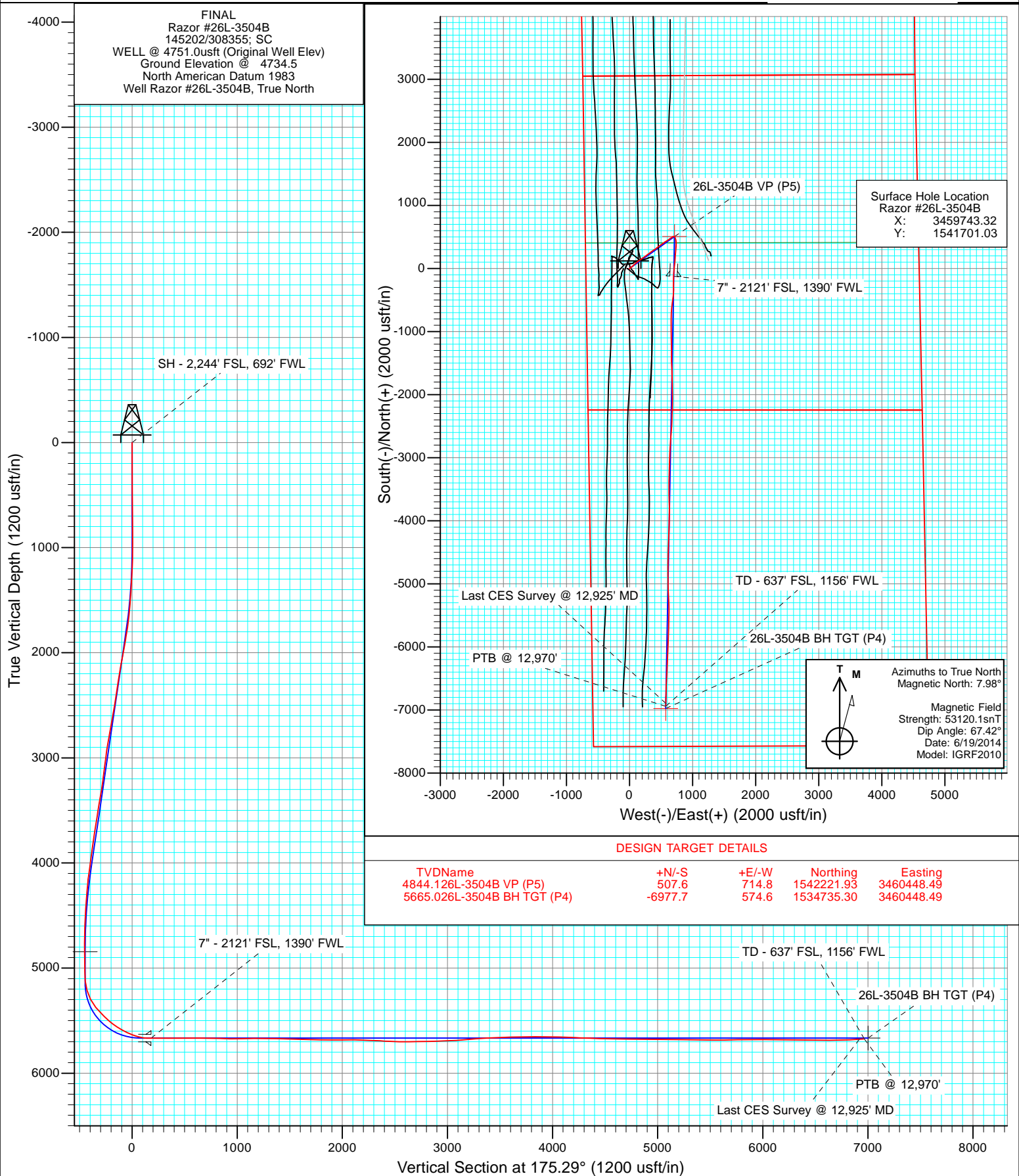


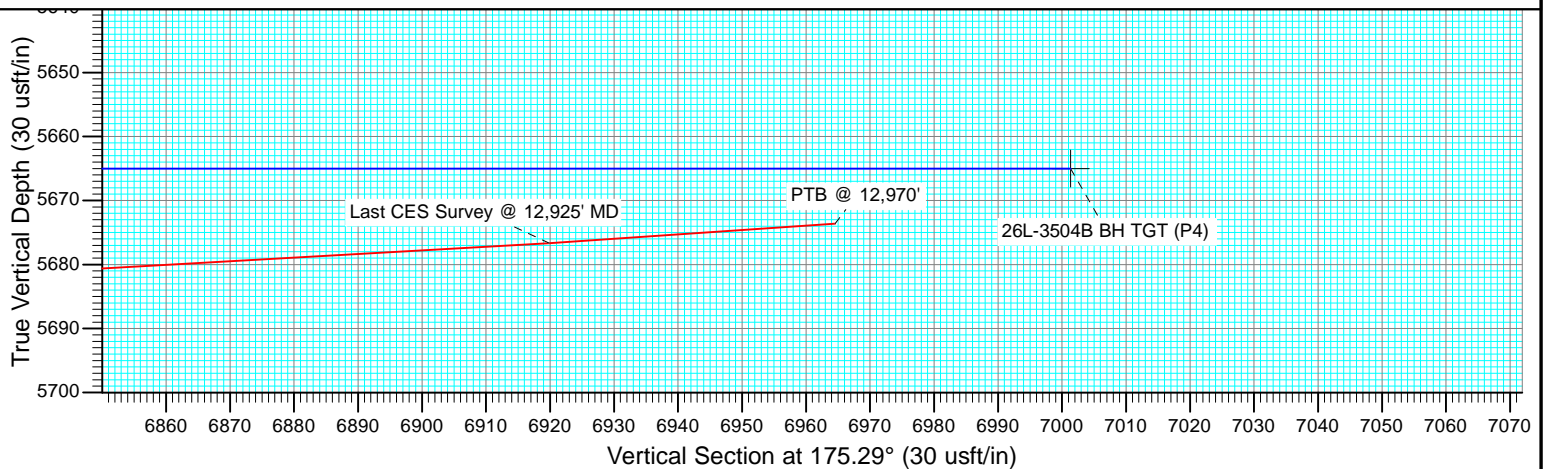
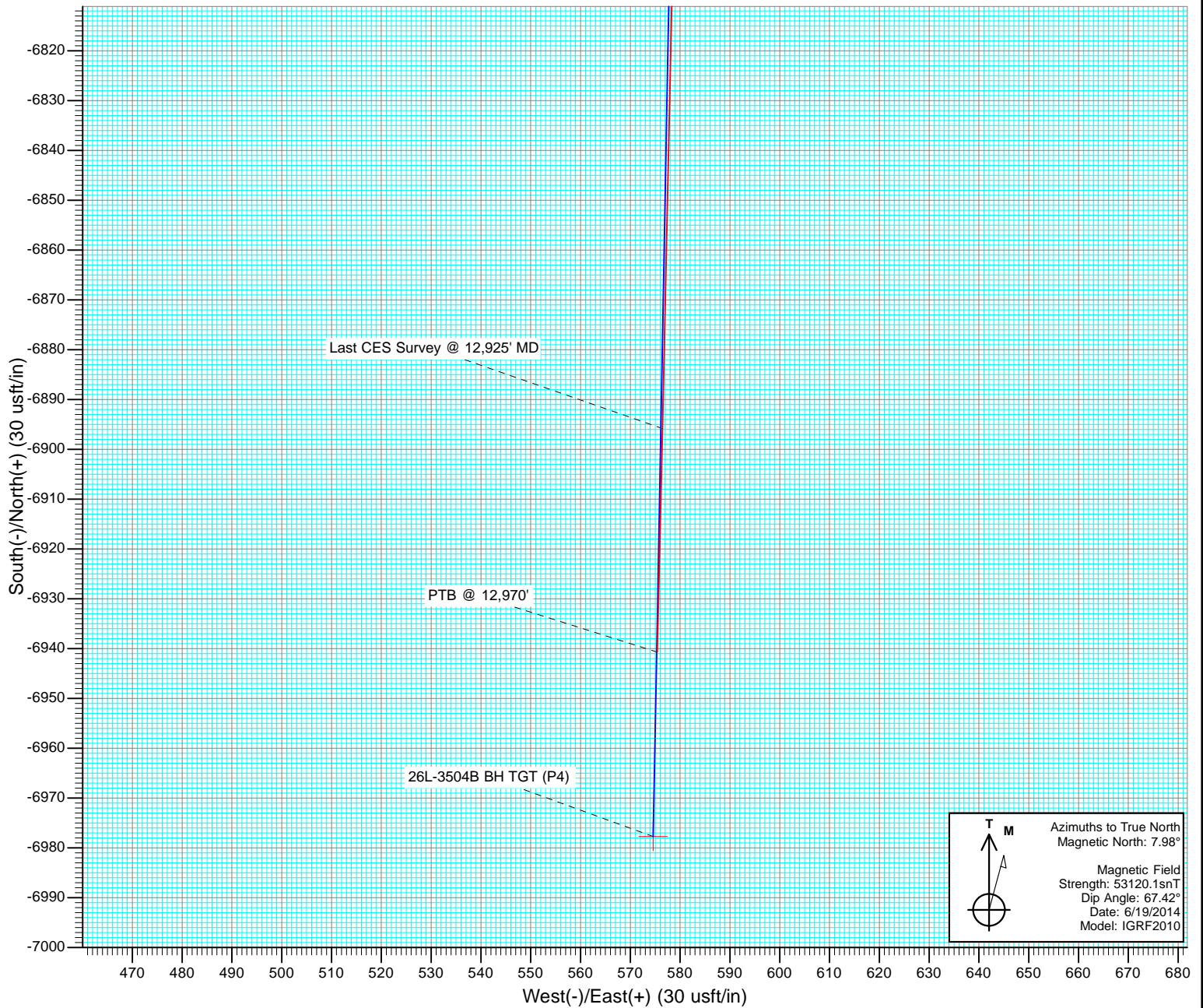


Project: Weld County, CO  
Site: S26-T10N-R58W  
Well: Razor #26L-3504B  
Wellbore: HZ  
Design: FINAL





Project: Weld County, CO  
Site: S26-T10N-R58W  
Well: Razor #26L-3504B  
Wellbore: HZ  
Design: FINAL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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 #26L-3504B				
Well Position	+N/-S	0.0 usft	Northing:	1,541,701.03 usft	Latitude:	40.808533
	+E/-W	0.0 usft	Easting:	3,459,743.32 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	6/19/2014	7.98	67.42	53,120

<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	175.29	

<b>Survey Program</b>	<b>Date</b>	7/21/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
418.0	12,970.0	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		
418.0	0.40	201.92	418.0	-1.4	-0.5	1.3	0.10	0.10		
877.0	0.48	187.78	877.0	-4.7	-1.4	4.6	0.03	0.02		
968.0	0.79	67.46	968.0	-4.9	-0.9	4.8	1.22	0.34		
1,060.0	1.45	74.32	1,060.0	-4.3	0.8	4.4	0.73	0.72		
1,152.0	3.47	42.16	1,151.9	-1.9	3.8	2.3	2.58	2.20		
1,243.0	4.13	42.84	1,242.7	2.5	7.9	-1.8	0.73	0.73		
1,334.0	5.27	47.22	1,333.4	7.7	13.2	-6.6	1.31	1.25		
1,426.0	6.29	48.43	1,424.9	14.0	20.1	-12.3	1.12	1.11		
1,500.0	7.03	49.22	1,498.4	19.6	26.5	-17.4	1.01	1.00		
1,582.0	8.79	52.23	1,579.6	26.7	35.3	-23.7	2.20	2.15		
1,674.0	10.86	47.10	1,670.3	36.9	47.2	-32.9	2.44	2.25		
1,766.0	12.92	47.08	1,760.3	49.8	61.1	-44.6	2.24	2.24		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
1,857.0	14.95	47.73	1,848.6	64.7	77.2	-58.1	2.24	2.23	
1,949.0	17.14	48.82	1,937.0	81.6	96.2	-73.4	2.40	2.38	
2,040.0	18.46	50.82	2,023.7	99.5	117.5	-89.5	1.60	1.45	
2,132.0	18.64	55.62	2,110.9	117.0	140.9	-105.0	1.67	0.20	
2,223.0	17.89	53.49	2,197.3	133.5	164.1	-119.6	1.10	-0.82	
2,314.0	17.98	56.21	2,283.9	149.7	187.0	-133.8	0.93	0.10	
2,406.0	17.49	56.04	2,371.5	165.3	210.3	-147.5	0.54	-0.53	
2,497.0	17.41	56.14	2,458.3	180.5	232.9	-160.8	0.09	-0.09	
2,589.0	17.85	54.33	2,546.0	196.4	255.8	-174.7	0.76	0.48	
2,680.0	17.93	52.88	2,632.6	213.0	278.3	-189.4	0.50	0.09	
2,772.0	18.11	50.43	2,720.1	230.6	300.6	-205.2	0.85	0.20	
2,863.0	18.11	49.39	2,806.6	248.8	322.3	-221.6	0.36	0.00	
2,954.0	17.19	57.20	2,893.3	265.3	344.3	-236.2	2.79	-1.01	
3,046.0	15.03	54.50	2,981.7	279.6	365.5	-248.7	2.48	-2.35	
3,138.0	15.03	59.05	3,070.5	292.7	385.4	-260.1	1.28	0.00	
3,229.0	14.07	57.37	3,158.6	304.7	404.8	-270.5	1.15	-1.05	
3,321.0	15.69	52.42	3,247.5	318.3	424.1	-282.5	2.24	1.76	
3,413.0	16.31	50.83	3,336.0	334.1	444.0	-296.5	0.83	0.67	
3,504.0	16.79	49.76	3,423.2	350.7	463.9	-311.4	0.62	0.53	
3,595.0	18.59	56.94	3,509.9	367.1	486.1	-325.9	3.10	1.98	
3,686.0	17.58	56.33	3,596.4	382.6	509.7	-339.5	1.13	-1.11	
3,778.0	15.69	52.98	3,684.6	397.8	531.2	-352.9	2.30	-2.05	
3,869.0	16.40	52.49	3,772.0	413.0	551.2	-366.4	0.79	0.78	
3,960.0	16.44	58.71	3,859.3	427.5	572.4	-379.1	1.93	0.04	
4,052.0	15.91	58.42	3,947.7	440.9	594.3	-390.6	0.58	-0.58	
4,143.0	15.34	55.91	4,035.3	454.2	614.9	-402.2	0.97	-0.63	
4,236.0	14.42	53.42	4,125.2	468.0	634.4	-414.3	1.20	-0.99	
4,327.0	12.09	58.91	4,213.8	479.6	651.6	-424.6	2.91	-2.56	
4,419.0	9.23	59.01	4,304.2	488.4	666.2	-432.1	3.11	-3.11	
4,510.0	7.69	55.81	4,394.2	495.6	677.5	-438.3	1.77	-1.69	
4,601.0	7.82	55.81	4,484.3	502.5	687.7	-444.4	0.14	0.14	
4,693.0	6.11	69.19	4,575.7	507.8	697.4	-448.8	2.55	-1.86	
4,784.0	3.91	67.66	4,666.3	510.7	704.8	-451.1	2.42	-2.42	
4,876.0	2.02	89.92	4,758.2	511.9	709.4	-451.9	2.37	-2.05	
4,967.0	0.75	99.52	4,849.2	511.8	711.5	-451.6	1.41	-1.40	
5,059.0	0.75	117.17	4,941.1	511.4	712.7	-451.2	0.25	0.00	
5,151.0	1.58	125.89	5,033.1	510.4	714.2	-450.0	0.92	0.90	
5,242.0	4.66	150.71	5,124.0	506.4	717.1	-445.8	3.62	3.38	
5,333.0	17.14	157.69	5,213.2	490.7	724.0	-429.6	13.77	13.71	
5,424.0	28.13	164.34	5,297.0	457.5	734.9	-395.7	12.38	12.08	
5,515.0	38.64	179.20	5,373.0	408.3	741.1	-346.1	14.56	11.55	
5,606.0	46.24	185.37	5,440.2	347.0	738.4	-285.2	9.51	8.35	
5,637.0	46.11	185.38	5,461.7	324.8	736.3	-263.2	0.42	-0.42	
5,668.0	46.90	185.43	5,483.0	302.4	734.2	-241.1	2.55	2.55	
5,698.0	48.88	184.93	5,503.1	280.2	732.2	-219.2	6.71	6.60	
5,729.0	51.74	184.15	5,522.9	256.4	730.3	-195.6	9.43	9.23	
5,759.0	54.99	184.10	5,540.8	232.4	728.6	-171.8	10.83	10.83	
5,789.0	57.14	183.82	5,557.5	207.6	726.9	-147.2	7.21	7.17	
5,820.0	59.52	184.12	5,573.8	181.3	725.1	-121.2	7.72	7.68	
5,850.0	62.11	184.78	5,588.4	155.2	723.0	-95.3	8.84	8.63	
5,881.0	64.31	184.97	5,602.4	127.6	720.7	-68.0	7.12	7.10	
5,912.0	65.14	185.10	5,615.7	99.7	718.2	-40.4	2.70	2.68	
5,944.0	67.12	185.19	5,628.6	70.5	715.6	-11.6	6.19	6.19	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
5,976.0	69.71	186.07	5,640.4	40.9	712.7	17.7	8.49	8.09	
6,007.0	73.54	185.98	5,650.1	11.7	709.6	46.6	12.36	12.35	
6,039.0	77.85	185.75	5,658.1	-19.2	706.4	77.1	13.49	13.47	
6,070.0	82.33	184.61	5,663.4	-49.6	703.7	107.2	14.90	14.45	
6,101.0	87.52	183.17	5,666.1	-80.4	701.6	137.7	17.37	16.74	
6,172.0	91.11	181.86	5,667.0	-151.3	698.4	208.1	5.38	5.06	
6,266.0	89.63	179.09	5,666.4	-245.3	697.7	301.7	3.34	-1.57	
6,361.0	90.22	179.60	5,666.5	-340.3	698.8	396.5	0.82	0.62	
6,456.0	90.12	185.59	5,666.2	-435.1	694.5	490.6	6.31	-0.11	
6,551.0	90.00	189.90	5,666.1	-529.2	681.7	583.4	4.54	-0.13	
6,646.0	89.51	184.95	5,666.5	-623.4	669.4	676.2	5.24	-0.52	
6,741.0	89.32	181.96	5,667.5	-718.2	663.7	770.3	3.15	-0.20	
6,835.0	87.50	180.72	5,670.1	-812.1	661.5	863.7	2.34	-1.94	
6,930.0	89.72	179.92	5,672.4	-907.1	660.9	958.3	2.48	2.34	
7,025.0	91.29	179.75	5,671.6	-1,002.1	661.2	1,053.0	1.66	1.65	
7,120.0	89.94	178.94	5,670.5	-1,097.1	662.3	1,147.7	1.66	-1.42	
7,215.0	90.68	178.79	5,670.0	-1,192.1	664.2	1,242.6	0.79	0.78	
7,309.0	89.72	178.97	5,669.7	-1,286.0	666.0	1,336.4	1.04	-1.02	
7,404.0	88.21	179.89	5,671.4	-1,381.0	667.0	1,431.1	1.86	-1.59	
7,499.0	88.15	178.86	5,674.4	-1,476.0	668.0	1,525.8	1.09	-0.06	
7,594.0	88.30	178.05	5,677.4	-1,570.9	670.5	1,620.6	0.87	0.16	
7,689.0	87.29	177.34	5,681.0	-1,665.7	674.4	1,715.5	1.30	-1.06	
7,782.0	89.54	178.23	5,683.6	-1,758.6	678.0	1,808.3	2.60	2.42	
7,874.0	89.97	179.38	5,684.0	-1,850.6	679.9	1,900.2	1.33	0.47	
7,966.0	91.36	178.75	5,682.9	-1,942.6	681.4	1,991.9	1.66	1.51	
8,059.0	89.72	180.38	5,682.1	-2,035.6	682.1	2,084.7	2.49	-1.76	
8,151.0	87.69	181.74	5,684.1	-2,127.5	680.4	2,176.2	2.66	-2.21	
8,243.0	87.96	180.97	5,687.6	-2,219.4	678.2	2,267.6	0.89	0.29	
8,335.0	86.11	181.93	5,692.4	-2,311.3	675.9	2,358.9	2.26	-2.01	
8,426.0	88.00	181.88	5,697.1	-2,402.1	672.9	2,449.2	2.08	2.08	
8,518.0	88.55	183.80	5,699.8	-2,493.9	668.3	2,540.4	2.17	0.60	
8,610.0	90.49	183.98	5,700.6	-2,585.7	662.1	2,631.3	2.12	2.11	
8,701.0	91.17	184.07	5,699.3	-2,676.5	655.7	2,721.3	0.75	0.75	
8,793.0	90.59	183.80	5,697.9	-2,768.3	649.4	2,812.2	0.70	-0.63	
8,884.0	92.63	183.69	5,695.3	-2,859.0	643.4	2,902.2	2.25	2.24	
8,975.0	91.63	182.40	5,691.9	-2,949.8	638.6	2,992.3	1.79	-1.10	
9,067.0	93.58	181.79	5,687.7	-3,041.7	635.2	3,083.5	2.22	2.12	
9,158.0	94.48	181.26	5,681.4	-3,132.4	632.8	3,173.8	1.15	0.99	
9,250.0	95.74	180.56	5,673.2	-3,224.0	631.4	3,265.0	1.57	1.37	
9,341.0	94.07	181.56	5,665.4	-3,314.7	629.7	3,355.2	2.14	-1.84	
9,432.0	90.89	180.72	5,661.4	-3,405.6	627.9	3,445.6	3.61	-3.49	
9,524.0	91.17	180.04	5,659.8	-3,497.5	627.3	3,537.2	0.80	0.30	
9,615.0	91.73	179.24	5,657.5	-3,588.5	627.8	3,627.9	1.07	0.62	
9,707.0	91.66	178.28	5,654.8	-3,680.4	629.8	3,719.7	1.05	-0.08	
9,798.0	89.48	178.66	5,653.9	-3,771.4	632.3	3,810.6	2.43	-2.40	
9,890.0	88.95	180.78	5,655.1	-3,863.4	632.7	3,902.3	2.38	-0.58	
9,982.0	90.89	181.12	5,655.2	-3,955.4	631.2	3,993.8	2.14	2.11	
10,073.0	88.55	181.04	5,655.7	-4,046.3	629.5	4,084.4	2.57	-2.57	
10,164.0	86.79	181.91	5,659.4	-4,137.2	627.1	4,174.7	2.16	-1.93	
10,255.0	87.81	182.69	5,663.7	-4,228.1	623.5	4,265.0	1.41	1.12	
10,347.0	87.90	182.15	5,667.1	-4,319.9	619.6	4,356.2	0.59	0.10	
10,438.0	87.93	181.51	5,670.4	-4,410.8	616.7	4,446.5	0.70	0.03	
10,530.0	89.01	181.82	5,672.9	-4,502.7	614.0	4,537.9	1.22	1.17	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
10,622.0	89.38	181.79	5,674.2	-4,594.7	611.1	4,629.3	0.40	0.40	
10,713.0	89.41	181.07	5,675.1	-4,685.6	608.9	4,719.8	0.79	0.03	
10,805.0	89.32	179.60	5,676.2	-4,777.6	608.3	4,811.4	1.60	-0.10	
10,897.0	89.44	178.76	5,677.2	-4,869.6	609.6	4,903.2	0.92	0.13	
10,988.0	89.26	179.72	5,678.2	-4,960.6	610.8	4,994.0	1.07	-0.20	
11,080.0	89.60	178.61	5,679.1	-5,052.6	612.2	5,085.8	1.26	0.37	
11,171.0	89.23	176.55	5,680.0	-5,143.5	616.0	5,176.7	2.30	-0.41	
11,262.0	89.26	176.85	5,681.2	-5,234.3	621.3	5,267.7	0.33	0.03	
11,354.0	89.08	177.66	5,682.6	-5,326.2	625.7	5,359.6	0.90	-0.20	
11,445.0	89.51	180.51	5,683.7	-5,417.2	627.1	5,450.4	3.17	0.47	
11,537.0	89.60	181.97	5,684.4	-5,509.2	625.1	5,541.9	1.59	0.10	
11,628.0	90.31	181.15	5,684.5	-5,600.1	622.7	5,632.3	1.19	0.78	
11,720.0	91.60	182.12	5,682.9	-5,692.1	620.0	5,723.8	1.75	1.40	
11,811.0	90.37	182.34	5,681.4	-5,783.0	616.5	5,814.1	1.37	-1.35	
11,902.0	91.51	181.47	5,679.9	-5,873.9	613.5	5,904.5	1.58	1.25	
11,993.0	89.57	181.24	5,679.0	-5,964.9	611.3	5,995.0	2.15	-2.13	
12,084.0	88.61	181.51	5,680.5	-6,055.9	609.1	6,085.4	1.10	-1.05	
12,176.0	89.51	180.64	5,682.0	-6,147.8	607.4	6,177.0	1.36	0.98	
12,268.0	88.80	183.77	5,683.3	-6,239.8	603.9	6,268.3	3.49	-0.77	
12,359.0	90.71	184.05	5,683.7	-6,330.5	597.7	6,358.2	2.12	2.10	
12,450.0	88.55	183.22	5,684.3	-6,421.3	591.9	6,448.3	2.54	-2.37	
12,545.0	89.04	182.32	5,686.3	-6,516.2	587.3	6,542.4	1.08	0.52	
12,640.0	90.44	181.95	5,686.7	-6,611.1	583.8	6,636.7	1.52	1.47	
12,735.0	91.44	181.62	5,685.2	-6,706.1	580.8	6,731.1	1.11	1.05	
12,830.0	92.45	181.13	5,682.0	-6,801.0	578.5	6,825.5	1.18	1.06	
12,925.0	93.91	181.36	5,676.7	-6,895.8	576.5	6,919.9	1.56	1.54	Last CES Survey @ 12,925' MD
12,970.0	93.91	181.36	5,673.6	-6,940.7	575.4	6,964.5	0.00	0.00	TD - 637' FSL, 1156' FWL - PTB @ 12,970'

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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-3504B VP (P4)	0.00	1.07	5,044.1	507.6	714.8	1,542,221.93	3,460,448.49	40.809926	-103.836590
- actual wellpath misses target center by 2.6usft at 5162.1usft MD (5044.2 TVD, 510.1 N, 714.5 E)									
- Point									
26L-3504B VP	0.00	1.07	5,054.1	507.6	714.8	1,542,221.93	3,460,448.49	40.809926	-103.836590
- actual wellpath misses target center by 2.3usft at 5172.1usft MD (5054.2 TVD, 509.9 N, 714.7 E)									
- Point									
26L-3504B BH TGT	0.00	1.07	5,675.0	-6,977.7	574.6	1,534,735.30	3,460,448.49	40.789381	-103.837097
- actual wellpath misses target center by 37.0usft at 12970.0usft MD (5673.6 TVD, -6940.7 N, 575.4 E)									
- Point									
26L-3504B VP (P5)	0.00	1.07	4,844.1	507.6	714.8	1,542,221.93	3,460,448.49	40.809926	-103.836590
- actual wellpath misses target center by 5.3usft at 4962.0usft MD (4844.2 TVD, 511.8 N, 711.5 E)									
- Point									
26L-3504B BH TGT (P4)	0.00	1.07	5,665.0	-6,977.7	574.6	1,534,735.30	3,460,448.49	40.789381	-103.837097
- actual wellpath misses target center by 38.0usft at 12970.0usft MD (5673.6 TVD, -6940.7 N, 575.4 E)									
- Point									
26L-3504B PBHL	0.00	1.07	5,675.0	-7,476.9	582.4	1,534,236.39	3,460,465.60	40.788011	-103.837069
- actual wellpath misses target center by 536.2usft at 12970.0usft MD (5673.6 TVD, -6940.7 N, 575.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,143.5	5,667.2	7" - 2121' FSL, 1390' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
12,925.0	5,676.7	-6,895.8	576.5	Last CES Survey @ 12,925' MD	
12,970.0	5,673.6	-6,940.7	575.4	PTB @ 12,970'	
12,970.0	5,673.6	-6,940.7	575.4	TD - 637' FSL, 1156' FWL	

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

**Weld County, CO**

**S26-T10N-R58W**

**Razor #26L-3504B**

**HZ**

**Design: FINAL**

## **Survey Report - Geographic**

**21 July, 2014**



# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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 #26L-3504B					
Well Position	+N-S	0.0 usft	Northing:	1,541,701.04 usft	Latitude:	40.808533
	+E-W	0.0 usft	Easting:	3,459,743.32 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	6/19/2014	7.98	67.42	53,120

<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	175.29	

<b>Survey Program</b>	<b>Date</b>	7/21/2014			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
418.0	12,970.0	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	1,541,701.04	3,459,743.32	40.808533	-103.839172	
418.0	0.40	201.92	418.0	-1.4	-0.5	1,541,699.67	3,459,742.80	40.808529	-103.839174	
877.0	0.48	187.78	877.0	-4.7	-1.4	1,541,696.27	3,459,742.01	40.808520	-103.839177	
968.0	0.79	67.46	968.0	-4.9	-0.9	1,541,696.14	3,459,742.54	40.808520	-103.839175	
1,060.0	1.45	74.32	1,060.0	-4.3	0.8	1,541,696.73	3,459,744.23	40.808521	-103.839169	
1,152.0	3.47	42.16	1,151.9	-1.9	3.8	1,541,699.16	3,459,747.18	40.808528	-103.839158	
1,243.0	4.13	42.84	1,242.7	2.5	7.9	1,541,703.68	3,459,751.17	40.808540	-103.839144	
1,334.0	5.27	47.22	1,333.4	7.7	13.2	1,541,709.02	3,459,756.37	40.808554	-103.839125	
1,426.0	6.29	48.43	1,424.9	14.0	20.1	1,541,715.37	3,459,763.12	40.808571	-103.839100	
1,500.0	7.03	49.22	1,498.4	19.6	26.5	1,541,721.13	3,459,769.47	40.808587	-103.839076	
1,582.0	8.79	52.23	1,579.6	26.7	35.3	1,541,728.41	3,459,778.09	40.808606	-103.839045	
1,674.0	10.86	47.10	1,670.3	36.9	47.2	1,541,738.84	3,459,789.81	40.808634	-103.839002	

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
1,766.0	12.92	47.08	1,760.3	49.8	61.1	1,541,752.00	3,459,803.44	40.808670	-103.838952
1,857.0	14.95	47.73	1,848.6	64.7	77.2	1,541,767.13	3,459,819.30	40.808710	-103.838893
1,949.0	17.14	48.82	1,937.0	81.6	96.2	1,541,784.39	3,459,837.97	40.808757	-103.838825
2,040.0	18.46	50.82	2,023.7	99.5	117.5	1,541,802.72	3,459,858.89	40.808806	-103.838748
2,132.0	18.64	55.62	2,110.9	117.0	140.9	1,541,820.66	3,459,881.98	40.808854	-103.838663
2,223.0	17.89	53.49	2,197.3	133.5	164.1	1,541,837.62	3,459,904.91	40.808899	-103.838579
2,314.0	17.98	56.21	2,283.9	149.7	187.0	1,541,854.17	3,459,927.51	40.808944	-103.838497
2,406.0	17.49	56.04	2,371.5	165.3	210.3	1,541,870.22	3,459,950.48	40.808987	-103.838413
2,497.0	17.41	56.14	2,458.3	180.5	232.9	1,541,885.87	3,459,972.84	40.809028	-103.838331
2,589.0	17.85	54.33	2,546.0	196.4	255.8	1,541,902.19	3,459,995.42	40.809072	-103.838248
2,680.0	17.93	52.88	2,632.6	213.0	278.3	1,541,919.19	3,460,017.61	40.809117	-103.838167
2,772.0	18.11	50.43	2,720.1	230.6	300.6	1,541,937.26	3,460,039.59	40.809166	-103.838086
2,863.0	18.11	49.39	2,806.6	248.8	322.3	1,541,955.88	3,460,060.88	40.809216	-103.838008
2,954.0	17.19	57.20	2,893.3	265.3	344.3	1,541,972.78	3,460,082.61	40.809261	-103.837928
3,046.0	15.03	54.50	2,981.7	279.6	365.5	1,541,987.47	3,460,103.48	40.809300	-103.837852
3,138.0	15.03	59.05	3,070.5	292.7	385.4	1,542,000.90	3,460,123.18	40.809336	-103.837780
3,229.0	14.07	57.37	3,158.6	304.7	404.8	1,542,013.30	3,460,142.38	40.809369	-103.837710
3,321.0	15.69	52.42	3,247.5	318.3	424.1	1,542,027.27	3,460,161.40	40.809407	-103.837640
3,413.0	16.31	50.83	3,336.0	334.1	444.0	1,542,043.39	3,460,180.98	40.809450	-103.837568
3,504.0	16.79	49.76	3,423.2	350.7	463.9	1,542,060.32	3,460,200.60	40.809495	-103.837496
3,595.0	18.59	56.94	3,509.9	367.1	486.1	1,542,077.14	3,460,222.49	40.809540	-103.837416
3,686.0	17.58	56.33	3,596.4	382.6	509.7	1,542,093.11	3,460,245.79	40.809583	-103.837331
3,778.0	15.69	52.98	3,684.6	397.8	531.2	1,542,108.71	3,460,267.00	40.809625	-103.837253
3,869.0	16.40	52.49	3,772.0	413.0	551.2	1,542,124.31	3,460,286.72	40.809667	-103.837181
3,960.0	16.44	58.71	3,859.3	427.5	572.4	1,542,139.21	3,460,307.64	40.809706	-103.837104
4,052.0	15.91	58.42	3,947.7	440.9	594.3	1,542,152.99	3,460,329.26	40.809743	-103.837025
4,143.0	15.34	55.91	4,035.3	454.2	614.9	1,542,166.65	3,460,349.60	40.809779	-103.836951
4,236.0	14.42	53.42	4,125.2	468.0	634.4	1,542,180.81	3,460,368.83	40.809817	-103.836881
4,327.0	12.09	58.91	4,213.8	479.6	651.6	1,542,192.81	3,460,385.87	40.809849	-103.836818
4,419.0	9.23	59.01	4,304.2	488.4	666.2	1,542,201.85	3,460,400.28	40.809873	-103.836766
4,510.0	7.69	55.81	4,394.2	495.6	677.5	1,542,209.24	3,460,411.44	40.809893	-103.836725
4,601.0	7.82	55.81	4,484.3	502.5	687.7	1,542,216.33	3,460,421.46	40.809912	-103.836688
4,693.0	6.11	69.19	4,575.7	507.8	697.4	1,542,221.77	3,460,431.12	40.809927	-103.836653
4,784.0	3.91	67.66	4,666.3	510.7	704.8	1,542,224.81	3,460,438.46	40.809934	-103.836626
4,876.0	2.02	89.92	4,758.2	511.9	709.4	1,542,226.09	3,460,442.96	40.809938	-103.836610
4,967.0	0.75	99.52	4,849.2	511.8	711.5	1,542,226.03	3,460,445.15	40.809938	-103.836602
5,059.0	0.75	117.17	4,941.1	511.4	712.7	1,542,225.68	3,460,446.29	40.809936	-103.836598
5,151.0	1.58	125.89	5,033.1	510.4	714.2	1,542,224.69	3,460,447.87	40.809934	-103.836592
5,242.0	4.66	150.71	5,124.0	506.4	717.1	1,542,220.78	3,460,450.77	40.809923	-103.836582
5,333.0	17.14	157.69	5,213.2	490.7	724.0	1,542,205.22	3,460,457.99	40.809880	-103.836557
5,424.0	28.13	164.34	5,297.0	457.5	734.9	1,542,172.27	3,460,469.52	40.809789	-103.836518
5,515.0	38.64	179.20	5,373.0	408.3	741.1	1,542,123.11	3,460,476.66	40.809653	-103.836495
5,606.0	46.24	185.37	5,440.2	347.0	738.4	1,542,061.83	3,460,475.12	40.809485	-103.836505
5,637.0	46.11	185.38	5,461.7	324.8	736.3	1,542,039.52	3,460,473.45	40.809424	-103.836512
5,668.0	46.90	185.43	5,483.0	302.4	734.2	1,542,017.10	3,460,471.75	40.809363	-103.836520
5,698.0	48.88	184.93	5,503.1	280.2	732.2	1,541,994.90	3,460,470.16	40.809302	-103.836527
5,729.0	51.74	184.15	5,522.9	256.4	730.3	1,541,971.09	3,460,468.72	40.809237	-103.836534
5,759.0	54.99	184.10	5,540.8	232.4	728.6	1,541,947.06	3,460,467.44	40.809171	-103.836540
5,789.0	57.14	183.82	5,557.5	207.6	726.9	1,541,922.20	3,460,466.18	40.809103	-103.836547
5,820.0	59.52	184.12	5,573.8	181.3	725.1	1,541,895.85	3,460,464.85	40.809030	-103.836553
5,850.0	62.11	184.78	5,588.4	155.2	723.0	1,541,869.71	3,460,463.30	40.808959	-103.836560
5,881.0	64.31	184.97	5,602.4	127.6	720.7	1,541,842.10	3,460,461.47	40.808883	-103.836569
5,912.0	65.14	185.10	5,615.7	99.7	718.2	1,541,814.13	3,460,459.53	40.808806	-103.836578
5,944.0	67.12	185.19	5,628.6	70.5	715.6	1,541,784.95	3,460,457.45	40.808726	-103.836587
5,976.0	69.71	186.07	5,640.4	40.9	712.7	1,541,755.29	3,460,455.09	40.808645	-103.836598

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
6,007.0	73.54	185.98	5,650.1	11.7	709.6	1,541,725.98	3,460,452.55	40.808565	-103.836609
6,039.0	77.85	185.75	5,658.1	-19.2	706.4	1,541,695.09	3,460,449.96	40.808480	-103.836621
6,070.0	82.33	184.61	5,663.4	-49.6	703.7	1,541,664.64	3,460,447.78	40.808397	-103.836630
6,101.0	87.52	183.17	5,666.1	-80.4	701.6	1,541,633.81	3,460,446.26	40.808312	-103.836638
6,172.0	91.11	181.86	5,667.0	-151.3	698.4	1,541,562.86	3,460,444.48	40.808118	-103.836649
6,266.0	89.63	179.09	5,666.4	-245.3	697.7	1,541,468.88	3,460,445.46	40.807860	-103.836652
6,361.0	90.22	179.60	5,666.5	-340.3	698.8	1,541,373.93	3,460,448.32	40.807599	-103.836648
6,456.0	90.12	185.59	5,666.2	-435.1	694.5	1,541,279.00	3,460,445.80	40.807339	-103.836664
6,551.0	90.00	189.90	5,666.1	-529.2	681.7	1,541,184.67	3,460,434.76	40.807080	-103.836710
6,646.0	89.51	184.95	5,666.5	-623.4	669.4	1,541,090.28	3,460,424.26	40.806822	-103.836754
6,741.0	89.32	181.96	5,667.5	-718.2	663.7	1,540,995.38	3,460,420.31	40.806562	-103.836775
6,835.0	87.50	180.72	5,670.1	-812.1	661.5	1,540,901.42	3,460,419.87	40.806304	-103.836783
6,930.0	89.72	179.92	5,672.4	-907.1	660.9	1,540,806.47	3,460,421.12	40.806043	-103.836785
7,025.0	91.29	179.75	5,671.6	-1,002.1	661.2	1,540,711.50	3,460,423.17	40.805782	-103.836784
7,120.0	89.94	178.94	5,670.5	-1,097.1	662.3	1,540,616.55	3,460,426.04	40.805522	-103.836780
7,215.0	90.68	178.79	5,670.0	-1,192.1	664.2	1,540,521.62	3,460,429.70	40.805261	-103.836773
7,309.0	89.72	178.97	5,669.7	-1,286.0	666.0	1,540,427.69	3,460,433.30	40.805003	-103.836767
7,404.0	88.21	179.89	5,671.4	-1,381.0	667.0	1,540,332.75	3,460,436.02	40.804742	-103.836763
7,499.0	88.15	178.86	5,674.4	-1,476.0	668.0	1,540,237.84	3,460,438.83	40.804482	-103.836759
7,594.0	88.30	178.05	5,677.4	-1,570.9	670.5	1,540,142.99	3,460,443.17	40.804221	-103.836750
7,689.0	87.29	177.34	5,681.0	-1,665.7	674.4	1,540,048.22	3,460,448.76	40.803961	-103.836736
7,782.0	89.54	178.23	5,683.6	-1,758.6	678.0	1,539,955.42	3,460,454.09	40.803706	-103.836723
7,874.0	89.97	179.38	5,684.0	-1,850.6	679.9	1,539,863.50	3,460,457.74	40.803454	-103.836717
7,966.0	91.36	178.75	5,682.9	-1,942.6	681.4	1,539,771.56	3,460,460.96	40.803201	-103.836711
8,059.0	89.72	180.38	5,682.1	-2,035.6	682.1	1,539,678.60	3,460,463.41	40.802946	-103.836709
8,151.0	87.69	181.74	5,684.1	-2,127.5	680.4	1,539,586.63	3,460,463.43	40.802693	-103.836715
8,243.0	87.96	180.97	5,687.6	-2,219.4	678.2	1,539,494.70	3,460,462.98	40.802441	-103.836723
8,335.0	86.11	181.93	5,692.4	-2,311.3	675.9	1,539,402.83	3,460,462.37	40.802189	-103.836731
8,426.0	88.00	181.88	5,697.1	-2,402.1	672.9	1,539,311.97	3,460,461.05	40.801940	-103.836742
8,518.0	88.55	183.80	5,699.8	-2,493.9	668.3	1,539,220.06	3,460,458.22	40.801688	-103.836758
8,610.0	90.49	183.98	5,700.6	-2,585.7	662.1	1,539,128.18	3,460,453.70	40.801436	-103.836781
8,701.0	91.17	184.07	5,699.3	-2,676.5	655.7	1,539,037.31	3,460,449.01	40.801187	-103.836804
8,793.0	90.59	183.80	5,697.9	-2,768.3	649.4	1,538,945.43	3,460,444.42	40.800935	-103.836827
8,884.0	92.63	183.69	5,695.3	-2,859.0	643.4	1,538,854.57	3,460,440.18	40.800686	-103.836848
8,975.0	91.63	182.40	5,691.9	-2,949.8	638.6	1,538,763.69	3,460,437.05	40.800437	-103.836866
9,067.0	93.58	181.79	5,687.7	-3,041.7	635.2	1,538,671.81	3,460,435.41	40.800184	-103.836878
9,158.0	94.48	181.26	5,681.4	-3,132.4	632.8	1,538,581.04	3,460,434.69	40.799935	-103.836887
9,250.0	95.74	180.56	5,673.2	-3,224.0	631.4	1,538,489.41	3,460,434.95	40.799684	-103.836892
9,341.0	94.07	181.56	5,665.4	-3,314.7	629.7	1,538,398.74	3,460,434.97	40.799435	-103.836898
9,432.0	90.89	180.72	5,661.4	-3,405.6	627.9	1,538,307.84	3,460,434.87	40.799186	-103.836904
9,524.0	91.17	180.04	5,659.8	-3,497.5	627.3	1,538,215.86	3,460,435.98	40.798933	-103.836907
9,615.0	91.73	179.24	5,657.5	-3,588.5	627.8	1,538,124.92	3,460,438.26	40.798684	-103.836905
9,707.0	91.66	178.28	5,654.8	-3,680.4	629.8	1,538,033.04	3,460,441.97	40.798431	-103.836897
9,798.0	89.48	178.66	5,653.9	-3,771.4	632.3	1,537,942.14	3,460,446.10	40.798182	-103.836889
9,890.0	88.95	180.78	5,655.1	-3,863.4	632.7	1,537,850.18	3,460,448.27	40.797929	-103.836887
9,982.0	90.89	181.12	5,655.2	-3,955.4	631.2	1,537,758.19	3,460,448.47	40.797677	-103.836893
10,073.0	88.55	181.04	5,655.7	-4,046.3	629.5	1,537,667.20	3,460,448.46	40.797427	-103.836899
10,164.0	86.79	181.91	5,659.4	-4,137.2	627.1	1,537,576.28	3,460,447.82	40.797177	-103.836907
10,255.0	87.81	182.69	5,663.7	-4,228.1	623.5	1,537,485.40	3,460,445.87	40.796928	-103.836920
10,347.0	87.90	182.15	5,667.1	-4,319.9	619.6	1,537,393.49	3,460,443.71	40.796676	-103.836934
10,438.0	87.93	181.51	5,670.4	-4,410.8	616.7	1,537,302.56	3,460,442.51	40.796427	-103.836945
10,530.0	89.01	181.82	5,672.9	-4,502.7	614.0	1,537,210.60	3,460,441.56	40.796174	-103.836955
10,622.0	89.38	181.79	5,674.2	-4,594.7	611.1	1,537,118.62	3,460,440.39	40.795922	-103.836965
10,713.0	89.41	181.07	5,675.1	-4,685.6	608.9	1,537,027.63	3,460,439.82	40.795672	-103.836973
10,805.0	89.32	179.60	5,676.2	-4,777.6	608.3	1,536,935.64	3,460,441.01	40.795420	-103.836975

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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
10,897.0	89.44	178.76	5,677.2	-4,869.6	609.6	1,536,843.70	3,460,444.04	40.795167	-103.836971
10,988.0	89.26	179.72	5,678.2	-4,960.6	610.8	1,536,752.75	3,460,446.96	40.794918	-103.836966
11,080.0	89.60	178.61	5,679.1	-5,052.6	612.2	1,536,660.81	3,460,450.02	40.794665	-103.836961
11,171.0	89.23	176.55	5,680.0	-5,143.5	616.0	1,536,569.99	3,460,455.56	40.794416	-103.836947
11,262.0	89.26	176.85	5,681.2	-5,234.3	621.3	1,536,479.26	3,460,462.50	40.794166	-103.836929
11,354.0	89.08	177.66	5,682.6	-5,326.2	625.7	1,536,387.48	3,460,468.63	40.793914	-103.836913
11,445.0	89.51	180.51	5,683.7	-5,417.2	627.1	1,536,296.55	3,460,471.78	40.793664	-103.836907
11,537.0	89.60	181.97	5,684.4	-5,509.2	625.1	1,536,204.55	3,460,471.51	40.793412	-103.836915
11,628.0	90.31	181.15	5,684.5	-5,600.1	622.7	1,536,113.56	3,460,470.74	40.793162	-103.836924
11,720.0	91.60	182.12	5,682.9	-5,692.1	620.0	1,536,021.58	3,460,469.84	40.792910	-103.836933
11,811.0	90.37	182.34	5,681.4	-5,783.0	616.5	1,535,930.59	3,460,468.00	40.792660	-103.836946
11,902.0	91.51	181.47	5,679.9	-5,873.9	613.5	1,535,839.61	3,460,466.68	40.792411	-103.836957
11,993.0	89.57	181.24	5,679.0	-5,964.9	611.3	1,535,748.62	3,460,466.23	40.792161	-103.836965
12,084.0	88.61	181.51	5,680.5	-6,055.9	609.1	1,535,657.64	3,460,465.75	40.791911	-103.836972
12,176.0	89.51	180.64	5,682.0	-6,147.8	607.4	1,535,565.65	3,460,465.75	40.791659	-103.836979
12,268.0	88.80	183.77	5,683.3	-6,239.8	603.9	1,535,473.69	3,460,463.93	40.791407	-103.836991
12,359.0	90.71	184.05	5,683.7	-6,330.5	597.7	1,535,382.81	3,460,459.43	40.791157	-103.837014
12,450.0	88.55	183.22	5,684.3	-6,421.3	591.9	1,535,291.91	3,460,455.36	40.790908	-103.837035
12,545.0	89.04	182.32	5,686.3	-6,516.2	587.3	1,535,196.97	3,460,452.55	40.790648	-103.837051
12,640.0	90.44	181.95	5,686.7	-6,611.1	583.8	1,535,101.99	3,460,450.79	40.790387	-103.837064
12,735.0	91.44	181.62	5,685.2	-6,706.1	580.8	1,535,007.01	3,460,449.61	40.790127	-103.837075
12,830.0	92.45	181.13	5,682.0	-6,801.0	578.5	1,534,912.07	3,460,449.11	40.789866	-103.837083
12,925.0	93.91	181.36	5,676.7	-6,895.8	576.5	1,534,817.22	3,460,448.83	40.789606	-103.837091
Last CES Survey @ 12,925' MD									
12,970.0	93.91	181.36	5,673.6	-6,940.7	575.4	1,534,772.32	3,460,448.60	40.789483	-103.837094
TD - 637' FSL, 1156' FWL - PTB @ 12,970'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
26L-3504B VP (P5)	0.00	1.07	4,844.1	507.6	714.8	1,542,221.94	3,460,448.49	40.809926	-103.836590
- hit/miss target									
- Shape									
- actual wellpath misses target center by 5.3usft at 4962.0usft MD (4844.2 TVD, 511.8 N, 711.5 E)									
- Point									
26L-3504B BH TGT (P4)	0.00	1.07	5,665.0	-6,977.7	574.6	1,534,735.30	3,460,448.49	40.789381	-103.837097
- hit/miss target									
- Shape									
- actual wellpath misses target center by 38.0usft at 12970.0usft MD (5673.6 TVD, -6940.7 N, 575.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,143.5	5,667.2	7" - 2121' FSL, 1390' FWL	0	0	

# Cathedral Energy Services

## Survey Report - Geographic

<b>Company:</b>	Whiting Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Razor #26L-3504B
<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 #26L-3504B	<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)	
12,925.0	5,676.7	-6,895.8	576.5	Last CES Survey @ 12,925' MD
12,970.0	5,673.6	-6,940.7	575.4	TD - 637' FSL, 1156' FWL
12,970.0	5,673.6	-6,940.7	575.4	PTB @ 12,970'

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