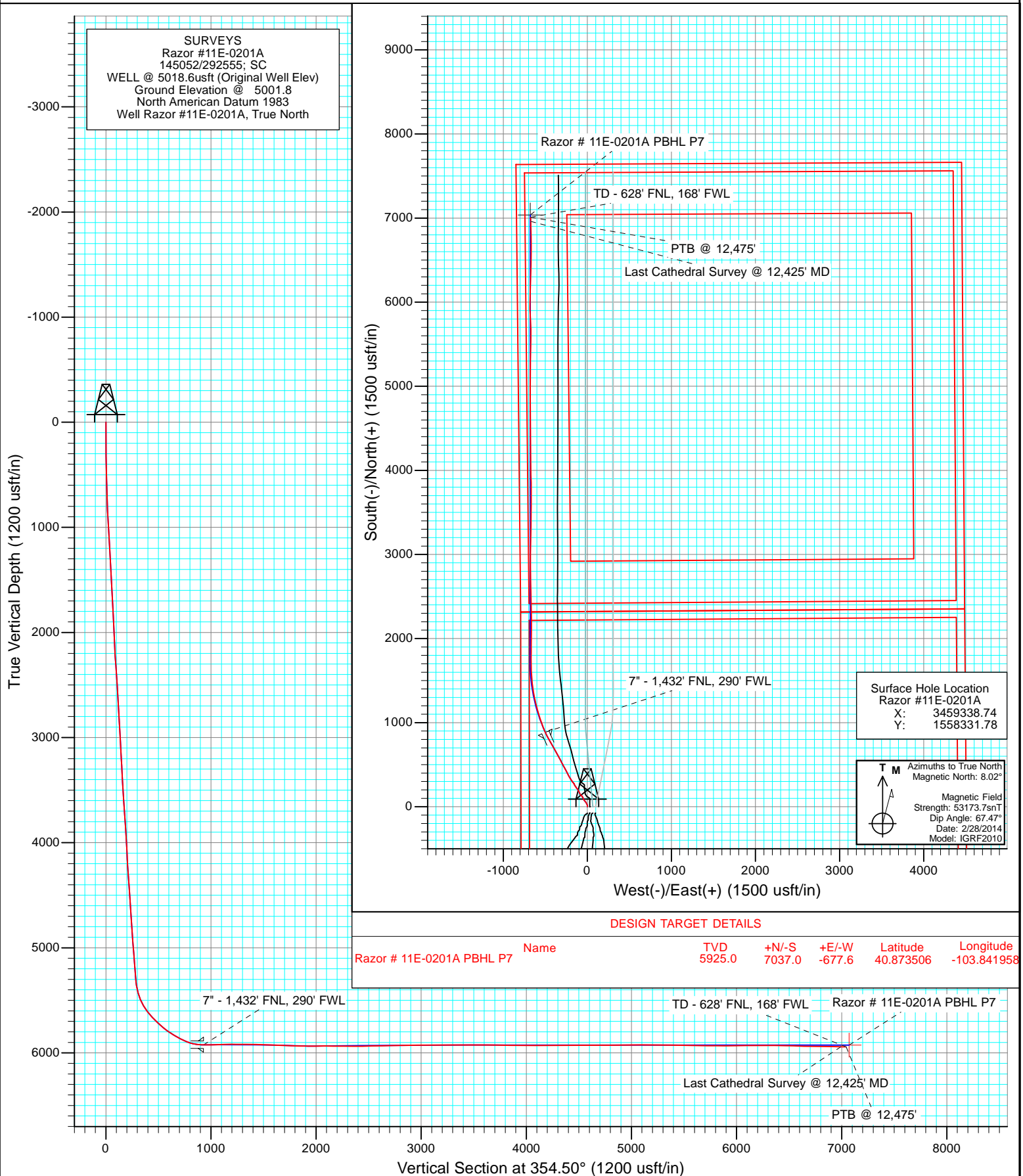


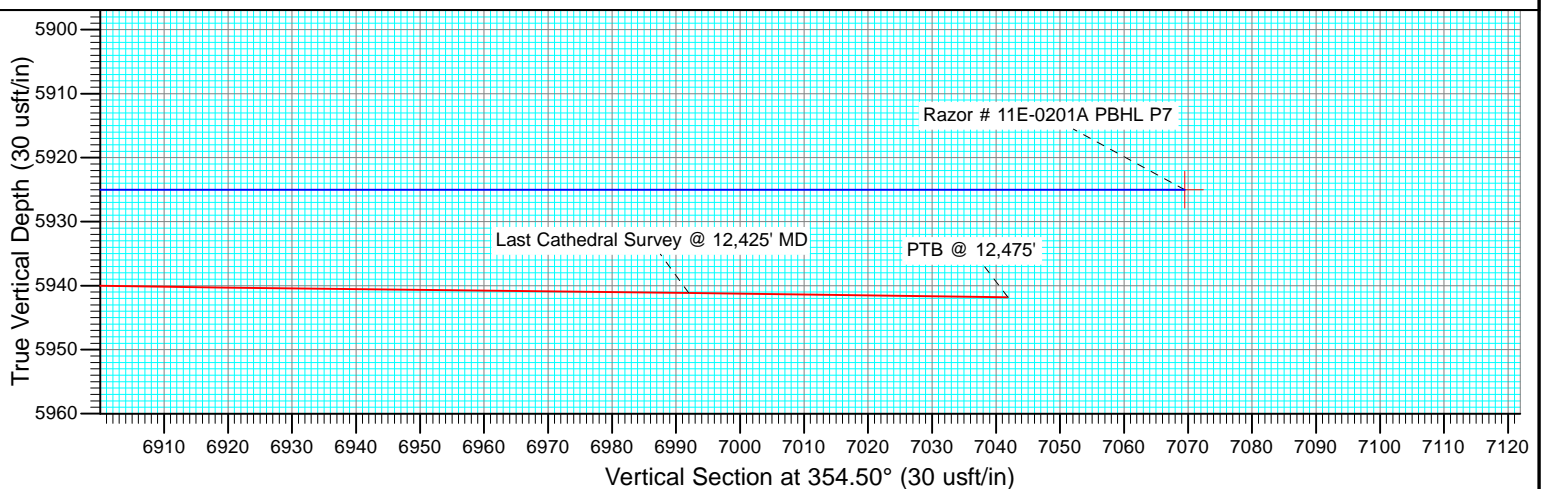
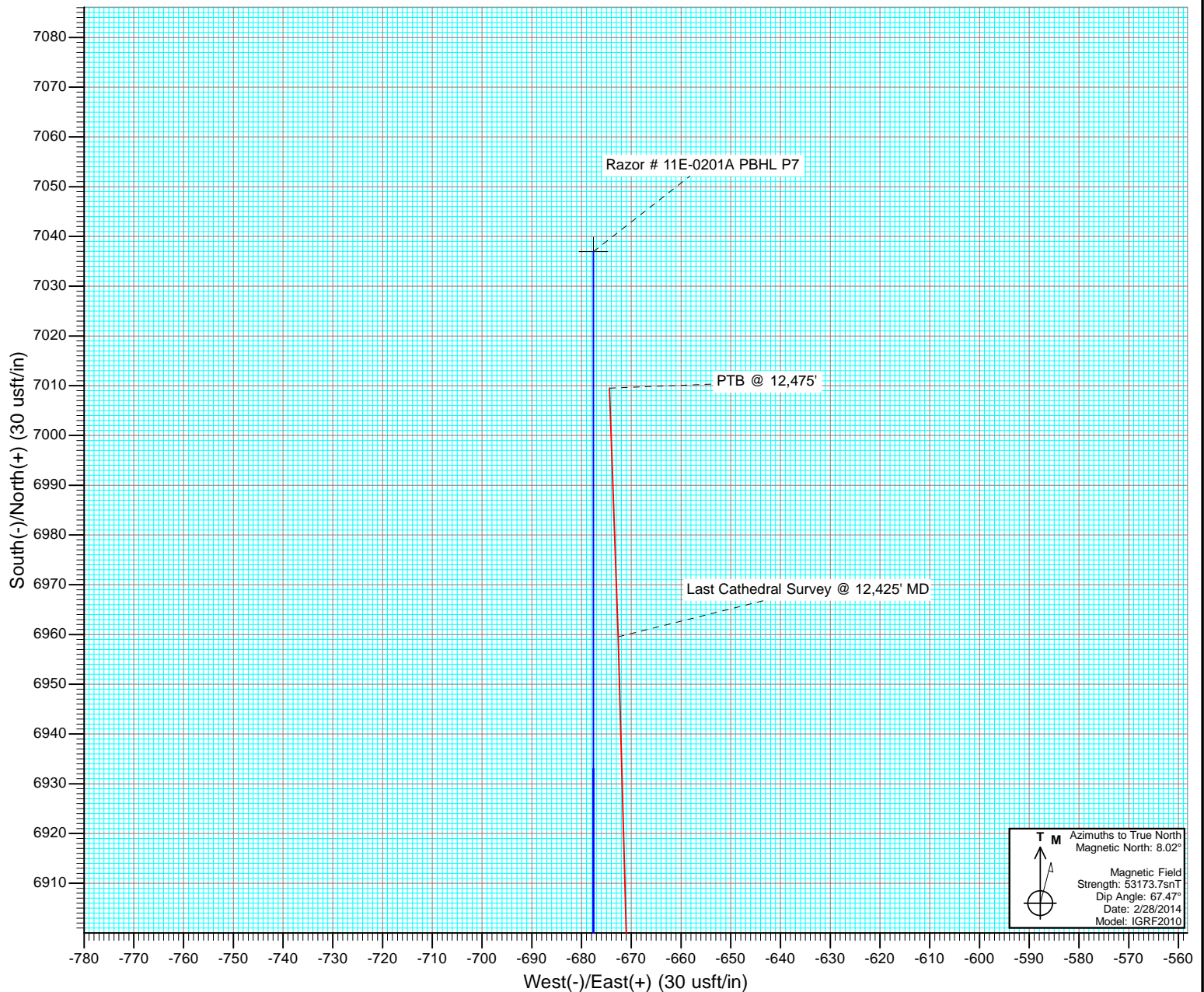


Project: Weld County, CO  
Site: S11-T10N-R58W  
Well: Razor #11E-0201A  
Wellbore: HZ  
Design: SURVEYS





Project: Weld County, CO  
Site: S11-T10N-R58W  
Well: Razor #11E-0201A  
Wellbore: HZ  
Design: SURVEYS



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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-0201A					
Well Position	+N/-S	0.0 usft	Northing:	1,558,331.78 usft	Latitude:	40.854192
	+E/-W	0.0 usft	Easting:	3,459,338.74 usft	Longitude:	-103.839508
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 (nT)</b>
	IGRF2010	2/28/2014	8.02	67.47	53,174

<b>Design</b>	SURVEYS				
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	354.50	

<b>Survey Program</b>	<b>Date</b>	3/12/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
321.0	12,475.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usf)</b>	<b>Build Rate (°/100u)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
321.0	0.79	14.45	321.0	2.1	0.6	2.1	0.25	0.25		
782.0	2.07	1.50	781.8	13.5	1.6	13.3	0.28	0.28		
874.0	3.74	331.11	873.7	17.8	0.2	17.7	2.41	1.82		
1,240.0	3.21	335.74	1,239.0	37.6	-9.8	38.4	0.16	-0.14		
1,422.0	3.82	333.69	1,420.7	47.7	-14.6	48.9	0.34	0.34		
1,605.0	3.56	316.40	1,603.3	57.3	-21.2	59.1	0.62	-0.14		
1,781.0	3.16	317.22	1,779.0	64.8	-28.3	67.2	0.23	-0.23		
1,855.0	3.47	323.56	1,852.9	68.1	-31.0	70.8	0.65	0.42		
1,947.0	3.38	323.52	1,944.7	72.5	-34.3	75.5	0.10	-0.10		
2,038.0	2.99	315.76	2,035.6	76.4	-37.5	79.6	0.64	-0.43		
2,129.0	2.46	336.52	2,126.5	79.9	-40.0	83.3	1.22	-0.58		
2,221.0	4.31	334.15	2,218.3	84.8	-42.2	88.5	2.02	2.01		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
2,313.0	4.35	334.74	2,310.1	91.1	-45.2	95.0	0.07	0.04	
2,405.0	4.35	332.76	2,401.8	97.3	-48.3	101.5	0.16	0.00	
2,495.0	4.22	331.82	2,491.5	103.3	-51.5	107.7	0.16	-0.14	
2,587.0	3.52	333.11	2,583.3	108.8	-54.3	113.5	0.77	-0.76	
2,678.0	3.21	334.54	2,674.2	113.6	-56.7	118.5	0.35	-0.34	
2,769.0	3.30	334.86	2,765.0	118.2	-58.9	123.3	0.10	0.10	
2,861.0	3.21	336.98	2,856.9	123.0	-61.0	128.3	0.16	-0.10	
2,952.0	4.62	312.44	2,947.7	127.8	-64.7	133.4	2.37	1.55	
3,044.0	4.31	308.41	3,039.4	132.5	-70.2	138.6	0.48	-0.34	
3,135.0	3.82	305.68	3,130.2	136.4	-75.3	143.0	0.58	-0.54	
3,227.0	4.57	317.87	3,221.9	140.9	-80.3	147.9	1.26	0.82	
3,318.0	3.52	323.52	3,312.7	145.8	-84.4	153.2	1.23	-1.15	
3,410.0	3.03	324.09	3,404.5	150.0	-87.5	157.7	0.53	-0.53	
3,502.0	3.69	336.47	3,496.4	154.7	-90.1	162.6	1.06	0.72	
3,594.0	3.87	342.59	3,588.2	160.4	-92.2	168.5	0.48	0.20	
3,685.0	4.04	337.77	3,679.0	166.3	-94.3	174.6	0.41	0.19	
3,776.0	4.31	335.75	3,769.7	172.4	-96.9	180.9	0.34	0.30	
3,868.0	4.31	334.81	3,861.5	178.7	-99.8	187.4	0.08	0.00	
3,959.0	3.60	337.47	3,952.3	184.4	-102.4	193.4	0.81	-0.78	
4,050.0	2.64	343.10	4,043.1	189.0	-104.1	198.2	1.11	-1.05	
4,142.0	2.33	343.77	4,135.0	192.9	-105.2	202.1	0.34	-0.34	
4,233.0	5.54	320.71	4,225.8	198.0	-108.5	207.5	3.86	3.53	
4,324.0	5.27	321.84	4,316.4	204.7	-113.9	214.7	0.32	-0.30	
4,416.0	4.88	320.19	4,408.0	211.1	-119.0	221.5	0.45	-0.42	
4,508.0	4.35	321.54	4,499.7	216.8	-123.7	227.7	0.59	-0.58	
4,598.0	3.25	322.88	4,589.5	221.5	-127.3	232.7	1.23	-1.22	
4,690.0	4.88	325.10	4,681.3	226.8	-131.1	238.3	1.78	1.77	
4,781.0	4.66	327.85	4,772.0	233.1	-135.3	245.0	0.35	-0.24	
4,873.0	4.57	326.11	4,863.7	239.3	-139.4	251.6	0.18	-0.10	
4,964.0	4.22	322.83	4,954.4	245.0	-143.4	257.6	0.47	-0.38	
5,056.0	5.14	331.36	5,046.1	251.3	-147.4	264.3	1.25	1.00	
5,148.0	5.05	334.33	5,137.8	258.6	-151.2	271.9	0.30	-0.10	
5,239.0	4.44	337.39	5,228.5	265.4	-154.2	279.0	0.73	-0.67	
5,330.0	5.98	327.73	5,319.1	272.7	-158.1	286.6	1.94	1.69	
5,421.0	16.22	320.78	5,408.3	286.6	-168.7	301.4	11.33	11.25	
5,512.0	25.76	325.64	5,493.1	312.8	-188.0	329.4	10.65	10.48	
5,603.0	35.60	329.73	5,571.3	352.1	-212.5	370.9	11.05	10.81	
5,695.0	43.91	332.67	5,642.0	403.7	-240.7	424.9	9.26	9.03	
5,786.0	48.57	331.98	5,704.9	461.9	-271.3	485.7	5.15	5.12	
5,817.0	49.36	331.79	5,725.3	482.5	-282.3	507.3	2.59	2.55	
5,847.0	50.51	331.64	5,744.6	502.7	-293.2	528.5	3.85	3.83	
5,877.0	52.88	332.13	5,763.2	523.5	-304.3	550.2	8.00	7.90	
5,908.0	55.52	332.19	5,781.3	545.7	-316.0	573.5	8.52	8.52	
5,938.0	58.11	332.54	5,797.7	567.9	-327.6	596.7	8.69	8.63	
5,969.0	58.90	332.85	5,813.9	591.4	-339.8	621.3	2.69	2.55	
6,001.0	60.53	331.48	5,830.0	615.8	-352.7	646.8	6.29	5.09	
6,032.0	63.12	330.74	5,844.7	639.8	-365.9	671.9	8.62	8.35	
6,064.0	63.78	331.06	5,859.0	664.8	-379.8	698.1	2.25	2.06	
6,096.0	64.79	330.74	5,872.9	690.0	-393.8	724.5	3.28	3.16	
6,127.0	67.65	330.35	5,885.4	714.7	-407.8	750.5	9.30	9.23	
6,159.0	71.21	329.93	5,896.6	740.6	-422.7	777.7	11.19	11.13	
6,190.0	74.90	330.20	5,905.6	766.3	-437.5	804.7	11.93	11.90	
6,222.0	78.51	330.24	5,913.0	793.4	-452.9	833.1	11.28	11.28	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
6,254.0	81.98	331.41	5,918.4	820.9	-468.3	862.0	11.43	10.84	
6,293.0	86.64	333.80	5,922.3	855.3	-486.2	898.0	13.41	11.95	
6,359.0	91.91	338.01	5,923.1	915.6	-513.1	960.5	10.22	7.98	
6,454.0	90.55	340.22	5,921.1	1,004.3	-546.9	1,052.1	2.73	-1.43	
6,548.0	91.08	343.33	5,919.7	1,093.5	-576.3	1,143.8	3.36	0.56	
6,643.0	91.38	345.46	5,917.7	1,185.0	-601.9	1,237.3	2.26	0.32	
6,738.0	88.57	347.61	5,917.7	1,277.4	-624.0	1,331.3	3.72	-2.96	
6,832.0	88.88	350.58	5,919.8	1,369.7	-641.8	1,424.9	3.18	0.33	
6,927.0	87.78	353.61	5,922.6	1,463.7	-654.8	1,519.7	3.39	-1.16	
7,021.0	87.43	356.63	5,926.5	1,557.3	-662.8	1,613.6	3.23	-0.37	
7,116.0	88.66	357.57	5,929.8	1,652.1	-667.6	1,708.5	1.63	1.29	
7,208.0	88.18	0.57	5,932.3	1,744.0	-669.1	1,800.1	3.30	-0.52	
7,300.0	87.96	0.66	5,935.4	1,836.0	-668.1	1,891.6	0.26	-0.24	
7,393.0	91.82	0.46	5,935.6	1,929.0	-667.2	1,984.0	4.16	4.15	
7,485.0	89.89	0.69	5,934.2	2,020.9	-666.3	2,075.5	2.11	-2.10	
7,576.0	89.41	0.52	5,934.8	2,111.9	-665.3	2,166.0	0.56	-0.53	
7,669.0	89.98	359.56	5,935.3	2,204.9	-665.3	2,258.5	1.20	0.61	
7,762.0	89.45	359.49	5,935.7	2,297.9	-666.0	2,351.2	0.57	-0.57	
7,853.0	90.68	358.81	5,935.6	2,388.9	-667.4	2,441.9	1.54	1.35	
7,945.0	91.25	358.18	5,934.1	2,480.9	-669.8	2,533.6	0.92	0.62	
8,037.0	91.21	358.99	5,932.1	2,572.8	-672.1	2,625.4	0.88	-0.04	
8,128.0	91.43	359.13	5,930.0	2,663.8	-673.6	2,716.1	0.29	0.24	
8,220.0	91.30	358.88	5,927.8	2,755.7	-675.2	2,807.8	0.31	-0.14	
8,311.0	90.42	359.37	5,926.4	2,846.7	-676.6	2,898.5	1.11	-0.97	
8,403.0	89.89	359.72	5,926.2	2,938.7	-677.3	2,990.1	0.69	-0.58	
8,494.0	90.55	1.41	5,925.8	3,029.7	-676.4	3,080.6	1.99	0.73	
8,585.0	90.42	1.16	5,925.1	3,120.7	-674.3	3,170.9	0.31	-0.14	
8,676.0	90.29	1.08	5,924.5	3,211.7	-672.6	3,261.3	0.17	-0.14	
8,768.0	90.37	0.99	5,924.0	3,303.6	-670.9	3,352.7	0.13	0.09	
8,860.0	90.20	0.71	5,923.5	3,395.6	-669.5	3,444.2	0.36	-0.18	
8,951.0	89.58	0.12	5,923.7	3,486.6	-668.9	3,534.7	0.94	-0.68	
9,042.0	89.67	0.67	5,924.3	3,577.6	-668.3	3,625.2	0.61	0.10	
9,134.0	89.49	0.71	5,925.0	3,669.6	-667.1	3,716.7	0.20	-0.20	
9,225.0	88.79	359.42	5,926.3	3,760.6	-667.0	3,807.2	1.61	-0.77	
9,317.0	89.58	358.85	5,927.6	3,852.6	-668.4	3,898.9	1.06	0.86	
9,409.0	89.23	358.37	5,928.6	3,944.6	-670.7	3,990.7	0.65	-0.38	
9,501.0	90.29	358.95	5,929.0	4,036.5	-672.8	4,082.4	1.31	1.15	
9,592.0	89.98	358.68	5,928.8	4,127.5	-674.7	4,173.2	0.45	-0.34	
9,684.0	90.51	0.58	5,928.4	4,219.5	-675.3	4,264.8	2.14	0.58	
9,775.0	89.89	359.70	5,928.1	4,310.5	-675.1	4,355.4	1.18	-0.68	
9,866.0	90.07	359.66	5,928.1	4,401.5	-675.6	4,446.0	0.20	0.20	
9,958.0	90.11	359.75	5,927.9	4,493.5	-676.1	4,537.6	0.11	0.04	
10,049.0	90.29	359.55	5,927.6	4,584.5	-676.6	4,628.2	0.30	0.20	
10,140.0	90.51	359.35	5,927.0	4,675.5	-677.5	4,718.9	0.33	0.24	
10,232.0	90.46	358.78	5,926.2	4,767.5	-679.0	4,810.6	0.62	-0.05	
10,323.0	90.86	0.60	5,925.2	4,858.5	-679.5	4,901.2	2.05	0.44	
10,415.0	91.08	0.30	5,923.6	4,950.4	-678.8	4,992.7	0.40	0.24	
10,506.0	89.19	359.87	5,923.4	5,041.4	-678.6	5,083.3	2.13	-2.08	
10,597.0	88.75	359.90	5,925.0	5,132.4	-678.8	5,173.8	0.48	-0.48	
10,688.0	90.68	1.31	5,925.5	5,223.4	-677.8	5,264.3	2.63	2.12	
10,780.0	89.01	0.96	5,925.7	5,315.4	-676.0	5,355.7	1.85	-1.82	
10,871.0	89.80	1.47	5,926.7	5,406.3	-674.1	5,446.1	1.03	0.87	
10,963.0	88.44	0.82	5,928.1	5,498.3	-672.2	5,537.4	1.64	-1.48	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
11,055.0	88.48	0.96	5,930.6	5,590.3	-670.8	5,628.8	0.16	0.04	
11,147.0	90.24	358.74	5,931.6	5,682.3	-671.1	5,720.4	3.08	1.91	
11,237.0	89.32	356.67	5,931.9	5,772.2	-674.7	5,810.3	2.52	-1.02	
11,329.0	89.67	356.53	5,932.7	5,864.0	-680.1	5,902.2	0.41	0.38	
11,419.0	90.99	0.15	5,932.2	5,954.0	-682.7	5,992.0	4.28	1.47	
11,511.0	91.08	1.45	5,930.6	6,045.9	-681.4	6,083.4	1.42	0.10	
11,602.0	90.55	2.38	5,929.3	6,136.9	-678.4	6,173.6	1.18	-0.58	
11,694.0	90.86	2.45	5,928.1	6,228.8	-674.5	6,264.8	0.35	0.34	
11,785.0	88.44	0.99	5,928.7	6,319.7	-671.8	6,355.0	3.11	-2.66	
11,879.0	88.40	0.84	5,931.3	6,413.7	-670.3	6,448.4	0.17	-0.04	
11,974.0	88.18	0.73	5,934.1	6,508.6	-669.0	6,542.8	0.26	-0.23	
12,069.0	89.41	0.26	5,936.1	6,603.6	-668.2	6,637.3	1.39	1.29	
12,164.0	89.05	359.63	5,937.4	6,698.6	-668.3	6,731.8	0.76	-0.38	
12,258.0	89.01	359.29	5,939.0	6,792.6	-669.1	6,825.5	0.36	-0.04	
12,353.0	89.41	358.88	5,940.3	6,887.6	-670.7	6,920.1	0.60	0.42	
12,425.0	89.23	358.00	5,941.1	6,959.5	-672.6	6,992.0	1.25	-0.25	Last Cathedral Survey @ 12,425' MD
12,475.0	89.23	358.00	5,941.8	7,009.5	-674.4	7,041.9	0.00	0.00	PTB @ 12,475' - TD - 628' FNL, 168' FWL

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Razor # 11E-0201A WP	0.00	0.00	5,935.0	1,944.0	-677.6	1,560,262.76	3,458,624.87	40.859527	-103.841958
- actual wellpath misses target center by 10.5usft at 7407.9usft MD (5935.1 TVD, 1943.9 N, -667.1 E)									
- Point									
Razor # 11E-0201A WP	0.00	0.00	5,925.0	2,948.6	-677.6	1,561,267.18	3,458,606.06	40.862284	-103.841958
- actual wellpath misses target center by 1.2usft at 8412.9usft MD (5926.2 TVD, 2948.6 N, -677.3 E)									
- Point									
Razor # 11E-0201A PB+	0.00	0.00	5,925.0	7,037.0	-677.6	1,565,354.81	3,458,529.51	40.873506	-103.841958
- actual wellpath misses target center by 32.4usft at 12475.0usft MD (5941.8 TVD, 7009.5 N, -674.4 E)									
- Point									
Razor # 11E-0201A PB+	0.00	0.00	5,922.0	7,537.0	-683.0	1,565,854.67	3,458,514.72	40.874878	-103.841978
- actual wellpath misses target center by 527.9usft at 12475.0usft MD (5941.8 TVD, 7009.5 N, -674.4 E)									
- Point									
Razor # 11E-0201A PB+	0.00	0.00	5,922.0	7,037.0	-677.6	1,565,354.81	3,458,529.51	40.873506	-103.841958
- actual wellpath misses target center by 34.0usft at 12475.0usft MD (5941.8 TVD, 7009.5 N, -674.4 E)									
- Point									
Razor # 11E-0201A PB+	0.00	0.00	5,912.0	7,037.0	-677.6	1,565,354.81	3,458,529.51	40.873506	-103.841958
- actual wellpath misses target center by 40.7usft at 12475.0usft MD (5941.8 TVD, 7009.5 N, -674.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,325.8	5,923.4	7" - 1,432' FNL, 290' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
12,425.0	5,941.1	6,959.5	-672.6	Last Cathedral Survey @ 12,425' MD	
12,475.0	5,941.8	7,009.5	-674.4	PTB @ 12,475'	
12,475.0	5,941.8	7,009.5	-674.4	TD - 628' FNL, 168' FWL	

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

**Weld County, CO**

**S11-T10N-R58W**

**Razor #11E-0201A**

**HZ**

**Design: SURVEYS**

## **Survey Report - Geographic**

**12 March, 2014**



# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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-0201A					
Well Position	+N-S	0.0 usft	Northing:	1,558,331.79 usft	Latitude:	40.854192
	+E-W	0.0 usft	Easting:	3,459,338.74 usft	Longitude:	-103.839509
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 (nT)</b>
	IGRF2010	2/28/2014	8.02	67.47	53,174

<b>Design</b>	SURVEYS				
<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	354.50	

<b>Survey Program</b>	<b>Date</b>	3/12/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
321.0	12,475.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

<b>Survey</b>									
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>
0.0	0.00	0.00	0.0	0.0	0.0	1,558,331.79	3,459,338.74	40.854192	-103.839509
321.0	0.79	14.45	321.0	2.1	0.6	1,558,333.94	3,459,339.25	40.854198	-103.839507
782.0	2.07	1.50	781.8	13.5	1.6	1,558,345.36	3,459,340.05	40.854229	-103.839503
874.0	3.74	331.11	873.7	17.8	0.2	1,558,349.62	3,459,338.56	40.854241	-103.839508
1,240.0	3.21	335.74	1,239.0	37.6	-9.8	1,558,369.22	3,459,328.21	40.854295	-103.839544
1,422.0	3.82	333.69	1,420.7	47.7	-14.6	1,558,379.21	3,459,323.25	40.854323	-103.839561
1,605.0	3.56	316.40	1,603.3	57.3	-21.2	1,558,388.67	3,459,316.45	40.854349	-103.839585
1,781.0	3.16	317.22	1,779.0	64.8	-28.3	1,558,396.05	3,459,309.24	40.854370	-103.839611
1,855.0	3.47	323.56	1,852.9	68.1	-31.0	1,558,399.30	3,459,306.47	40.854379	-103.839621
1,947.0	3.38	323.52	1,944.7	72.5	-34.3	1,558,403.66	3,459,303.12	40.854391	-103.839632
2,038.0	2.99	315.76	2,035.6	76.4	-37.5	1,558,407.45	3,459,299.80	40.854401	-103.839644
2,129.0	2.46	336.52	2,126.5	79.9	-40.0	1,558,410.90	3,459,297.30	40.854411	-103.839653

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
2,221.0	4.31	334.15	2,218.3	84.8	-42.2	1,558,415.78	3,459,294.91	40.854424	-103.839661
2,313.0	4.35	334.74	2,310.1	91.1	-45.2	1,558,421.99	3,459,291.80	40.854442	-103.839672
2,405.0	4.35	332.76	2,401.8	97.3	-48.3	1,558,428.18	3,459,288.60	40.854459	-103.839683
2,495.0	4.22	331.82	2,491.5	103.3	-51.5	1,558,434.08	3,459,285.36	40.854475	-103.839695
2,587.0	3.52	333.11	2,583.3	108.8	-54.3	1,558,439.53	3,459,282.38	40.854490	-103.839705
2,678.0	3.21	334.54	2,674.2	113.6	-56.7	1,558,444.27	3,459,279.93	40.854503	-103.839714
2,769.0	3.30	334.86	2,765.0	118.2	-58.9	1,558,448.90	3,459,277.64	40.854516	-103.839721
2,861.0	3.21	336.98	2,856.9	123.0	-61.0	1,558,453.63	3,459,275.42	40.854529	-103.839729
2,952.0	4.62	312.44	2,947.7	127.8	-64.7	1,558,458.38	3,459,271.63	40.854543	-103.839743
3,044.0	4.31	308.41	3,039.4	132.5	-70.2	1,558,462.92	3,459,266.10	40.854555	-103.839762
3,135.0	3.82	305.68	3,130.2	136.4	-75.3	1,558,466.72	3,459,260.88	40.854566	-103.839781
3,227.0	4.57	317.87	3,221.9	140.9	-80.3	1,558,471.13	3,459,255.85	40.854578	-103.839799
3,318.0	3.52	323.52	3,312.7	145.8	-84.4	1,558,475.99	3,459,251.67	40.854592	-103.839814
3,410.0	3.03	324.09	3,404.5	150.0	-87.5	1,558,480.17	3,459,248.48	40.854604	-103.839825
3,502.0	3.69	336.47	3,496.4	154.7	-90.1	1,558,484.80	3,459,245.79	40.854616	-103.839834
3,594.0	3.87	342.59	3,588.2	160.4	-92.2	1,558,490.44	3,459,243.57	40.854632	-103.839842
3,685.0	4.04	337.77	3,679.0	166.3	-94.3	1,558,496.30	3,459,241.33	40.854648	-103.839850
3,776.0	4.31	335.75	3,769.7	172.4	-96.9	1,558,502.33	3,459,238.60	40.854665	-103.839859
3,868.0	4.31	334.81	3,861.5	178.7	-99.8	1,558,508.56	3,459,235.59	40.854682	-103.839869
3,959.0	3.60	337.47	3,952.3	184.4	-102.4	1,558,514.24	3,459,232.93	40.854698	-103.839879
4,050.0	2.64	343.10	4,043.1	189.0	-104.1	1,558,518.85	3,459,231.14	40.854711	-103.839885
4,142.0	2.33	343.77	4,135.0	192.9	-105.2	1,558,522.65	3,459,229.93	40.854721	-103.839889
4,233.0	5.54	320.71	4,225.8	198.0	-108.5	1,558,527.77	3,459,226.54	40.854735	-103.839901
4,324.0	5.27	321.84	4,316.4	204.7	-113.9	1,558,534.35	3,459,221.05	40.854754	-103.839920
4,416.0	4.88	320.19	4,408.0	211.1	-119.0	1,558,540.58	3,459,215.82	40.854771	-103.839939
4,508.0	4.35	321.54	4,499.7	216.8	-123.7	1,558,546.23	3,459,211.03	40.854787	-103.839956
4,598.0	3.25	322.88	4,589.5	221.5	-127.3	1,558,550.87	3,459,207.28	40.854800	-103.839969
4,690.0	4.88	325.10	4,681.3	226.8	-131.1	1,558,556.09	3,459,203.37	40.854814	-103.839983
4,781.0	4.66	327.85	4,772.0	233.1	-135.3	1,558,562.31	3,459,199.07	40.854832	-103.839998
4,873.0	4.57	326.11	4,863.7	239.3	-139.4	1,558,568.44	3,459,194.92	40.854849	-103.840012
4,964.0	4.22	322.83	4,954.4	245.0	-143.4	1,558,574.04	3,459,190.77	40.854864	-103.840027
5,056.0	5.14	331.36	5,046.1	251.3	-147.4	1,558,580.28	3,459,186.64	40.854881	-103.840041
5,148.0	5.05	334.33	5,137.8	258.6	-151.2	1,558,587.48	3,459,182.77	40.854901	-103.840055
5,239.0	4.44	337.39	5,228.5	265.4	-154.2	1,558,594.28	3,459,179.55	40.854920	-103.840066
5,330.0	5.98	327.73	5,319.1	272.7	-158.1	1,558,601.47	3,459,175.53	40.854940	-103.840080
5,421.0	16.22	320.78	5,408.3	286.6	-168.7	1,558,615.16	3,459,164.68	40.854978	-103.840118
5,512.0	25.76	325.64	5,493.1	312.8	-188.0	1,558,641.02	3,459,144.95	40.855050	-103.840188
5,603.0	35.60	329.73	5,571.3	352.1	-212.5	1,558,679.86	3,459,119.64	40.855158	-103.840277
5,695.0	43.91	332.67	5,642.0	403.7	-240.7	1,558,730.88	3,459,090.49	40.855300	-103.840379
5,786.0	48.57	331.98	5,704.9	461.9	-271.3	1,558,788.48	3,459,058.87	40.855459	-103.840489
5,817.0	49.36	331.79	5,725.3	482.5	-282.3	1,558,808.90	3,459,047.47	40.855516	-103.840529
5,847.0	50.51	331.64	5,744.6	502.7	-293.2	1,558,828.91	3,459,036.21	40.855571	-103.840568
5,877.0	52.88	332.13	5,763.2	523.5	-304.3	1,558,849.46	3,459,024.73	40.855628	-103.840608
5,908.0	55.52	332.19	5,781.3	545.7	-316.0	1,558,871.46	3,459,012.58	40.855689	-103.840651
5,938.0	58.11	332.54	5,797.7	567.9	-327.6	1,558,893.48	3,459,000.52	40.855750	-103.840693
5,969.0	58.90	332.85	5,813.9	591.4	-339.8	1,558,916.73	3,458,987.96	40.855815	-103.840737
6,001.0	60.53	331.48	5,830.0	615.8	-352.7	1,558,940.92	3,458,974.60	40.855882	-103.840783
6,032.0	63.12	330.74	5,844.7	639.8	-365.9	1,558,964.59	3,458,960.95	40.855948	-103.840831
6,064.0	63.78	331.06	5,859.0	664.8	-379.8	1,558,989.34	3,458,946.57	40.856016	-103.840881
6,096.0	64.79	330.74	5,872.9	690.0	-393.8	1,559,014.26	3,458,932.08	40.856085	-103.840932
6,127.0	67.65	330.35	5,885.4	714.7	-407.8	1,559,038.70	3,458,917.67	40.856153	-103.840983
6,159.0	71.21	329.93	5,896.6	740.6	-422.7	1,559,064.39	3,458,902.27	40.856225	-103.841037
6,190.0	74.90	330.20	5,905.6	766.3	-437.5	1,559,089.80	3,458,886.99	40.856295	-103.841090
6,222.0	78.51	330.24	5,913.0	793.4	-452.9	1,559,116.53	3,458,871.03	40.856369	-103.841146
6,254.0	81.98	331.41	5,918.4	820.9	-468.3	1,559,143.77	3,458,855.14	40.856445	-103.841201

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
6,293.0	86.64	333.80	5,922.3	855.3	-486.2	1,559,177.88	3,458,836.65	40.856539	-103.841266
6,359.0	91.91	338.01	5,923.1	915.6	-513.1	1,559,237.57	3,458,808.61	40.856705	-103.841363
6,454.0	90.55	340.22	5,921.1	1,004.3	-546.9	1,559,325.65	3,458,773.10	40.856948	-103.841486
6,548.0	91.08	343.33	5,919.7	1,093.5	-576.3	1,559,414.35	3,458,742.04	40.857193	-103.841592
6,643.0	91.38	345.46	5,917.7	1,185.0	-601.9	1,559,505.33	3,458,714.78	40.857444	-103.841684
6,738.0	88.57	347.61	5,917.7	1,277.4	-624.0	1,559,597.27	3,458,690.94	40.857698	-103.841764
6,832.0	88.88	350.58	5,919.8	1,369.7	-641.8	1,559,689.19	3,458,671.44	40.857951	-103.841829
6,927.0	87.78	353.61	5,922.6	1,463.7	-654.8	1,559,782.98	3,458,656.62	40.858209	-103.841876
7,021.0	87.43	356.63	5,926.5	1,557.3	-662.8	1,559,876.38	3,458,646.88	40.858466	-103.841905
7,116.0	88.66	357.57	5,929.8	1,652.1	-667.6	1,559,971.09	3,458,640.30	40.858726	-103.841922
7,208.0	88.18	0.57	5,932.3	1,744.0	-669.1	1,560,062.99	3,458,637.09	40.858978	-103.841927
7,300.0	87.96	0.66	5,935.4	1,836.0	-668.1	1,560,154.93	3,458,636.35	40.859231	-103.841924
7,393.0	91.82	0.46	5,935.6	1,929.0	-667.2	1,560,247.91	3,458,635.52	40.859486	-103.841921
7,485.0	89.89	0.69	5,934.2	2,020.9	-666.3	1,560,339.89	3,458,634.72	40.859738	-103.841917
7,576.0	89.41	0.52	5,934.8	2,111.9	-665.3	1,560,430.89	3,458,633.98	40.859988	-103.841914
7,669.0	89.98	359.56	5,935.3	2,204.9	-665.3	1,560,523.87	3,458,632.30	40.860243	-103.841914
7,762.0	89.45	359.49	5,935.7	2,297.9	-666.0	1,560,616.83	3,458,629.79	40.860499	-103.841916
7,853.0	90.68	358.81	5,935.6	2,388.9	-667.4	1,560,707.78	3,458,626.74	40.860748	-103.841921
7,945.0	91.25	358.18	5,934.1	2,480.9	-669.8	1,560,799.67	3,458,622.60	40.861001	-103.841930
8,037.0	91.21	358.99	5,932.1	2,572.8	-672.1	1,560,891.56	3,458,618.61	40.861253	-103.841938
8,128.0	91.43	359.13	5,930.0	2,663.8	-673.6	1,560,982.48	3,458,615.41	40.861503	-103.841944
8,220.0	91.30	358.88	5,927.8	2,755.7	-675.2	1,561,074.40	3,458,612.09	40.861755	-103.841949
8,311.0	90.42	359.37	5,926.4	2,846.7	-676.6	1,561,165.33	3,458,609.00	40.862005	-103.841954
8,403.0	89.89	359.72	5,926.2	2,938.7	-677.3	1,561,257.30	3,458,606.55	40.862257	-103.841957
8,494.0	90.55	1.41	5,925.8	3,029.7	-676.4	1,561,348.29	3,458,605.74	40.862507	-103.841954
8,585.0	90.42	1.16	5,925.1	3,120.7	-674.3	1,561,439.29	3,458,606.08	40.862757	-103.841946
8,676.0	90.29	1.08	5,924.5	3,211.7	-672.6	1,561,530.28	3,458,606.15	40.863007	-103.841940
8,768.0	90.37	0.99	5,924.0	3,303.6	-670.9	1,561,622.28	3,458,606.09	40.863259	-103.841934
8,860.0	90.20	0.71	5,923.5	3,395.6	-669.5	1,561,714.28	3,458,605.73	40.863512	-103.841929
8,951.0	89.58	0.12	5,923.7	3,486.6	-668.9	1,561,805.27	3,458,604.69	40.863761	-103.841927
9,042.0	89.67	0.67	5,924.3	3,577.6	-668.3	1,561,896.26	3,458,603.61	40.864011	-103.841925
9,134.0	89.49	0.71	5,925.0	3,669.6	-667.1	1,561,988.26	3,458,603.00	40.864263	-103.841921
9,225.0	88.79	359.42	5,926.3	3,760.6	-667.0	1,562,079.23	3,458,601.40	40.864513	-103.841920
9,317.0	89.58	358.85	5,927.6	3,852.6	-668.4	1,562,171.17	3,458,598.29	40.864766	-103.841925
9,409.0	89.23	358.37	5,928.6	3,944.6	-670.7	1,562,263.10	3,458,594.33	40.865018	-103.841933
9,501.0	90.29	358.95	5,929.0	4,036.5	-672.8	1,562,355.01	3,458,590.46	40.865271	-103.841941
9,592.0	89.98	358.68	5,928.8	4,127.5	-674.7	1,562,445.94	3,458,586.87	40.865520	-103.841948
9,684.0	90.51	0.58	5,928.4	4,219.5	-675.3	1,562,537.91	3,458,584.56	40.865773	-103.841950
9,775.0	89.89	359.70	5,928.1	4,310.5	-675.1	1,562,628.89	3,458,583.08	40.866023	-103.841949
9,866.0	90.07	359.66	5,928.1	4,401.5	-675.6	1,562,719.87	3,458,580.86	40.866272	-103.841951
9,958.0	90.11	359.75	5,927.9	4,493.5	-676.1	1,562,811.84	3,458,578.67	40.866525	-103.841953
10,049.0	90.29	359.55	5,927.6	4,584.5	-676.6	1,562,902.81	3,458,576.41	40.866775	-103.841955
10,140.0	90.51	359.35	5,927.0	4,675.5	-677.5	1,562,993.77	3,458,573.83	40.867024	-103.841958
10,232.0	90.46	358.78	5,926.2	4,767.5	-679.0	1,563,085.71	3,458,570.61	40.867277	-103.841963
10,323.0	90.86	0.60	5,925.2	4,858.5	-679.5	1,563,176.68	3,458,568.41	40.867526	-103.841965
10,415.0	91.08	0.30	5,923.6	4,950.4	-678.8	1,563,268.64	3,458,567.41	40.867779	-103.841963
10,506.0	89.19	359.87	5,923.4	5,041.4	-678.6	1,563,359.62	3,458,565.84	40.868029	-103.841962
10,597.0	88.75	359.90	5,925.0	5,132.4	-678.8	1,563,450.58	3,458,563.96	40.868278	-103.841963
10,688.0	90.68	1.31	5,925.5	5,223.4	-677.8	1,563,541.57	3,458,563.21	40.868528	-103.841959
10,780.0	89.01	0.96	5,925.7	5,315.4	-676.0	1,563,633.57	3,458,563.31	40.868781	-103.841953
10,871.0	89.80	1.47	5,926.7	5,406.3	-674.1	1,563,724.56	3,458,563.54	40.869030	-103.841946
10,963.0	88.44	0.82	5,928.1	5,498.3	-672.2	1,563,816.55	3,458,563.65	40.869283	-103.841939
11,055.0	88.48	0.96	5,930.6	5,590.3	-670.8	1,563,908.52	3,458,563.36	40.869535	-103.841934
11,147.0	90.24	358.74	5,931.6	5,682.3	-671.1	1,564,000.48	3,458,561.40	40.869787	-103.841935
11,237.0	89.32	356.67	5,931.9	5,772.2	-674.7	1,564,090.32	3,458,556.11	40.870034	-103.841948

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #11E-0201A
<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-0201A	<b>North Reference:</b>	True
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
11,329.0	89.67	356.53	5,932.7	5,864.0	-680.1	1,564,182.03	3,458,548.94	40.870286	-103.841968
11,419.0	90.99	0.15	5,932.2	5,954.0	-682.7	1,564,271.91	3,458,544.65	40.870533	-103.841977
11,511.0	91.08	1.45	5,930.6	6,045.9	-681.4	1,564,363.89	3,458,544.21	40.870786	-103.841972
11,602.0	90.55	2.38	5,929.3	6,136.9	-678.4	1,564,454.87	3,458,545.54	40.871035	-103.841961
11,694.0	90.86	2.45	5,928.1	6,228.8	-674.5	1,564,546.86	3,458,547.70	40.871288	-103.841947
11,785.0	88.44	0.99	5,928.7	6,319.7	-671.8	1,564,637.85	3,458,548.73	40.871537	-103.841938
11,879.0	88.40	0.84	5,931.3	6,413.7	-670.3	1,564,731.81	3,458,548.47	40.871795	-103.841932
11,974.0	88.18	0.73	5,934.1	6,508.6	-669.0	1,564,826.77	3,458,547.99	40.872056	-103.841927
12,069.0	89.41	0.26	5,936.1	6,603.6	-668.2	1,564,921.74	3,458,547.03	40.872316	-103.841925
12,164.0	89.05	359.63	5,937.4	6,698.6	-668.3	1,565,016.71	3,458,545.16	40.872577	-103.841925
12,258.0	89.01	359.29	5,939.0	6,792.6	-669.1	1,565,110.66	3,458,542.52	40.872835	-103.841928
12,353.0	89.41	358.88	5,940.3	6,887.6	-670.7	1,565,205.59	3,458,539.22	40.873096	-103.841934
12,425.0	89.23	358.00	5,941.1	6,959.5	-672.6	1,565,277.51	3,458,535.92	40.873293	-103.841941
<b>Last Cathedral Survey @ 12,425' MD</b>									
12,475.0	89.23	358.00	5,941.8	7,009.5	-674.4	1,565,327.44	3,458,533.24	40.873430	-103.841947
<b>PTB @ 12,475' - TD - 628' FNL, 168' FWL</b>									

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									
Razor # 11E-0201A PBI-	0.00	0.00	5,925.0	7,037.0	-677.6	1,565,354.82	3,458,529.51	40.873506	-103.841959
- actual wellpath misses target center by 32.4usft at 12475.0usft MD (5941.8 TVD, 7009.5 N, -674.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,325.8	5,923.4	7" - 1,432' FNL, 290' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
12,425.0	5,941.1	6,959.5	-672.6	Last Cathedral Survey @ 12,425' MD	
12,475.0	5,941.8	7,009.5	-674.4	PTB @ 12,475'	
12,475.0	5,941.8	7,009.5	-674.4	TD - 628' FNL, 168' FWL	

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