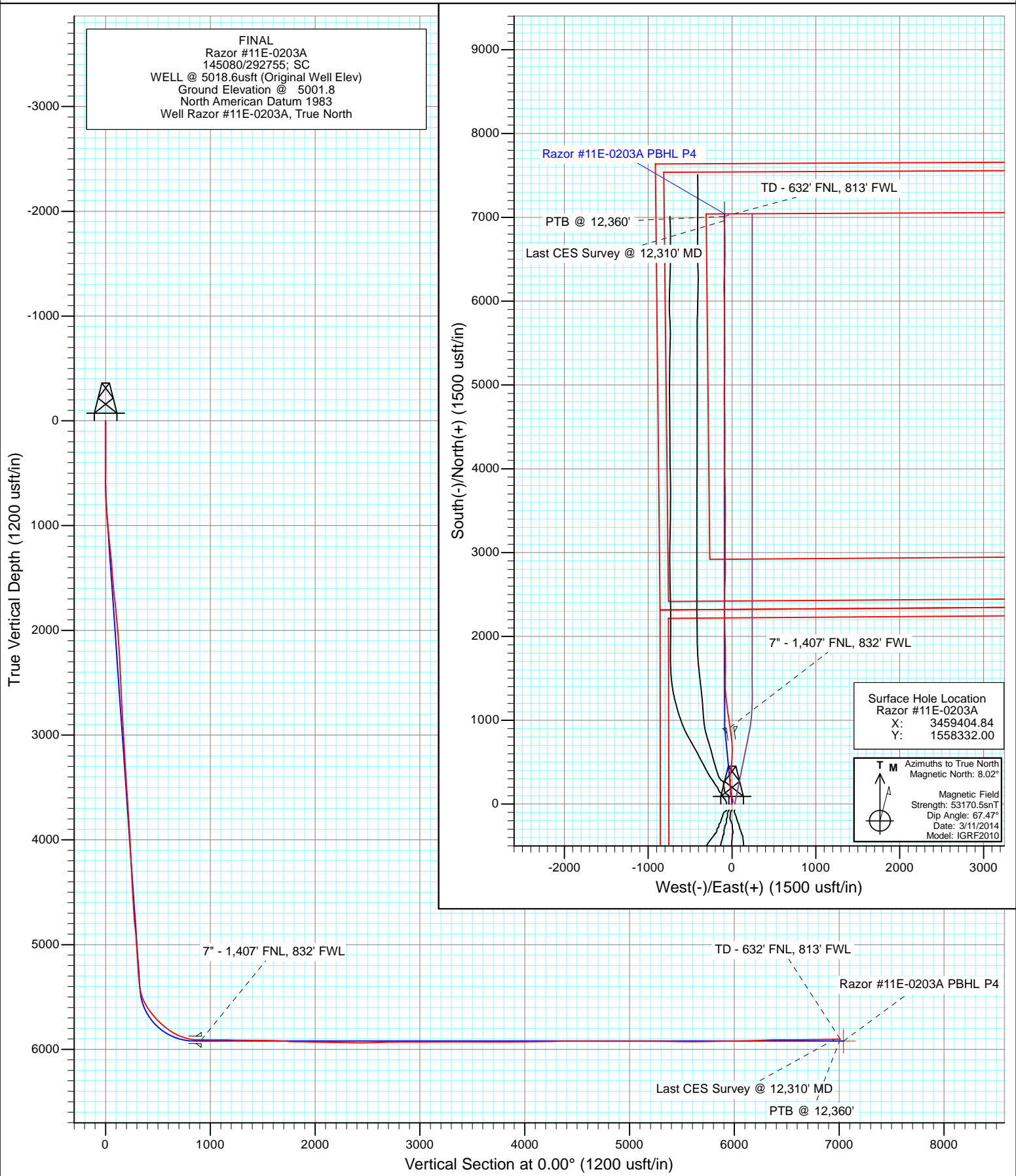


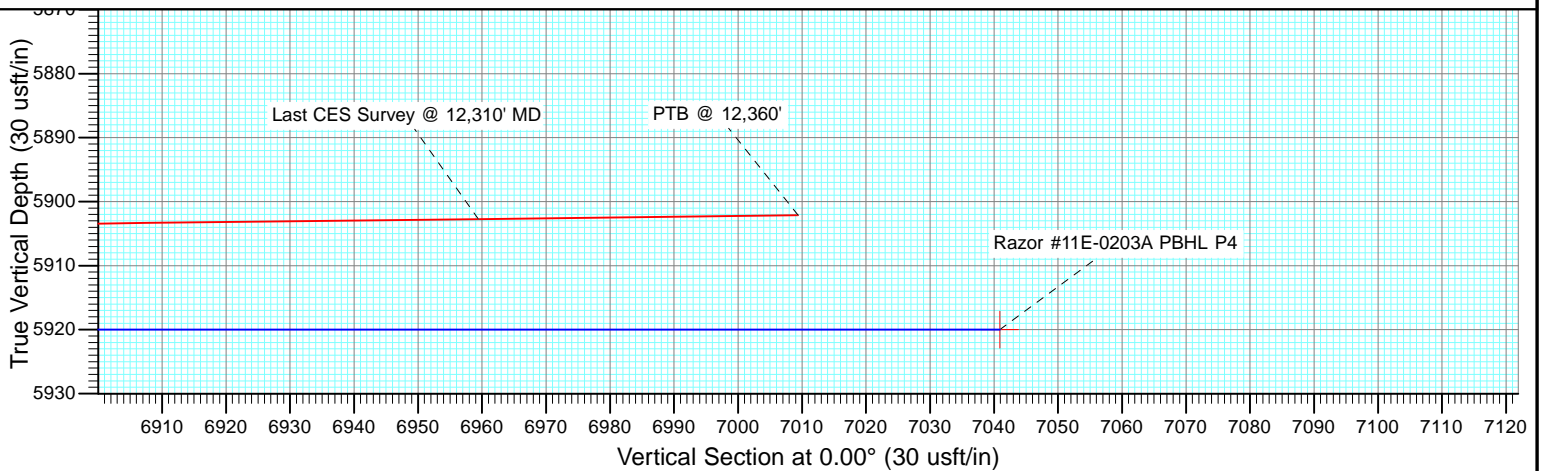
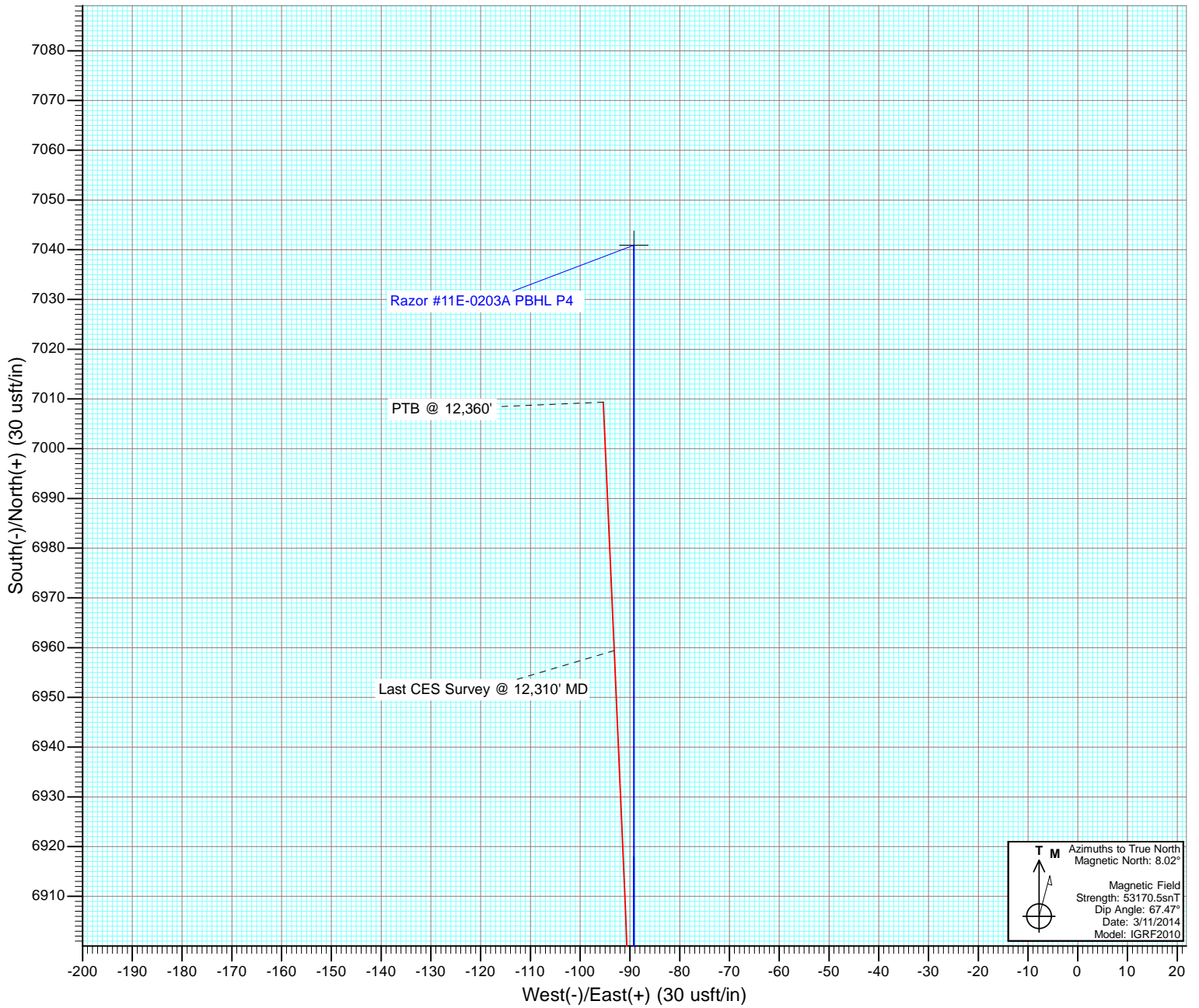


Project: Weld County, CO  
Site: S11-T10N-R58W  
Well: Razor #11E-0203A  
Wellbore: HZ  
Design: FINAL





Project: Weld County, CO  
Site: S11-T10N-R58W  
Well: Razor #11E-0203A  
Wellbore: HZ  
Design: FINAL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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	S11-T10N-R58W				
Site Position:		Northing:	1,558,620.57 usft	Latitude:	40.854775
From:	Lat/Long	Easting:	3,463,389.92 usft	Longitude:	-103.824847
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.08 °

Well		Razor #11E-0203A				
Well Position	+N/-S	0.0 usft	Northing:	1,558,332.00 usft	Latitude:	40.854189
	+E/-W	0.0 usft	Easting:	3,459,404.84 usft	Longitude:	-103.839269
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,001.8 usft

<b>Wellbore</b>	HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2010	3/11/2014	(°)	(°)	(nT)
			8.02	67.47	53,171

<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>	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	0.00	

<b>Survey Program</b>	<b>Date</b>	3/20/2014			
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
(usft)	(usft)				
413.0	12,360.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

<b>Survey</b>									
<b>Measured</b>	<b>Vertical</b>	<b>Vertical</b>	<b>Dogleg</b>	<b>Build</b>	<b>Formations /</b>				
<b>Depth</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Depth</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Section</b>	<b>Rate</b>	<b>Rate</b>	<b>Comments</b>
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usf	(°/100u	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
413.0	1.45	274.21	413.0	0.4	-5.2	0.4	0.35	0.35	
597.0	0.53	317.27	596.9	1.2	-8.1	1.2	0.61	-0.50	
690.0	2.20	38.31	689.9	2.9	-7.3	2.9	2.35	1.80	
782.0	4.22	44.29	781.8	6.7	-3.8	6.7	2.22	2.20	
874.0	4.57	48.59	873.5	11.6	1.3	11.6	0.52	0.38	
965.0	5.45	35.30	964.1	17.5	6.5	17.5	1.59	0.97	
1,056.0	6.37	16.34	1,054.7	25.9	10.4	25.9	2.36	1.01	
1,148.0	6.86	355.86	1,146.1	36.2	11.4	36.2	2.60	0.53	
1,240.0	6.02	342.32	1,237.5	46.3	9.6	46.3	1.88	-0.91	
1,332.0	4.62	332.30	1,329.1	54.2	6.4	54.2	1.82	-1.52	
1,820.0	6.46	343.38	1,814.8	97.9	-10.6	97.9	0.43	0.38	
1,949.0	6.46	336.59	1,943.0	111.5	-15.5	111.5	0.59	0.00	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
2,040.0	4.40	345.84	2,033.6	119.6	-18.4	119.6	2.45	-2.26	
2,131.0	3.87	344.74	2,124.3	125.9	-20.1	125.9	0.59	-0.58	
2,223.0	3.12	14.82	2,216.2	131.4	-20.3	131.4	2.12	-0.82	
2,314.0	3.16	15.86	2,307.0	136.2	-19.0	136.2	0.08	0.04	
2,407.0	2.81	14.73	2,399.9	140.8	-17.7	140.8	0.38	-0.38	
2,497.0	2.55	13.38	2,489.8	144.9	-16.7	144.9	0.30	-0.29	
2,588.0	2.81	14.96	2,580.7	149.0	-15.6	149.0	0.30	0.29	
2,680.0	2.68	21.80	2,672.6	153.2	-14.2	153.2	0.38	-0.14	
2,771.0	4.00	341.76	2,763.5	158.2	-14.4	158.2	2.86	1.45	
2,863.0	3.69	336.38	2,855.2	164.0	-16.6	164.0	0.52	-0.34	
2,954.0	3.96	317.03	2,946.1	168.9	-19.9	168.9	1.44	0.30	
3,046.0	3.30	348.14	3,037.9	173.9	-22.6	173.9	2.22	-0.72	
3,137.0	2.99	342.87	3,128.7	178.7	-23.9	178.7	0.47	-0.34	
3,229.0	4.04	4.79	3,220.6	184.2	-24.3	184.2	1.83	1.14	
3,320.0	3.47	9.81	3,311.4	190.1	-23.6	190.1	0.72	-0.63	
3,412.0	2.86	13.73	3,403.2	195.1	-22.6	195.1	0.70	-0.66	
3,504.0	4.00	351.62	3,495.1	200.5	-22.5	200.5	1.88	1.24	
3,596.0	3.82	350.88	3,586.9	206.7	-23.4	206.7	0.20	-0.20	
3,687.0	3.96	347.55	3,677.6	212.8	-24.6	212.8	0.29	0.15	
3,778.0	4.13	345.47	3,768.4	219.0	-26.1	219.0	0.25	0.19	
3,869.0	3.91	344.46	3,859.2	225.2	-27.8	225.2	0.25	-0.24	
3,961.0	3.03	350.05	3,951.0	230.6	-29.0	230.6	1.02	-0.96	
4,052.0	2.86	12.54	4,041.9	235.2	-28.9	235.2	1.27	-0.19	
4,143.0	2.77	16.80	4,132.8	239.5	-27.8	239.5	0.25	-0.10	
4,235.0	3.03	2.64	4,224.7	244.0	-27.1	244.0	0.83	0.28	
4,327.0	2.81	22.24	4,316.6	248.6	-26.1	248.6	1.11	-0.24	
4,418.0	3.87	2.82	4,407.4	253.7	-25.1	253.7	1.69	1.16	
4,508.0	2.99	24.00	4,587.1	264.1	-22.9	264.1	0.85	-0.49	
4,690.0	3.21	18.27	4,679.0	268.7	-21.1	268.7	0.41	0.24	
4,781.0	5.89	9.07	4,769.7	275.7	-19.6	275.7	3.04	2.95	
4,873.0	6.02	344.73	4,861.2	285.0	-20.1	285.0	2.73	0.14	
4,964.0	4.70	335.89	4,951.8	293.0	-22.9	293.0	1.71	-1.45	
5,056.0	3.47	333.04	5,043.5	299.0	-25.7	299.0	1.35	-1.34	
5,148.0	3.78	349.41	5,135.4	304.4	-27.5	304.4	1.17	0.34	
5,239.0	4.44	12.54	5,226.1	310.8	-27.3	310.8	1.94	0.73	
5,330.0	3.65	8.94	5,316.9	317.1	-26.1	317.1	0.91	-0.87	
5,421.0	8.48	4.55	5,407.4	326.7	-25.1	326.7	5.33	5.31	
5,512.0	18.86	7.13	5,495.7	348.0	-22.7	348.0	11.42	11.41	
5,603.0	31.16	10.31	5,578.0	385.9	-16.7	385.9	13.59	13.52	
5,695.0	38.29	6.22	5,653.6	437.7	-9.3	437.7	8.15	7.75	
5,790.0	43.96	3.52	5,725.1	500.0	-4.1	500.0	6.25	5.97	
5,885.0	51.52	2.64	5,788.9	570.1	-0.3	570.1	7.99	7.96	
5,917.0	55.21	3.83	5,808.0	595.8	1.1	595.8	11.91	11.53	
5,948.0	56.31	2.21	5,825.5	621.4	2.5	621.4	5.59	3.55	
5,980.0	60.09	0.52	5,842.3	648.5	3.1	648.5	12.64	11.81	
6,011.0	63.34	357.26	5,857.0	675.8	2.6	675.8	13.99	10.48	
6,043.0	67.25	356.12	5,870.4	704.8	0.9	704.8	12.64	12.21	
6,075.0	70.86	353.94	5,881.8	734.6	-1.7	734.6	12.95	11.28	
6,106.0	73.85	353.93	5,891.2	764.0	-4.8	764.0	9.65	9.65	
6,138.0	77.32	353.41	5,899.2	794.8	-8.2	794.8	10.96	10.85	
6,169.0	81.71	352.55	5,904.8	825.0	-12.0	825.0	14.42	14.16	
6,201.0	86.69	351.98	5,908.1	856.6	-16.3	856.6	15.66	15.56	
6,223.0	89.01	352.13	5,908.9	878.3	-19.3	878.3	10.57	10.55	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
6,359.0	90.42	351.47	5,909.6	1,012.9	-38.7	1,012.9	1.14	1.04	
6,454.0	89.89	352.18	5,909.3	1,107.0	-52.2	1,107.0	0.93	-0.56	
6,548.0	88.75	353.06	5,910.4	1,200.2	-64.3	1,200.2	1.53	-1.21	
6,643.0	89.14	354.99	5,912.2	1,294.6	-74.2	1,294.6	2.07	0.41	
6,738.0	88.88	357.59	5,913.8	1,389.4	-80.3	1,389.4	2.75	-0.27	
6,832.0	90.24	1.73	5,914.5	1,483.4	-80.9	1,483.4	4.64	1.45	
6,927.0	87.82	0.65	5,916.2	1,578.3	-78.9	1,578.3	2.79	-2.55	
7,021.0	87.08	0.05	5,920.3	1,672.2	-78.3	1,672.2	1.01	-0.79	
7,115.0	86.77	359.03	5,925.4	1,766.1	-79.1	1,766.1	1.13	-0.33	
7,210.0	89.93	359.03	5,928.1	1,861.0	-80.7	1,861.0	3.33	3.33	
7,302.0	89.41	358.64	5,928.6	1,953.0	-82.5	1,953.0	0.71	-0.57	
7,394.0	88.88	358.29	5,930.0	2,045.0	-85.0	2,045.0	0.69	-0.58	
7,487.0	88.31	357.74	5,932.3	2,137.9	-88.2	2,137.9	0.85	-0.61	
7,579.0	89.58	359.44	5,934.0	2,229.8	-90.5	2,229.8	2.31	1.38	
7,670.0	88.66	358.68	5,935.4	2,320.8	-92.0	2,320.8	1.31	-1.01	
7,763.0	89.41	1.38	5,937.0	2,413.8	-91.9	2,413.8	3.01	0.81	
7,856.0	91.78	2.50	5,936.0	2,506.7	-88.8	2,506.7	2.82	2.55	
7,947.0	91.69	1.88	5,933.2	2,597.6	-85.3	2,597.6	0.69	-0.10	
8,039.0	91.74	2.06	5,930.5	2,689.5	-82.2	2,689.5	0.20	0.05	
8,131.0	90.15	359.82	5,929.0	2,781.5	-80.6	2,781.5	2.99	-1.73	
8,222.0	89.71	359.23	5,929.1	2,872.5	-81.4	2,872.5	0.81	-0.48	
8,314.0	90.24	0.15	5,929.1	2,964.5	-81.9	2,964.5	1.15	0.58	
8,405.0	89.85	359.51	5,929.0	3,055.5	-82.2	3,055.5	0.82	-0.43	
8,497.0	90.20	0.04	5,929.0	3,147.5	-82.5	3,147.5	0.69	0.38	
8,588.0	90.73	0.56	5,928.3	3,238.5	-82.1	3,238.5	0.82	0.58	
8,679.0	89.45	0.09	5,928.1	3,329.5	-81.5	3,329.5	1.50	-1.41	
8,770.0	90.02	0.58	5,928.5	3,420.5	-81.0	3,420.5	0.83	0.63	
8,862.0	89.80	359.82	5,928.7	3,512.5	-80.7	3,512.5	0.86	-0.24	
8,954.0	90.02	359.92	5,928.8	3,604.5	-80.9	3,604.5	0.26	0.24	
9,045.0	89.89	359.04	5,928.9	3,695.5	-81.7	3,695.5	0.98	-0.14	
9,136.0	90.07	358.94	5,928.9	3,786.4	-83.3	3,786.4	0.23	0.20	
9,228.0	90.24	358.55	5,928.7	3,878.4	-85.3	3,878.4	0.46	0.18	
9,320.0	90.33	358.70	5,928.2	3,970.4	-87.5	3,970.4	0.19	0.10	
9,411.0	90.95	0.77	5,927.2	4,061.4	-88.0	4,061.4	2.37	0.68	
9,503.0	91.03	0.73	5,925.6	4,153.4	-86.8	4,153.4	0.10	0.09	
9,595.0	91.12	0.68	5,923.9	4,245.3	-85.6	4,245.3	0.11	0.10	
9,686.0	90.77	359.99	5,922.4	4,336.3	-85.1	4,336.3	0.85	-0.38	
9,778.0	90.55	359.78	5,921.3	4,428.3	-85.3	4,428.3	0.33	-0.24	
9,869.0	90.24	359.47	5,920.7	4,519.3	-85.9	4,519.3	0.48	-0.34	
9,960.0	90.11	359.23	5,920.4	4,610.3	-86.9	4,610.3	0.30	-0.14	
10,052.0	89.45	358.80	5,920.8	4,702.3	-88.5	4,702.3	0.86	-0.72	
10,143.0	89.05	358.11	5,922.0	4,793.3	-90.9	4,793.3	0.88	-0.44	
10,234.0	90.11	359.66	5,922.6	4,884.2	-92.7	4,884.2	2.06	1.16	
10,326.0	90.29	1.36	5,922.3	4,976.2	-91.9	4,976.2	1.86	0.20	
10,418.0	90.29	1.47	5,921.9	5,068.2	-89.6	5,068.2	0.12	0.00	
10,509.0	89.63	0.60	5,921.9	5,159.2	-88.0	5,159.2	1.20	-0.73	
10,601.0	89.89	0.64	5,922.3	5,251.2	-87.0	5,251.2	0.29	0.28	
10,691.0	89.36	0.32	5,922.9	5,341.2	-86.2	5,341.2	0.69	-0.59	
10,783.0	88.92	359.42	5,924.3	5,433.2	-86.4	5,433.2	1.09	-0.48	
10,874.0	88.75	359.00	5,926.1	5,524.1	-87.7	5,524.1	0.50	-0.19	
10,965.0	90.15	359.54	5,927.0	5,615.1	-88.9	5,615.1	1.65	1.54	
11,057.0	91.69	0.14	5,925.5	5,707.1	-89.1	5,707.1	1.80	1.67	
11,149.0	91.30	359.87	5,923.1	5,799.1	-89.1	5,799.1	0.52	-0.42	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
11,241.0	90.73	359.40	5,921.5	5,891.1	-89.7	5,891.1	0.80	-0.62	
11,332.0	90.46	358.77	5,920.5	5,982.0	-91.1	5,982.0	0.75	-0.30	
11,423.0	90.59	358.36	5,919.7	6,073.0	-93.4	6,073.0	0.47	0.14	
11,514.0	92.53	359.38	5,917.2	6,164.0	-95.2	6,164.0	2.41	2.13	
11,605.0	93.05	2.38	5,912.8	6,254.8	-93.8	6,254.8	3.34	0.57	
11,696.0	91.12	2.76	5,909.5	6,345.7	-89.7	6,345.7	2.16	-2.12	
11,788.0	89.89	1.23	5,908.7	6,437.6	-86.5	6,437.6	2.13	-1.34	
11,879.0	89.85	0.77	5,908.9	6,528.6	-85.0	6,528.6	0.51	-0.04	
11,974.0	91.08	359.64	5,908.1	6,623.6	-84.6	6,623.6	1.76	1.29	
12,069.0	91.21	359.28	5,906.2	6,718.6	-85.5	6,718.6	0.40	0.14	
12,163.0	90.90	358.30	5,904.5	6,812.5	-87.5	6,812.5	1.09	-0.33	
12,258.0	90.51	357.59	5,903.3	6,907.5	-90.9	6,907.5	0.85	-0.41	
12,310.0	90.73	357.47	5,902.8	6,959.4	-93.1	6,959.4	0.48	0.42	Last CES Survey @ 12,310' MD
12,360.0	90.73	357.47	5,902.1	7,009.4	-95.3	7,009.4	0.00	0.00	PTB @ 12,360' - TD - 632' FNL, 813' FWL

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude Longitude
Razor #11E-0203A PBH	- actual wellpath misses target center by 35.1usft at 12360.0usft MD (5902.1 TVD, 7009.4 N, -95.3 E)	0.00	0.00	5,912.0	7,041.0	-83.7	1,565,370.20	3,459,189.25	40.873514 -103.839572
- Point									
Razor #11E-0203A PBH	- actual wellpath misses target center by 36.8usft at 12360.0usft MD (5902.1 TVD, 7009.4 N, -95.3 E)	0.00	0.00	5,920.0	7,040.9	-89.2	1,565,370.00	3,459,183.79	40.873514 -103.839592
- Point									
Razor #11E-0203A PBH	- actual wellpath misses target center by 531.9usft at 12360.0usft MD (5902.1 TVD, 7009.4 N, -95.3 E)	0.00	0.00	5,920.0	7,540.9	-89.2	1,565,869.93	3,459,174.42	40.874886 -103.839592
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,259.2	5,909.4	7" - 1,407' FNL, 832' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment	
12,310.0	5,902.8	6,959.4	-93.1	Last CES Survey @ 12,310' MD	
12,360.0	5,902.1	7,009.4	-95.3	PTB @ 12,360'	
12,360.0	5,902.1	7,009.4	-95.3	TD - 632' FNL, 813' FWL	

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

**Weld County, CO**

**S11-T10N-R58W**

**Razor #11E-0203A**

**HZ**

**Design: FINAL**

## **Survey Report - Geographic**

**20 March, 2014**

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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		S11-T10N-R58W			
Site Position:		Northing:	1,558,620.57 usft	Latitude:	40.854775
From:	Lat/Long	Easting:	3,463,389.92 usft	Longitude:	-103.824847
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.08 °

Well	Razor #11E-0203A					
Well Position	+N/-S	0.0 usft	Northing:	1,558,332.01 usft	Latitude:	40.854189
	+E/-W	0.0 usft	Easting:	3,459,404.83 usft	Longitude:	-103.839270
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,001.8 usft

<b>Wellbore</b>	HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
			(°)	(°)	(nT)
	IGRF2010	3/11/2014	8.02	67.47	53,171

<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>	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	0.00	

<b>Survey Program</b>	<b>Date</b>	3/20/2014			
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
(usft)	(usft)				
413.0	12,360.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

<b>Survey</b>										
<b>Measured</b>	<b>Vertical</b>	<b>Map</b>	<b>Map</b>	<b>Latitude</b>	<b>Longitude</b>					
<b>Depth</b>	<b>Depth</b>	<b>Northing</b>	<b>Easting</b>							
(usft)	(usft)	(usft)	(usft)							
0.0	0.0	0.0	0.0	40.854189	-103.839270					
413.0	1.45	274.21	413.0	40.854190	-103.839289					
597.0	0.53	317.27	596.9	40.854192	-103.839299					
690.0	2.20	38.31	689.9	40.854197	-103.839296					
782.0	4.22	44.29	781.8	40.854207	-103.839284					
874.0	4.57	48.59	873.5	40.854221	-103.839265					
965.0	5.45	35.30	964.1	40.854237	-103.839246					
1,056.0	6.37	16.34	1,054.7	40.854260	-103.839232					
1,148.0	6.86	355.86	1,146.1	40.854288	-103.839228					
1,240.0	6.02	342.32	1,237.5	40.854316	-103.839235					
1,332.0	4.62	332.30	1,329.1	40.854338	-103.839247					
1,820.0	6.46	343.38	1,814.8	40.854458	-103.839308					



# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
1,949.0	6.46	336.59	1,943.0	111.5	-15.5	1,558,443.20	3,459,387.20	40.854495	-103.839326	
2,040.0	4.40	345.84	2,033.6	119.6	-18.4	1,558,451.23	3,459,384.16	40.854517	-103.839336	
2,131.0	3.87	344.74	2,124.3	125.9	-20.1	1,558,457.55	3,459,382.38	40.854535	-103.839342	
2,223.0	3.12	14.82	2,216.2	131.4	-20.3	1,558,462.96	3,459,382.10	40.854549	-103.839343	
2,314.0	3.16	15.86	2,307.0	136.2	-19.0	1,558,467.79	3,459,383.33	40.854563	-103.839338	
2,407.0	2.81	14.73	2,399.9	140.8	-17.7	1,558,472.48	3,459,384.52	40.854575	-103.839334	
2,497.0	2.55	13.38	2,489.8	144.9	-16.7	1,558,476.58	3,459,385.47	40.854587	-103.839330	
2,588.0	2.81	14.96	2,580.7	149.0	-15.6	1,558,480.73	3,459,386.44	40.854598	-103.839326	
2,680.0	2.68	21.80	2,672.6	153.2	-14.2	1,558,484.93	3,459,387.74	40.854609	-103.839321	
2,771.0	4.00	341.76	2,763.5	158.2	-14.4	1,558,489.91	3,459,387.44	40.854623	-103.839322	
2,863.0	3.69	336.38	2,855.2	164.0	-16.6	1,558,495.63	3,459,385.14	40.854639	-103.839330	
2,954.0	3.96	317.03	2,946.1	168.9	-19.9	1,558,500.55	3,459,381.74	40.854653	-103.839342	
3,046.0	3.30	348.14	3,037.9	173.9	-22.6	1,558,505.42	3,459,378.93	40.854666	-103.839352	
3,137.0	2.99	342.87	3,128.7	178.7	-23.9	1,558,510.22	3,459,377.61	40.854679	-103.839356	
3,229.0	4.04	4.79	3,220.6	184.2	-24.3	1,558,515.74	3,459,377.07	40.854695	-103.839358	
3,320.0	3.47	9.81	3,311.4	190.1	-23.6	1,558,521.66	3,459,377.69	40.854711	-103.839355	
3,412.0	2.86	13.73	3,403.2	195.1	-22.6	1,558,526.65	3,459,378.62	40.854724	-103.839351	
3,504.0	4.00	351.62	3,495.1	200.5	-22.5	1,558,532.05	3,459,378.59	40.854739	-103.839351	
3,596.0	3.82	350.88	3,586.9	206.7	-23.4	1,558,538.23	3,459,377.53	40.854756	-103.839354	
3,687.0	3.96	347.55	3,677.6	212.8	-24.6	1,558,544.27	3,459,376.25	40.854773	-103.839359	
3,778.0	4.13	345.47	3,768.4	219.0	-26.1	1,558,550.48	3,459,374.64	40.854790	-103.839364	
3,869.0	3.91	344.46	3,859.2	225.2	-27.8	1,558,556.61	3,459,372.87	40.854807	-103.839370	
3,961.0	3.03	350.05	3,951.0	230.6	-29.0	1,558,562.01	3,459,371.51	40.854822	-103.839375	
4,052.0	2.86	12.54	4,041.9	235.2	-28.9	1,558,566.59	3,459,371.50	40.854834	-103.839374	
4,143.0	2.77	16.80	4,132.8	239.5	-27.8	1,558,570.93	3,459,372.55	40.854846	-103.839370	
4,235.0	3.03	2.64	4,224.7	244.0	-27.1	1,558,575.50	3,459,373.22	40.854859	-103.839367	
4,327.0	2.81	22.24	4,316.6	248.6	-26.1	1,558,580.04	3,459,374.10	40.854871	-103.839364	
4,418.0	3.87	2.82	4,407.4	253.7	-25.1	1,558,585.19	3,459,375.00	40.854885	-103.839360	
4,598.0	2.99	24.00	4,587.1	264.1	-22.9	1,558,595.58	3,459,377.01	40.854914	-103.839352	
4,690.0	3.21	18.27	4,679.0	268.7	-21.1	1,558,600.25	3,459,378.71	40.854926	-103.839346	
4,781.0	5.89	9.07	4,769.7	275.7	-19.6	1,558,607.31	3,459,380.11	40.854946	-103.839340	
4,873.0	6.02	344.73	4,861.2	285.0	-20.1	1,558,616.62	3,459,379.41	40.854971	-103.839342	
4,964.0	4.70	335.89	4,951.8	293.0	-22.9	1,558,624.57	3,459,376.48	40.854993	-103.839352	
5,056.0	3.47	333.04	5,043.5	299.0	-25.7	1,558,630.44	3,459,373.57	40.855010	-103.839363	
5,148.0	3.78	349.41	5,135.4	304.4	-27.5	1,558,635.87	3,459,371.64	40.855024	-103.839369	
5,239.0	4.44	12.54	5,226.1	310.8	-27.3	1,558,642.26	3,459,371.74	40.855042	-103.839368	
5,330.0	3.65	8.94	5,316.9	317.1	-26.1	1,558,648.58	3,459,372.84	40.855059	-103.839364	
5,421.0	8.48	4.55	5,407.4	326.7	-25.1	1,558,658.15	3,459,373.64	40.855086	-103.839360	
5,512.0	18.86	7.13	5,495.7	348.0	-22.7	1,558,679.53	3,459,375.60	40.855144	-103.839352	
5,603.0	31.16	10.31	5,578.0	385.9	-16.7	1,558,717.55	3,459,380.96	40.855248	-103.839330	
5,695.0	38.29	6.22	5,653.6	437.7	-9.3	1,558,769.50	3,459,387.34	40.855390	-103.839303	
5,790.0	43.96	3.52	5,725.1	500.0	-4.1	1,558,831.81	3,459,391.39	40.855561	-103.839284	
5,885.0	51.52	2.64	5,788.9	570.1	-0.3	1,558,902.03	3,459,393.82	40.855754	-103.839271	
5,917.0	55.21	3.83	5,808.0	595.8	1.1	1,558,927.68	3,459,394.80	40.855824	-103.839266	
5,948.0	56.31	2.21	5,825.5	621.4	2.5	1,558,953.29	3,459,395.66	40.855894	-103.839261	
5,980.0	60.09	0.52	5,842.3	648.5	3.1	1,558,980.48	3,459,395.80	40.855969	-103.839258	
6,011.0	63.34	357.26	5,857.0	675.8	2.6	1,559,007.75	3,459,394.74	40.856044	-103.839260	
6,043.0	67.25	356.12	5,870.4	704.8	0.9	1,559,036.74	3,459,392.52	40.856123	-103.839267	
6,075.0	70.86	353.94	5,881.8	734.6	-1.7	1,559,066.46	3,459,389.36	40.856205	-103.839276	
6,106.0	73.85	353.93	5,891.2	764.0	-4.8	1,559,095.76	3,459,385.69	40.856286	-103.839287	
6,138.0	77.32	353.41	5,899.2	794.8	-8.2	1,559,126.48	3,459,381.70	40.856370	-103.839300	
6,169.0	81.71	352.55	5,904.8	825.0	-12.0	1,559,156.65	3,459,377.41	40.856453	-103.839313	
6,201.0	86.69	351.98	5,908.1	856.6	-16.3	1,559,188.10	3,459,372.54	40.856540	-103.839328	
6,223.0	89.01	352.13	5,908.9	878.3	-19.3	1,559,209.82	3,459,369.09	40.856600	-103.839339	
6,359.0	90.42	351.47	5,909.6	1,012.9	-38.7	1,559,344.03	3,459,347.18	40.856969	-103.839410	

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
6,454.0	89.89	352.18	5,909.3	1,107.0	-52.2	1,559,437.80	3,459,331.91	40.857227	-103.839458	
6,548.0	88.75	353.06	5,910.4	1,200.2	-64.3	1,559,530.77	3,459,318.09	40.857483	-103.839502	
6,643.0	89.14	354.99	5,912.2	1,294.6	-74.2	1,559,625.03	3,459,306.44	40.857742	-103.839538	
6,738.0	88.88	357.59	5,913.8	1,389.4	-80.3	1,559,719.67	3,459,298.52	40.858002	-103.839560	
6,832.0	90.24	1.73	5,914.5	1,483.4	-80.9	1,559,813.62	3,459,296.20	40.858260	-103.839562	
6,927.0	87.82	0.65	5,916.2	1,578.3	-78.9	1,559,908.60	3,459,296.40	40.858521	-103.839555	
7,021.0	87.08	0.05	5,920.3	1,672.2	-78.3	1,560,002.49	3,459,295.21	40.858779	-103.839553	
7,115.0	86.77	359.03	5,925.4	1,766.1	-79.1	1,560,096.32	3,459,292.70	40.859036	-103.839556	
7,210.0	89.93	359.03	5,928.1	1,861.0	-80.7	1,560,191.21	3,459,289.32	40.859297	-103.839561	
7,302.0	89.41	358.64	5,928.6	1,953.0	-82.5	1,560,283.14	3,459,285.72	40.859549	-103.839568	
7,394.0	88.88	358.29	5,930.0	2,045.0	-85.0	1,560,375.03	3,459,281.54	40.859802	-103.839577	
7,487.0	88.31	357.74	5,932.3	2,137.9	-88.2	1,560,467.87	3,459,276.58	40.860057	-103.839589	
7,579.0	89.58	359.44	5,934.0	2,229.8	-90.5	1,560,559.76	3,459,272.59	40.860309	-103.839597	
7,670.0	88.66	358.68	5,935.4	2,320.8	-92.0	1,560,650.70	3,459,269.40	40.860559	-103.839602	
7,763.0	89.41	1.38	5,937.0	2,413.8	-91.9	1,560,743.66	3,459,267.70	40.860814	-103.839602	
7,856.0	91.78	2.50	5,936.0	2,506.7	-88.8	1,560,836.63	3,459,269.11	40.861069	-103.839591	
7,947.0	91.69	1.88	5,933.2	2,597.6	-85.3	1,560,927.57	3,459,270.88	40.861319	-103.839578	
8,039.0	91.74	2.06	5,930.5	2,689.5	-82.2	1,561,019.52	3,459,272.32	40.861571	-103.839567	
8,131.0	90.15	359.82	5,929.0	2,781.5	-80.6	1,561,111.50	3,459,272.11	40.861823	-103.839561	
8,222.0	89.71	359.23	5,929.1	2,872.5	-81.4	1,561,202.47	3,459,269.65	40.862073	-103.839564	
8,314.0	90.24	0.15	5,929.1	2,964.5	-81.9	1,561,294.44	3,459,267.43	40.862325	-103.839566	
8,405.0	89.85	359.51	5,929.0	3,055.5	-82.2	1,561,385.42	3,459,265.46	40.862575	-103.839567	
8,497.0	90.20	0.04	5,929.0	3,147.5	-82.5	1,561,477.39	3,459,263.37	40.862828	-103.839568	
8,588.0	90.73	0.56	5,928.3	3,238.5	-82.1	1,561,568.38	3,459,262.14	40.863077	-103.839566	
8,679.0	89.45	0.09	5,928.1	3,329.5	-81.5	1,561,659.37	3,459,260.96	40.863327	-103.839564	
8,770.0	90.02	0.58	5,928.5	3,420.5	-81.0	1,561,750.36	3,459,259.78	40.863577	-103.839563	
8,862.0	89.80	359.82	5,928.7	3,512.5	-80.7	1,561,842.35	3,459,258.38	40.863829	-103.839561	
8,954.0	90.02	359.92	5,928.8	3,604.5	-80.9	1,561,934.33	3,459,256.45	40.864082	-103.839562	
9,045.0	89.89	359.04	5,928.9	3,695.5	-81.7	1,562,025.29	3,459,253.92	40.864332	-103.839565	
9,136.0	90.07	358.94	5,928.9	3,786.4	-83.3	1,562,116.23	3,459,250.61	40.864581	-103.839571	
9,228.0	90.24	358.55	5,928.7	3,878.4	-85.3	1,562,208.15	3,459,246.88	40.864834	-103.839578	
9,320.0	90.33	358.70	5,928.2	3,970.4	-87.5	1,562,300.07	3,459,242.95	40.865086	-103.839586	
9,411.0	90.95	0.77	5,927.2	4,061.4	-88.0	1,562,391.03	3,459,240.82	40.865336	-103.839588	
9,503.0	91.03	0.73	5,925.6	4,153.4	-86.8	1,562,483.02	3,459,240.30	40.865588	-103.839583	
9,595.0	91.12	0.68	5,923.9	4,245.3	-85.6	1,562,575.00	3,459,239.71	40.865841	-103.839579	
9,686.0	90.77	359.99	5,922.4	4,336.3	-85.1	1,562,665.98	3,459,238.54	40.866091	-103.839577	
9,778.0	90.55	359.78	5,921.3	4,428.3	-85.3	1,562,757.95	3,459,236.63	40.866343	-103.839578	
9,869.0	90.24	359.47	5,920.7	4,519.3	-85.9	1,562,848.92	3,459,234.33	40.866593	-103.839580	
9,960.0	90.11	359.23	5,920.4	4,610.3	-86.9	1,562,939.88	3,459,231.60	40.866843	-103.839584	
10,052.0	89.45	358.80	5,920.8	4,702.3	-88.5	1,563,031.82	3,459,228.29	40.867095	-103.839590	
10,143.0	89.05	358.11	5,922.0	4,793.3	-90.9	1,563,122.71	3,459,224.14	40.867345	-103.839599	
10,234.0	90.11	359.66	5,922.6	4,884.2	-92.7	1,563,213.64	3,459,220.66	40.867594	-103.839605	
10,326.0	90.29	1.36	5,922.3	4,976.2	-91.9	1,563,305.65	3,459,219.76	40.867847	-103.839602	
10,418.0	90.29	1.47	5,921.9	5,068.2	-89.6	1,563,397.65	3,459,220.31	40.868099	-103.839594	
10,509.0	89.63	0.60	5,921.9	5,159.2	-88.0	1,563,488.65	3,459,220.25	40.868349	-103.839588	
10,601.0	89.89	0.64	5,922.3	5,251.2	-87.0	1,563,580.64	3,459,219.52	40.868602	-103.839584	
10,691.0	89.36	0.32	5,922.9	5,341.2	-86.2	1,563,670.64	3,459,218.59	40.868849	-103.839581	
10,783.0	88.92	359.42	5,924.3	5,433.2	-86.4	1,563,762.61	3,459,216.66	40.869101	-103.839582	
10,874.0	88.75	359.00	5,926.1	5,524.1	-87.7	1,563,853.54	3,459,213.70	40.869351	-103.839587	
10,965.0	90.15	359.54	5,927.0	5,615.1	-88.9	1,563,944.49	3,459,210.84	40.869600	-103.839591	
11,057.0	91.69	0.14	5,925.5	5,707.1	-89.1	1,564,036.45	3,459,208.86	40.869853	-103.839592	
11,149.0	91.30	359.87	5,923.1	5,799.1	-89.1	1,564,128.40	3,459,207.14	40.870105	-103.839592	
11,241.0	90.73	359.40	5,921.5	5,891.1	-89.7	1,564,220.36	3,459,204.83	40.870358	-103.839594	
11,332.0	90.46	358.77	5,920.5	5,982.0	-91.1	1,564,311.30	3,459,201.68	40.870608	-103.839599	
11,423.0	90.59	358.36	5,919.7	6,073.0	-93.4	1,564,402.21	3,459,197.70	40.870857	-103.839607	

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0203A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Site:</b>	S11-T10N-R58W	<b>MD Reference:</b>	WELL @ 5018.6usft (Original Well Elev)
<b>Well:</b>	Razor #11E-0203A	<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 (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
11,514.0	92.53	359.38	5,917.2	6,164.0	-95.2	1,564,493.10	3,459,194.20	40.871107	-103.839614	
11,605.0	93.05	2.38	5,912.8	6,254.8	-93.8	1,564,583.98	3,459,193.89	40.871356	-103.839609	
11,696.0	91.12	2.76	5,909.5	6,345.7	-89.7	1,564,674.89	3,459,196.27	40.871606	-103.839594	
11,788.0	89.89	1.23	5,908.7	6,437.6	-86.5	1,564,766.87	3,459,197.75	40.871858	-103.839583	
11,879.0	89.85	0.77	5,908.9	6,528.6	-85.0	1,564,857.87	3,459,197.63	40.872108	-103.839577	
11,974.0	91.08	359.64	5,908.1	6,623.6	-84.6	1,564,952.85	3,459,196.19	40.872368	-103.839576	
12,069.0	91.21	359.28	5,906.2	6,718.6	-85.5	1,565,047.79	3,459,193.52	40.872629	-103.839579	
12,163.0	90.90	358.30	5,904.5	6,812.5	-87.5	1,565,141.70	3,459,189.77	40.872887	-103.839586	
12,258.0	90.51	357.59	5,903.3	6,907.5	-90.9	1,565,236.55	3,459,184.59	40.873147	-103.839598	
12,310.0	90.73	357.47	5,902.8	6,959.4	-93.1	1,565,288.45	3,459,181.38	40.873290	-103.839606	
<b>Last CES Survey @ 12,310' MD</b>										
12,360.0	90.73	357.47	5,902.1	7,009.4	-95.3	1,565,338.34	3,459,178.24	40.873427	-103.839614	
<b>PTB @ 12,360' - TD - 632' FNL, 813' FWL</b>										

Design Targets										
Target Name										
- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Razor #11E-0203A PBH	0.00	0.00	5,920.0	7,040.9	-89.2	1,565,370.00	3,459,183.79	40.873514	-103.839592	
- actual wellpath misses target center by 36.8usft at 12360.0usft MD (5902.1 TVD, 7009.4 N, -95.3 E)										
- Point										

Casing Points										
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")						
6,259.2	5,909.4	7" - 1,407' FNL, 832' FWL	0	0						

Design Annotations										
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			Comment					
12,310.0	5,902.8	6,959.4	-93.1		Last CES Survey @ 12,310' MD					
12,360.0	5,902.1	7,009.4	-95.3		PTB @ 12,360'					
12,360.0	5,902.1	7,009.4	-95.3		TD - 632' FNL, 813' FWL					

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