7" - 135' FSL, 2418' FWL			

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
21C-0908B VP P5	0.00	1.05	5,063.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 19.4usft at 5097.4usft MD (5063.6 TVD, -97.5 N, 496.4 E)									
- Point									
WP 2	0.00	0.00	5,880.0	2,974.9	506.2	1,552,375.95	3,450,588.40	40.838293	-103.871529
- survey misses target center by 4.2usft at 8726.8usft MD (5878.5 TVD, 2975.1 N, 510.1 E)									
- Point									
21C-0908B BHL	0.00	1.05	5,892.5	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 11.7usft at 14060.8usft MD (5897.9 TVD, 8305.0 N, 513.6 E)									
- Point									
WP 5	0.00	0.00	5,875.0	6,782.0	504.1	1,556,182.37	3,450,516.46	40.848742	-103.871536
- survey misses target center by 22.6usft at 12537.0usft MD (5896.8 TVD, 6781.8 N, 498.4 E)									
- Point									
21C-0908B BHL FP	0.00	1.05	5,885.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 16.5usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
WP 1	0.00	0.00	5,880.0	1,472.1	507.0	1,550,873.42	3,450,616.76	40.834168	-103.871526
- survey misses target center by 16.2usft at 7223.2usft MD (5882.4 TVD, 1471.9 N, 523.0 E)									
- Point									
21C-0908B BHL P7	0.00	0.00	5,884.0	8,460.2	503.1	1,557,860.23	3,450,484.72	40.853348	-103.871539
- survey misses target center by 17.8usft at 14215.8usft MD (5901.0 TVD, 8460.0 N, 508.2 E)									
- Point									
21C-0908B VP P4	0.00	1.05	5,203.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 16.5usft at 5237.3usft MD (5203.3 TVD, -96.5 N, 500.3 E)									
- Point									
21C-0908B VP	0.00	1.05	5,203.1	-520.9	507.9	1,548,880.77	3,450,654.22	40.828698	-103.871523
- survey misses target center by 424.4usft at 5234.1usft MD (5200.2 TVD, -96.6 N, 500.3 E)									
- Point									
21C-0908B BHL P2	0.00	1.05	6,024.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 126.5usft at 14063.0usft MD (5897.9 TVD, 8307.3 N, 513.5 E)									
- Point									
WP 3	0.00	0.00	5,875.0	3,976.7	505.6	1,553,377.57	3,450,569.42	40.841043	-103.871531
- survey misses target center by 11.3usft at 9730.3usft MD (5871.7 TVD, 3977.5 N, 516.4 E)									
- Point									
21C-0908B TGT	0.00	1.05	5,892.5	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 8.5usft at 13560.6usft MD (5894.7 TVD, 7804.9 N, 516.1 E)									
- Point									
21C-0908B BHL P5	0.00	1.05	5,884.0	8,304.9	503.2	1,557,704.95	3,450,487.66	40.852922	-103.871539
- survey misses target center by 17.3usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									
21C-0908B TGT P2	0.00	1.05	6,024.0	7,805.0	507.9	1,557,205.24	3,450,501.54	40.851550	-103.871522
- survey misses target center by 129.6usft at 13559.6usft MD (5894.7 TVD, 7803.9 N, 516.1 E)									
- Point									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,225.0	5,869.7	7" - 135' FSL, 2418' FWL		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,186.0	5,900.4	8,430.2	509.4	Last CES Survey @ 14,186' MD
14,236.0	5,901.5	8,480.1	507.4	Projection to Bit @ 14,236' MD
14,236.0	5,901.5	8,480.1	507.4	TD - 2732' FSL, 2480' FWL

Checked By: _____	Approved By: _____	Date: _____
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Whiting Petroleum Corporation

Weld County, CO

S21-T10N-R58W

Razor #21C-0908B

HZ

Survey: Survey #1

Survey Report - Geographic

09 September, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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 #21C-0908B				
Well Position	+N-S	0.0 usft	Northing:	1,549,392.27 usft	Latitude:	40.830128
	+E-W	0.0 usft	Easting:	3,450,136.85 usft	Longitude:	-103.873358
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,844.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/22/2014	7.99	67.43	53,117

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	3.47	

Survey Program	Date	9/9/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
507.0	14,236.0	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	1,549,392.27	3,450,136.85	40.830128	-103.873358
507.0	0.92	226.78	507.0	-2.8	-3.0	1,549,389.43	3,450,133.93	40.830120	-103.873369
692.0	0.92	238.12	692.0	-4.6	-5.3	1,549,387.59	3,450,131.62	40.830115	-103.873377
785.0	1.49	157.70	784.9	-6.1	-5.5	1,549,386.07	3,450,131.48	40.830111	-103.873378
880.0	2.81	127.22	879.9	-8.7	-3.2	1,549,383.56	3,450,133.85	40.830104	-103.873370
974.0	4.62	117.11	973.7	-11.8	2.0	1,549,380.54	3,450,139.11	40.830096	-103.873351
1,066.0	6.15	116.54	1,065.3	-15.7	9.8	1,549,376.79	3,450,146.88	40.830085	-103.873323
1,161.0	7.16	119.59	1,159.6	-20.9	19.5	1,549,371.77	3,450,156.68	40.830071	-103.873288
1,256.0	7.65	118.89	1,253.8	-26.8	30.1	1,549,365.99	3,450,167.47	40.830054	-103.873249
1,351.0	8.40	113.98	1,347.9	-32.7	42.0	1,549,360.33	3,450,179.45	40.830038	-103.873206
1,446.0	8.18	112.73	1,441.9	-38.1	54.6	1,549,355.13	3,450,192.13	40.830023	-103.873161
1,678.0	5.76	120.45	1,672.2	-50.4	79.9	1,549,343.32	3,450,217.61	40.829990	-103.873070

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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
1,800.0	4.92	126.19	1,793.6	-56.6	89.4	1,549,337.30	3,450,227.22	40.829973	-103.873035
1,891.0	7.74	119.71	1,884.1	-62.0	97.8	1,549,332.12	3,450,235.79	40.829958	-103.873005
1,983.0	9.85	107.49	1,975.0	-67.4	110.7	1,549,326.92	3,450,248.78	40.829943	-103.872958
2,075.0	9.41	106.22	2,065.7	-71.9	125.4	1,549,322.72	3,450,263.58	40.829931	-103.872905
2,170.0	9.58	104.90	2,159.4	-76.1	140.5	1,549,318.80	3,450,278.76	40.829919	-103.872850
2,264.0	9.01	105.17	2,252.2	-80.0	155.2	1,549,315.13	3,450,293.49	40.829908	-103.872797
2,359.0	8.00	101.85	2,346.1	-83.3	168.8	1,549,312.08	3,450,307.20	40.829899	-103.872748
2,454.0	7.21	101.60	2,440.3	-85.9	181.2	1,549,309.75	3,450,319.55	40.829892	-103.872704
2,549.0	6.90	100.54	2,534.6	-88.1	192.6	1,549,307.71	3,450,331.04	40.829886	-103.872662
2,644.0	9.10	93.78	2,628.6	-89.6	205.7	1,549,306.42	3,450,344.17	40.829882	-103.872615
2,739.0	8.75	92.49	2,722.5	-90.5	220.4	1,549,305.88	3,450,358.90	40.829880	-103.872562
2,833.0	8.79	92.38	2,815.4	-91.1	234.8	1,549,305.53	3,450,373.23	40.829878	-103.872510
2,928.0	8.66	91.14	2,909.3	-91.5	249.2	1,549,305.35	3,450,387.64	40.829877	-103.872458
3,023.0	8.18	89.79	3,003.3	-91.6	263.1	1,549,305.49	3,450,401.55	40.829877	-103.872408
3,118.0	6.90	88.86	3,097.4	-91.5	275.5	1,549,305.86	3,450,414.01	40.829877	-103.872363
3,213.0	6.29	93.38	3,191.8	-91.7	286.4	1,549,305.86	3,450,424.91	40.829876	-103.872323
3,307.0	5.93	91.49	3,285.3	-92.1	296.4	1,549,305.62	3,450,434.91	40.829875	-103.872287
3,402.0	8.26	94.16	3,379.5	-92.7	308.1	1,549,305.21	3,450,446.63	40.829874	-103.872245
3,497.0	8.26	93.86	3,473.6	-93.7	321.8	1,549,304.50	3,450,460.26	40.829871	-103.872196
3,592.0	8.44	92.17	3,567.6	-94.4	335.5	1,549,304.03	3,450,474.05	40.829869	-103.872146
3,687.0	8.88	90.34	3,661.5	-94.7	349.8	1,549,303.99	3,450,488.35	40.829868	-103.872094
3,782.0	8.75	88.81	3,755.4	-94.6	364.4	1,549,304.36	3,450,502.90	40.829868	-103.872042
3,876.0	7.03	82.35	3,848.5	-93.7	377.2	1,549,305.51	3,450,515.74	40.829871	-103.871995
3,971.0	7.69	91.67	3,942.7	-93.1	389.3	1,549,306.32	3,450,527.84	40.829872	-103.871951
4,066.0	6.86	92.34	4,036.9	-93.5	401.4	1,549,306.13	3,450,539.87	40.829871	-103.871908
4,160.0	6.77	91.53	4,130.2	-93.9	412.5	1,549,305.95	3,450,551.02	40.829870	-103.871868
4,254.0	6.42	91.94	4,223.6	-94.2	423.3	1,549,305.83	3,450,561.81	40.829869	-103.871829
4,349.0	5.85	89.82	4,318.1	-94.4	433.5	1,549,305.85	3,450,571.97	40.829869	-103.871792
4,444.0	7.30	90.46	4,412.5	-94.4	444.3	1,549,306.01	3,450,582.84	40.829869	-103.871753
4,539.0	6.73	90.76	4,506.7	-94.5	455.9	1,549,306.10	3,450,594.44	40.829869	-103.871711
4,634.0	5.63	92.25	4,601.2	-94.8	466.2	1,549,306.03	3,450,604.67	40.829868	-103.871674
4,728.0	4.70	94.58	4,694.8	-95.3	474.6	1,549,305.70	3,450,613.12	40.829866	-103.871643
4,823.0	3.91	97.73	4,789.5	-96.0	481.7	1,549,305.08	3,450,620.22	40.829864	-103.871618
4,918.0	3.56	96.85	4,884.3	-96.8	487.8	1,549,304.41	3,450,626.38	40.829862	-103.871596
5,013.0	2.73	97.00	4,979.2	-97.5	493.0	1,549,303.88	3,450,631.56	40.829861	-103.871577
5,108.0	1.89	81.43	5,074.1	-97.5	496.8	1,549,303.90	3,450,635.36	40.829860	-103.871563
5,203.0	1.54	70.21	5,169.1	-96.8	499.6	1,549,304.62	3,450,638.09	40.829862	-103.871553
5,298.0	0.70	64.39	5,264.1	-96.1	501.3	1,549,305.34	3,450,639.81	40.829864	-103.871547
5,392.0	7.91	2.24	5,357.7	-89.4	502.0	1,549,312.07	3,450,640.45	40.829883	-103.871544
5,487.0	18.07	354.15	5,450.2	-68.2	500.8	1,549,333.29	3,450,638.81	40.829941	-103.871549
5,582.0	27.34	4.35	5,537.8	-31.7	501.0	1,549,369.79	3,450,638.30	40.830041	-103.871548
5,677.0	32.70	10.01	5,620.0	15.4	507.1	1,549,416.96	3,450,643.55	40.830170	-103.871526
5,772.0	42.02	7.94	5,695.4	72.3	515.9	1,549,474.00	3,450,651.38	40.830326	-103.871494
5,803.0	47.21	4.10	5,717.5	93.9	518.2	1,549,495.68	3,450,653.23	40.830386	-103.871486
5,835.0	50.20	0.89	5,738.6	117.9	519.2	1,549,519.71	3,450,653.82	40.830452	-103.871482
5,867.0	51.82	359.58	5,758.8	142.8	519.3	1,549,544.57	3,450,653.47	40.830520	-103.871482
5,898.0	53.36	357.19	5,777.6	167.4	518.6	1,549,569.17	3,450,652.32	40.830588	-103.871484
5,930.0	55.65	356.02	5,796.2	193.4	517.1	1,549,595.14	3,450,650.29	40.830659	-103.871490
5,962.0	60.31	356.87	5,813.1	220.5	515.4	1,549,622.18	3,450,648.12	40.830733	-103.871496
5,993.0	64.44	357.67	5,827.5	247.9	514.1	1,549,649.58	3,450,646.31	40.830808	-103.871501
6,025.0	68.97	359.07	5,840.2	277.3	513.3	1,549,678.93	3,450,644.94	40.830889	-103.871504
6,056.0	74.55	0.30	5,849.9	306.7	513.1	1,549,708.35	3,450,644.25	40.830970	-103.871504
6,088.0	79.43	0.96	5,857.1	337.9	513.5	1,549,739.52	3,450,644.02	40.831055	-103.871503
6,120.0	82.20	1.87	5,862.2	369.5	514.2	1,549,771.10	3,450,644.22	40.831142	-103.871500
6,151.0	84.00	1.62	5,865.9	400.2	515.2	1,549,801.87	3,450,644.59	40.831227	-103.871497

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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
6,175.0	86.81	0.58	5,867.8	424.1	515.6	1,549,825.79	3,450,644.61	40.831292	-103.871495
6,300.0	92.09	358.56	5,869.0	549.1	514.7	1,549,950.70	3,450,641.38	40.831635	-103.871498
6,395.0	90.68	359.35	5,866.7	644.0	513.0	1,550,045.60	3,450,637.91	40.831896	-103.871505
6,490.0	89.41	359.63	5,866.6	739.0	512.1	1,550,140.56	3,450,635.32	40.832156	-103.871508
6,585.0	89.45	359.47	5,867.6	834.0	511.4	1,550,235.53	3,450,632.83	40.832417	-103.871510
6,680.0	88.62	1.51	5,869.2	929.0	512.2	1,550,330.52	3,450,631.90	40.832678	-103.871507
6,775.0	88.66	1.37	5,871.4	1,023.9	514.6	1,550,425.49	3,450,632.55	40.832938	-103.871499
6,870.0	88.40	1.25	5,873.9	1,118.9	516.7	1,550,520.45	3,450,632.98	40.833199	-103.871491
6,965.0	88.09	1.10	5,876.8	1,213.8	518.7	1,550,615.41	3,450,633.18	40.833460	-103.871484
7,060.0	87.60	0.98	5,880.4	1,308.7	520.4	1,550,710.34	3,450,633.17	40.833720	-103.871478
7,155.0	90.02	0.90	5,882.3	1,403.7	522.0	1,550,805.31	3,450,632.98	40.833981	-103.871472
7,250.0	89.80	0.83	5,882.5	1,498.7	523.4	1,550,900.31	3,450,632.67	40.834241	-103.871467
7,345.0	89.76	0.46	5,882.8	1,593.7	524.5	1,550,995.31	3,450,632.00	40.834502	-103.871463
7,440.0	89.58	0.40	5,883.4	1,688.7	525.2	1,551,090.30	3,450,630.97	40.834763	-103.871460
7,535.0	89.27	0.01	5,884.3	1,783.7	525.5	1,551,185.29	3,450,629.57	40.835024	-103.871459
7,630.0	90.37	0.38	5,884.6	1,878.7	525.8	1,551,280.27	3,450,628.15	40.835284	-103.871458
7,725.0	90.07	0.25	5,884.3	1,973.7	526.4	1,551,375.27	3,450,626.93	40.835545	-103.871456
7,820.0	90.20	0.23	5,884.1	2,068.7	526.8	1,551,470.26	3,450,625.58	40.835806	-103.871455
7,915.0	90.33	0.48	5,883.6	2,163.7	527.4	1,551,565.25	3,450,624.43	40.836067	-103.871453
8,010.0	89.85	0.02	5,883.5	2,258.7	527.8	1,551,660.24	3,450,623.10	40.836327	-103.871451
8,105.0	91.16	359.52	5,882.6	2,353.7	527.4	1,551,755.21	3,450,620.98	40.836588	-103.871452
8,200.0	90.77	359.05	5,881.0	2,448.6	526.2	1,551,850.15	3,450,618.05	40.836849	-103.871457
8,295.0	90.64	358.78	5,879.9	2,543.6	524.4	1,551,945.08	3,450,614.51	40.837109	-103.871463
8,391.0	91.12	358.42	5,878.4	2,639.6	522.1	1,552,040.98	3,450,610.40	40.837373	-103.871472
8,486.0	91.08	357.70	5,876.6	2,734.5	518.8	1,552,135.83	3,450,605.45	40.837633	-103.871483
8,581.0	89.45	358.30	5,876.1	2,829.4	515.5	1,552,230.69	3,450,600.39	40.837894	-103.871495
8,676.0	88.92	357.67	5,877.5	2,924.4	512.2	1,552,325.54	3,450,595.31	40.838154	-103.871507
8,768.0	88.57	357.51	5,879.5	3,016.3	508.3	1,552,417.35	3,450,589.76	40.838407	-103.871521
8,860.0	87.43	1.74	5,882.7	3,108.2	507.7	1,552,509.25	3,450,587.47	40.838659	-103.871523
8,953.0	90.20	3.30	5,884.6	3,201.1	511.8	1,552,602.18	3,450,589.85	40.838914	-103.871509
9,046.0	90.15	2.71	5,884.3	3,293.9	516.7	1,552,695.13	3,450,593.02	40.839169	-103.871491
9,138.0	92.35	2.04	5,882.3	3,385.8	520.5	1,552,787.08	3,450,595.15	40.839421	-103.871477
9,230.0	92.09	1.75	5,878.8	3,477.7	523.5	1,552,879.00	3,450,596.50	40.839673	-103.871466
9,322.0	91.96	1.41	5,875.5	3,569.6	526.1	1,552,970.94	3,450,597.35	40.839925	-103.871457
9,414.0	92.04	1.07	5,872.3	3,661.5	528.1	1,553,062.88	3,450,597.66	40.840178	-103.871450
9,506.0	90.99	358.87	5,869.9	3,753.5	528.0	1,553,154.82	3,450,595.92	40.840430	-103.871450
9,597.0	89.23	356.62	5,869.7	3,844.4	524.4	1,553,245.66	3,450,590.67	40.840680	-103.871463
9,688.0	89.14	356.56	5,871.0	3,935.2	519.0	1,553,336.38	3,450,583.60	40.840929	-103.871483
9,780.0	88.75	356.03	5,872.7	4,027.0	513.1	1,553,428.04	3,450,575.97	40.841181	-103.871504
9,872.0	89.80	358.35	5,873.9	4,118.9	508.6	1,553,519.82	3,450,569.78	40.841433	-103.871520
9,963.0	89.76	357.93	5,874.2	4,209.9	505.6	1,553,610.70	3,450,565.15	40.841683	-103.871531
10,054.0	89.14	357.33	5,875.1	4,300.8	501.8	1,553,701.54	3,450,559.72	40.841932	-103.871545
10,145.0	87.96	1.00	5,877.4	4,391.7	500.5	1,553,792.42	3,450,556.73	40.842182	-103.871549
10,236.0	89.63	2.41	5,879.3	4,482.6	503.2	1,553,883.39	3,450,557.77	40.842431	-103.871540
10,328.0	89.58	2.40	5,879.9	4,574.6	507.1	1,553,975.36	3,450,559.94	40.842684	-103.871526
10,419.0	89.23	3.73	5,880.9	4,665.4	512.0	1,554,066.30	3,450,563.14	40.842933	-103.871508
10,511.0	91.60	3.24	5,880.2	4,757.2	517.5	1,554,158.20	3,450,567.05	40.843185	-103.871488
10,603.0	91.21	3.13	5,877.9	4,849.1	522.7	1,554,250.11	3,450,570.47	40.843437	-103.871469
10,695.0	91.69	0.87	5,875.6	4,941.0	525.9	1,554,342.06	3,450,572.00	40.843689	-103.871458
10,786.0	92.35	1.58	5,872.4	5,031.9	527.8	1,554,433.01	3,450,572.27	40.843939	-103.871451
10,877.0	90.46	358.86	5,870.2	5,122.9	528.2	1,554,523.96	3,450,570.95	40.844189	-103.871449
10,968.0	91.03	359.66	5,869.0	5,213.8	527.0	1,554,614.90	3,450,568.11	40.844438	-103.871454
11,059.0	88.88	358.46	5,869.1	5,304.8	525.5	1,554,705.84	3,450,564.95	40.844688	-103.871459
11,150.0	88.75	358.52	5,871.0	5,395.8	523.1	1,554,796.73	3,450,560.88	40.844938	-103.871468
11,242.0	88.44	358.01	5,873.2	5,487.7	520.3	1,554,888.59	3,450,556.41	40.845190	-103.871478

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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
11,334.0	88.31	357.89	5,875.8	5,579.6	517.0	1,554,980.42	3,450,551.44	40.845442	-103.871490
11,425.0	88.13	357.93	5,878.6	5,670.5	513.7	1,555,071.24	3,450,546.45	40.845692	-103.871502
11,516.0	87.87	357.63	5,881.8	5,761.4	510.2	1,555,162.04	3,450,541.26	40.845941	-103.871514
11,608.0	90.73	359.14	5,882.9	5,853.3	507.6	1,555,253.92	3,450,536.99	40.846193	-103.871524
11,699.0	90.46	358.86	5,882.0	5,944.3	506.0	1,555,344.85	3,450,533.73	40.846443	-103.871529
11,790.0	90.51	358.39	5,881.2	6,035.3	503.8	1,555,435.77	3,450,529.88	40.846693	-103.871537
11,882.0	90.07	358.04	5,880.8	6,127.2	501.0	1,555,527.65	3,450,525.32	40.846945	-103.871548
11,973.0	89.32	358.24	5,881.2	6,218.2	498.0	1,555,618.53	3,450,520.70	40.847195	-103.871558
12,064.0	85.85	359.15	5,885.1	6,309.1	495.9	1,555,709.36	3,450,516.97	40.847444	-103.871566
12,156.0	87.03	359.65	5,890.8	6,400.9	495.0	1,555,801.17	3,450,514.32	40.847696	-103.871569
12,247.0	89.14	1.55	5,893.8	6,491.8	495.9	1,555,892.11	3,450,513.60	40.847946	-103.871566
12,339.0	89.27	1.03	5,895.1	6,583.8	498.0	1,555,984.10	3,450,513.99	40.848198	-103.871558
12,430.0	89.54	0.13	5,896.1	6,674.8	498.9	1,556,075.09	3,450,513.24	40.848448	-103.871555
12,523.0	89.63	359.35	5,896.7	6,767.8	498.5	1,556,168.06	3,450,511.11	40.848703	-103.871556
12,613.0	89.19	1.20	5,897.7	6,857.8	498.9	1,556,258.04	3,450,509.89	40.848950	-103.871555
12,704.0	89.10	0.36	5,899.0	6,948.8	500.2	1,556,349.03	3,450,509.46	40.849200	-103.871550
12,795.0	89.05	359.88	5,900.5	7,039.7	500.3	1,556,440.01	3,450,507.98	40.849450	-103.871550
12,887.0	89.01	359.58	5,902.0	7,131.7	499.9	1,556,531.97	3,450,505.86	40.849702	-103.871551
12,978.0	89.76	1.37	5,903.0	7,222.7	500.7	1,556,622.95	3,450,504.95	40.849952	-103.871549
13,069.0	89.63	1.09	5,903.5	7,313.7	502.6	1,556,713.95	3,450,505.23	40.850202	-103.871542
13,160.0	89.32	0.61	5,904.3	7,404.7	504.0	1,556,804.95	3,450,504.91	40.850451	-103.871537
13,251.0	91.82	2.62	5,903.4	7,495.6	506.5	1,556,895.93	3,450,505.81	40.850701	-103.871527
13,342.0	91.65	2.21	5,900.7	7,586.5	510.4	1,556,986.86	3,450,507.97	40.850950	-103.871513
13,437.0	91.52	1.56	5,898.0	7,681.4	513.5	1,557,081.81	3,450,509.36	40.851211	-103.871502
13,532.0	91.74	1.08	5,895.3	7,776.3	515.7	1,557,176.77	3,450,509.80	40.851472	-103.871494
13,627.0	89.10	0.00	5,894.7	7,871.3	516.6	1,557,271.76	3,450,508.96	40.851732	-103.871491
13,722.0	90.11	0.77	5,895.3	7,966.3	517.2	1,557,366.74	3,450,507.85	40.851993	-103.871489
13,817.0	89.49	359.21	5,895.6	8,061.3	517.2	1,557,461.72	3,450,506.09	40.852254	-103.871489
13,912.0	89.80	359.70	5,896.2	8,156.3	516.3	1,557,556.69	3,450,503.45	40.852514	-103.871492
14,008.0	89.19	358.65	5,897.1	8,252.3	514.9	1,557,652.63	3,450,500.30	40.852778	-103.871497
14,103.0	88.88	358.25	5,898.7	8,347.3	512.3	1,557,747.52	3,450,495.99	40.853038	-103.871506
14,186.0	88.75	357.71	5,900.4	8,430.2	509.4	1,557,830.38	3,450,491.55	40.853266	-103.871517
Last CES Survey @ 14,186' MD									
14,236.0	88.75	357.71	5,901.5	8,480.1	507.4	1,557,880.28	3,450,488.63	40.853403	-103.871524
Projection to Bit @ 14,236' MD - TD - 2732' FSL, 2480' FWL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
21C-0908B VP P5	0.00	1.05	5,063.1	-81.9	507.9	1,549,319.68	3,450,646.17	40.829903	-103.871523
- survey misses target center by 19.4usft at 5097.4usft MD (5063.6 TVD, -97.5 N, 496.4 E)									
- Point									
21C-0908B BHL P5	0.00	1.05	5,884.0	8,304.9	503.2	1,557,704.96	3,450,487.65	40.852922	-103.871539
- survey misses target center by 17.3usft at 14060.6usft MD (5897.9 TVD, 8304.9 N, 513.6 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0908B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0908B	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 (")
6,225.0	5,869.7	7" - 135' FSL, 2418' FWL		

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,186.0	5,900.4	8,430.2	509.4	Last CES Survey @ 14,186' MD
14,236.0	5,901.5	8,480.1	507.4	Projection to Bit @ 14,236' MD
14,236.0	5,901.5	8,480.1	507.4	TD - 2732' FSL, 2480' FWL

Checked By: _____ Approved By: _____ Date: _____