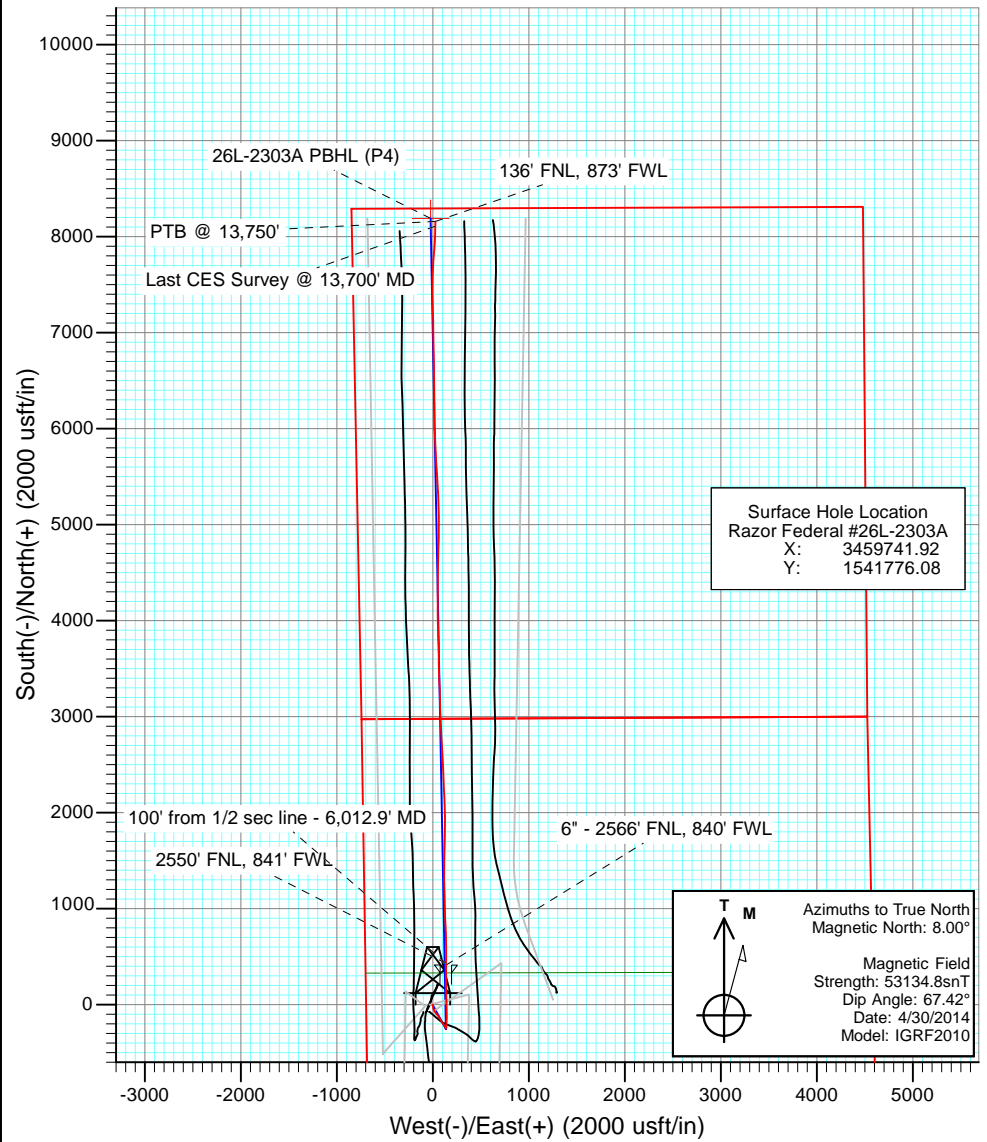
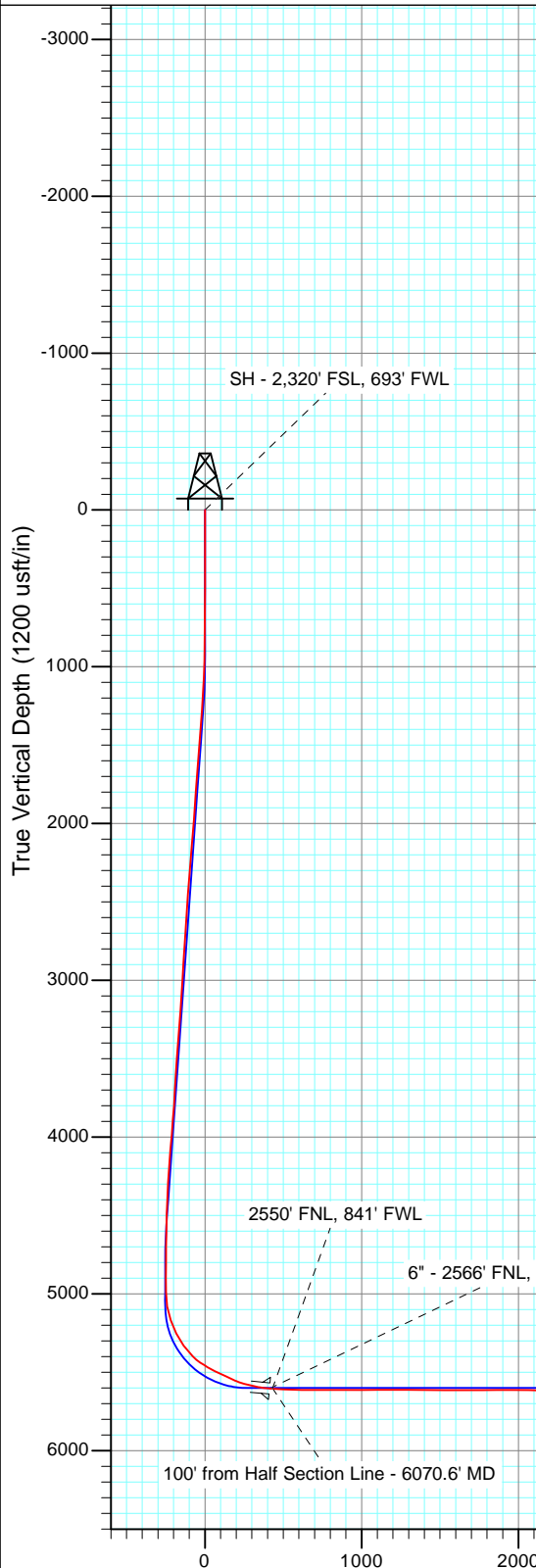
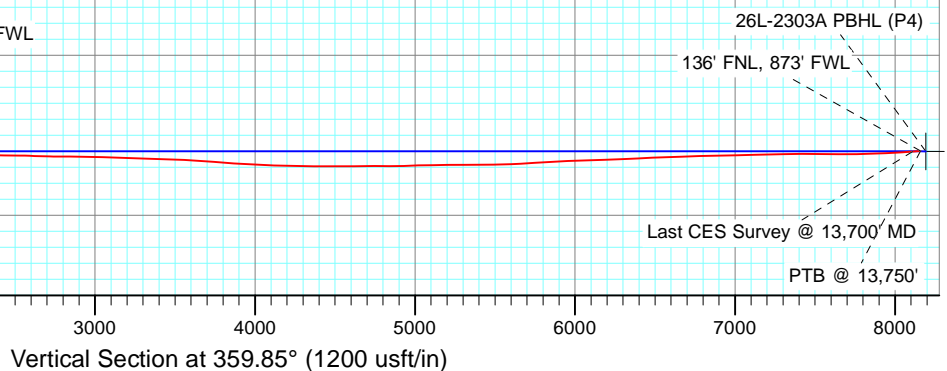


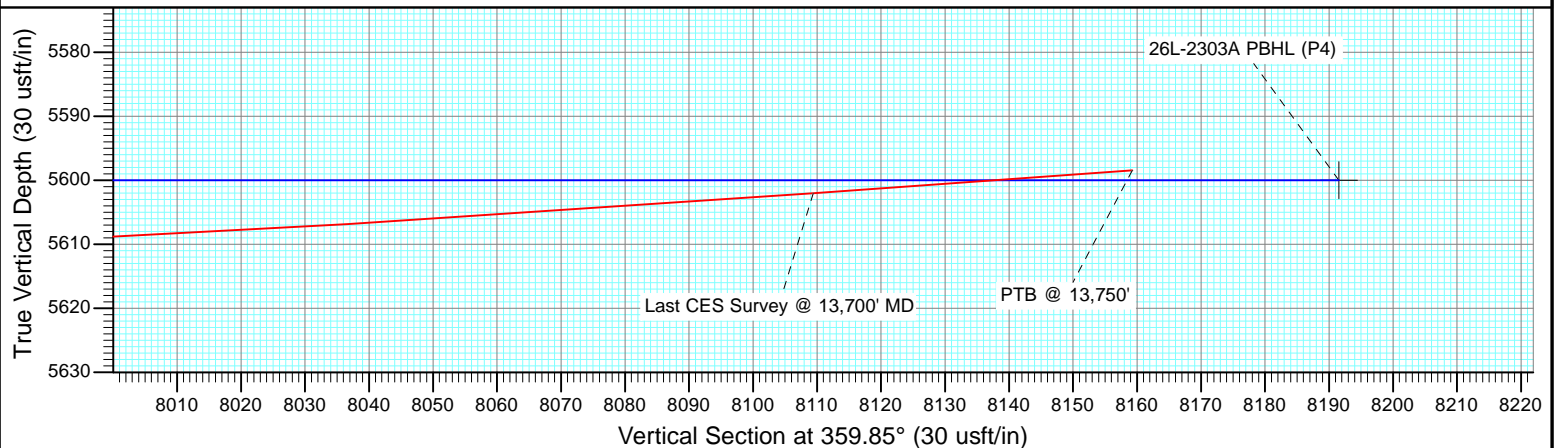
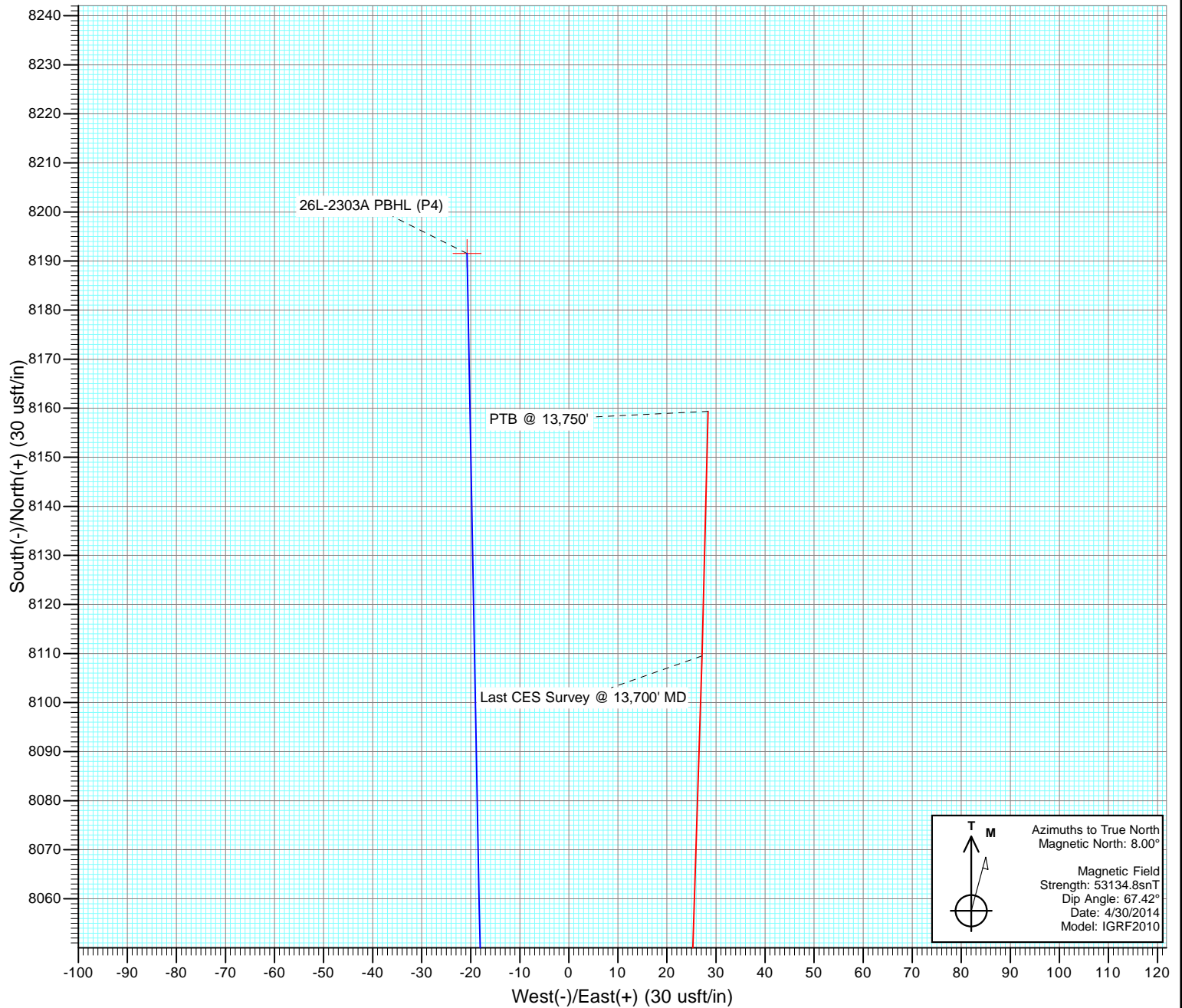
FINAL  
 Razor Federal #26L-2303A  
 145143/308955; SC  
 WELL @ 4751.0usft (Original Well Elev)  
 Ground Elevation @ 4734.5  
 North American Datum 1983  
 Well Razor Federal #26L-2303A, True North



#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
26L-2303A PBHL (P4)	5600.0	8191.5	-20.8	1549965.77	3459567.75





# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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		S26-T10N-R58W			
Site Position:		Northing:	1,541,774.28 usft	Latitude:	40.808739
From:	Lat/Long	Easting:	3,459,642.55 usft	Longitude:	-103.839531
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.07 °

Well	Razor Federal #26L-2303A					
Well Position	+N/-S	0.0 usft	Northing:	1,541,776.08 usft	Latitude:	40.808739
	+E/-W	0.0 usft	Easting:	3,459,741.92 usft	Longitude:	-103.839172
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,734.5 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	4/30/2014	8.00	67.42	53,135

<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	359.85	

<b>Survey Program</b>	<b>Date</b>	6/2/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
507.0	13,750.0	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		
507.0	0.26	283.96	507.0	0.3	-1.1	0.3	0.05	0.05		
874.0	0.62	180.35	874.0	-1.5	-1.9	-1.5	0.20	0.10		
965.0	1.58	166.38	965.0	-3.2	-1.6	-3.2	1.09	1.05		
1,056.0	2.29	162.20	1,055.9	-6.2	-0.8	-6.2	0.79	0.78		
1,148.0	3.16	164.12	1,147.8	-10.4	0.5	-10.4	0.95	0.95		
1,239.0	4.31	173.86	1,238.6	-16.2	1.5	-16.2	1.44	1.26		
1,331.0	4.70	168.02	1,330.3	-23.3	2.7	-23.3	0.65	0.42		
1,487.0	4.53	168.74	1,485.8	-35.6	5.2	-35.6	0.12	-0.11		
1,614.0	3.78	157.21	1,612.5	-44.4	7.8	-44.4	0.88	-0.59		
1,706.0	5.41	159.62	1,704.2	-51.2	10.5	-51.3	1.78	1.77		
1,798.0	4.62	150.81	1,795.8	-58.5	13.8	-58.6	1.20	-0.86		
1,890.0	4.35	145.62	1,887.6	-64.6	17.6	-64.7	0.53	-0.29		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
1,981.0	3.56	151.81	1,978.4	-70.0	20.9	-70.0	0.99	-0.87	
2,073.0	6.90	147.29	2,070.0	-77.2	25.2	-77.2	3.66	3.63	
2,164.0	6.42	143.77	2,160.3	-85.9	31.2	-85.9	0.69	-0.53	
2,256.0	5.80	140.88	2,251.8	-93.6	37.1	-93.7	0.75	-0.67	
2,347.0	5.63	136.52	2,342.4	-100.4	43.1	-100.5	0.51	-0.19	
2,439.0	5.32	135.21	2,433.9	-106.7	49.2	-106.8	0.36	-0.34	
2,530.0	5.23	131.97	2,524.6	-112.5	55.3	-112.6	0.34	-0.10	
2,621.0	4.84	155.42	2,615.2	-118.8	60.0	-118.9	2.28	-0.43	
2,713.0	4.40	154.01	2,706.9	-125.5	63.1	-125.6	0.49	-0.48	
2,804.0	4.26	149.94	2,797.7	-131.5	66.3	-131.7	0.37	-0.15	
2,895.0	3.65	148.12	2,888.4	-136.9	69.6	-137.1	0.68	-0.67	
2,987.0	4.40	147.23	2,980.2	-142.4	73.0	-142.5	0.82	0.82	
3,078.0	3.74	144.70	3,071.0	-147.7	76.6	-147.9	0.75	-0.73	
3,170.0	4.84	153.04	3,162.7	-153.6	80.1	-153.8	1.37	1.20	
3,262.0	4.84	152.39	3,254.4	-160.5	83.7	-160.7	0.06	0.00	
3,354.0	5.01	148.53	3,346.1	-167.4	87.6	-167.6	0.40	0.18	
3,445.0	4.84	148.32	3,436.7	-174.0	91.7	-174.3	0.19	-0.19	
3,537.0	4.75	147.62	3,528.4	-180.6	95.7	-180.8	0.12	-0.10	
3,627.0	4.13	145.86	3,618.1	-186.4	99.6	-186.6	0.71	-0.69	
3,719.0	3.78	156.78	3,709.9	-191.9	102.6	-192.2	0.90	-0.38	
3,810.0	4.75	140.81	3,800.7	-197.6	106.2	-197.9	1.68	1.07	
3,902.0	5.14	143.70	3,892.3	-203.9	111.0	-204.2	0.50	0.42	
3,993.0	6.02	136.77	3,982.9	-210.6	116.7	-210.9	1.22	0.97	
4,085.0	5.36	154.19	4,074.4	-218.0	121.9	-218.3	2.00	-0.72	
4,268.0	4.66	143.68	4,256.7	-231.7	130.0	-232.0	0.63	-0.38	
4,360.0	4.70	142.58	4,348.4	-237.7	134.5	-238.0	0.11	0.04	
4,452.0	2.02	155.42	4,440.3	-242.2	137.5	-242.5	3.01	-2.91	
4,543.0	0.84	226.13	4,531.3	-244.1	137.7	-244.4	2.10	-1.30	
4,634.0	0.75	199.71	4,622.2	-245.1	137.0	-245.5	0.41	-0.10	
4,725.0	0.79	169.97	4,713.2	-246.3	136.9	-246.6	0.44	0.04	
4,817.0	0.97	137.33	4,805.2	-247.5	137.5	-247.8	0.57	0.20	
4,908.0	0.70	135.46	4,896.2	-248.5	138.4	-248.8	0.30	-0.30	
5,000.0	1.10	23.04	4,988.2	-248.0	139.2	-248.4	1.64	0.43	
5,092.0	9.14	6.82	5,079.8	-240.0	140.4	-240.3	8.79	8.74	
5,183.0	19.21	359.85	5,167.9	-217.8	141.2	-218.1	11.20	11.07	
5,274.0	26.95	6.85	5,251.6	-182.3	143.6	-182.6	9.01	8.51	
5,365.0	34.73	2.10	5,329.6	-135.8	147.0	-136.2	8.95	8.55	
5,456.0	45.85	356.99	5,399.0	-77.1	146.3	-77.5	12.74	12.22	
5,486.0	51.21	356.85	5,418.8	-54.7	145.1	-55.0	17.87	17.87	
5,517.0	55.16	357.39	5,437.4	-29.9	143.8	-30.2	12.82	12.74	
5,548.0	57.10	358.58	5,454.7	-4.1	142.9	-4.5	7.02	6.26	
5,578.0	60.13	358.86	5,470.3	21.5	142.4	21.1	10.13	10.10	
5,609.0	63.91	358.58	5,484.8	48.8	141.7	48.5	12.22	12.19	
5,639.0	64.70	358.88	5,497.8	75.8	141.1	75.5	2.78	2.63	
5,670.0	64.40	359.21	5,511.2	103.8	140.7	103.5	1.36	-0.97	
5,700.0	64.18	358.84	5,524.2	130.9	140.2	130.5	1.33	-0.73	
5,731.0	63.96	358.83	5,537.7	158.7	139.6	158.4	0.71	-0.71	
5,761.0	66.29	359.14	5,550.4	185.9	139.2	185.6	7.82	7.77	
5,792.0	69.98	0.14	5,561.9	214.7	139.0	214.4	12.27	11.90	
5,822.0	73.67	359.62	5,571.3	243.2	138.9	242.9	12.41	12.30	
5,853.0	76.70	0.08	5,579.2	273.2	138.9	272.8	9.88	9.77	
5,883.0	77.76	359.87	5,585.8	302.4	138.8	302.1	3.60	3.53	
5,913.0	78.42	0.52	5,592.0	331.8	138.9	331.4	3.06	2.20	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
5,945.0	80.70	0.37	5,597.8	363.2	139.2	362.9	7.14	7.12	
6,012.9	85.95	0.80	5,605.7	430.7	139.9	430.3	7.76	7.73	2550' FNL, 841' FWL - 100' from 1/2 sec line - 6,0
6,024.0	86.81	0.87	5,606.4	441.7	140.0	441.4	7.76	7.73	
6,119.0	88.53	0.02	5,610.3	536.7	140.8	536.3	2.02	1.81	
6,214.0	89.98	358.43	5,611.5	631.6	139.5	631.3	2.27	1.53	
6,309.0	89.54	358.29	5,611.9	726.6	136.8	726.2	0.49	-0.46	
6,403.0	88.79	357.53	5,613.3	820.5	133.3	820.2	1.14	-0.80	
6,498.0	90.64	358.22	5,613.7	915.4	129.8	915.1	2.08	1.95	
6,593.0	90.59	358.54	5,612.7	1,010.4	127.1	1,010.1	0.34	-0.05	
6,688.0	90.33	357.91	5,611.9	1,105.4	124.2	1,105.0	0.72	-0.27	
6,782.0	90.07	358.61	5,611.6	1,199.3	121.3	1,199.0	0.79	-0.28	
6,877.0	89.71	359.68	5,611.8	1,294.3	119.9	1,294.0	1.19	-0.38	
6,972.0	89.41	359.55	5,612.5	1,389.3	119.3	1,389.0	0.34	-0.32	
7,067.0	89.76	1.27	5,613.2	1,484.3	120.0	1,484.0	1.85	0.37	
7,162.0	89.71	1.68	5,613.7	1,579.2	122.4	1,578.9	0.43	-0.05	
7,257.0	89.54	1.61	5,614.3	1,674.2	125.1	1,673.9	0.19	-0.18	
7,352.0	91.69	1.18	5,613.3	1,769.2	127.4	1,768.8	2.31	2.26	
7,447.0	89.76	359.29	5,612.1	1,864.2	127.8	1,863.8	2.84	-2.03	
7,541.0	89.49	358.90	5,612.7	1,958.1	126.3	1,957.8	0.50	-0.29	
7,636.0	88.97	358.61	5,613.9	2,053.1	124.3	2,052.8	0.63	-0.55	
7,731.0	88.35	357.55	5,616.2	2,148.0	121.1	2,147.7	1.29	-0.65	
7,826.0	88.09	357.78	5,619.1	2,242.9	117.2	2,242.6	0.37	-0.27	
7,921.0	87.38	357.33	5,622.9	2,337.7	113.2	2,337.4	0.88	-0.75	
8,016.0	88.97	357.49	5,625.9	2,432.6	108.9	2,432.3	1.68	1.67	
8,111.0	89.63	358.60	5,627.1	2,527.5	105.7	2,527.3	1.36	0.69	
8,206.0	88.26	356.45	5,628.8	2,622.4	101.6	2,622.1	2.68	-1.44	
8,301.0	87.87	355.04	5,632.0	2,717.1	94.5	2,716.8	1.54	-0.41	
8,396.0	89.76	357.70	5,634.0	2,811.9	88.5	2,811.6	3.43	1.99	
8,490.0	90.37	357.57	5,633.9	2,905.8	84.6	2,905.6	0.66	0.65	
8,585.0	88.66	358.39	5,634.7	3,000.7	81.3	3,000.5	2.00	-1.80	
8,680.0	87.69	357.25	5,637.7	3,095.6	77.7	3,095.4	1.58	-1.02	
8,772.0	87.16	358.91	5,641.8	3,187.5	74.6	3,187.3	1.89	-0.58	
8,865.0	88.92	358.24	5,645.0	3,280.4	72.3	3,280.2	2.02	1.89	
8,957.0	88.79	357.27	5,646.9	3,372.3	68.7	3,372.1	1.06	-0.14	
9,050.0	88.13	358.97	5,649.4	3,465.2	65.6	3,465.0	1.96	-0.71	
9,142.0	86.33	358.82	5,653.8	3,557.1	63.8	3,556.9	1.96	-1.96	
9,234.0	86.33	359.15	5,659.7	3,648.9	62.2	3,648.7	0.36	0.00	
9,326.0	86.02	358.13	5,665.8	3,740.6	60.0	3,740.5	1.16	-0.34	
9,417.0	85.89	358.40	5,672.2	3,831.4	57.3	3,831.2	0.33	-0.14	
9,509.0	86.37	358.80	5,678.5	3,923.1	55.0	3,923.0	0.68	0.52	
9,600.0	87.47	359.07	5,683.3	4,014.0	53.4	4,013.8	1.24	1.21	
9,692.0	87.16	359.01	5,687.7	4,105.9	51.8	4,105.7	0.34	-0.34	
9,783.0	88.18	0.29	5,691.4	4,196.8	51.3	4,196.6	1.80	1.12	
9,874.0	90.37	0.37	5,692.5	4,287.8	51.8	4,287.6	2.41	2.41	
9,966.0	89.58	359.92	5,692.5	4,379.8	52.0	4,379.6	0.99	-0.86	
10,057.0	88.88	0.68	5,693.8	4,470.8	52.5	4,470.6	1.14	-0.77	
10,149.0	90.86	1.54	5,694.0	4,562.7	54.3	4,562.6	2.35	2.15	
10,240.0	90.64	1.64	5,692.8	4,653.7	56.8	4,653.5	0.27	-0.24	
10,332.0	90.15	1.49	5,692.2	4,745.6	59.3	4,745.5	0.56	-0.53	
10,423.0	89.49	1.34	5,692.4	4,836.6	61.6	4,836.4	0.74	-0.73	
10,514.0	91.74	0.54	5,691.5	4,927.6	63.1	4,927.4	2.62	2.47	
10,606.0	91.74	359.83	5,688.7	5,019.6	63.4	5,019.4	0.77	0.00	
10,697.0	90.81	358.93	5,686.6	5,110.5	62.4	5,110.3	1.42	-1.02	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
10,789.0	91.52	358.40	5,684.8	5,202.5	60.2	5,202.3	0.96	0.77	
10,881.0	89.45	358.04	5,684.0	5,294.4	57.4	5,294.3	2.28	-2.25	
10,973.0	90.42	356.20	5,684.1	5,386.3	52.7	5,386.2	2.26	1.05	
11,064.0	90.90	356.50	5,683.1	5,477.1	47.0	5,477.0	0.62	0.53	
11,155.0	92.35	356.75	5,680.5	5,567.9	41.6	5,567.8	1.62	1.59	
11,246.0	92.04	356.17	5,677.0	5,658.7	36.0	5,658.6	0.72	-0.34	
11,338.0	94.29	358.00	5,671.9	5,750.4	31.3	5,750.3	3.15	2.45	
11,429.0	92.53	357.73	5,666.5	5,841.2	27.9	5,841.1	1.96	-1.93	
11,520.0	92.66	356.36	5,662.4	5,931.9	23.2	5,931.9	1.51	0.14	
11,612.0	92.40	358.22	5,658.3	6,023.7	18.9	6,023.7	2.04	-0.28	
11,703.0	91.21	358.60	5,655.4	6,114.7	16.4	6,114.6	1.37	-1.31	
11,796.0	92.31	1.05	5,652.6	6,207.6	16.1	6,207.5	2.89	1.18	
11,887.0	92.40	0.17	5,648.9	6,298.5	17.1	6,298.5	0.97	0.10	
11,979.0	92.62	359.31	5,644.8	6,390.4	16.6	6,390.4	0.96	0.24	
12,070.0	92.97	359.31	5,640.4	6,481.3	15.5	6,481.3	0.38	0.38	
12,161.0	91.65	359.28	5,636.7	6,572.2	14.4	6,572.2	1.45	-1.45	
12,253.0	91.87	358.04	5,633.9	6,664.2	12.3	6,664.1	1.37	0.24	
12,344.0	92.22	357.97	5,630.6	6,755.1	9.1	6,755.0	0.39	0.38	
12,436.0	90.77	358.98	5,628.2	6,847.0	6.7	6,847.0	1.92	-1.58	
12,527.0	91.56	0.26	5,626.4	6,938.0	6.1	6,937.9	1.65	0.87	
12,619.0	91.38	359.54	5,624.0	7,030.0	5.9	7,029.9	0.81	-0.20	
12,711.0	91.43	358.83	5,621.8	7,121.9	4.6	7,121.9	0.77	0.05	
12,801.0	91.38	358.33	5,619.6	7,211.9	2.4	7,211.8	0.56	-0.06	
12,892.0	90.68	357.60	5,617.9	7,302.8	-0.9	7,302.8	1.11	-0.77	
12,983.0	90.64	359.14	5,616.9	7,393.7	-3.5	7,393.7	1.69	-0.04	
13,075.0	90.15	0.82	5,616.3	7,485.7	-3.5	7,485.7	1.90	-0.53	
13,166.0	88.88	1.86	5,617.0	7,576.7	-1.4	7,576.7	1.80	-1.40	
13,258.0	89.76	3.91	5,618.1	7,668.6	3.3	7,668.5	2.42	0.96	
13,349.0	91.03	3.78	5,617.5	7,759.4	9.4	7,759.3	1.40	1.40	
13,441.0	91.69	3.61	5,615.3	7,851.2	15.3	7,851.1	0.74	0.72	
13,532.0	92.62	2.99	5,611.9	7,941.9	20.5	7,941.9	1.23	1.02	
13,627.0	93.45	2.24	5,606.9	8,036.7	24.9	8,036.6	1.18	0.87	
13,700.0	94.11	1.39	5,602.0	8,109.5	27.2	8,109.4	1.47	0.90	Last CES Survey @ 13,700' MD
13,750.0	94.11	1.39	5,598.5	8,159.4	28.4	8,159.3	0.00	0.00	136' FNL, 873' FWL - PTB @ 13,750'

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
26L-2303A PBHL (P4)	0.00	1.07	5,600.0	8,191.5	-20.8	1,549,965.77	3,459,567.75	40.831222	-103.839247
- actual wellpath misses target center by 58.7usft at 13750.0usft MD (5598.5 TVD, 8159.4 N, 28.4 E)									
- Point									
26L-2303A VP	0.00	1.08	4,966.1	-252.6	136.8	1,541,526.08	3,459,883.42	40.808045	-103.838678
- actual wellpath misses target center by 4.8usft at 4977.9usft MD (4966.1 TVD, -248.4 N, 139.0 E)									
- Point									
26L-2303A VP (P4)	0.00	1.08	4,979.1	-252.6	136.8	1,541,526.08	3,459,883.42	40.808045	-103.838678
- actual wellpath misses target center by 5.0usft at 4990.9usft MD (4979.1 TVD, -248.2 N, 139.1 E)									
- Point									
26L-2303A PBHL	0.00	1.07	5,587.0	8,191.5	-20.8	1,549,965.77	3,459,567.75	40.831222	-103.839247
- actual wellpath misses target center by 59.8usft at 13750.0usft MD (5598.5 TVD, 8159.4 N, 28.4 E)									
- Point									
26L-2303A TGT	0.00	1.07	5,587.0	7,691.6	-10.8	1,549,466.17	3,459,587.07	40.829850	-103.839211
- actual wellpath misses target center by 34.8usft at 13280.3usft MD (5618.1 TVD, 7690.8 N, 4.8 E)									
- Point									
26L-2303A VP (P5)	0.00	1.08	4,779.1	-252.6	136.8	1,541,526.08	3,459,883.42	40.808045	-103.838678
- actual wellpath misses target center by 5.5usft at 4790.9usft MD (4779.2 TVD, -247.2 N, 137.3 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
5,995.0	5,604.2	6" - 2566' FNL, 840' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
6,012.9	5,605.7	430.7	139.9	2550' FNL, 841' FWL	
6,012.9	5,605.7	430.7	139.9	100' from 1/2 sec line - 6,012.9' MD	
13,700.0	5,602.0	8,109.5	27.2	Last CES Survey @ 13,700' MD	
13,750.0	5,598.5	8,159.4	28.4	136' FNL, 873' FWL	
13,750.0	5,598.5	8,159.4	28.4	PTB @ 13,750'	

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

# **Whiting Petroleum Corporation**

**Weld County, CO**

**S26-T10N-R58W**

**Razor Federal #26L-2303A**

**HZ**

**Design: FINAL**

## **Survey Report - Geographic**

**02 June, 2014**



# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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	S26-T10N-R58W				
Site Position:		Northing:	1,541,774.28 usft	Latitude:	40.808739
From:	Lat/Long	Easting:	3,459,642.55 usft	Longitude:	-103.839531
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.07 °

Well		Razor Federal #26L-2303A				
Well Position	+N/-S	0.0 usft	Northing:	1,541,776.08 usft	Latitude:	40.808739
	+E/-W	0.0 usft	Easting:	3,459,741.91 usft	Longitude:	-103.839172
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,734.5 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	4/30/2014	8.00	67.42	53,135

<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) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	359.85	

<b>Survey Program</b>	<b>Date</b>	5/30/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
507.0	13,750.0	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	1,541,776.08	3,459,741.91	40.808739	-103.839172
507.0	0.26	283.96	507.0	0.3	-1.1	1,541,776.34	3,459,740.79	40.808740	-103.839176
874.0	0.62	180.35	874.0	-1.5	-1.9	1,541,774.54	3,459,740.01	40.808735	-103.839179
965.0	1.58	166.38	965.0	-3.2	-1.6	1,541,772.83	3,459,740.33	40.808730	-103.839178
1,056.0	2.29	162.20	1,055.9	-6.2	-0.8	1,541,769.90	3,459,741.24	40.808722	-103.839175
1,148.0	3.16	164.12	1,147.8	-10.4	0.5	1,541,765.73	3,459,742.57	40.808710	-103.839171
1,239.0	4.31	173.86	1,238.6	-16.2	1.5	1,541,759.94	3,459,743.73	40.808695	-103.839167
1,331.0	4.70	168.02	1,330.3	-23.3	2.7	1,541,752.84	3,459,745.02	40.808675	-103.839163
1,487.0	4.53	168.74	1,485.8	-35.6	5.2	1,541,740.60	3,459,747.78	40.808641	-103.839153
1,614.0	3.78	157.21	1,612.5	-44.4	7.8	1,541,731.87	3,459,750.54	40.808617	-103.839144
1,706.0	5.41	159.62	1,704.2	-51.2	10.5	1,541,725.06	3,459,753.35	40.808598	-103.839134
1,798.0	4.62	150.81	1,795.8	-58.5	13.8	1,541,717.82	3,459,756.81	40.808578	-103.839122

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
1,890.0	4.35	145.62	1,887.6	-64.6	17.6	1,541,711.78	3,459,760.70	40.808561	-103.839109
1,981.0	3.56	151.81	1,978.4	-70.0	20.9	1,541,706.50	3,459,764.08	40.808547	-103.839097
2,073.0	6.90	147.29	2,070.0	-77.2	25.2	1,541,699.42	3,459,768.55	40.808527	-103.839081
2,164.0	6.42	143.77	2,160.3	-85.9	31.2	1,541,690.83	3,459,774.67	40.808503	-103.839060
2,256.0	5.80	140.88	2,251.8	-93.6	37.1	1,541,683.18	3,459,780.79	40.808482	-103.839038
2,347.0	5.63	136.52	2,342.4	-100.4	43.1	1,541,676.49	3,459,786.89	40.808463	-103.839017
2,439.0	5.32	135.21	2,433.9	-106.7	49.2	1,541,670.30	3,459,793.12	40.808446	-103.838994
2,530.0	5.23	131.97	2,524.6	-112.5	55.3	1,541,664.65	3,459,799.28	40.808430	-103.838973
2,621.0	4.84	155.42	2,615.2	-118.8	60.0	1,541,658.47	3,459,804.08	40.808413	-103.838956
2,713.0	4.40	154.01	2,706.9	-125.5	63.1	1,541,651.83	3,459,807.36	40.808395	-103.838944
2,804.0	4.26	149.94	2,797.7	-131.5	66.3	1,541,645.83	3,459,810.70	40.808378	-103.838933
2,895.0	3.65	148.12	2,888.4	-136.9	69.6	1,541,640.51	3,459,814.02	40.808363	-103.838921
2,987.0	4.40	147.23	2,980.2	-142.4	73.0	1,541,635.12	3,459,817.58	40.808348	-103.838909
3,078.0	3.74	144.70	3,071.0	-147.7	76.6	1,541,629.83	3,459,821.29	40.808334	-103.838895
3,170.0	4.84	153.04	3,162.7	-153.6	80.1	1,541,623.99	3,459,824.89	40.808317	-103.838883
3,262.0	4.84	152.39	3,254.4	-160.5	83.7	1,541,617.16	3,459,828.58	40.808298	-103.838870
3,354.0	5.01	148.53	3,346.1	-167.4	87.6	1,541,610.37	3,459,832.60	40.808280	-103.838856
3,445.0	4.84	148.32	3,436.7	-174.0	91.7	1,541,603.79	3,459,836.81	40.808261	-103.838841
3,537.0	4.75	147.62	3,528.4	-180.6	95.7	1,541,597.35	3,459,841.01	40.808243	-103.838826
3,627.0	4.13	145.86	3,618.1	-186.4	99.6	1,541,591.59	3,459,844.94	40.808227	-103.838813
3,719.0	3.78	156.78	3,709.9	-191.9	102.6	1,541,586.12	3,459,848.10	40.808212	-103.838802
3,810.0	4.75	140.81	3,800.7	-197.6	106.2	1,541,580.51	3,459,851.76	40.808197	-103.838789
3,902.0	5.14	143.70	3,892.3	-203.9	111.0	1,541,574.33	3,459,856.73	40.808179	-103.838771
3,993.0	6.02	136.77	3,982.9	-210.6	116.7	1,541,567.67	3,459,862.54	40.808161	-103.838751
4,085.0	5.36	154.19	4,074.4	-218.0	121.9	1,541,560.39	3,459,867.85	40.808141	-103.838732
4,268.0	4.66	143.68	4,256.7	-231.7	130.0	1,541,546.86	3,459,876.23	40.808103	-103.838703
4,360.0	4.70	142.58	4,348.4	-237.7	134.5	1,541,540.94	3,459,880.84	40.808086	-103.838686
4,452.0	2.02	155.42	4,440.3	-242.2	137.5	1,541,536.52	3,459,883.89	40.808074	-103.838676
4,543.0	0.84	226.13	4,531.3	-244.1	137.7	1,541,534.61	3,459,884.11	40.808069	-103.838675
4,634.0	0.75	199.71	4,622.2	-245.1	137.0	1,541,533.57	3,459,883.45	40.808066	-103.838677
4,725.0	0.79	169.97	4,713.2	-246.3	136.9	1,541,532.39	3,459,883.38	40.808063	-103.838678
4,817.0	0.97	137.33	4,805.2	-247.5	137.5	1,541,531.21	3,459,884.04	40.808060	-103.838676
4,908.0	0.70	135.46	4,896.2	-248.5	138.4	1,541,530.26	3,459,884.97	40.808057	-103.838672
5,000.0	1.10	23.04	4,988.2	-248.0	139.2	1,541,530.69	3,459,885.70	40.808058	-103.838670
5,092.0	9.14	6.82	5,079.8	-240.0	140.4	1,541,538.79	3,459,886.77	40.808080	-103.838665
5,183.0	19.21	359.85	5,167.9	-217.8	141.2	1,541,561.01	3,459,887.17	40.808141	-103.838662
5,274.0	26.95	6.85	5,251.6	-182.3	143.6	1,541,596.55	3,459,888.93	40.808239	-103.838653
5,365.0	34.73	2.10	5,329.6	-135.8	147.0	1,541,643.07	3,459,891.48	40.808366	-103.838641
5,456.0	45.85	356.99	5,399.0	-77.1	146.3	1,541,701.75	3,459,889.61	40.808527	-103.838644
5,486.0	51.21	356.85	5,418.8	-54.7	145.1	1,541,724.16	3,459,887.98	40.808589	-103.838648
5,517.0	55.16	357.39	5,437.4	-29.9	143.8	1,541,748.91	3,459,886.27	40.808657	-103.838653
5,548.0	57.10	358.58	5,454.7	-4.1	142.9	1,541,774.61	3,459,884.89	40.808728	-103.838656
5,578.0	60.13	358.86	5,470.3	21.5	142.4	1,541,800.20	3,459,883.84	40.808798	-103.838658
5,609.0	63.91	358.58	5,484.8	48.8	141.7	1,541,827.55	3,459,882.72	40.808873	-103.838660
5,639.0	64.70	358.88	5,497.8	75.8	141.1	1,541,854.56	3,459,881.61	40.808947	-103.838662
5,670.0	64.40	359.21	5,511.2	103.8	140.7	1,541,882.53	3,459,880.62	40.809024	-103.838664
5,700.0	64.18	358.84	5,524.2	130.9	140.2	1,541,909.54	3,459,879.65	40.809098	-103.838666
5,731.0	63.96	358.83	5,537.7	158.7	139.6	1,541,937.40	3,459,878.57	40.809175	-103.838668
5,761.0	66.29	359.14	5,550.4	185.9	139.2	1,541,964.60	3,459,877.57	40.809249	-103.838670
5,792.0	69.98	0.14	5,561.9	214.7	139.0	1,541,993.36	3,459,876.86	40.809328	-103.838670
5,822.0	73.67	359.62	5,571.3	243.2	138.9	1,542,021.85	3,459,876.26	40.809406	-103.838670
5,853.0	76.70	0.08	5,579.2	273.2	138.9	1,542,051.81	3,459,875.62	40.809489	-103.838671
5,883.0	77.76	359.87	5,585.8	302.4	138.8	1,542,081.06	3,459,875.06	40.809569	-103.838671
5,913.0	78.42	0.52	5,592.0	331.8	138.9	1,542,110.41	3,459,874.61	40.809650	-103.838670
5,945.0	80.70	0.37	5,597.8	363.2	139.2	1,542,141.88	3,459,874.27	40.809736	-103.838669

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
6,012.9	85.95	0.80	5,605.7	430.7	139.9	1,542,209.29	3,459,873.70	40.809921	-103.838667
<b>2550' FNL, 841' FWL - 100' from 1/2 sec line - 6,012.9' MD</b>									
6,024.0	86.81	0.87	5,606.4	441.7	140.0	1,542,220.37	3,459,873.65	40.809951	-103.838666
6,119.0	88.53	0.02	5,610.3	536.7	140.8	1,542,315.28	3,459,872.61	40.810212	-103.838664
6,214.0	89.98	358.43	5,611.5	631.6	139.5	1,542,410.21	3,459,869.55	40.810473	-103.838668
6,309.0	89.54	358.29	5,611.9	726.6	136.8	1,542,505.11	3,459,865.05	40.810733	-103.838678
6,403.0	88.79	357.53	5,613.3	820.5	133.3	1,542,598.95	3,459,859.86	40.810991	-103.838691
6,498.0	90.64	358.22	5,613.7	915.4	129.8	1,542,693.80	3,459,854.56	40.811252	-103.838703
6,593.0	90.59	358.54	5,612.7	1,010.4	127.1	1,542,788.69	3,459,850.10	40.811512	-103.838713
6,688.0	90.33	357.91	5,611.9	1,105.4	124.2	1,542,883.57	3,459,845.38	40.811773	-103.838724
6,782.0	90.07	358.61	5,611.6	1,199.3	121.3	1,542,977.45	3,459,840.77	40.812031	-103.838734
6,877.0	89.71	359.68	5,611.8	1,294.3	119.9	1,543,072.40	3,459,837.57	40.812291	-103.838739
6,972.0	89.41	359.55	5,612.5	1,389.3	119.3	1,543,167.36	3,459,835.15	40.812552	-103.838741
7,067.0	89.76	1.27	5,613.2	1,484.3	120.0	1,543,262.35	3,459,834.05	40.812813	-103.838739
7,162.0	89.71	1.68	5,613.7	1,579.2	122.4	1,543,357.35	3,459,834.72	40.813073	-103.838730
7,257.0	89.54	1.61	5,614.3	1,674.2	125.1	1,543,452.34	3,459,835.67	40.813334	-103.838720
7,352.0	91.69	1.18	5,613.3	1,769.2	127.4	1,543,547.33	3,459,836.20	40.813595	-103.838712
7,447.0	89.76	359.29	5,612.1	1,864.2	127.8	1,543,642.30	3,459,834.81	40.813855	-103.838710
7,541.0	89.49	358.90	5,612.7	1,958.1	126.3	1,543,736.24	3,459,831.57	40.814113	-103.838716
7,636.0	88.97	358.61	5,613.9	2,053.1	124.3	1,543,831.16	3,459,827.73	40.814374	-103.838723
7,731.0	88.35	357.55	5,616.2	2,148.0	121.1	1,543,926.00	3,459,822.77	40.814635	-103.838735
7,826.0	88.09	357.78	5,619.1	2,242.9	117.2	1,544,020.79	3,459,817.12	40.814895	-103.838749
7,921.0	87.38	357.33	5,622.9	2,337.7	113.2	1,544,115.53	3,459,811.30	40.815155	-103.838763
8,016.0	88.97	357.49	5,625.9	2,432.6	108.9	1,544,210.29	3,459,805.23	40.815416	-103.838779
8,111.0	89.63	358.60	5,627.1	2,527.5	105.7	1,544,305.14	3,459,800.21	40.815676	-103.838791
8,206.0	88.26	356.45	5,628.8	2,622.4	101.6	1,544,399.94	3,459,794.34	40.815937	-103.838805
8,301.0	87.87	355.04	5,632.0	2,717.1	94.5	1,544,494.47	3,459,785.52	40.816197	-103.838831
8,396.0	89.76	357.70	5,634.0	2,811.9	88.5	1,544,589.12	3,459,777.73	40.816457	-103.838853
8,490.0	90.37	357.57	5,633.9	2,905.8	84.6	1,544,682.95	3,459,772.10	40.816714	-103.838867
8,585.0	88.66	358.39	5,634.7	3,000.7	81.3	1,544,777.80	3,459,766.97	40.816975	-103.838879
8,680.0	87.69	357.25	5,637.7	3,095.6	77.7	1,544,872.60	3,459,761.58	40.817235	-103.838892
8,772.0	87.16	358.91	5,641.8	3,187.5	74.6	1,544,964.38	3,459,756.78	40.817488	-103.838903
8,865.0	88.92	358.24	5,645.0	3,280.4	72.3	1,545,057.23	3,459,752.73	40.817743	-103.838911
8,957.0	88.79	357.27	5,646.9	3,372.3	68.7	1,545,149.06	3,459,747.41	40.817995	-103.838924
9,050.0	88.13	358.97	5,649.4	3,465.2	65.6	1,545,241.90	3,459,742.62	40.818250	-103.838935
9,142.0	86.33	358.82	5,653.8	3,557.1	63.8	1,545,333.72	3,459,739.13	40.818502	-103.838942
9,234.0	86.33	359.15	5,659.7	3,648.9	62.2	1,545,425.47	3,459,735.78	40.818754	-103.838947
9,326.0	86.02	358.13	5,665.8	3,740.6	60.0	1,545,517.18	3,459,731.88	40.819006	-103.838955
9,417.0	85.89	358.40	5,672.2	3,831.4	57.3	1,545,607.84	3,459,727.44	40.819255	-103.838965
9,509.0	86.37	358.80	5,678.5	3,923.1	55.0	1,545,699.55	3,459,723.48	40.819507	-103.838973
9,600.0	87.47	359.07	5,683.3	4,014.0	53.4	1,545,790.35	3,459,720.09	40.819756	-103.838979
9,692.0	87.16	359.01	5,687.7	4,105.9	51.8	1,545,882.19	3,459,716.83	40.820008	-103.838985
9,783.0	88.18	0.29	5,691.4	4,196.8	51.3	1,545,973.09	3,459,714.57	40.820258	-103.838987
9,874.0	90.37	0.37	5,692.5	4,287.8	51.8	1,546,064.07	3,459,713.39	40.820508	-103.838985
9,966.0	89.58	359.92	5,692.5	4,379.8	52.0	1,546,156.05	3,459,711.90	40.820760	-103.838984
10,057.0	88.88	0.68	5,693.8	4,470.8	52.5	1,546,247.03	3,459,710.67	40.821010	-103.838983
10,149.0	90.86	1.54	5,694.0	4,562.7	54.3	1,546,339.03	3,459,710.73	40.821262	-103.838976
10,240.0	90.64	1.64	5,692.8	4,653.7	56.8	1,546,430.02	3,459,711.55	40.821512	-103.838967
10,332.0	90.15	1.49	5,692.2	4,745.6	59.3	1,546,522.01	3,459,712.34	40.821764	-103.838958
10,423.0	89.49	1.34	5,692.4	4,836.6	61.6	1,546,613.01	3,459,712.88	40.822014	-103.838950
10,514.0	91.74	0.54	5,691.5	4,927.6	63.1	1,546,704.00	3,459,712.67	40.822264	-103.838944
10,606.0	91.74	359.83	5,688.7	5,019.6	63.4	1,546,795.94	3,459,711.25	40.822516	-103.838943
10,697.0	90.81	358.93	5,686.6	5,110.5	62.4	1,546,886.88	3,459,708.56	40.822766	-103.838947
10,789.0	91.52	358.40	5,684.8	5,202.5	60.2	1,546,978.78	3,459,704.69	40.823018	-103.838955
10,881.0	89.45	358.04	5,684.0	5,294.4	57.4	1,547,070.65	3,459,700.11	40.823270	-103.838965

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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
10,973.0	90.42	356.20	5,684.1	5,386.3	52.7	1,547,162.43	3,459,693.77	40.823523	-103.838982
11,064.0	90.90	356.50	5,683.1	5,477.1	47.0	1,547,253.12	3,459,686.28	40.823772	-103.839003
11,155.0	92.35	356.75	5,680.5	5,567.9	41.6	1,547,343.80	3,459,679.23	40.824021	-103.839022
11,246.0	92.04	356.17	5,677.0	5,658.7	36.0	1,547,434.44	3,459,671.91	40.824270	-103.839042
11,338.0	94.29	358.00	5,671.9	5,750.4	31.3	1,547,526.05	3,459,665.52	40.824522	-103.839059
11,429.0	92.53	357.73	5,666.5	5,841.2	27.9	1,547,616.74	3,459,660.44	40.824771	-103.839071
11,520.0	92.66	356.36	5,662.4	5,931.9	23.2	1,547,707.42	3,459,654.05	40.825020	-103.839088
11,612.0	92.40	358.22	5,658.3	6,023.7	18.9	1,547,799.12	3,459,647.99	40.825272	-103.839104
11,703.0	91.21	358.60	5,655.4	6,114.7	16.4	1,547,889.98	3,459,643.77	40.825522	-103.839113
11,796.0	92.31	1.05	5,652.6	6,207.6	16.1	1,547,982.90	3,459,641.74	40.825777	-103.839114
11,887.0	92.40	0.17	5,648.9	6,298.5	17.1	1,548,073.82	3,459,641.01	40.826026	-103.839111
11,979.0	92.62	359.31	5,644.8	6,390.4	16.6	1,548,165.71	3,459,638.87	40.826279	-103.839112
12,070.0	92.97	359.31	5,640.4	6,481.3	15.5	1,548,256.56	3,459,636.07	40.826528	-103.839116
12,161.0	91.65	359.28	5,636.7	6,572.2	14.4	1,548,347.44	3,459,633.25	40.826778	-103.839120
12,253.0	91.87	358.04	5,633.9	6,664.2	12.3	1,548,439.31	3,459,629.38	40.827030	-103.839128
12,344.0	92.22	357.97	5,630.6	6,755.1	9.1	1,548,530.12	3,459,624.51	40.827279	-103.839139
12,436.0	90.77	358.98	5,628.2	6,847.0	6.7	1,548,622.02	3,459,620.34	40.827532	-103.839148
12,527.0	91.56	0.26	5,626.4	6,938.0	6.1	1,548,712.97	3,459,618.03	40.827782	-103.839150
12,619.0	91.38	359.54	5,624.0	7,030.0	5.9	1,548,804.92	3,459,616.15	40.828034	-103.839151
12,711.0	91.43	358.83	5,621.8	7,121.9	4.6	1,548,896.84	3,459,613.12	40.828286	-103.839156
12,801.0	91.38	358.33	5,619.6	7,211.9	2.4	1,548,986.72	3,459,609.21	40.828533	-103.839164
12,892.0	90.68	357.60	5,617.9	7,302.8	-0.9	1,549,077.58	3,459,604.27	40.828783	-103.839175
12,983.0	90.64	359.14	5,616.9	7,393.7	-3.5	1,549,168.47	3,459,599.98	40.829032	-103.839185
13,075.0	90.15	0.82	5,616.3	7,485.7	-3.5	1,549,260.44	3,459,598.23	40.829285	-103.839185
13,166.0	88.88	1.86	5,617.0	7,576.7	-1.4	1,549,351.44	3,459,598.65	40.829535	-103.839177
13,258.0	89.76	3.91	5,618.1	7,668.6	3.3	1,549,443.38	3,459,601.56	40.829787	-103.839160
13,349.0	91.03	3.78	5,617.5	7,759.4	9.4	1,549,534.27	3,459,605.96	40.830036	-103.839138
13,441.0	91.69	3.61	5,615.3	7,851.2	15.3	1,549,626.14	3,459,610.17	40.830288	-103.839117
13,532.0	92.62	2.99	5,611.9	7,941.9	20.5	1,549,717.01	3,459,613.70	40.830537	-103.839098
13,627.0	93.45	2.24	5,606.9	8,036.7	24.9	1,549,811.84	3,459,616.25	40.830797	-103.839082
13,700.0	94.11	1.39	5,602.0	8,109.5	27.2	1,549,884.67	3,459,617.20	40.830997	-103.839074
Last CES Survey @ 13,700' MD									
13,750.0	94.11	1.39	5,598.5	8,159.4	28.4	1,549,934.54	3,459,617.47	40.831134	-103.839070
136' FNL, 873' FWL - PTB @ 13,750'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
26L-2303A PBHL (P4)	0.00	1.07	5,600.0	8,191.5	-20.8	1,549,965.78	3,459,567.75	40.831222	-103.839247
- hit/miss target									
- Shape									
- actual wellpath misses target center by 58.7usft at 13750.0usft MD (5598.5 TVD, 8159.4 N, 28.4 E)									
- Point									

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor Federal #26L-2303A
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Site:</b>	S26-T10N-R58W	<b>MD Reference:</b>	WELL @ 4751.0usft (Original Well Elev)
<b>Well:</b>	Razor Federal #26L-2303A	<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

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,012.9	5,605.7	430.7	139.9	2550' FNL, 841' FWL
6,012.9	5,605.7	430.7	139.9	100' from 1/2 sec line - 6,012.9' MD
13,700.0	5,602.0	8,109.5	27.2	Last CES Survey @ 13,700' MD
13,750.0	5,598.5	8,159.4	28.4	136' FNL, 873' FWL
13,750.0	5,598.5	8,159.4	28.4	PTB @ 13,750'

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