



Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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-0911A					
Well Position	+N/-S	0.0 usft	Northing:	1,549,442.54 usft	Latitude:	40.830200
	+E/-W	0.0 usft	Easting:	3,451,445.14 usft	Longitude:	-103.868628
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	9/24/2014	7.96	67.42	53,099

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	1.45	

Survey Program	Date	10/22/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
192.0	13,969.0	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		
192.0	0.45	142.27	192.0	-0.6	0.5	-0.6	0.23	0.23		
286.0	0.79	151.17	286.0	-1.5	1.0	-1.4	0.37	0.36		
378.0	0.73	152.50	378.0	-2.5	1.6	-2.5	0.07	-0.07		
469.0	0.97	155.51	469.0	-3.7	2.2	-3.7	0.27	0.26		
560.0	0.76	88.51	560.0	-4.4	3.1	-4.4	1.07	-0.23		
651.0	0.52	97.15	651.0	-4.5	4.1	-4.4	0.28	-0.26		
744.0	0.56	122.75	744.0	-4.8	4.9	-4.6	0.26	0.04		
836.0	0.55	120.00	836.0	-5.2	5.7	-5.1	0.03	-0.01		
927.0	2.52	96.65	926.9	-5.7	8.0	-5.5	2.23	2.16		
1,018.0	3.05	95.41	1,017.8	-6.1	12.4	-5.8	0.59	0.58		
1,110.0	2.89	101.32	1,109.7	-6.8	17.1	-6.4	0.38	-0.17		
1,202.0	2.94	101.40	1,201.6	-7.7	21.7	-7.2	0.05	0.05		

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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
1,293.0	2.71	99.82	1,292.5	-8.6	26.1	-7.9	0.27	-0.25	
1,384.0	3.05	103.45	1,383.3	-9.5	30.6	-8.7	0.42	0.37	
1,475.0	2.86	107.88	1,474.2	-10.8	35.1	-9.9	0.33	-0.21	
1,566.0	2.78	107.54	1,565.1	-12.1	39.4	-11.1	0.09	-0.09	
1,630.0	2.52	109.81	1,629.0	-13.1	42.2	-12.0	0.44	-0.41	
1,788.0	2.23	99.76	1,786.9	-14.8	48.5	-13.5	0.32	-0.18	
1,880.0	1.81	95.50	1,878.8	-15.2	51.7	-13.9	0.48	-0.46	
1,971.0	4.52	141.52	1,969.7	-18.2	55.4	-16.8	3.86	2.98	
2,062.0	4.19	129.76	2,060.4	-23.1	60.1	-21.6	1.04	-0.36	
2,154.0	4.32	128.21	2,152.2	-27.4	65.4	-25.7	0.19	0.14	
2,246.0	3.58	122.44	2,244.0	-31.1	70.6	-29.3	0.91	-0.80	
2,337.0	3.04	124.99	2,334.8	-34.0	75.0	-32.1	0.61	-0.59	
2,428.0	3.20	126.28	2,425.7	-36.9	79.0	-34.9	0.19	0.18	
2,519.0	2.72	121.89	2,516.6	-39.5	82.9	-37.4	0.58	-0.53	
2,701.0	2.84	124.26	2,698.3	-44.3	90.3	-42.0	0.09	0.07	
2,793.0	2.67	123.79	2,790.2	-46.8	93.9	-44.4	0.19	-0.18	
2,884.0	2.69	121.41	2,881.1	-49.1	97.5	-46.6	0.12	0.02	
2,975.0	2.57	122.67	2,972.0	-51.3	101.1	-48.7	0.15	-0.13	
3,158.0	4.13	97.89	3,154.7	-54.4	111.0	-51.6	1.14	0.85	
3,249.0	3.31	96.47	3,245.5	-55.2	116.9	-52.2	0.91	-0.90	
3,340.0	2.87	96.30	3,336.4	-55.7	121.8	-52.6	0.48	-0.48	
3,431.0	2.92	87.41	3,427.3	-55.9	126.4	-52.7	0.50	0.05	
3,522.0	4.44	100.09	3,518.1	-56.4	132.1	-53.0	1.88	1.67	
3,614.0	5.14	99.63	3,609.8	-57.7	139.7	-54.1	0.76	0.76	
3,704.0	4.89	124.13	3,699.5	-60.5	146.9	-56.8	2.38	-0.28	
3,795.0	4.03	112.07	3,790.2	-63.9	153.0	-60.0	1.39	-0.95	
3,886.0	3.76	93.44	3,881.0	-65.3	159.0	-61.2	1.42	-0.30	
3,977.0	4.62	128.64	3,971.7	-67.7	164.8	-63.6	2.92	0.95	
4,069.0	3.98	123.88	4,063.5	-71.8	170.4	-67.5	0.80	-0.70	
4,160.0	3.26	131.54	4,154.3	-75.3	174.9	-70.9	0.95	-0.79	
4,252.0	3.24	125.41	4,246.2	-78.6	179.0	-74.0	0.38	-0.02	
4,343.0	2.34	127.26	4,337.0	-81.2	182.6	-76.5	0.99	-0.99	
4,434.0	1.99	130.67	4,428.0	-83.3	185.2	-78.6	0.41	-0.38	
4,526.0	2.00	130.00	4,519.9	-85.4	187.7	-80.6	0.03	0.01	
4,618.0	1.60	175.03	4,611.9	-87.7	189.0	-82.9	1.55	-0.43	
4,710.0	2.08	217.14	4,703.8	-90.3	188.1	-85.5	1.52	0.52	
4,801.0	2.49	105.51	4,794.8	-92.2	189.0	-87.4	4.16	0.45	
4,892.0	1.21	97.13	4,885.7	-92.8	191.9	-87.9	1.43	-1.41	
4,983.0	0.84	101.74	4,976.7	-93.1	193.5	-88.1	0.42	-0.41	
5,074.0	1.33	101.73	5,067.7	-93.4	195.2	-88.5	0.54	0.54	
5,166.0	5.76	8.16	5,159.6	-89.1	196.9	-84.1	6.51	4.82	
5,258.0	17.43	11.48	5,249.5	-70.9	200.3	-65.8	12.70	12.68	
5,348.0	21.93	7.32	5,334.2	-41.0	205.1	-35.8	5.23	5.00	
5,440.0	26.87	6.44	5,418.0	-3.3	209.7	2.0	5.38	5.37	
5,532.0	36.30	3.08	5,496.3	44.7	213.5	50.0	10.42	10.25	
5,623.0	48.30	0.25	5,563.5	105.8	215.1	111.2	13.35	13.19	
5,653.0	49.46	0.26	5,583.2	128.4	215.2	133.7	3.87	3.87	
5,684.0	48.90	359.96	5,603.5	151.8	215.2	157.2	1.95	-1.81	
5,714.0	48.44	359.59	5,623.3	174.3	215.1	179.7	1.79	-1.53	
5,746.0	49.36	359.34	5,644.3	198.5	214.9	203.8	2.93	2.88	
5,778.0	53.86	357.86	5,664.2	223.5	214.3	228.9	14.52	14.06	
5,809.0	59.14	357.12	5,681.3	249.3	213.1	254.6	17.15	17.03	
5,841.0	62.66	358.35	5,696.9	277.3	212.0	282.5	11.50	11.00	

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5,872.0	65.37	0.25	5,710.4	305.1	211.7	310.4	10.33	8.74	
5,904.0	65.16	359.33	5,723.8	334.2	211.6	339.4	2.69	-0.66	
5,936.0	66.30	0.05	5,737.0	363.4	211.4	368.6	4.11	3.56	
5,967.0	72.08	2.49	5,748.0	392.3	212.1	397.6	20.04	18.65	
5,999.0	78.93	3.35	5,756.0	423.2	213.7	428.5	21.56	21.41	
6,031.0	80.63	3.38	5,761.7	454.7	215.5	460.0	5.31	5.31	
6,068.0	82.82	3.30	5,767.0	491.2	217.6	496.6	5.92	5.92	
6,201.0	91.36	2.37	5,773.7	623.8	224.2	629.2	6.46	6.42	
6,296.0	89.29	0.30	5,773.2	718.7	226.4	724.2	3.08	-2.18	
6,391.0	89.76	0.04	5,774.0	813.7	226.7	819.2	0.57	0.49	
6,485.0	90.31	0.71	5,773.9	907.7	227.3	913.2	0.92	0.59	
6,580.0	90.25	1.33	5,773.5	1,002.7	229.0	1,008.2	0.66	-0.06	
6,675.0	89.05	359.96	5,774.1	1,097.7	230.1	1,103.2	1.92	-1.26	
6,770.0	89.67	0.21	5,775.1	1,192.7	230.2	1,198.1	0.70	0.65	
6,865.0	90.24	1.16	5,775.2	1,287.7	231.4	1,293.1	1.17	0.60	
6,960.0	87.74	358.76	5,776.9	1,382.7	231.3	1,388.1	3.65	-2.63	
7,055.0	87.65	358.15	5,780.7	1,477.6	228.7	1,482.9	0.65	-0.09	
7,150.0	89.59	357.06	5,783.0	1,572.4	224.8	1,577.6	2.34	2.04	
7,244.0	90.36	357.84	5,783.0	1,666.3	220.6	1,671.4	1.17	0.82	
7,339.0	89.46	355.73	5,783.2	1,761.2	215.3	1,766.1	2.41	-0.95	
7,434.0	90.99	356.89	5,782.8	1,856.0	209.1	1,860.7	2.02	1.61	
7,529.0	91.26	0.18	5,780.9	1,950.9	206.7	1,955.5	3.47	0.28	
7,624.0	91.80	359.42	5,778.4	2,045.9	206.4	2,050.4	0.98	0.57	
7,719.0	90.23	1.45	5,776.7	2,140.9	207.1	2,145.4	2.70	-1.65	
7,813.0	90.23	1.71	5,776.3	2,234.8	209.7	2,239.4	0.28	0.00	
7,908.0	89.64	1.08	5,776.4	2,329.8	212.0	2,334.4	0.91	-0.62	
8,003.0	90.72	2.74	5,776.1	2,424.7	215.2	2,429.4	2.08	1.14	
8,098.0	89.06	0.90	5,776.3	2,519.7	218.2	2,524.4	2.61	-1.75	
8,193.0	89.48	0.92	5,777.5	2,614.7	219.7	2,619.4	0.44	0.44	
8,288.0	89.96	0.59	5,778.0	2,709.7	220.9	2,714.4	0.61	0.51	
8,383.0	88.38	0.07	5,779.4	2,804.6	221.5	2,809.3	1.75	-1.66	
8,478.0	88.14	359.69	5,782.3	2,899.6	221.3	2,904.3	0.47	-0.25	
8,572.0	87.22	359.15	5,786.1	2,993.5	220.3	2,998.1	1.13	-0.98	
8,667.0	90.28	0.95	5,788.1	3,088.5	220.4	3,093.1	3.74	3.22	
8,760.0	89.51	358.55	5,788.3	3,181.5	220.0	3,186.0	2.71	-0.83	
8,854.0	91.29	359.48	5,787.6	3,275.4	218.4	3,279.9	2.14	1.89	
8,946.0	91.74	358.65	5,785.2	3,367.4	216.9	3,371.8	1.03	0.49	
9,037.0	89.94	359.62	5,783.9	3,458.4	215.5	3,462.7	2.25	-1.98	
9,128.0	89.50	358.57	5,784.3	3,549.4	214.1	3,553.6	1.25	-0.48	
9,220.0	89.86	0.63	5,784.8	3,641.3	213.5	3,645.6	2.27	0.39	
9,312.0	89.78	0.23	5,785.1	3,733.3	214.1	3,737.6	0.44	-0.09	
9,404.0	88.99	1.85	5,786.1	3,825.3	215.8	3,829.6	1.96	-0.86	
9,495.0	88.41	0.54	5,788.2	3,916.3	217.7	3,920.5	1.57	-0.64	
9,586.0	90.66	2.10	5,788.9	4,007.2	219.8	4,011.5	3.01	2.47	
9,678.0	90.53	1.29	5,788.0	4,099.2	222.5	4,103.5	0.89	-0.14	
9,770.0	90.31	0.37	5,787.3	4,191.2	223.9	4,195.5	1.03	-0.24	
9,861.0	89.87	359.06	5,787.1	4,282.2	223.4	4,286.4	1.52	-0.48	
9,952.0	90.67	0.37	5,786.7	4,373.2	223.0	4,377.4	1.69	0.88	
10,043.0	90.36	359.83	5,785.9	4,464.1	223.1	4,468.4	0.68	-0.34	
10,134.0	90.19	0.03	5,785.5	4,555.1	223.0	4,559.3	0.29	-0.19	
10,226.0	89.13	359.73	5,786.0	4,647.1	222.8	4,651.3	1.20	-1.15	
10,317.0	90.71	2.32	5,786.1	4,738.1	224.4	4,742.3	3.33	1.74	
10,408.0	90.10	0.59	5,785.5	4,829.1	226.8	4,833.3	2.02	-0.67	

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10,499.0	89.68	0.03	5,785.7	4,920.1	227.2	4,924.3	0.77	-0.46	
10,591.0	89.10	359.10	5,786.6	5,012.1	226.5	5,016.2	1.19	-0.63	
10,682.0	90.98	359.00	5,786.6	5,103.1	225.0	5,107.1	2.07	2.07	
10,773.0	90.21	358.05	5,785.6	5,194.0	222.7	5,198.0	1.34	-0.85	
10,864.0	90.09	357.61	5,785.4	5,285.0	219.2	5,288.8	0.50	-0.13	
10,955.0	90.44	357.22	5,785.0	5,375.9	215.1	5,379.6	0.58	0.38	
11,046.0	90.17	358.15	5,784.5	5,466.8	211.5	5,470.4	1.06	-0.30	
11,138.0	90.43	358.89	5,784.0	5,558.7	209.1	5,562.3	0.85	0.28	
11,228.0	89.79	1.92	5,783.8	5,648.7	209.7	5,652.2	3.44	-0.71	
11,319.0	90.05	1.78	5,784.0	5,739.7	212.7	5,743.2	0.32	0.29	
11,411.0	87.73	2.41	5,785.7	5,831.6	216.0	5,835.2	2.61	-2.52	
11,501.0	87.71	1.89	5,789.3	5,921.5	219.4	5,925.1	0.58	-0.02	
11,593.0	87.33	1.20	5,793.3	6,013.3	221.9	6,017.0	0.86	-0.41	
11,684.0	88.26	2.00	5,796.8	6,104.2	224.4	6,108.0	1.35	1.02	
11,776.0	89.74	0.74	5,798.4	6,196.2	226.6	6,199.9	2.11	1.61	
11,867.0	88.99	359.67	5,799.4	6,287.2	226.9	6,290.9	1.44	-0.82	
11,958.0	90.92	0.44	5,799.5	6,378.2	227.0	6,381.9	2.28	2.12	
12,050.0	90.83	359.75	5,798.1	6,470.2	227.2	6,473.8	0.76	-0.10	
12,142.0	91.74	359.82	5,796.0	6,562.1	226.8	6,565.8	0.99	0.99	
12,234.0	90.01	358.54	5,794.6	6,654.1	225.5	6,657.7	2.34	-1.88	
12,325.0	89.87	357.74	5,794.7	6,745.1	222.6	6,748.5	0.89	-0.15	
12,416.0	89.62	358.11	5,795.1	6,836.0	219.3	6,839.4	0.49	-0.27	
12,507.0	89.72	357.51	5,795.6	6,926.9	215.8	6,930.2	0.67	0.11	
12,598.0	90.94	359.13	5,795.1	7,017.9	213.1	7,021.0	2.23	1.34	
12,690.0	89.82	1.07	5,794.5	7,109.9	213.3	7,113.0	2.43	-1.22	
12,782.0	89.68	2.35	5,794.9	7,201.9	216.0	7,205.0	1.40	-0.15	
12,872.0	86.90	1.72	5,797.6	7,291.8	219.2	7,295.0	3.17	-3.09	
12,964.0	86.27	1.28	5,803.1	7,383.6	221.6	7,386.8	0.83	-0.68	
13,056.0	88.02	0.80	5,807.7	7,475.4	223.3	7,478.7	1.97	1.90	
13,147.0	89.50	0.52	5,809.6	7,566.4	224.3	7,569.7	1.66	1.63	
13,238.0	89.46	359.88	5,810.5	7,657.4	224.7	7,660.6	0.70	-0.04	
13,333.0	90.79	359.73	5,810.2	7,752.4	224.3	7,755.6	1.41	1.40	
13,428.0	89.92	359.14	5,809.7	7,847.4	223.4	7,850.5	1.11	-0.92	
13,523.0	90.82	359.23	5,809.0	7,942.4	222.1	7,945.5	0.95	0.95	
13,617.0	90.07	358.86	5,808.3	8,036.4	220.5	8,039.4	0.89	-0.80	
13,712.0	89.93	358.75	5,808.3	8,131.3	218.5	8,134.3	0.19	-0.15	
13,807.0	89.46	357.71	5,808.8	8,226.3	215.6	8,229.1	1.20	-0.49	
13,914.0	89.46	357.13	5,809.8	8,333.2	210.8	8,335.8	0.54	0.00	Last CES Survey @ 13,914' MD
13,969.0	89.46	357.13	5,810.3	8,388.1	208.0	8,390.7	0.00	0.00	TD - 2668' FSL, 1807' FEL - PTB @ 13,969'

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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-0911A BHL - actual wellpath misses target center by 16.4usft at 13858.3usft MD (5809.3 TVD, 8277.6 N, 213.4 E) - Point	0.00	1.05	5,793.5	8,277.5	209.1	1,557,722.51	3,451,501.98	40.852919	-103.867872
21B-0911A BHL P2 - actual wellpath misses target center by 108.8usft at 13859.5usft MD (5809.3 TVD, 8278.7 N, 213.3 E) - Point	0.00	1.05	5,918.0	8,277.5	209.1	1,557,722.51	3,451,501.98	40.852919	-103.867872
21B-0911A TGT - actual wellpath misses target center by 20.4usft at 13358.5usft MD (5809.9 TVD, 7777.9 N, 224.2 E) - Point	0.00	1.05	5,793.5	7,777.6	212.2	1,557,222.77	3,451,514.22	40.851547	-103.867861
21B-0911A VP P5 - actual wellpath misses target center by 17.5usft at 4958.7usft MD (4952.4 TVD, -93.0 N, 193.1 E) - Point	0.00	1.05	4,952.1	-100.0	209.1	1,549,346.40	3,451,656.09	40.829925	-103.867872
21B-0911A TGT P2 - actual wellpath misses target center by 108.7usft at 13357.7usft MD (5810.0 TVD, 7777.1 N, 224.2 E) - Point	0.00	1.05	5,918.0	7,777.6	212.2	1,557,222.77	3,451,514.22	40.851547	-103.867861
21B-0911A VP P3 - actual wellpath misses target center by 15.0usft at 5103.3usft MD (5097.0 TVD, -93.1 N, 195.8 E) - Point	0.00	1.05	5,097.1	-100.0	209.1	1,549,346.40	3,451,656.09	40.829925	-103.867872
21B-0911A BHL P5 - actual wellpath misses target center by 36.6usft at 13858.1usft MD (5809.3 TVD, 8277.4 N, 213.4 E) - Point	0.00	1.05	5,773.0	8,277.5	209.1	1,557,722.51	3,451,501.98	40.852919	-103.867872

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,126.0	5,772.4	7" - 216' FSL, 1869' FEL	0	0

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
13,914.0	5,809.8	8,333.2	210.8	Last CES Survey @ 13,914' MD
13,969.0	5,810.3	8,388.1	208.0	TD - 2668' FSL, 1807' FEL
13,969.0	5,810.3	8,388.1	208.0	PTB @ 13,969'

Checked By: _____ Approved By: _____ Date: _____

Whiting Petroleum Corporation

Weld County, CO

S21-T10N-R58W

Razor #21B-0911A

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-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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-0911A				
Well Position	+N/-S	0.0 usft	Northing:	1,549,442.54 usft	Latitude:	40.830200
	+E/-W	0.0 usft	Easting:	3,451,445.14 usft	Longitude:	-103.868628
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	9/24/2014	7.96	67.42	53,099

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	1.45	

Survey Program	Date	10/22/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
192.0	13,969.0	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	1,549,442.54	3,451,445.14	40.830200	-103.868628
192.0	0.45	142.27	192.0	-0.6	0.5	1,549,441.95	3,451,445.61	40.830198	-103.868627
286.0	0.79	151.17	286.0	-1.5	1.0	1,549,441.10	3,451,446.17	40.830196	-103.868625
378.0	0.73	152.50	378.0	-2.5	1.6	1,549,440.04	3,451,446.76	40.830193	-103.868623
469.0	0.97	155.51	469.0	-3.7	2.2	1,549,438.83	3,451,447.37	40.830190	-103.868620
560.0	0.76	88.51	560.0	-4.4	3.1	1,549,438.17	3,451,448.31	40.830188	-103.868617
651.0	0.52	97.15	651.0	-4.5	4.1	1,549,438.15	3,451,449.32	40.830188	-103.868613
744.0	0.56	122.75	744.0	-4.8	4.9	1,549,437.87	3,451,450.13	40.830187	-103.868611
836.0	0.55	120.00	836.0	-5.2	5.7	1,549,437.42	3,451,450.90	40.830186	-103.868608
927.0	2.52	96.65	926.9	-5.7	8.0	1,549,437.01	3,451,453.27	40.830184	-103.868599
1,018.0	3.05	95.41	1,017.8	-6.1	12.4	1,549,436.63	3,451,457.67	40.830183	-103.868583
1,110.0	2.89	101.32	1,109.7	-6.8	17.1	1,549,436.03	3,451,462.40	40.830181	-103.868566

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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
1,202.0	2.94	101.40	1,201.6	-7.7	21.7	1,549,435.19	3,451,467.00	40.830179	-103.868550
1,293.0	2.71	99.82	1,292.5	-8.6	26.1	1,549,434.45	3,451,471.42	40.830177	-103.868534
1,384.0	3.05	103.45	1,383.3	-9.5	30.6	1,549,433.60	3,451,475.91	40.830174	-103.868518
1,475.0	2.86	107.88	1,474.2	-10.8	35.1	1,549,432.42	3,451,480.45	40.830170	-103.868501
1,566.0	2.78	107.54	1,565.1	-12.1	39.4	1,549,431.14	3,451,484.74	40.830167	-103.868486
1,630.0	2.52	109.81	1,629.0	-13.1	42.2	1,549,430.25	3,451,487.56	40.830164	-103.868476
1,788.0	2.23	99.76	1,786.9	-14.8	48.5	1,549,428.66	3,451,493.89	40.830159	-103.868453
1,880.0	1.81	95.50	1,878.8	-15.2	51.7	1,549,428.28	3,451,497.11	40.830158	-103.868441
1,971.0	4.52	141.52	1,969.7	-18.2	55.4	1,549,425.40	3,451,500.82	40.830150	-103.868428
2,062.0	4.19	129.76	2,060.4	-23.1	60.1	1,549,420.56	3,451,505.70	40.830137	-103.868411
2,154.0	4.32	128.21	2,152.2	-27.4	65.4	1,549,416.36	3,451,511.08	40.830125	-103.868392
2,246.0	3.58	122.44	2,244.0	-31.1	70.6	1,549,412.77	3,451,516.30	40.830115	-103.868373
2,337.0	3.04	124.99	2,334.8	-34.0	75.0	1,549,409.95	3,451,520.72	40.830107	-103.868357
2,428.0	3.20	126.28	2,425.7	-36.9	79.0	1,549,407.14	3,451,524.80	40.830099	-103.868343
2,519.0	2.72	121.89	2,516.6	-39.5	82.9	1,549,404.56	3,451,528.73	40.830092	-103.868329
2,701.0	2.84	124.26	2,698.3	-44.3	90.3	1,549,399.88	3,451,536.21	40.830078	-103.868302
2,793.0	2.67	123.79	2,790.2	-46.8	93.9	1,549,397.47	3,451,539.92	40.830072	-103.868289
2,884.0	2.69	121.41	2,881.1	-49.1	97.5	1,549,395.25	3,451,543.54	40.830065	-103.868276
2,975.0	2.57	122.67	2,972.0	-51.3	101.1	1,549,393.10	3,451,547.12	40.830059	-103.868263
3,158.0	4.13	97.89	3,154.7	-54.4	111.0	1,549,390.17	3,451,557.16	40.830051	-103.868227
3,249.0	3.31	96.47	3,245.5	-55.2	116.9	1,549,389.53	3,451,563.03	40.830049	-103.868206
3,340.0	2.87	96.30	3,336.4	-55.7	121.8	1,549,389.07	3,451,567.92	40.830047	-103.868188
3,431.0	2.92	87.41	3,427.3	-55.9	126.4	1,549,389.01	3,451,572.50	40.830047	-103.868172
3,522.0	4.44	100.09	3,518.1	-56.4	132.1	1,549,388.60	3,451,578.29	40.830045	-103.868151
3,614.0	5.14	99.63	3,609.8	-57.7	139.7	1,549,387.43	3,451,585.88	40.830042	-103.868123
3,704.0	4.89	124.13	3,699.5	-60.5	146.9	1,549,384.74	3,451,593.08	40.830034	-103.868098
3,795.0	4.03	112.07	3,790.2	-63.9	153.0	1,549,381.47	3,451,599.32	40.830025	-103.868075
3,886.0	3.76	93.44	3,881.0	-65.3	159.0	1,549,380.20	3,451,605.29	40.830021	-103.868054
3,977.0	4.62	128.64	3,971.7	-67.7	164.8	1,549,377.84	3,451,611.17	40.830014	-103.868033
4,069.0	3.98	123.88	4,063.5	-71.8	170.4	1,549,373.85	3,451,616.79	40.830003	-103.868013
4,160.0	3.26	131.54	4,154.3	-75.3	174.9	1,549,370.46	3,451,621.41	40.829993	-103.867996
4,252.0	3.24	125.41	4,246.2	-78.6	179.0	1,549,367.29	3,451,625.55	40.829984	-103.867981
4,343.0	2.34	127.26	4,337.0	-81.2	182.6	1,549,364.74	3,451,629.17	40.829977	-103.867969
4,434.0	1.99	130.67	4,428.0	-83.3	185.2	1,549,362.64	3,451,631.89	40.829971	-103.867959
4,526.0	2.00	130.00	4,519.9	-85.4	187.7	1,549,360.61	3,451,634.37	40.829966	-103.867950
4,618.0	1.60	175.03	4,611.9	-87.7	189.0	1,549,358.32	3,451,635.75	40.829959	-103.867945
4,710.0	2.08	217.14	4,703.8	-90.3	188.1	1,549,355.70	3,451,634.90	40.829952	-103.867948
4,801.0	2.49	105.51	4,794.8	-92.2	189.0	1,549,353.87	3,451,635.84	40.829947	-103.867945
4,892.0	1.21	97.13	4,885.7	-92.8	191.9	1,549,353.27	3,451,638.71	40.829945	-103.867935
4,983.0	0.84	101.74	4,976.7	-93.1	193.5	1,549,353.05	3,451,640.32	40.829945	-103.867929
5,074.0	1.33	101.73	5,067.7	-93.4	195.2	1,549,352.73	3,451,642.02	40.829944	-103.867923
5,166.0	5.76	8.16	5,159.6	-89.1	196.9	1,549,357.12	3,451,643.64	40.829956	-103.867917
5,258.0	17.43	11.48	5,249.5	-70.9	200.3	1,549,375.31	3,451,646.71	40.830005	-103.867904
5,348.0	21.93	7.32	5,334.2	-41.0	205.1	1,549,405.29	3,451,650.99	40.830087	-103.867887
5,440.0	26.87	6.44	5,418.0	-3.3	209.7	1,549,443.09	3,451,654.82	40.830191	-103.867871
5,532.0	36.30	3.08	5,496.3	44.7	213.5	1,549,491.12	3,451,657.74	40.830323	-103.867857
5,623.0	48.30	0.25	5,563.5	105.8	215.1	1,549,552.23	3,451,658.22	40.830490	-103.867851
5,653.0	49.46	0.26	5,583.2	128.4	215.2	1,549,574.83	3,451,657.90	40.830552	-103.867851
5,684.0	48.90	359.96	5,603.5	151.8	215.2	1,549,598.29	3,451,657.52	40.830617	-103.867851
5,714.0	48.44	359.59	5,623.3	174.3	215.1	1,549,620.81	3,451,657.01	40.830679	-103.867851
5,746.0	49.36	359.34	5,644.3	198.5	214.9	1,549,644.91	3,451,656.34	40.830745	-103.867852
5,778.0	53.86	357.86	5,664.2	223.5	214.3	1,549,669.97	3,451,655.26	40.830814	-103.867854
5,809.0	59.14	357.12	5,681.3	249.3	213.1	1,549,695.76	3,451,653.65	40.830884	-103.867858
5,841.0	62.66	358.35	5,696.9	277.3	212.0	1,549,723.66	3,451,652.03	40.830961	-103.867862
5,872.0	65.37	0.25	5,710.4	305.1	211.7	1,549,751.51	3,451,651.19	40.831038	-103.867863

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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
5,904.0	65.16	359.33	5,723.8	334.2	211.6	1,549,780.57	3,451,650.55	40.831117	-103.867864
5,936.0	66.30	0.05	5,737.0	363.4	211.4	1,549,809.73	3,451,649.85	40.831197	-103.867864
5,967.0	72.08	2.49	5,748.0	392.3	212.1	1,549,838.70	3,451,649.97	40.831277	-103.867862
5,999.0	78.93	3.35	5,756.0	423.2	213.7	1,549,869.64	3,451,650.99	40.831362	-103.867856
6,031.0	80.63	3.38	5,761.7	454.7	215.5	1,549,901.11	3,451,652.26	40.831448	-103.867849
6,068.0	82.82	3.30	5,767.0	491.2	217.6	1,549,937.69	3,451,653.72	40.831548	-103.867842
6,201.0	91.36	2.37	5,773.7	623.8	224.2	1,550,070.34	3,451,657.84	40.831912	-103.867818
6,296.0	89.29	0.30	5,773.2	718.7	226.4	1,550,165.33	3,451,658.30	40.832173	-103.867810
6,391.0	89.76	0.04	5,774.0	813.7	226.7	1,550,260.31	3,451,656.84	40.832433	-103.867809
6,485.0	90.31	0.71	5,773.9	907.7	227.3	1,550,354.31	3,451,655.72	40.832691	-103.867807
6,580.0	90.25	1.33	5,773.5	1,002.7	229.0	1,550,449.31	3,451,655.67	40.832952	-103.867801
6,675.0	89.05	359.96	5,774.1	1,097.7	230.1	1,550,544.30	3,451,654.99	40.833213	-103.867797
6,770.0	89.67	0.21	5,775.1	1,192.7	230.2	1,550,639.28	3,451,653.38	40.833474	-103.867796
6,865.0	90.24	1.16	5,775.2	1,287.7	231.4	1,550,734.27	3,451,652.77	40.833734	-103.867792
6,960.0	87.74	358.76	5,776.9	1,382.7	231.3	1,550,829.23	3,451,650.96	40.833995	-103.867792
7,055.0	87.65	358.15	5,780.7	1,477.6	228.7	1,550,924.05	3,451,646.65	40.834255	-103.867802
7,150.0	89.59	357.06	5,783.0	1,572.4	224.8	1,551,018.85	3,451,640.94	40.834516	-103.867816
7,244.0	90.36	357.84	5,783.0	1,666.3	220.6	1,551,112.66	3,451,635.03	40.834774	-103.867831
7,339.0	89.46	355.73	5,783.2	1,761.2	215.3	1,551,207.39	3,451,627.96	40.835034	-103.867850
7,434.0	90.99	356.89	5,782.8	1,856.0	209.1	1,551,302.06	3,451,620.10	40.835294	-103.867872
7,529.0	91.26	0.18	5,780.9	1,950.9	206.7	1,551,396.94	3,451,615.93	40.835555	-103.867881
7,624.0	91.80	359.42	5,778.4	2,045.9	206.4	1,551,491.88	3,451,613.85	40.835815	-103.867882
7,719.0	90.23	1.45	5,776.7	2,140.9	207.1	1,551,586.85	3,451,612.82	40.836076	-103.867880
7,813.0	90.23	1.71	5,776.3	2,234.8	209.7	1,551,680.84	3,451,613.69	40.836334	-103.867870
7,908.0	89.64	1.08	5,776.4	2,329.8	212.0	1,551,775.84	3,451,614.25	40.836595	-103.867862
8,003.0	90.72	2.74	5,776.1	2,424.7	215.2	1,551,870.83	3,451,615.67	40.836855	-103.867851
8,098.0	89.06	0.90	5,776.3	2,519.7	218.2	1,551,965.81	3,451,616.94	40.837116	-103.867840
8,193.0	89.48	0.92	5,777.5	2,614.7	219.7	1,552,060.80	3,451,616.70	40.837376	-103.867834
8,288.0	89.96	0.59	5,778.0	2,709.7	220.9	1,552,155.80	3,451,616.20	40.837637	-103.867830
8,383.0	88.38	0.07	5,779.4	2,804.6	221.5	1,552,250.78	3,451,615.00	40.837898	-103.867828
8,478.0	88.14	359.69	5,782.3	2,899.6	221.3	1,552,345.71	3,451,613.06	40.838158	-103.867829
8,572.0	87.22	359.15	5,786.1	2,993.5	220.3	1,552,439.60	3,451,610.38	40.838416	-103.867832
8,667.0	90.28	0.95	5,788.1	3,088.5	220.4	1,552,534.55	3,451,608.72	40.838677	-103.867832
8,760.0	89.51	358.55	5,788.3	3,181.5	220.0	1,552,627.51	3,451,606.60	40.838932	-103.867833
8,854.0	91.29	359.48	5,787.6	3,275.4	218.4	1,552,721.45	3,451,603.26	40.839190	-103.867839
8,946.0	91.74	358.65	5,785.2	3,367.4	216.9	1,552,813.36	3,451,600.06	40.839442	-103.867844
9,037.0	89.94	359.62	5,783.9	3,458.4	215.5	1,552,904.29	3,451,597.02	40.839692	-103.867849
9,128.0	89.50	358.57	5,784.3	3,549.4	214.1	1,552,995.24	3,451,593.91	40.839942	-103.867855
9,220.0	89.86	0.63	5,784.8	3,641.3	213.5	1,553,087.20	3,451,591.57	40.840194	-103.867857
9,312.0	89.78	0.23	5,785.1	3,733.3	214.1	1,553,179.19	3,451,590.57	40.840447	-103.867854
9,404.0	88.99	1.85	5,786.1	3,825.3	215.8	1,553,271.19	3,451,590.55	40.840699	-103.867848
9,495.0	88.41	0.54	5,788.2	3,916.3	217.7	1,553,362.16	3,451,590.77	40.840949	-103.867841
9,586.0	90.66	2.10	5,788.9	4,007.2	219.8	1,553,453.13	3,451,591.19	40.841199	-103.867834
9,678.0	90.53	1.29	5,788.0	4,099.2	222.5	1,553,545.12	3,451,592.22	40.841451	-103.867824
9,770.0	90.31	0.37	5,787.3	4,191.2	223.9	1,553,637.11	3,451,591.86	40.841703	-103.867819
9,861.0	89.87	359.06	5,787.1	4,282.2	223.4	1,553,728.08	3,451,589.74	40.841953	-103.867821
9,952.0	90.67	0.37	5,786.7	4,373.2	223.0	1,553,819.06	3,451,587.61	40.842203	-103.867822
10,043.0	90.36	359.83	5,785.9	4,464.1	223.1	1,553,910.04	3,451,586.09	40.842453	-103.867822
10,134.0	90.19	0.03	5,785.5	4,555.1	223.0	1,554,001.02	3,451,584.31	40.842702	-103.867822
10,226.0	89.13	359.73	5,786.0	4,647.1	222.8	1,554,093.00	3,451,582.42	40.842955	-103.867823
10,317.0	90.71	2.32	5,786.1	4,738.1	224.4	1,554,183.99	3,451,582.38	40.843205	-103.867817
10,408.0	90.10	0.59	5,785.5	4,829.1	226.8	1,554,274.98	3,451,583.02	40.843454	-103.867809
10,499.0	89.68	0.03	5,785.7	4,920.1	227.2	1,554,365.97	3,451,581.83	40.843704	-103.867807
10,591.0	89.10	359.10	5,786.6	5,012.1	226.5	1,554,457.93	3,451,579.44	40.843957	-103.867809
10,682.0	90.98	359.00	5,786.6	5,103.1	225.0	1,554,548.87	3,451,576.26	40.844206	-103.867815

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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
10,773.0	90.21	358.05	5,785.6	5,194.0	222.7	1,554,639.78	3,451,572.25	40.844456	-103.867823
10,864.0	90.09	357.61	5,785.4	5,285.0	219.2	1,554,730.63	3,451,567.13	40.844705	-103.867836
10,955.0	90.44	357.22	5,785.0	5,375.9	215.1	1,554,821.45	3,451,561.35	40.844955	-103.867851
11,046.0	90.17	358.15	5,784.5	5,466.8	211.5	1,554,912.29	3,451,556.00	40.845205	-103.867864
11,138.0	90.43	358.89	5,784.0	5,558.7	209.1	1,555,004.19	3,451,551.94	40.845457	-103.867873
11,228.0	89.79	1.92	5,783.8	5,648.7	209.7	1,555,094.18	3,451,550.92	40.845704	-103.867870
11,319.0	90.05	1.78	5,784.0	5,739.7	212.7	1,555,185.17	3,451,552.18	40.845954	-103.867860
11,411.0	87.73	2.41	5,785.7	5,831.6	216.0	1,555,277.13	3,451,553.85	40.846206	-103.867847
11,501.0	87.71	1.89	5,789.3	5,921.5	219.4	1,555,367.04	3,451,555.57	40.846453	-103.867835
11,593.0	87.33	1.20	5,793.3	6,013.3	221.9	1,555,458.95	3,451,556.36	40.846705	-103.867826
11,684.0	88.26	2.00	5,796.8	6,104.2	224.4	1,555,549.88	3,451,557.23	40.846954	-103.867817
11,776.0	89.74	0.74	5,798.4	6,196.2	226.6	1,555,641.86	3,451,557.73	40.847207	-103.867809
11,867.0	88.99	359.67	5,799.4	6,287.2	226.9	1,555,732.84	3,451,556.38	40.847456	-103.867808
11,958.0	90.92	0.44	5,799.5	6,378.2	227.0	1,555,823.82	3,451,554.80	40.847706	-103.867808
12,050.0	90.83	359.75	5,798.1	6,470.2	227.2	1,555,915.80	3,451,553.26	40.847959	-103.867807
12,142.0	91.74	359.82	5,796.0	6,562.1	226.8	1,556,007.75	3,451,551.22	40.848211	-103.867808
12,234.0	90.01	358.54	5,794.6	6,654.1	225.5	1,556,099.68	3,451,548.21	40.848463	-103.867813
12,325.0	89.87	357.74	5,794.7	6,745.1	222.6	1,556,190.56	3,451,543.59	40.848713	-103.867824
12,416.0	89.62	358.11	5,795.1	6,836.0	219.3	1,556,281.43	3,451,538.62	40.848963	-103.867836
12,507.0	89.72	357.51	5,795.6	6,926.9	215.8	1,556,372.28	3,451,533.47	40.849212	-103.867848
12,598.0	90.94	359.13	5,795.1	7,017.9	213.1	1,556,463.17	3,451,529.13	40.849462	-103.867858
12,690.0	89.82	1.07	5,794.5	7,109.9	213.3	1,556,555.17	3,451,527.60	40.849714	-103.867857
12,782.0	89.68	2.35	5,794.9	7,201.9	216.0	1,556,647.17	3,451,528.65	40.849967	-103.867847
12,872.0	86.90	1.72	5,797.6	7,291.8	219.2	1,556,737.10	3,451,530.19	40.850214	-103.867836
12,964.0	86.27	1.28	5,803.1	7,383.6	221.6	1,556,828.94	3,451,530.91	40.850465	-103.867827
13,056.0	88.02	0.80	5,807.7	7,475.4	223.3	1,556,920.82	3,451,530.88	40.850718	-103.867821
13,147.0	89.50	0.52	5,809.6	7,566.4	224.3	1,557,011.79	3,451,530.26	40.850967	-103.867817
13,238.0	89.46	359.88	5,810.5	7,657.4	224.7	1,557,102.78	3,451,528.90	40.851217	-103.867816
13,333.0	90.79	359.73	5,810.2	7,752.4	224.3	1,557,197.75	3,451,526.83	40.851478	-103.867817
13,428.0	89.92	359.14	5,809.7	7,847.4	223.4	1,557,292.71	3,451,524.15	40.851739	-103.867821
13,523.0	90.82	359.23	5,809.0	7,942.4	222.1	1,557,387.66	3,451,521.05	40.851999	-103.867826
13,617.0	90.07	358.86	5,808.3	8,036.4	220.5	1,557,481.60	3,451,517.75	40.852257	-103.867831
13,712.0	89.93	358.75	5,808.3	8,131.3	218.5	1,557,576.52	3,451,514.02	40.852518	-103.867838
13,807.0	89.46	357.71	5,808.8	8,226.3	215.6	1,557,671.40	3,451,509.34	40.852778	-103.867849
13,914.0	89.46	357.13	5,809.8	8,333.2	210.8	1,557,778.18	3,451,502.56	40.853072	-103.867866
Last CES Survey @ 13,914' MD									
13,969.0	89.46	357.13	5,810.3	8,388.1	208.0	1,557,833.05	3,451,498.80	40.853223	-103.867876
TD - 2668' FSL, 1807' FEL - PTB @ 13,969'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
21B-0911A BHL P5	0.00	1.05	5,773.0	8,277.5	209.1	1,557,722.52	3,451,501.98	40.852919	-103.867872
- hit/miss target									
- Shape									
- actual wellpath misses target center by 36.6usft at 13858.1usft MD (5809.3 TVD, 8277.4 N, 213.4 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21B-0911A
Project:	Weld County, CO	TVD Reference:	KB=17 @ 4854.3usft
Site:	S21-T10N-R58W	MD Reference:	KB=17 @ 4854.3usft
Well:	Razor #21B-0911A	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 (")	
6,126.0	5,772.4	7" - 216' FSL, 1869' FEL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
13,914.0	5,809.8	8,333.2	210.8	Last CES Survey @ 13,914' MD	
13,969.0	5,810.3	8,388.1	208.0	TD - 2668' FSL, 1807' FEL	
13,969.0	5,810.3	8,388.1	208.0	PTB @ 13,969'	

Checked By: _____ Approved By: _____ Date: _____