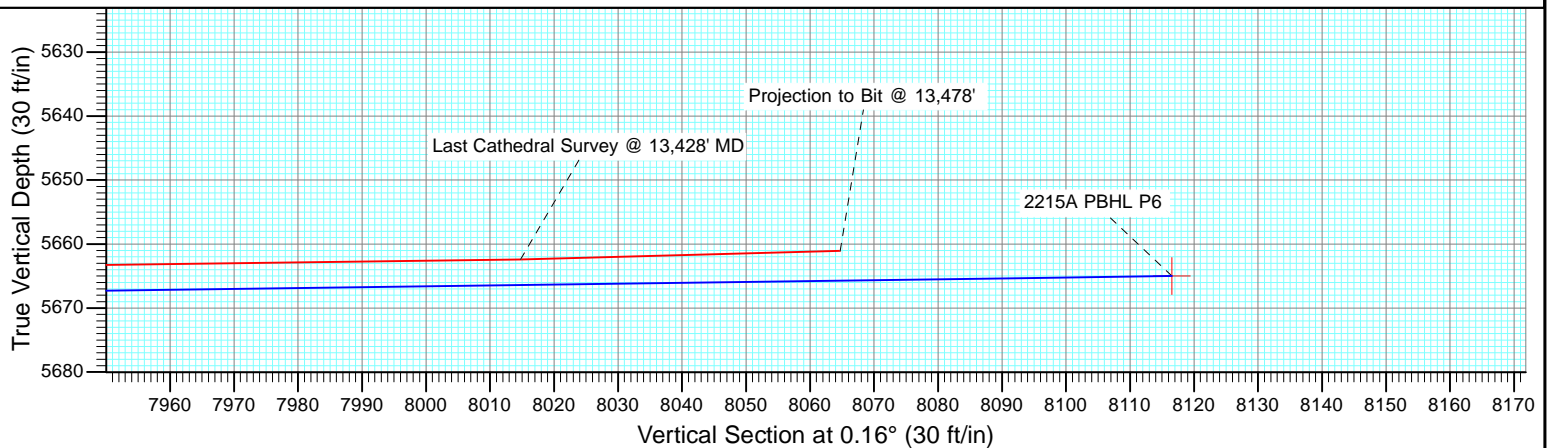
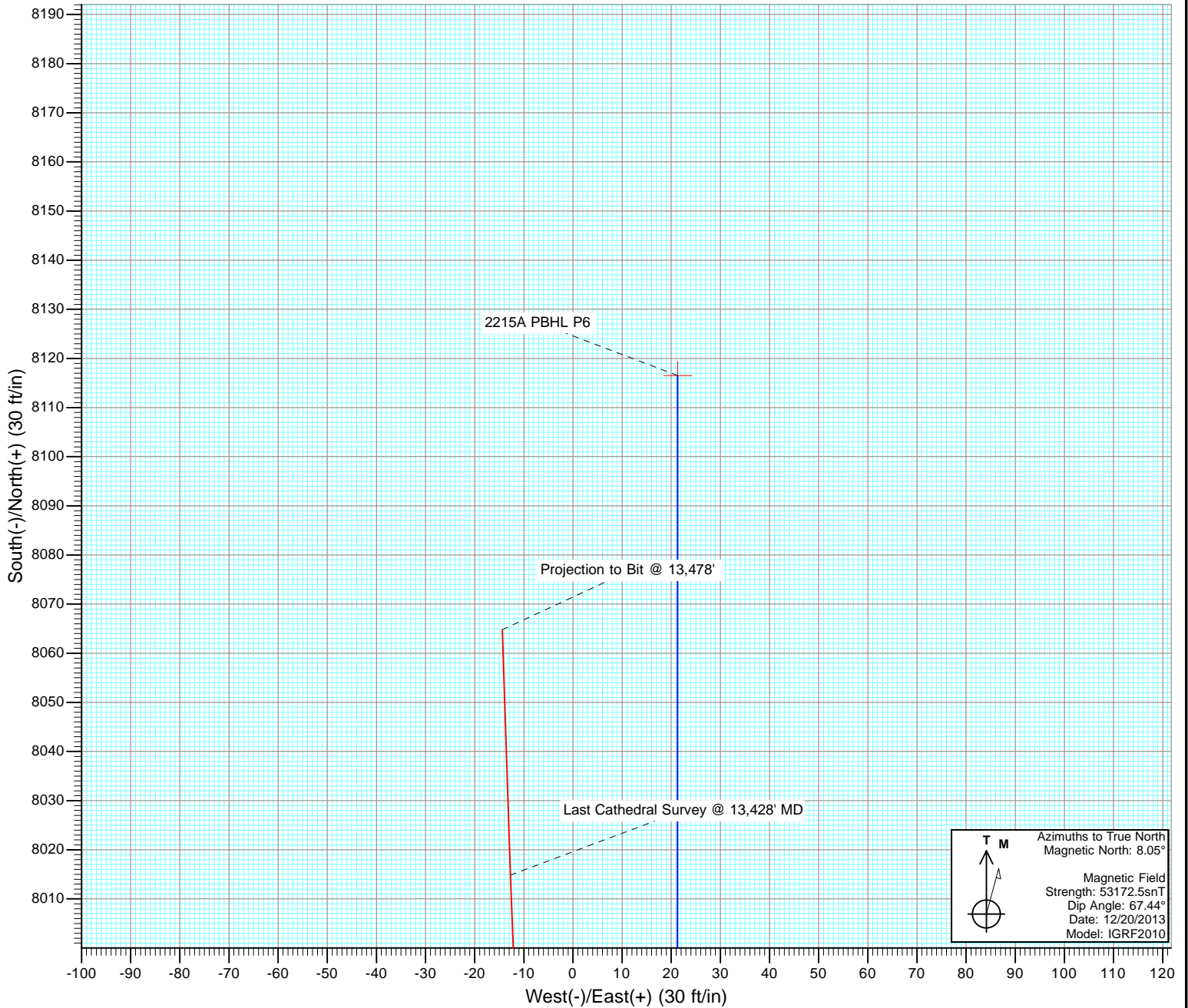




Project: Weld County, CO  
Site: S27-T10N-R58W  
Well: Razor #27I-2215A  
Wellbore: HZ  
Design: FINAL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

<b>Project</b>	Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		S27-T10N-R58W			
Site Position:		Northing:	1,541,650.73 ft	Latitude:	40° 48' 30.94 N
From:	Lat/Long	Easting:	3,455,691.89 ft	Longitude:	103° 51' 13.80 W
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	1.06 °

Well	Razor #27I-2215A					
Well Position	+N/-S	0.0 ft	Northing:	1,541,816.54 ft	Latitude:	40° 48' 32.08 N
	+E/-W	0.0 ft	Easting:	3,458,395.30 ft	Longitude:	103° 50' 38.61 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,756.5 ft

<b>Wellbore</b>	HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	12/20/2013	8.05	67.44	53,172

<b>Design</b>	FINAL				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	0.16	

<b>Survey Program</b>	<b>Date</b>	1/6/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
142.0	13,478.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
142.0	0.70	185.90	142.0	-0.9	-0.1	-0.9	0.49	0.49		
628.0	1.60	224.50	627.9	-8.7	-5.2	-8.7	0.23	0.19		
1,085.0	1.90	356.30	1,084.8	-5.6	-10.1	-5.7	0.70	0.07		
1,570.0	3.50	359.40	1,569.2	17.2	-10.8	17.2	0.33	0.33		
1,671.0	4.22	2.66	1,670.0	24.0	-10.6	23.9	0.74	0.71		
1,762.0	0.35	14.27	1,760.9	27.6	-10.4	27.6	4.26	-4.25		
1,853.0	0.79	144.45	1,851.9	27.4	-10.0	27.3	1.15	0.48		
1,945.0	0.48	96.91	1,943.9	26.8	-9.2	26.8	0.64	-0.34		
2,037.0	0.22	67.44	2,035.9	26.8	-8.7	26.8	0.33	-0.28		
2,128.0	0.31	117.97	2,126.9	26.8	-8.3	26.7	0.26	0.10		
2,220.0	0.26	103.14	2,218.9	26.6	-7.9	26.6	0.10	-0.05		
2,312.0	2.02	74.08	2,310.9	27.0	-6.1	27.0	1.95	1.91		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
2,403.0	1.80	64.69	2,401.8	28.0	-3.3	28.0	0.42	-0.24	
2,494.0	2.15	103.14	2,492.8	28.3	-0.3	28.3	1.47	0.38	
2,585.0	1.98	114.52	2,583.7	27.2	2.8	27.2	0.49	-0.19	
2,677.0	1.32	157.20	2,675.7	25.6	4.6	25.6	1.47	-0.72	
2,768.0	1.23	157.49	2,766.7	23.7	5.4	23.7	0.10	-0.10	
2,859.0	1.19	227.68	2,857.7	22.2	5.1	22.2	1.53	-0.04	
2,950.0	0.97	234.44	2,948.6	21.1	3.7	21.1	0.28	-0.24	
3,041.0	1.01	261.47	3,039.6	20.5	2.3	20.5	0.51	0.04	
3,133.0	1.49	282.77	3,131.6	20.7	0.4	20.7	0.72	0.52	
3,224.0	2.24	281.54	3,222.6	21.3	-2.5	21.3	0.83	0.82	
3,316.0	3.21	223.10	3,314.5	19.8	-6.1	19.8	3.03	1.05	
3,408.0	2.37	208.29	3,406.4	16.2	-8.7	16.2	1.20	-0.91	
3,500.0	2.90	201.05	3,498.3	12.4	-10.5	12.3	0.68	0.58	
3,591.0	1.49	138.63	3,589.2	9.3	-10.5	9.3	2.83	-1.55	
3,683.0	1.85	149.56	3,681.2	7.2	-9.0	7.1	0.52	0.39	
3,774.0	1.71	117.98	3,772.1	5.3	-7.0	5.2	1.07	-0.15	
3,866.0	1.27	131.46	3,864.1	3.9	-5.0	3.9	0.61	-0.48	
3,958.0	1.10	113.82	3,956.1	2.9	-3.5	2.9	0.44	-0.18	
4,050.0	0.79	96.15	4,048.1	2.5	-2.0	2.5	0.46	-0.34	
4,141.0	1.10	114.41	4,139.1	2.1	-0.6	2.0	0.47	0.34	
4,232.0	0.92	26.11	4,230.0	2.3	0.5	2.3	1.55	-0.20	
4,323.0	0.35	60.26	4,321.0	3.1	1.1	3.1	0.73	-0.63	
4,414.0	0.40	212.96	4,412.0	3.0	1.1	3.0	0.80	0.05	
4,505.0	0.84	193.87	4,503.0	2.1	0.8	2.1	0.53	0.48	
4,596.0	0.88	178.23	4,594.0	0.8	0.7	0.8	0.26	0.04	
4,687.0	1.58	155.39	4,685.0	-1.1	1.2	-1.1	0.92	0.77	
4,779.0	0.88	84.81	4,777.0	-2.2	2.4	-2.2	1.66	-0.76	
4,870.0	1.01	95.98	4,868.0	-2.2	3.9	-2.2	0.25	0.14	
4,962.0	0.79	108.36	4,960.0	-2.5	5.3	-2.5	0.32	-0.24	
5,053.0	3.43	22.84	5,050.9	-0.2	7.0	-0.2	3.80	2.90	
5,145.0	10.33	10.28	5,142.2	10.5	9.5	10.5	7.63	7.50	
5,236.0	15.38	16.34	5,230.9	30.1	14.4	30.2	5.74	5.55	
5,297.0	20.53	17.57	5,288.9	48.1	19.9	48.1	8.47	8.44	
5,328.0	23.08	18.19	5,317.7	59.0	23.4	59.1	8.26	8.23	
5,358.0	26.33	17.66	5,344.9	71.0	27.3	71.1	10.86	10.83	
5,389.0	29.45	17.08	5,372.3	84.8	31.6	84.9	10.10	10.06	
5,419.0	32.18	18.42	5,398.1	99.4	36.3	99.5	9.38	9.10	
5,480.0	38.24	20.59	5,447.9	132.6	48.1	132.7	10.14	9.93	
5,511.0	41.93	19.11	5,471.6	151.3	54.9	151.5	12.29	11.90	
5,541.0	47.25	17.71	5,493.0	171.3	61.5	171.5	18.03	17.73	
5,572.0	52.13	16.27	5,513.0	193.9	68.4	194.1	16.13	15.74	
5,601.0	55.78	13.25	5,530.1	216.6	74.3	216.8	15.14	12.59	
5,632.0	58.86	7.94	5,546.8	242.2	79.1	242.4	17.50	9.94	
5,662.0	61.76	2.64	5,561.7	268.2	81.5	268.4	18.13	9.67	
5,693.0	65.05	358.45	5,575.6	295.9	81.8	296.1	16.08	10.61	
5,724.0	68.44	353.45	5,587.8	324.3	79.7	324.5	18.41	10.94	
5,754.0	72.75	351.36	5,597.8	352.3	76.0	352.5	15.80	14.37	
5,785.0	77.27	350.91	5,605.8	381.9	71.4	382.1	14.64	14.58	
5,815.0	82.73	351.85	5,611.0	411.1	66.9	411.3	18.46	18.20	
5,845.0	86.42	353.38	5,613.8	440.7	63.1	440.9	13.31	12.30	
5,876.0	87.12	354.25	5,615.6	471.5	59.8	471.6	3.60	2.26	
5,906.0	87.91	354.75	5,616.9	501.3	56.9	501.5	3.12	2.63	
5,937.0	89.49	353.83	5,617.6	532.1	53.8	532.3	5.90	5.10	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
5,967.0	90.99	352.88	5,617.5	561.9	50.3	562.1	5.92	5.00	
5,999.0	92.30	353.00	5,616.6	593.7	46.4	593.8	4.11	4.10	
6,037.0	91.70	352.50	5,615.2	631.3	41.6	631.5	2.05	-1.58	
6,110.0	88.80	352.00	5,614.9	703.7	31.8	703.7	4.03	-3.97	
6,205.0	88.60	355.20	5,617.1	798.0	21.2	798.1	3.37	-0.21	
6,300.0	88.90	359.50	5,619.1	892.9	16.8	892.9	4.54	0.32	
6,395.0	91.20	359.20	5,619.1	987.9	15.7	987.9	2.44	2.42	
6,489.0	91.40	358.80	5,616.9	1,081.8	14.1	1,081.9	0.48	0.21	
6,584.0	91.43	358.82	5,614.6	1,176.8	12.1	1,176.8	0.04	0.03	
6,679.0	89.54	357.08	5,613.8	1,271.7	8.7	1,271.7	2.70	-1.99	
6,774.0	88.62	358.66	5,615.3	1,366.6	5.2	1,366.6	1.92	-0.97	
6,869.0	89.49	1.14	5,616.9	1,461.6	5.0	1,461.6	2.77	0.92	
6,963.0	88.97	0.82	5,618.1	1,555.6	6.6	1,555.6	0.65	-0.55	
7,058.0	90.24	3.92	5,618.8	1,650.5	10.6	1,650.5	3.53	1.34	
7,153.0	90.73	4.19	5,618.0	1,745.3	17.3	1,745.3	0.59	0.52	
7,248.0	91.47	2.48	5,616.2	1,840.1	22.8	1,840.1	1.96	0.78	
7,343.0	90.20	358.91	5,614.8	1,935.0	23.9	1,935.1	3.99	-1.34	
7,438.0	88.44	356.99	5,615.9	2,030.0	20.5	2,030.0	2.74	-1.85	
7,532.0	86.46	358.25	5,620.1	2,123.8	16.6	2,123.8	2.50	-2.11	
7,627.0	86.46	0.17	5,625.9	2,218.6	15.3	2,218.6	2.02	0.00	
7,722.0	88.44	2.01	5,630.2	2,313.5	17.1	2,313.5	2.84	2.08	
7,817.0	91.47	3.06	5,630.3	2,408.4	21.3	2,408.4	3.38	3.19	
7,912.0	93.32	358.81	5,626.3	2,503.2	22.9	2,503.3	4.88	1.95	
8,006.0	91.78	358.07	5,622.1	2,597.1	20.3	2,597.2	1.82	-1.64	
8,101.0	90.11	356.67	5,620.5	2,692.0	16.0	2,692.0	2.29	-1.76	
8,196.0	90.20	356.61	5,620.3	2,786.8	10.4	2,786.8	0.11	0.09	
8,291.0	87.78	357.97	5,621.9	2,881.7	5.9	2,881.7	2.92	-2.55	
8,382.0	86.33	0.36	5,626.6	2,972.6	4.6	2,972.6	3.07	-1.59	
8,474.0	86.81	2.73	5,632.1	3,064.3	7.1	3,064.4	2.62	0.52	
8,566.0	89.45	4.04	5,635.1	3,156.1	12.5	3,156.2	3.20	2.87	
8,657.0	90.46	1.92	5,635.2	3,247.0	17.2	3,247.0	2.58	1.11	
8,749.0	90.46	1.71	5,634.5	3,338.9	20.2	3,339.0	0.23	0.00	
8,841.0	90.11	1.63	5,634.0	3,430.9	22.8	3,431.0	0.39	-0.38	
8,932.0	88.79	1.42	5,634.9	3,521.9	25.3	3,521.9	1.47	-1.45	
9,023.0	90.59	1.86	5,635.4	3,612.8	27.9	3,612.9	2.04	1.98	
9,114.0	91.78	359.70	5,633.5	3,703.8	29.1	3,703.9	2.71	1.31	
9,206.0	90.15	358.47	5,631.9	3,795.8	27.6	3,795.8	2.22	-1.77	
9,298.0	90.51	359.14	5,631.4	3,887.7	25.7	3,887.8	0.83	0.39	
9,389.0	91.12	359.97	5,630.1	3,978.7	25.0	3,978.8	1.13	0.67	
9,481.0	88.04	358.51	5,630.8	4,070.7	23.8	4,070.8	3.70	-3.35	
9,572.0	86.90	358.32	5,634.8	4,161.6	21.3	4,161.6	1.27	-1.25	
9,663.0	88.04	359.76	5,638.8	4,252.5	19.7	4,252.5	2.02	1.25	
9,755.0	90.11	0.49	5,640.3	4,344.5	19.9	4,344.5	2.39	2.25	
9,846.0	90.51	1.32	5,639.8	4,435.4	21.4	4,435.5	1.01	0.44	
9,938.0	90.42	1.29	5,639.1	4,527.4	23.5	4,527.5	0.10	-0.10	
10,029.0	91.52	0.18	5,637.5	4,618.4	24.6	4,618.4	1.72	1.21	
10,119.0	89.27	358.23	5,636.9	4,708.4	23.4	4,708.4	3.31	-2.50	
10,211.0	88.04	357.85	5,639.1	4,800.3	20.3	4,800.3	1.40	-1.34	
10,302.0	87.21	357.61	5,642.8	4,891.1	16.6	4,891.2	0.95	-0.91	
10,394.0	87.78	358.64	5,646.9	4,983.0	13.6	4,983.0	1.28	0.62	
10,485.0	87.03	358.22	5,651.0	5,073.9	11.2	5,073.9	0.94	-0.82	
10,577.0	86.95	0.12	5,655.8	5,165.7	9.8	5,165.7	2.06	-0.09	
10,669.0	89.05	2.83	5,659.0	5,257.6	12.2	5,257.6	3.73	2.28	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
10,760.0	88.97	2.83	5,660.6	5,348.5	16.7	5,348.5	0.09	-0.09	
10,852.0	90.68	0.92	5,660.9	5,440.4	19.7	5,440.5	2.79	1.86	
10,944.0	88.79	358.74	5,661.3	5,532.4	19.4	5,532.5	3.14	-2.05	
11,036.0	87.65	358.12	5,664.2	5,624.4	16.9	5,624.4	1.41	-1.24	
11,128.0	88.04	0.62	5,667.6	5,716.3	15.9	5,716.3	2.75	0.42	
11,219.0	89.41	1.31	5,669.6	5,807.2	17.4	5,807.3	1.69	1.51	
11,310.0	88.57	1.05	5,671.2	5,898.2	19.3	5,898.2	0.97	-0.92	
11,401.0	90.64	1.08	5,671.9	5,989.2	21.0	5,989.2	2.27	2.27	
11,492.0	90.24	0.88	5,671.2	6,080.2	22.5	6,080.2	0.49	-0.44	
11,583.0	89.10	0.73	5,671.7	6,171.2	23.8	6,171.2	1.26	-1.25	
11,674.0	88.09	0.55	5,673.9	6,262.1	24.8	6,262.2	1.13	-1.11	
11,765.0	90.15	0.37	5,675.3	6,353.1	25.6	6,353.1	2.27	2.26	
11,857.0	89.76	0.21	5,675.4	6,445.1	26.0	6,445.1	0.46	-0.42	
11,948.0	89.93	359.37	5,675.6	6,536.1	25.7	6,536.1	0.94	0.19	
12,040.0	90.15	358.63	5,675.6	6,628.1	24.1	6,628.1	0.84	0.24	
12,131.0	92.53	359.94	5,673.5	6,719.0	23.0	6,719.1	2.99	2.62	
12,223.0	91.82	358.07	5,670.0	6,811.0	21.4	6,811.0	2.17	-0.77	
12,314.0	91.82	357.78	5,667.1	6,901.9	18.1	6,901.9	0.32	0.00	
12,405.0	91.56	356.98	5,664.4	6,992.7	13.9	6,992.7	0.92	-0.29	
12,496.0	89.58	357.67	5,663.5	7,083.6	9.7	7,083.6	2.30	-2.18	
12,588.0	88.92	0.26	5,664.7	7,175.6	8.0	7,175.6	2.90	-0.72	
12,679.0	91.65	0.91	5,664.2	7,266.6	8.9	7,266.6	3.08	3.00	
12,770.0	92.13	0.04	5,661.2	7,357.5	9.7	7,357.5	1.09	0.53	
12,862.0	92.70	359.51	5,657.4	7,449.4	9.3	7,449.4	0.85	0.62	
12,953.0	90.02	357.73	5,655.2	7,540.4	7.1	7,540.4	3.54	-2.95	
13,044.0	87.82	357.50	5,656.9	7,631.3	3.3	7,631.2	2.43	-2.42	
13,136.0	88.70	357.34	5,659.7	7,723.1	-0.8	7,723.1	0.97	0.96	
13,230.0	88.31	357.68	5,662.2	7,817.0	-4.9	7,817.0	0.55	-0.41	
13,325.0	89.85	357.56	5,663.7	7,911.9	-8.8	7,911.9	1.63	1.62	
13,428.0	91.56	358.11	5,662.4	8,014.8	-12.7	8,014.8	1.74	1.66	Last Cathedral Survey @ 13,428' MD Projection to Bit @ 13,478' - TD - 151' FNL, 516'
13,478.0	91.56	358.11	5,661.1	8,064.8	-14.4	8,064.7	0.00	0.00	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	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	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
2215A PBHL P6	0.00	0.00	5,665.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 62.9ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 4600 P6	0.00	0.00	5,640.0	4,600.0	21.1	1,546,416.13	3,458,330.50	40° 49' 17.53 N	103° 50' 38.33 W
- actual wellpath misses target center by 4.0ft at 10010.5ft MD (5638.0 TVD, 4599.9 N, 24.6 E)									
- Point									
2215A VS 1400 P6	0.00	0.00	5,612.0	1,399.9	20.9	1,543,216.59	3,458,390.06	40° 48' 45.91 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 6807.2ft MD (5616.0 TVD, 1399.8 N, 4.7 E)									
- Point									
2215A BHL P3	0.00	0.00	5,630.0	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 68.2ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 3000 P6	0.00	0.00	5,633.0	2,999.9	21.0	1,544,816.31	3,458,360.28	40° 49' 1.72 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 8410.1ft MD (5628.4 TVD, 3000.6 N, 5.0 E)									
- Point									
2215A VS 7000 P6	0.00	0.00	5,680.0	7,000.0	21.2	1,548,815.72	3,458,285.79	40° 49' 41.25 N	103° 50' 38.33 W
- actual wellpath misses target center by 17.5ft at 12411.8ft MD (5664.2 TVD, 6999.5 N, 13.6 E)									
- Point									
2215A PBHL P5	0.00	0.00	5,622.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 74.0ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A BHL	0.00	0.00	5,649.3	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 61.8ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A Tgt	0.00	0.00	5,649.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 18.9ft at 13031.7ft MD (5656.5 TVD, 7619.0 N, 3.9 E)									
- Point									
2215A Tgt P3	0.00	0.00	5,630.0	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 31.7ft at 13031.4ft MD (5656.5 TVD, 7618.6 N, 3.9 E)									
- Point									
2215A PBHL P4	0.00	0.00	5,622.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 38.4ft at 13031.2ft MD (5656.5 TVD, 7618.5 N, 3.9 E)									
- Point									
2215A VS 5800 P6	0.00	0.00	5,675.0	5,800.0	21.2	1,547,615.93	3,458,308.19	40° 49' 29.39 N	103° 50' 38.33 W
- actual wellpath misses target center by 6.7ft at 11211.9ft MD (5669.6 TVD, 5800.2 N, 17.3 E)									
- Point									

Casing Points					
	Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
	6,076.0	5,614.6	7" - 1,832' FNL, 605' FEL		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
2215A PBHL P6	0.00	0.00	5,665.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 62.9ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 4600 P6	0.00	0.00	5,640.0	4,600.0	21.1	1,546,416.13	3,458,330.50	40° 49' 17.53 N	103° 50' 38.33 W
- actual wellpath misses target center by 4.0ft at 10010.5ft MD (5638.0 TVD, 4599.9 N, 24.6 E)									
- Point									
2215A VS 1400 P6	0.00	0.00	5,612.0	1,399.9	20.9	1,543,216.59	3,458,390.06	40° 48' 45.91 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 6807.2ft MD (5616.0 TVD, 1399.8 N, 4.7 E)									
- Point									
2215A BHL P3	0.00	0.00	5,630.0	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 68.2ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 3000 P6	0.00	0.00	5,633.0	2,999.9	21.0	1,544,816.31	3,458,360.28	40° 49' 1.72 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 8410.1ft MD (5628.4 TVD, 3000.6 N, 5.0 E)									
- Point									
2215A VS 7000 P6	0.00	0.00	5,680.0	7,000.0	21.2	1,548,815.72	3,458,285.79	40° 49' 41.25 N	103° 50' 38.33 W
- actual wellpath misses target center by 17.5ft at 12411.8ft MD (5664.2 TVD, 6999.5 N, 13.6 E)									
- Point									
2215A PBHL P5	0.00	0.00	5,622.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 74.0ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A BHL	0.00	0.00	5,649.3	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 61.8ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A Tgt	0.00	0.00	5,649.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 18.9ft at 13031.7ft MD (5656.5 TVD, 7619.0 N, 3.9 E)									
- Point									
2215A Tgt P3	0.00	0.00	5,630.0	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 31.7ft at 13031.4ft MD (5656.5 TVD, 7618.6 N, 3.9 E)									
- Point									
2215A PBHL P4	0.00	0.00	5,622.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 38.4ft at 13031.2ft MD (5656.5 TVD, 7618.5 N, 3.9 E)									
- Point									
2215A VS 5800 P6	0.00	0.00	5,675.0	5,800.0	21.2	1,547,615.93	3,458,308.19	40° 49' 29.39 N	103° 50' 38.33 W
- actual wellpath misses target center by 6.7ft at 11211.9ft MD (5669.6 TVD, 5800.2 N, 17.3 E)									
- Point									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
6,076.0	5,614.6	7" - 1,832' FNL, 605' FEL		

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
13,428.0	5,662.4	8,014.8	-12.7	Last Cathedral Survey @ 13,428' MD
13,478.0	5,661.1	8,064.8	-14.4	Projection to Bit @ 13,478'
13,478.0	5,661.1	8,064.8	-14.4	TD - 151' FNL, 516' FEL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #27I-2215A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	HZ @ 4773.3ft
<b>Site:</b>	S27-T10N-R58W	<b>MD Reference:</b>	HZ @ 4773.3ft
<b>Well:</b>	Razor #27I-2215A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	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	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
2215A PBHL P6	0.00	0.00	5,665.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 62.9ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 4600 P6	0.00	0.00	5,640.0	4,600.0	21.1	1,546,416.13	3,458,330.50	40° 49' 17.53 N	103° 50' 38.33 W
- actual wellpath misses target center by 4.0ft at 10010.5ft MD (5638.0 TVD, 4599.9 N, 24.6 E)									
- Point									
2215A VS 1400 P6	0.00	0.00	5,612.0	1,399.9	20.9	1,543,216.59	3,458,390.06	40° 48' 45.91 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 6807.2ft MD (5616.0 TVD, 1399.8 N, 4.7 E)									
- Point									
2215A BHL P3	0.00	0.00	5,630.0	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 68.2ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A VS 3000 P6	0.00	0.00	5,633.0	2,999.9	21.0	1,544,816.31	3,458,360.28	40° 49' 1.72 N	103° 50' 38.34 W
- actual wellpath misses target center by 16.7ft at 8410.1ft MD (5628.4 TVD, 3000.6 N, 5.0 E)									
- Point									
2215A VS 7000 P6	0.00	0.00	5,680.0	7,000.0	21.2	1,548,815.72	3,458,285.79	40° 49' 41.25 N	103° 50' 38.33 W
- actual wellpath misses target center by 17.5ft at 12411.8ft MD (5664.2 TVD, 6999.5 N, 13.6 E)									
- Point									
2215A PBHL P5	0.00	0.00	5,622.0	8,116.5	21.3	1,549,932.03	3,458,265.04	40° 49' 52.28 N	103° 50' 38.33 W
- actual wellpath misses target center by 74.0ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A BHL	0.00	0.00	5,649.3	8,119.7	11.3	1,549,935.08	3,458,255.03	40° 49' 52.31 N	103° 50' 38.46 W
- actual wellpath misses target center by 61.8ft at 13478.0ft MD (5661.1 TVD, 8064.8 N, -14.4 E)									
- Point									
2215A Tgt	0.00	0.00	5,649.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 18.9ft at 13031.7ft MD (5656.5 TVD, 7619.0 N, 3.9 E)									
- Point									
2215A Tgt P3	0.00	0.00	5,630.0	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 31.7ft at 13031.4ft MD (5656.5 TVD, 7618.6 N, 3.9 E)									
- Point									
2215A PBHL P4	0.00	0.00	5,622.3	7,619.9	21.3	1,549,435.48	3,458,274.32	40° 49' 47.37 N	103° 50' 38.33 W
- actual wellpath misses target center by 38.4ft at 13031.2ft MD (5656.5 TVD, 7618.5 N, 3.9 E)									
- Point									
2215A VS 5800 P6	0.00	0.00	5,675.0	5,800.0	21.2	1,547,615.93	3,458,308.19	40° 49' 29.39 N	103° 50' 38.33 W
- actual wellpath misses target center by 6.7ft at 11211.9ft MD (5669.6 TVD, 5800.2 N, 17.3 E)									
- Point									

Casing Points					
	Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
	6,076.0	5,614.6	7" - 1,832' FNL, 605' FEL		

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_