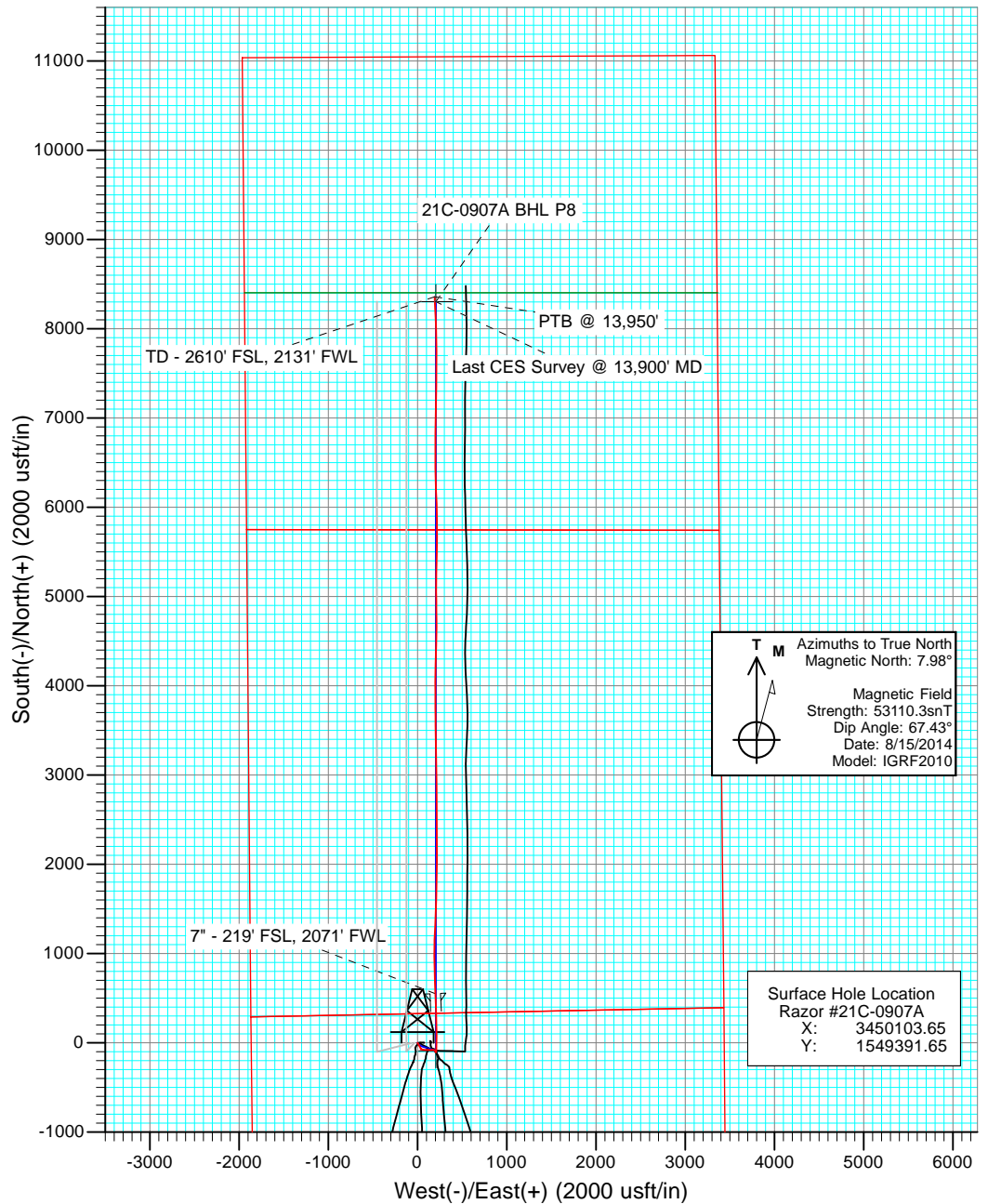
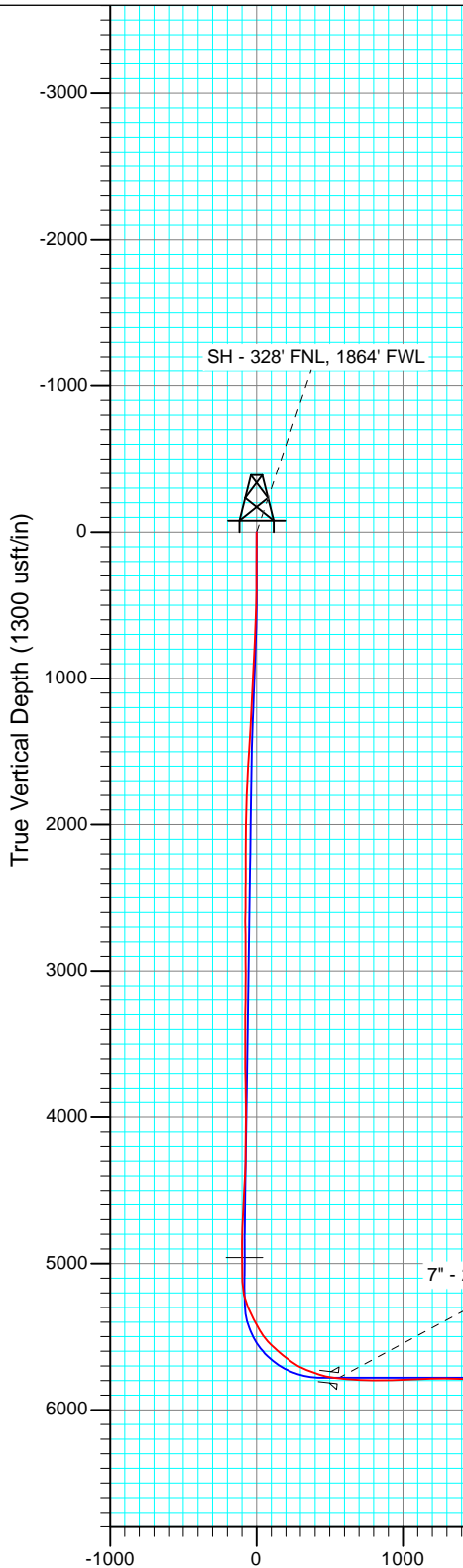
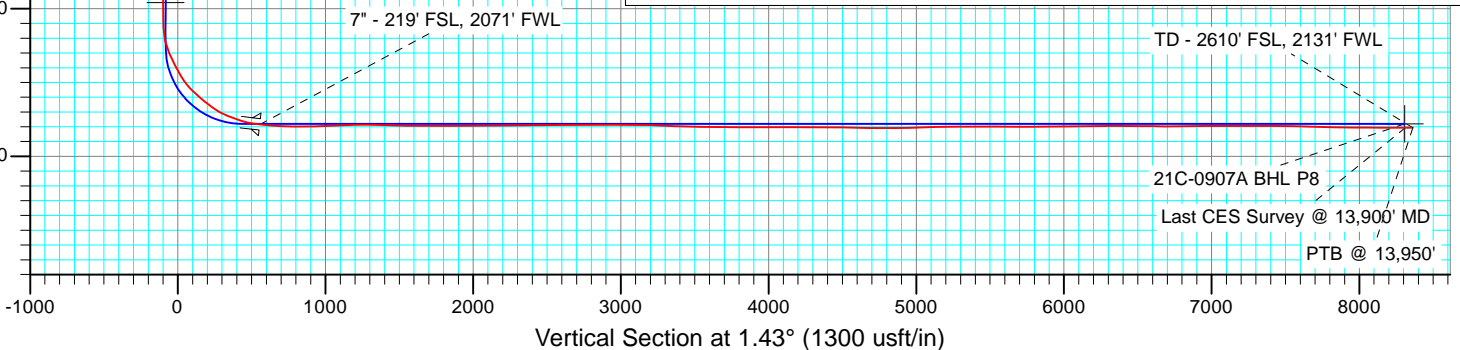


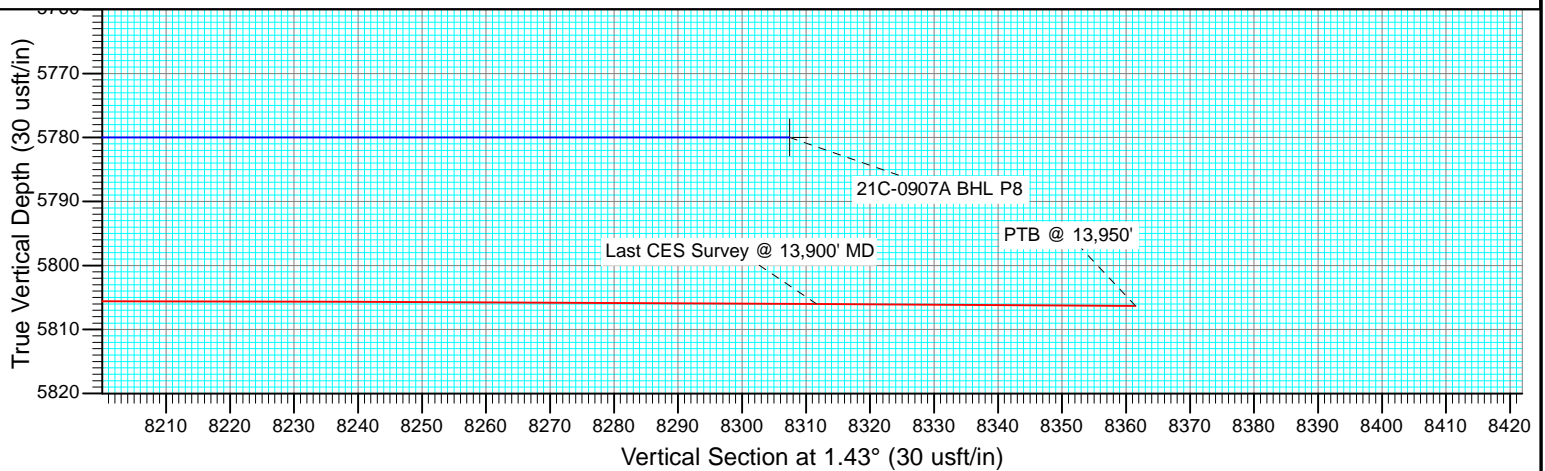
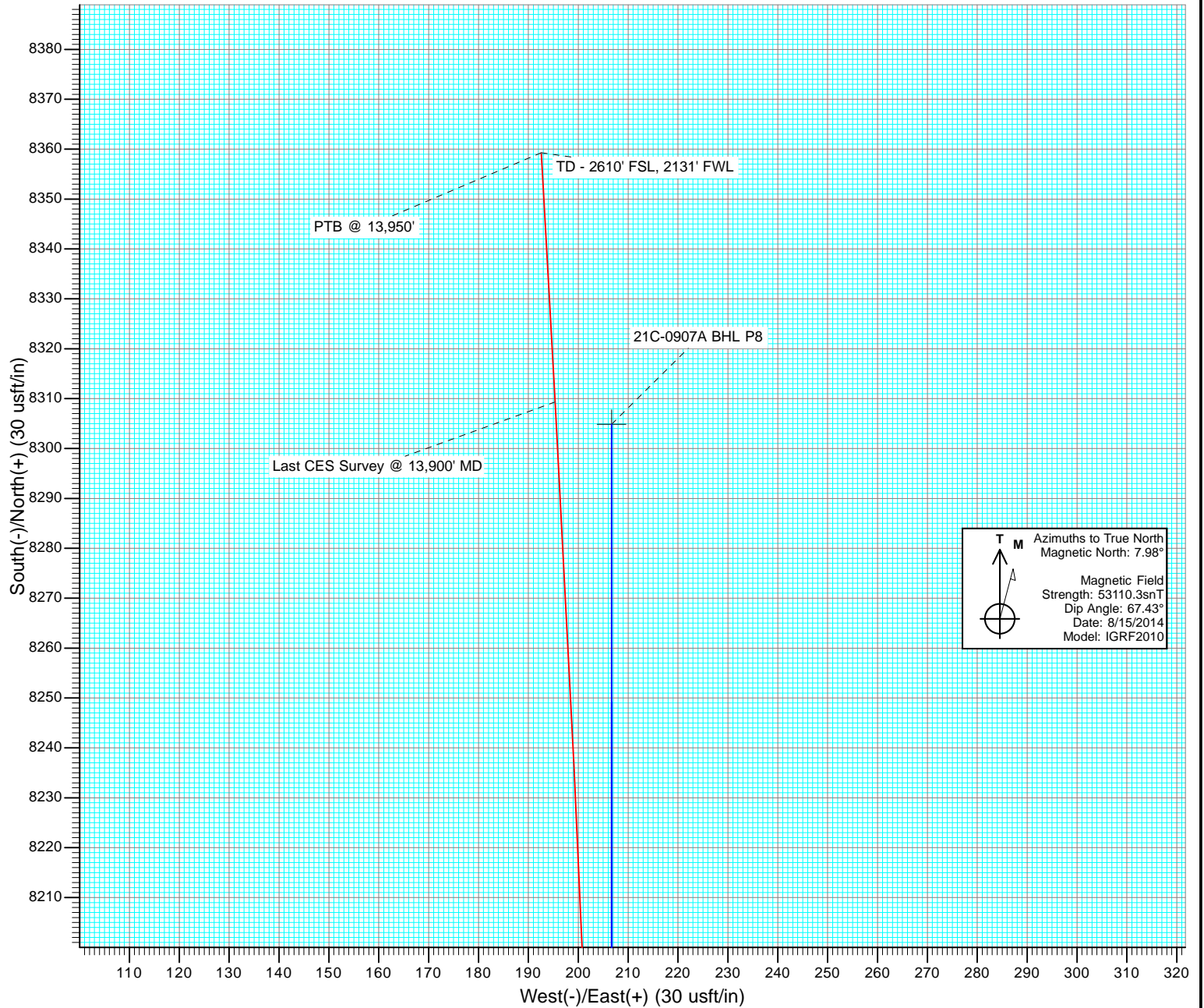
FINAL
 Razor #21C-0907A
 145272/24037; SC
 KB=17' @ 4861.0usft
 Ground Elevation @ 4844.0
 North American Datum 1983
 Well Razor #21C-0907A, True North



DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
21C-0907A VP P8	4959.1	-88.5	206.7	1549306.95	3450311.89
21C-0907A BHL P8	5780.0	8304.9	206.7	1557698.90	3450157.95





Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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

Site		S21-T10N-R58W			
Site Position:		Northing:	1,549,389.38 usft	Latitude:	40.830125
From:	Lat/Long	Easting:	3,450,038.37 usft	Longitude:	-103.873714
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.05 °

Well	Razor #21C-0907A					
Well Position	+N/-S	0.0 usft	Northing:	1,549,391.65 usft	Latitude:	40.830128
	+E/-W	0.0 usft	Easting:	3,450,103.65 usft	Longitude:	-103.873478
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,844.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/15/2014	7.98	67.43	53,110

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	1.43	

Survey Program	Date	9/10/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
218.0	13,950.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

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	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
218.0	0.44	130.41	218.0	-0.5	0.6	-0.5	0.20	0.20		
311.0	0.34	134.49	311.0	-1.0	1.1	-0.9	0.11	-0.11		
404.0	0.36	122.81	404.0	-1.3	1.5	-1.3	0.08	0.02		
496.0	1.71	156.18	496.0	-2.7	2.3	-2.7	1.55	1.47		
588.0	3.33	144.76	587.9	-6.2	4.4	-6.1	1.83	1.76		
680.0	3.20	146.87	679.7	-10.5	7.4	-10.3	0.19	-0.14		
772.0	3.08	149.96	771.6	-14.8	10.0	-14.5	0.23	-0.13		
864.0	2.73	153.36	863.5	-18.9	12.2	-18.6	0.42	-0.38		
955.0	3.49	150.28	954.3	-23.2	14.6	-22.9	0.85	0.84		
1,047.0	3.00	155.57	1,046.2	-27.9	17.0	-27.4	0.62	-0.53		
1,138.0	3.58	142.16	1,137.0	-32.3	19.7	-31.8	1.05	0.64		
1,230.0	3.54	147.83	1,228.9	-36.9	23.0	-36.4	0.38	-0.04		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
1,321.0	3.41	153.01	1,319.7	-41.7	25.7	-41.1	0.37	-0.14	
1,413.0	4.25	149.17	1,411.5	-47.1	28.7	-46.4	0.95	0.91	
1,503.0	3.96	153.12	1,501.3	-52.7	31.8	-51.9	0.45	-0.32	
1,595.0	3.45	155.71	1,593.1	-58.1	34.4	-57.2	0.58	-0.55	
1,705.0	3.25	159.63	1,702.9	-64.0	36.8	-63.1	0.28	-0.18	
1,842.0	2.43	160.58	1,839.7	-70.4	39.1	-69.4	0.60	-0.60	
1,933.0	4.84	100.49	1,930.6	-72.9	43.6	-71.8	4.61	2.65	
2,025.0	3.77	94.35	2,022.3	-73.9	50.4	-72.6	1.26	-1.16	
2,116.0	3.24	99.75	2,113.1	-74.5	55.9	-73.1	0.69	-0.58	
2,208.0	3.08	98.63	2,205.0	-75.3	60.9	-73.8	0.19	-0.17	
2,300.0	2.76	99.59	2,296.9	-76.1	65.5	-74.4	0.35	-0.35	
2,391.0	2.40	106.87	2,387.8	-77.0	69.5	-75.2	0.53	-0.40	
2,482.0	4.30	99.61	2,478.6	-78.1	74.7	-76.2	2.14	2.09	
2,573.0	4.24	95.63	2,569.4	-79.0	81.4	-77.0	0.33	-0.07	
2,664.0	4.39	89.90	2,660.1	-79.3	88.3	-77.1	0.50	0.16	
2,756.0	4.36	88.59	2,751.8	-79.2	95.3	-76.9	0.11	-0.03	
2,847.0	4.39	85.38	2,842.6	-78.9	102.2	-76.3	0.27	0.03	
2,939.0	3.98	88.37	2,934.3	-78.5	108.9	-75.8	0.50	-0.45	
3,031.0	4.24	90.12	3,026.1	-78.4	115.5	-75.5	0.31	0.28	
3,122.0	3.72	100.50	3,116.9	-79.0	121.8	-75.9	0.97	-0.57	
3,213.0	3.35	99.45	3,207.7	-79.9	127.3	-76.8	0.41	-0.41	
3,305.0	2.74	98.34	3,299.6	-80.7	132.1	-77.4	0.67	-0.66	
3,395.0	2.38	87.66	3,389.5	-80.9	136.1	-77.5	0.66	-0.40	
3,487.0	2.19	89.73	3,481.4	-80.9	139.8	-77.4	0.23	-0.21	
3,578.0	1.98	91.94	3,572.3	-80.9	143.1	-77.3	0.25	-0.23	
3,670.0	2.32	83.95	3,664.3	-80.8	146.5	-77.1	0.49	0.37	
3,762.0	2.07	68.27	3,756.2	-79.9	149.9	-76.2	0.70	-0.27	
3,853.0	2.91	80.77	3,847.1	-79.0	153.7	-75.1	1.09	0.92	
3,944.0	2.60	74.35	3,938.0	-78.0	158.0	-74.1	0.48	-0.34	
4,035.0	4.99	100.90	4,028.8	-78.2	163.9	-74.1	3.19	2.63	
4,127.0	5.47	97.11	4,120.4	-79.5	172.2	-75.2	0.64	0.52	
4,218.0	5.40	95.64	4,211.0	-80.5	180.7	-76.0	0.17	-0.08	
4,309.0	4.89	94.20	4,301.7	-81.2	188.9	-76.5	0.58	-0.56	
4,401.0	4.06	145.23	4,393.4	-84.2	194.6	-79.3	4.27	-0.90	
4,492.0	3.74	149.61	4,484.2	-89.4	198.0	-84.4	0.48	-0.35	
4,584.0	3.10	150.40	4,576.0	-94.1	200.7	-89.1	0.70	-0.70	
4,675.0	2.66	156.06	4,666.9	-98.2	202.8	-93.1	0.58	-0.48	
4,766.0	2.52	151.95	4,757.8	-101.9	204.6	-96.8	0.26	-0.15	
4,858.0	1.52	158.25	4,849.8	-104.8	206.0	-99.6	1.11	-1.09	
4,950.0	1.63	44.64	4,941.7	-105.0	207.4	-99.8	2.87	0.12	
5,041.0	1.16	40.03	5,032.7	-103.4	208.9	-98.1	0.53	-0.52	
5,132.0	0.65	12.31	5,123.7	-102.2	209.6	-96.9	0.72	-0.56	
5,223.0	11.94	2.05	5,214.0	-92.2	210.0	-87.0	12.42	12.41	
5,314.0	24.60	4.93	5,300.3	-63.8	212.0	-58.5	13.94	13.91	
5,405.0	26.93	359.59	5,382.2	-24.3	213.5	-19.0	3.61	2.56	
5,497.0	30.75	358.19	5,462.8	20.0	212.6	25.3	4.22	4.15	
5,588.0	43.03	358.97	5,535.4	74.5	211.3	79.8	13.50	13.49	
5,618.0	47.50	0.86	5,556.5	95.8	211.2	101.1	15.56	14.90	
5,648.0	47.73	0.55	5,576.8	118.0	211.5	123.2	1.08	0.77	
5,678.0	47.43	0.14	5,597.0	140.1	211.7	145.4	1.42	-1.00	
5,709.0	48.68	0.90	5,617.7	163.2	211.9	168.4	4.43	4.03	
5,739.0	53.30	0.53	5,636.6	186.5	212.2	191.7	15.43	15.40	
5,770.0	53.75	0.81	5,655.0	211.4	212.4	216.6	1.62	1.45	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
5,802.0	54.15	0.14	5,673.9	237.3	212.7	242.5	2.10	1.25	
5,833.0	57.39	359.01	5,691.3	262.9	212.5	268.1	10.88	10.45	
5,865.0	62.91	359.01	5,707.2	290.7	212.0	295.8	17.25	17.25	
5,896.0	67.67	358.80	5,720.2	318.8	211.4	324.0	15.37	15.35	
5,928.0	69.27	357.83	5,731.9	348.6	210.6	353.7	5.74	5.00	
5,960.0	70.15	357.42	5,743.0	378.5	209.3	383.6	3.00	2.75	
5,991.0	70.00	356.83	5,753.6	407.6	207.9	412.7	1.85	-0.48	
6,023.0	72.90	357.27	5,763.8	437.9	206.3	442.9	9.16	9.06	
6,054.0	77.49	358.23	5,771.7	467.9	205.1	472.8	15.11	14.81	
6,083.0	81.85	357.68	5,776.9	496.4	204.1	501.3	15.15	15.03	
6,203.0	85.51	356.94	5,790.1	615.5	198.5	620.3	3.11	3.05	
6,298.0	87.33	357.88	5,796.0	710.2	194.2	714.8	2.16	1.92	
6,392.0	89.86	359.02	5,798.3	804.1	191.7	808.7	2.95	2.69	
6,488.0	91.71	359.15	5,797.0	900.1	190.2	904.6	1.93	1.93	
6,583.0	91.96	0.66	5,794.0	995.1	190.0	999.5	1.61	0.26	
6,678.0	92.38	0.20	5,790.4	1,090.0	190.7	1,094.4	0.66	0.44	
6,773.0	91.67	2.40	5,787.0	1,184.9	192.9	1,189.3	2.43	-0.75	
6,867.0	89.57	2.72	5,786.0	1,278.8	197.1	1,283.3	2.26	-2.23	
6,963.0	88.74	1.99	5,787.4	1,374.7	201.0	1,379.3	1.15	-0.86	
7,058.0	88.12	2.25	5,790.0	1,469.6	204.5	1,474.2	0.71	-0.65	
7,153.0	88.69	2.58	5,792.6	1,564.5	208.5	1,569.2	0.69	0.60	
7,248.0	90.32	1.94	5,793.5	1,659.4	212.3	1,664.2	1.84	1.72	
7,343.0	89.69	2.16	5,793.5	1,754.3	215.7	1,759.2	0.70	-0.66	
7,438.0	90.00	0.53	5,793.7	1,849.3	217.9	1,854.2	1.75	0.33	
7,533.0	89.18	0.34	5,794.4	1,944.3	218.6	1,949.1	0.89	-0.86	
7,628.0	90.94	359.29	5,794.3	2,039.3	218.3	2,044.1	2.16	1.85	
7,723.0	91.86	359.55	5,792.0	2,134.3	217.3	2,139.0	1.01	0.97	
7,818.0	90.33	0.04	5,790.2	2,229.2	217.0	2,234.0	1.69	-1.61	
7,913.0	90.83	359.81	5,789.2	2,324.2	216.9	2,328.9	0.58	0.53	
8,008.0	90.18	0.71	5,788.4	2,419.2	217.3	2,423.9	1.17	-0.68	
8,103.0	90.91	0.44	5,787.5	2,514.2	218.3	2,518.9	0.82	0.77	
8,198.0	89.50	359.27	5,787.1	2,609.2	218.0	2,613.8	1.93	-1.48	
8,293.0	89.83	359.37	5,787.7	2,704.2	216.9	2,708.8	0.36	0.35	
8,388.0	89.43	358.80	5,788.3	2,799.2	215.4	2,803.7	0.73	-0.42	
8,483.0	90.70	359.72	5,788.2	2,894.2	214.2	2,898.6	1.65	1.34	
8,578.0	90.83	359.36	5,786.9	2,989.2	213.4	2,993.6	0.40	0.14	
8,673.0	89.45	358.16	5,786.7	3,084.1	211.3	3,088.4	1.93	-1.45	
8,768.0	88.33	359.40	5,788.5	3,179.1	209.3	3,183.3	1.76	-1.18	
8,863.0	87.81	359.23	5,791.7	3,274.0	208.2	3,278.2	0.58	-0.55	
8,958.0	87.57	358.64	5,795.5	3,368.9	206.4	3,373.0	0.67	-0.25	
9,053.0	87.61	358.72	5,799.5	3,463.8	204.2	3,467.8	0.09	0.04	
9,148.0	89.56	359.66	5,801.9	3,558.8	202.9	3,562.7	2.28	2.05	
9,243.0	89.90	359.55	5,802.3	3,653.8	202.2	3,657.7	0.38	0.36	
9,339.0	89.81	359.76	5,802.6	3,749.8	201.7	3,753.6	0.24	-0.09	
9,434.0	90.09	359.82	5,802.7	3,844.8	201.3	3,848.6	0.30	0.29	
9,526.0	90.43	359.57	5,802.2	3,936.8	200.8	3,940.6	0.46	0.37	
9,618.0	89.77	0.36	5,802.1	4,028.8	200.8	4,032.5	1.12	-0.72	
9,711.0	89.91	0.05	5,802.3	4,121.8	201.1	4,125.5	0.37	0.15	
9,804.0	89.61	1.73	5,802.7	4,214.8	202.5	4,218.5	1.84	-0.32	
9,896.0	89.41	1.92	5,803.5	4,306.7	205.5	4,310.5	0.30	-0.22	
9,987.0	89.53	1.39	5,804.4	4,397.7	208.1	4,401.5	0.60	0.13	
10,080.0	89.59	1.67	5,805.1	4,490.6	210.6	4,494.5	0.31	0.06	
10,172.0	88.70	0.78	5,806.5	4,582.6	212.5	4,586.5	1.37	-0.97	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
10,264.0	89.18	359.86	5,808.2	4,674.6	213.1	4,678.4	1.13	0.52	
10,355.0	90.40	359.35	5,808.5	4,765.6	212.4	4,769.4	1.45	1.34	
10,446.0	89.54	359.10	5,808.5	4,856.6	211.2	4,860.3	0.98	-0.95	
10,538.0	92.19	359.92	5,807.1	4,948.5	210.4	4,952.2	3.02	2.88	
10,630.0	92.10	359.38	5,803.7	5,040.5	209.9	5,044.1	0.59	-0.10	
10,721.0	91.05	0.55	5,801.2	5,131.4	209.8	5,135.1	1.73	-1.15	
10,812.0	91.20	0.28	5,799.4	5,222.4	210.5	5,226.0	0.34	0.16	
10,903.0	90.37	1.76	5,798.2	5,313.4	212.1	5,317.0	1.86	-0.91	
10,994.0	90.01	1.55	5,797.9	5,404.4	214.7	5,408.0	0.46	-0.40	
11,086.0	89.63	1.18	5,798.2	5,496.3	216.9	5,500.0	0.58	-0.41	
11,177.0	89.57	0.87	5,798.8	5,587.3	218.5	5,591.0	0.35	-0.07	
11,269.0	89.11	0.32	5,799.8	5,679.3	219.5	5,683.0	0.78	-0.50	
11,361.0	91.01	359.92	5,799.8	5,771.3	219.7	5,775.0	2.11	2.07	
11,453.0	90.21	358.95	5,798.8	5,863.3	218.8	5,866.9	1.37	-0.87	
11,543.0	90.53	358.87	5,798.2	5,953.3	217.1	5,956.8	0.37	0.36	
11,635.0	90.97	358.57	5,797.0	6,045.2	215.0	6,048.7	0.58	0.48	
11,726.0	90.31	357.65	5,796.0	6,136.2	212.0	6,139.5	1.24	-0.73	
11,817.0	90.85	357.68	5,795.0	6,227.1	208.3	6,230.3	0.59	0.59	
11,908.0	89.43	358.14	5,794.8	6,318.0	205.0	6,321.2	1.64	-1.56	
12,000.0	89.78	357.90	5,795.5	6,410.0	201.8	6,413.0	0.46	0.38	
12,092.0	90.22	359.43	5,795.5	6,501.9	199.6	6,504.9	1.73	0.48	
12,183.0	89.11	1.11	5,796.0	6,592.9	200.1	6,595.9	2.21	-1.22	
12,274.0	90.02	1.38	5,796.7	6,683.9	202.1	6,686.9	1.04	1.00	
12,366.0	90.23	1.01	5,796.5	6,775.9	204.0	6,778.9	0.46	0.23	
12,457.0	90.48	0.55	5,795.9	6,866.9	205.2	6,869.9	0.58	0.27	
12,548.0	90.84	0.15	5,794.9	6,957.9	205.8	6,960.8	0.59	0.40	
12,639.0	90.07	0.84	5,794.1	7,048.9	206.6	7,051.8	1.14	-0.85	
12,731.0	89.55	1.30	5,794.5	7,140.8	208.3	7,143.8	0.75	-0.57	
12,822.0	89.87	0.39	5,794.9	7,231.8	209.6	7,234.8	1.06	0.35	
12,914.0	90.50	359.79	5,794.6	7,323.8	209.8	7,326.8	0.95	0.68	
13,005.0	89.39	0.55	5,794.7	7,414.8	210.0	7,417.8	1.48	-1.22	
13,096.0	89.79	0.60	5,795.4	7,505.8	210.9	7,508.7	0.44	0.44	
13,188.0	88.16	1.22	5,797.0	7,597.8	212.4	7,600.7	1.90	-1.77	
13,280.0	88.74	0.51	5,799.5	7,689.7	213.8	7,692.7	1.00	0.63	
13,371.0	88.44	359.68	5,801.7	7,780.7	213.9	7,783.6	0.97	-0.33	
13,462.0	89.30	358.71	5,803.5	7,871.7	212.7	7,874.5	1.42	0.95	
13,553.0	89.27	358.21	5,804.7	7,962.7	210.2	7,965.4	0.55	-0.03	
13,644.0	89.80	357.62	5,805.4	8,053.6	206.9	8,056.2	0.87	0.58	
13,736.0	90.05	357.68	5,805.5	8,145.5	203.1	8,148.0	0.28	0.27	
13,827.0	89.77	357.27	5,805.7	8,236.4	199.1	8,238.9	0.55	-0.31	
13,900.0	89.67	356.81	5,806.0	8,309.3	195.4	8,311.6	0.64	-0.14	Last CES Survey @ 13,900' MD
13,950.0	89.67	356.81	5,806.3	8,359.3	192.6	8,361.5	0.00	0.00	TD - 2610' FSL, 2131' FWL - PTB @ 13,950'

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
21C-0907A VP P5	0.00	1.05	4,979.1	-88.5	206.7	1,549,306.95	3,450,311.89	40.829885	-103.872731
- actual wellpath misses target center by 15.8usft at 4987.6usft MD (4979.4 TVD, -104.3 N, 208.0 E)									
- Point									
21C-0907A VP	0.00	1.05	5,100.1	-520.9	206.7	1,548,874.63	3,450,319.82	40.828698	-103.872731
- actual wellpath misses target center by 418.4usft at 5102.8usft MD (5094.5 TVD, -102.5 N, 209.4 E)									
- Point									
21C-0907A BHL P2	0.00	1.05	5,921.0	8,304.9	206.7	1,557,698.90	3,450,157.95	40.852922	-103.872731
- actual wellpath misses target center by 115.5usft at 13895.5usft MD (5806.0 TVD, 8304.8 N, 195.6 E)									
- Point									
21C-0907A VP P4	0.00	1.05	5,100.1	-88.5	206.7	1,549,306.95	3,450,311.89	40.829885	-103.872731
- actual wellpath misses target center by 14.2usft at 5108.5usft MD (5100.3 TVD, -102.4 N, 209.5 E)									
- Point									
21C-0907A BHL P5	0.00	1.05	5,800.0	8,304.9	206.7	1,557,698.90	3,450,157.95	40.852922	-103.872731
- actual wellpath misses target center by 12.6usft at 13894.9usft MD (5806.0 TVD, 8304.3 N, 195.6 E)									
- Point									
21C-0907A BHL	0.00	1.05	5,808.5	8,304.9	206.7	1,557,698.90	3,450,157.95	40.852922	-103.872731
- actual wellpath misses target center by 11.3usft at 13894.9usft MD (5806.0 TVD, 8304.3 N, 195.6 E)									
- Point									
21C-0907A VP P8	0.00	1.05	4,959.1	-88.5	206.7	1,549,306.95	3,450,311.89	40.829885	-103.872731
- actual wellpath misses target center by 16.2usft at 4967.6usft MD (4959.4 TVD, -104.7 N, 207.7 E)									
- Point									
21C-0907A BHL P8	0.00	1.05	5,780.0	8,304.9	206.7	1,557,698.90	3,450,157.95	40.852922	-103.872731
- actual wellpath misses target center by 28.2usft at 13894.8usft MD (5806.0 TVD, 8304.2 N, 195.6 E)									
- Point									
21C-0907A TGT	0.00	1.05	5,808.5	7,805.0	211.4	1,557,199.19	3,450,171.82	40.851550	-103.872714
- actual wellpath misses target center by 6.6usft at 13395.4usft MD (5802.3 TVD, 7805.1 N, 213.7 E)									
- Point									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,138.0	5,783.9	7" - 219' FSL, 2071' FWL		

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
13,900.0	5,806.0	8,309.3	195.4	Last CES Survey @ 13,900' MD	
13,950.0	5,806.3	8,359.3	192.6	PTB @ 13,950'	
13,950.0	5,806.3	8,359.3	192.6	TD - 2610' FSL, 2131' FWL	

Checked By: _____ Approved By: _____ Date: _____

Whiting Petroleum Corporation

Weld County, CO

S21-T10N-R58W

Razor #21C-0907A

HZ

Design: FINAL

Survey Report - Geographic

10 September, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

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

Site	S21-T10N-R58W				
Site Position:		Northing:	1,549,389.39 usft	Latitude:	40.830125
From:	Lat/Long	Easting:	3,450,038.36 usft	Longitude:	-103.873714
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.05 °

Well		Razor #21C-0907A				
Well Position	+N-S	0.0 usft	Northing:	1,549,391.65 usft	Latitude:	40.830128
	+E-W	0.0 usft	Easting:	3,450,103.64 usft	Longitude:	-103.873478
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,844.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/15/2014	7.98	67.43	53,110

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	1.43	

Survey Program	Date	9/10/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
218.0	13,950.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	1,549,391.65	3,450,103.64	40.830128	-103.873478
218.0	0.44	130.41	218.0	-0.5	0.6	1,549,391.12	3,450,104.29	40.830127	-103.873476
311.0	0.34	134.49	311.0	-1.0	1.1	1,549,390.71	3,450,104.77	40.830125	-103.873474
404.0	0.36	122.81	404.0	-1.3	1.5	1,549,390.36	3,450,105.22	40.830124	-103.873473
496.0	1.71	156.18	496.0	-2.7	2.3	1,549,388.97	3,450,106.04	40.830121	-103.873470
588.0	3.33	144.76	587.9	-6.2	4.4	1,549,385.57	3,450,108.20	40.830111	-103.873462
680.0	3.20	146.87	679.7	-10.5	7.4	1,549,381.29	3,450,111.22	40.830099	-103.873452
772.0	3.08	149.96	771.6	-14.8	10.0	1,549,377.05	3,450,113.94	40.830087	-103.873442
864.0	2.73	153.36	863.5	-18.9	12.2	1,549,372.99	3,450,116.24	40.830076	-103.873434
955.0	3.49	150.28	954.3	-23.2	14.6	1,549,368.69	3,450,118.66	40.830064	-103.873426
1,047.0	3.00	155.57	1,046.2	-27.9	17.0	1,549,364.11	3,450,121.13	40.830052	-103.873417
1,138.0	3.58	142.16	1,137.0	-32.3	19.7	1,549,359.75	3,450,123.94	40.830039	-103.873407

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
1,230.0	3.54	147.83	1,228.9	-36.9	23.0	1,549,355.14	3,450,127.30	40.830027	-103.873395
1,321.0	3.41	153.01	1,319.7	-41.7	25.7	1,549,350.40	3,450,130.11	40.830013	-103.873385
1,413.0	4.25	149.17	1,411.5	-47.1	28.7	1,549,345.09	3,450,133.20	40.829999	-103.873375
1,503.0	3.96	153.12	1,501.3	-52.7	31.8	1,549,339.51	3,450,136.41	40.829983	-103.873363
1,595.0	3.45	155.71	1,593.1	-58.1	34.4	1,549,334.21	3,450,139.09	40.829969	-103.873354
1,705.0	3.25	159.63	1,702.9	-64.0	36.8	1,549,328.31	3,450,141.64	40.829952	-103.873345
1,842.0	2.43	160.58	1,839.7	-70.4	39.1	1,549,321.97	3,450,144.07	40.829935	-103.873337
1,933.0	4.84	100.49	1,930.6	-72.9	43.6	1,549,319.54	3,450,148.54	40.829928	-103.873321
2,025.0	3.77	94.35	2,022.3	-73.9	50.4	1,549,318.73	3,450,155.39	40.829925	-103.873296
2,116.0	3.24	99.75	2,113.1	-74.5	55.9	1,549,318.17	3,450,160.92	40.829923	-103.873276
2,208.0	3.08	98.63	2,205.0	-75.3	60.9	1,549,317.45	3,450,165.94	40.829921	-103.873258
2,300.0	2.76	99.59	2,296.9	-76.1	65.5	1,549,316.79	3,450,170.58	40.829919	-103.873241
2,391.0	2.40	106.87	2,387.8	-77.0	69.5	1,549,315.95	3,450,174.58	40.829917	-103.873227
2,482.0	4.30	99.61	2,478.6	-78.1	74.7	1,549,314.92	3,450,179.78	40.829914	-103.873208
2,573.0	4.24	95.63	2,569.4	-79.0	81.4	1,549,314.14	3,450,186.51	40.829911	-103.873184
2,664.0	4.39	89.90	2,660.1	-79.3	88.3	1,549,313.94	3,450,193.35	40.829910	-103.873159
2,756.0	4.36	88.59	2,751.8	-79.2	95.3	1,549,314.17	3,450,200.36	40.829911	-103.873134
2,847.0	4.39	85.38	2,842.6	-78.9	102.2	1,549,314.66	3,450,207.28	40.829912	-103.873109
2,939.0	3.98	88.37	2,934.3	-78.5	108.9	1,549,315.16	3,450,213.97	40.829913	-103.873085
3,031.0	4.24	90.12	3,026.1	-78.4	115.5	1,549,315.36	3,450,220.56	40.829913	-103.873061
3,122.0	3.72	100.50	3,116.9	-79.0	121.8	1,549,314.93	3,450,226.84	40.829911	-103.873038
3,213.0	3.35	99.45	3,207.7	-79.9	127.3	1,549,314.06	3,450,232.38	40.829909	-103.873018
3,305.0	2.74	98.34	3,299.6	-80.7	132.1	1,549,313.39	3,450,237.22	40.829907	-103.873001
3,395.0	2.38	87.66	3,389.5	-80.9	136.1	1,549,313.22	3,450,241.22	40.829906	-103.872986
3,487.0	2.19	89.73	3,481.4	-80.9	139.8	1,549,313.38	3,450,244.89	40.829906	-103.872973
3,578.0	1.98	91.94	3,572.3	-80.9	143.1	1,549,313.39	3,450,248.20	40.829906	-103.872961
3,670.0	2.32	83.95	3,664.3	-80.8	146.5	1,549,313.60	3,450,251.63	40.829906	-103.872949
3,762.0	2.07	68.27	3,756.2	-79.9	149.9	1,549,314.47	3,450,255.01	40.829909	-103.872937
3,853.0	2.91	80.77	3,847.1	-79.0	153.7	1,549,315.52	3,450,258.80	40.829911	-103.872923
3,944.0	2.60	74.35	3,938.0	-78.0	158.0	1,549,316.53	3,450,263.05	40.829914	-103.872907
4,035.0	4.99	100.90	4,028.8	-78.2	163.9	1,549,316.44	3,450,268.93	40.829913	-103.872886
4,127.0	5.47	97.11	4,120.4	-79.5	172.2	1,549,315.29	3,450,277.23	40.829910	-103.872856
4,218.0	5.40	95.64	4,211.0	-80.5	180.7	1,549,314.49	3,450,285.81	40.829907	-103.872825
4,309.0	4.89	94.20	4,301.7	-81.2	188.9	1,549,313.94	3,450,293.95	40.829905	-103.872796
4,401.0	4.06	145.23	4,393.4	-84.2	194.6	1,549,311.08	3,450,299.78	40.829897	-103.872775
4,492.0	3.74	149.61	4,484.2	-89.4	198.0	1,549,305.94	3,450,303.21	40.829883	-103.872763
4,584.0	3.10	150.40	4,576.0	-94.1	200.7	1,549,301.24	3,450,306.04	40.829870	-103.872753
4,675.0	2.66	156.06	4,666.9	-98.2	202.8	1,549,297.21	3,450,308.19	40.829859	-103.872746
4,766.0	2.52	151.95	4,757.8	-101.9	204.6	1,549,293.54	3,450,310.06	40.829848	-103.872739
4,858.0	1.52	158.25	4,849.8	-104.8	206.0	1,549,290.65	3,450,311.51	40.829840	-103.872734
4,950.0	1.63	44.64	4,941.7	-105.0	207.4	1,549,290.47	3,450,312.89	40.829840	-103.872729
5,041.0	1.16	40.03	5,032.7	-103.4	208.9	1,549,292.13	3,450,314.36	40.829844	-103.872724
5,132.0	0.65	12.31	5,123.7	-102.2	209.6	1,549,293.35	3,450,315.04	40.829848	-103.872721
5,223.0	11.94	2.05	5,214.0	-92.2	210.0	1,549,303.30	3,450,315.30	40.829875	-103.872719
5,314.0	24.60	4.93	5,300.3	-63.8	212.0	1,549,331.73	3,450,316.76	40.829953	-103.872712
5,405.0	26.93	359.59	5,382.2	-24.3	213.5	1,549,371.23	3,450,317.51	40.830061	-103.872707
5,497.0	30.75	358.19	5,462.8	20.0	212.6	1,549,415.57	3,450,315.81	40.830183	-103.872710
5,588.0	43.03	358.97	5,535.4	74.5	211.3	1,549,470.04	3,450,313.51	40.830333	-103.872715
5,618.0	47.50	0.86	5,556.5	95.8	211.2	1,549,491.34	3,450,313.10	40.830391	-103.872715
5,648.0	47.73	0.55	5,576.8	118.0	211.5	1,549,513.50	3,450,312.97	40.830452	-103.872714
5,678.0	47.43	0.14	5,597.0	140.1	211.7	1,549,535.64	3,450,312.69	40.830513	-103.872713
5,709.0	48.68	0.90	5,617.7	163.2	211.9	1,549,558.70	3,450,312.48	40.830576	-103.872713
5,739.0	53.30	0.53	5,636.6	186.5	212.2	1,549,582.00	3,450,312.34	40.830640	-103.872712
5,770.0	53.75	0.81	5,655.0	211.4	212.4	1,549,606.93	3,450,312.18	40.830708	-103.872711
5,802.0	54.15	0.14	5,673.9	237.3	212.7	1,549,632.80	3,450,311.92	40.830779	-103.872710

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
5,833.0	57.39	359.01	5,691.3	262.9	212.5	1,549,658.42	3,450,311.25	40.830850	-103.872711
5,865.0	62.91	359.01	5,707.2	290.7	212.0	1,549,686.14	3,450,310.26	40.830926	-103.872712
5,896.0	67.67	358.80	5,720.2	318.8	211.4	1,549,714.28	3,450,309.21	40.831003	-103.872714
5,928.0	69.27	357.83	5,731.9	348.6	210.6	1,549,744.01	3,450,307.79	40.831085	-103.872717
5,960.0	70.15	357.42	5,743.0	378.5	209.3	1,549,773.97	3,450,305.99	40.831167	-103.872722
5,991.0	70.00	356.83	5,753.6	407.6	207.9	1,549,803.05	3,450,304.00	40.831247	-103.872727
6,023.0	72.90	357.27	5,763.8	437.9	206.3	1,549,833.31	3,450,301.88	40.831330	-103.872733
6,054.0	77.49	358.23	5,771.7	467.9	205.1	1,549,863.22	3,450,300.16	40.831412	-103.872737
6,083.0	81.85	357.68	5,776.9	496.4	204.1	1,549,891.70	3,450,298.62	40.831490	-103.872741
6,203.0	85.51	356.94	5,790.1	615.5	198.5	1,550,010.69	3,450,290.83	40.831817	-103.872761
6,298.0	87.33	357.88	5,796.0	710.2	194.2	1,550,105.31	3,450,284.81	40.832077	-103.872776
6,392.0	89.86	359.02	5,798.3	804.1	191.7	1,550,199.18	3,450,280.55	40.832335	-103.872786
6,488.0	91.71	359.15	5,797.0	900.1	190.2	1,550,295.11	3,450,277.26	40.832599	-103.872791
6,583.0	91.96	0.66	5,794.0	995.1	190.0	1,550,390.04	3,450,275.36	40.832859	-103.872792
6,678.0	92.38	0.20	5,790.4	1,090.0	190.7	1,550,484.96	3,450,274.33	40.833120	-103.872789
6,773.0	91.67	2.40	5,787.0	1,184.9	192.9	1,550,579.90	3,450,274.74	40.833380	-103.872781
6,867.0	89.57	2.72	5,786.0	1,278.8	197.1	1,550,673.85	3,450,277.22	40.833638	-103.872766
6,963.0	88.74	1.99	5,787.4	1,374.7	201.0	1,550,769.82	3,450,279.40	40.833901	-103.872752
7,058.0	88.12	2.25	5,790.0	1,469.6	204.5	1,550,864.76	3,450,281.17	40.834162	-103.872739
7,153.0	88.69	2.58	5,792.6	1,564.5	208.5	1,550,959.70	3,450,283.44	40.834422	-103.872725
7,248.0	90.32	1.94	5,793.5	1,659.4	212.3	1,551,054.67	3,450,285.44	40.834683	-103.872711
7,343.0	89.69	2.16	5,793.5	1,754.3	215.7	1,551,149.65	3,450,287.10	40.834943	-103.872699
7,438.0	90.00	0.53	5,793.7	1,849.3	217.9	1,551,244.65	3,450,287.58	40.835204	-103.872691
7,533.0	89.18	0.34	5,794.4	1,944.3	218.6	1,551,339.64	3,450,286.56	40.835465	-103.872688
7,628.0	90.94	359.29	5,794.3	2,039.3	218.3	1,551,434.61	3,450,284.51	40.835725	-103.872689
7,723.0	91.86	359.55	5,792.0	2,134.3	217.3	1,551,529.54	3,450,281.81	40.835986	-103.872693
7,818.0	90.33	0.04	5,790.2	2,229.2	217.0	1,551,624.50	3,450,279.73	40.836247	-103.872694
7,913.0	90.83	359.81	5,789.2	2,324.2	216.9	1,551,719.48	3,450,277.86	40.836507	-103.872694
8,008.0	90.18	0.71	5,788.4	2,419.2	217.3	1,551,814.46	3,450,276.55	40.836768	-103.872693
8,103.0	90.91	0.44	5,787.5	2,514.2	218.3	1,551,909.45	3,450,275.76	40.837029	-103.872689
8,198.0	89.50	359.27	5,787.1	2,609.2	218.0	1,552,004.43	3,450,273.78	40.837289	-103.872690
8,293.0	89.83	359.37	5,787.7	2,704.2	216.9	1,552,099.38	3,450,270.91	40.837550	-103.872694
8,388.0	89.43	358.80	5,788.3	2,799.2	215.4	1,552,194.33	3,450,267.65	40.837811	-103.872700
8,483.0	90.70	359.72	5,788.2	2,894.2	214.2	1,552,289.28	3,450,264.68	40.838072	-103.872704
8,578.0	90.83	359.36	5,786.9	2,989.2	213.4	1,552,384.23	3,450,262.18	40.838332	-103.872707
8,673.0	89.45	358.16	5,786.7	3,084.1	211.3	1,552,479.15	3,450,258.38	40.838593	-103.872715
8,768.0	88.33	359.40	5,788.5	3,179.1	209.3	1,552,574.06	3,450,254.62	40.838854	-103.872722
8,863.0	87.81	359.23	5,791.7	3,274.0	208.2	1,552,668.96	3,450,251.74	40.839114	-103.872726
8,958.0	87.57	358.64	5,795.5	3,368.9	206.4	1,552,763.82	3,450,248.23	40.839375	-103.872732
9,053.0	87.61	358.72	5,799.5	3,463.8	204.2	1,552,858.65	3,450,244.31	40.839635	-103.872740
9,148.0	89.56	359.66	5,801.9	3,558.8	202.9	1,552,953.57	3,450,241.22	40.839896	-103.872745
9,243.0	89.90	359.55	5,802.3	3,653.8	202.2	1,553,048.53	3,450,238.83	40.840156	-103.872747
9,339.0	89.81	359.76	5,802.6	3,749.8	201.7	1,553,144.51	3,450,236.49	40.840420	-103.872749
9,434.0	90.09	359.82	5,802.7	3,844.8	201.3	1,553,239.48	3,450,234.40	40.840681	-103.872751
9,526.0	90.43	359.57	5,802.2	3,936.8	200.8	1,553,331.46	3,450,232.22	40.840933	-103.872753
9,618.0	89.77	0.36	5,802.1	4,028.8	200.8	1,553,423.44	3,450,230.48	40.841186	-103.872753
9,711.0	89.91	0.05	5,802.3	4,121.8	201.1	1,553,516.43	3,450,229.10	40.841441	-103.872751
9,804.0	89.61	1.73	5,802.7	4,214.8	202.5	1,553,609.42	3,450,228.84	40.841696	-103.872746
9,896.0	89.41	1.92	5,803.5	4,306.7	205.5	1,553,701.41	3,450,230.09	40.841949	-103.872736
9,987.0	89.53	1.39	5,804.4	4,397.7	208.1	1,553,792.40	3,450,231.05	40.842198	-103.872726
10,080.0	89.59	1.67	5,805.1	4,490.6	210.6	1,553,885.39	3,450,231.82	40.842453	-103.872717
10,172.0	88.70	0.78	5,806.4	4,582.6	212.5	1,553,977.38	3,450,232.10	40.842706	-103.872710
10,264.0	89.18	359.86	5,808.2	4,674.6	213.1	1,554,069.36	3,450,230.93	40.842958	-103.872708
10,355.0	90.40	359.35	5,808.5	4,765.6	212.4	1,554,160.32	3,450,228.63	40.843208	-103.872711
10,446.0	89.54	359.10	5,808.5	4,856.6	211.2	1,554,251.28	3,450,225.73	40.843458	-103.872715

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	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
10,538.0	92.19	359.92	5,807.1	4,948.5	210.4	1,554,343.22	3,450,223.26	40.843710	-103.872718
10,630.0	92.10	359.38	5,803.7	5,040.5	209.9	1,554,435.13	3,450,221.01	40.843962	-103.872720
10,721.0	91.05	0.55	5,801.2	5,131.4	209.8	1,554,526.08	3,450,219.29	40.844212	-103.872720
10,812.0	91.20	0.28	5,799.4	5,222.4	210.5	1,554,617.05	3,450,218.28	40.844462	-103.872718
10,903.0	90.37	1.76	5,798.2	5,313.4	212.1	1,554,708.04	3,450,218.23	40.844712	-103.872712
10,994.0	90.01	1.55	5,797.9	5,404.4	214.7	1,554,799.04	3,450,219.19	40.844961	-103.872702
11,086.0	89.63	1.18	5,798.2	5,496.3	216.9	1,554,891.03	3,450,219.69	40.845214	-103.872694
11,177.0	89.57	0.87	5,798.8	5,587.3	218.5	1,554,982.03	3,450,219.65	40.845463	-103.872688
11,269.0	89.11	0.32	5,799.8	5,679.3	219.5	1,555,074.02	3,450,218.92	40.845716	-103.872685
11,361.0	91.01	359.92	5,799.8	5,771.3	219.7	1,555,166.01	3,450,217.42	40.845968	-103.872684
11,453.0	90.21	358.95	5,798.8	5,863.3	218.8	1,555,257.96	3,450,214.83	40.846221	-103.872688
11,543.0	90.53	358.87	5,798.2	5,953.3	217.1	1,555,347.90	3,450,211.47	40.846468	-103.872694
11,635.0	90.97	358.57	5,797.0	6,045.2	215.0	1,555,439.81	3,450,207.73	40.846720	-103.872701
11,726.0	90.31	357.65	5,796.0	6,136.2	212.0	1,555,530.68	3,450,203.06	40.846970	-103.872712
11,817.0	90.85	357.68	5,795.0	6,227.1	208.3	1,555,621.52	3,450,197.68	40.847219	-103.872725
11,908.0	89.43	358.14	5,794.8	6,318.0	205.0	1,555,712.38	3,450,192.70	40.847469	-103.872737
12,000.0	89.78	357.90	5,795.5	6,410.0	201.8	1,555,804.25	3,450,187.83	40.847721	-103.872749
12,092.0	90.22	359.43	5,795.5	6,501.9	199.6	1,555,896.17	3,450,184.00	40.847974	-103.872757
12,183.0	89.11	1.11	5,796.0	6,592.9	200.1	1,555,987.15	3,450,182.76	40.848223	-103.872755
12,274.0	90.02	1.38	5,796.7	6,683.9	202.1	1,556,078.15	3,450,183.07	40.848473	-103.872748
12,366.0	90.23	1.01	5,796.5	6,775.9	204.0	1,556,170.15	3,450,183.30	40.848726	-103.872741
12,457.0	90.48	0.55	5,795.9	6,866.9	205.2	1,556,261.14	3,450,182.87	40.848975	-103.872737
12,548.0	90.84	0.15	5,794.9	6,957.9	205.8	1,556,352.13	3,450,181.76	40.849225	-103.872735
12,639.0	90.07	0.84	5,794.1	7,048.9	206.6	1,556,443.12	3,450,180.88	40.849475	-103.872732
12,731.0	89.55	1.30	5,794.5	7,140.8	208.3	1,556,535.12	3,450,180.91	40.849727	-103.872725
12,822.0	89.87	0.39	5,794.9	7,231.8	209.6	1,556,626.12	3,450,180.58	40.849977	-103.872721
12,914.0	90.50	359.79	5,794.6	7,323.8	209.8	1,556,718.10	3,450,179.04	40.850230	-103.872720
13,005.0	89.39	0.55	5,794.7	7,414.8	210.0	1,556,809.09	3,450,177.64	40.850479	-103.872719
13,096.0	89.79	0.60	5,795.4	7,505.8	210.9	1,556,900.08	3,450,176.88	40.850729	-103.872716
13,188.0	88.16	1.22	5,797.0	7,597.8	212.4	1,556,992.07	3,450,176.66	40.850981	-103.872711
13,280.0	88.74	0.51	5,799.5	7,689.7	213.8	1,557,084.03	3,450,176.36	40.851234	-103.872705
13,371.0	88.44	359.68	5,801.7	7,780.7	213.9	1,557,174.99	3,450,174.84	40.851484	-103.872705
13,462.0	89.30	358.71	5,803.5	7,871.7	212.7	1,557,265.92	3,450,171.89	40.851733	-103.872710
13,553.0	89.27	358.21	5,804.7	7,962.7	210.2	1,557,356.82	3,450,167.78	40.851983	-103.872718
13,644.0	89.80	357.62	5,805.4	8,053.6	206.9	1,557,447.68	3,450,162.80	40.852232	-103.872730
13,736.0	90.05	357.68	5,805.5	8,145.5	203.1	1,557,539.52	3,450,157.34	40.852485	-103.872744
13,827.0	89.77	357.27	5,805.7	8,236.4	199.1	1,557,630.37	3,450,151.67	40.852734	-103.872758
13,900.0	89.67	356.81	5,806.0	8,309.3	195.4	1,557,703.19	3,450,146.56	40.852934	-103.872772
Last CES Survey @ 13,900' MD									
13,950.0	89.67	356.81	5,806.3	8,359.3	192.6	1,557,753.05	3,450,142.86	40.853071	-103.872782
TD - 2610' FSL, 2131' FWL - PTB @ 13,950'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
21C-0907A VP P8	0.00	1.05	4,959.1	-88.5	206.7	1,549,306.96	3,450,311.89	40.829885	-103.872732
- hit/miss target									
- Shape									
- actual wellpath misses target center by 16.2usft at 4967.6usft MD (4959.4 TVD, -104.7 N, 207.7 E)									
- Point									
21C-0907A BHL P8	0.00	1.05	5,780.0	8,304.9	206.7	1,557,698.90	3,450,157.94	40.852922	-103.872731
- hit/miss target									
- Shape									
- actual wellpath misses target center by 28.2usft at 13894.8usft MD (5806.0 TVD, 8304.2 N, 195.6 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0907A
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0907A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,138.0	5,783.9	7" - 219' FSL, 2071' FWL		

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13,900.0	5,806.0	8,309.3	195.4	Last CES Survey @ 13,900' MD
13,950.0	5,806.3	8,359.3	192.6	TD - 2610' FSL, 2131' FWL
13,950.0	5,806.3	8,359.3	192.6	PTB @ 13,950'

Checked By: _____ Approved By: _____ Date: _____