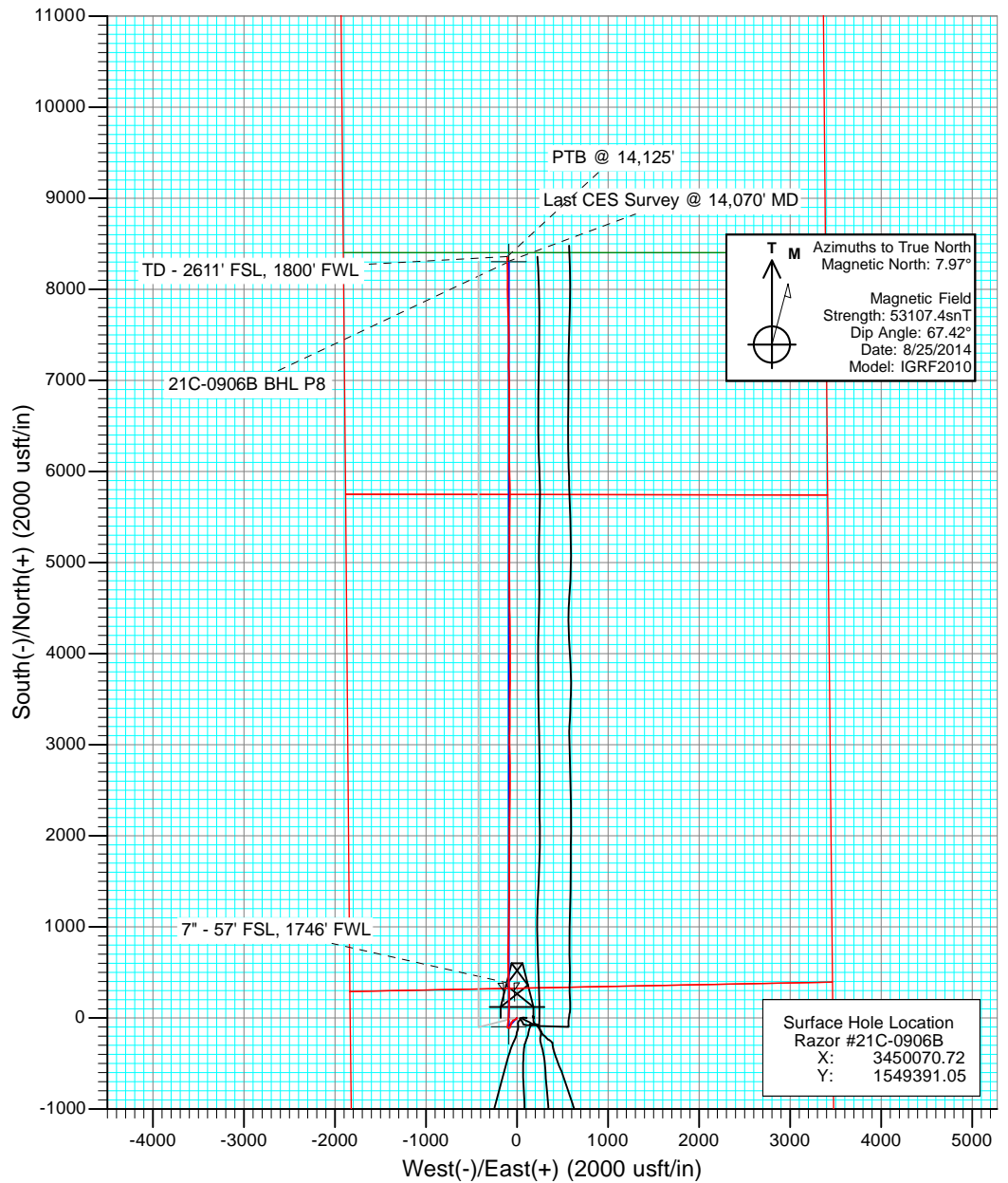
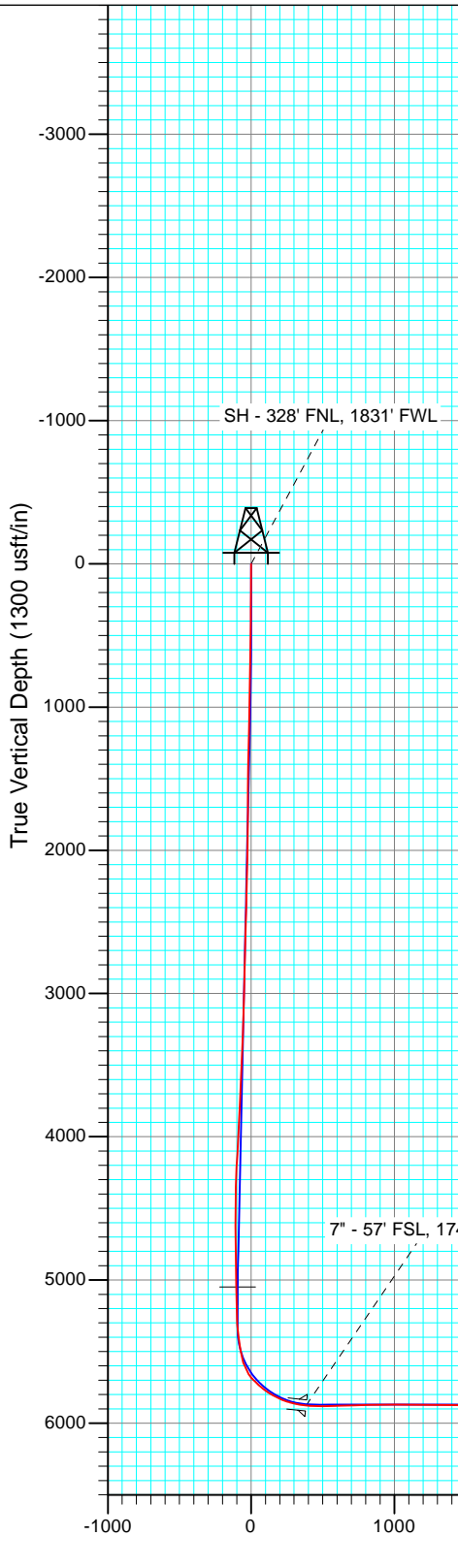




Project: Weld County, CO
Site: S21-T10N-R58W
Well: Razor #21C-0906B
Wellbore: HZ
Design: FINAL

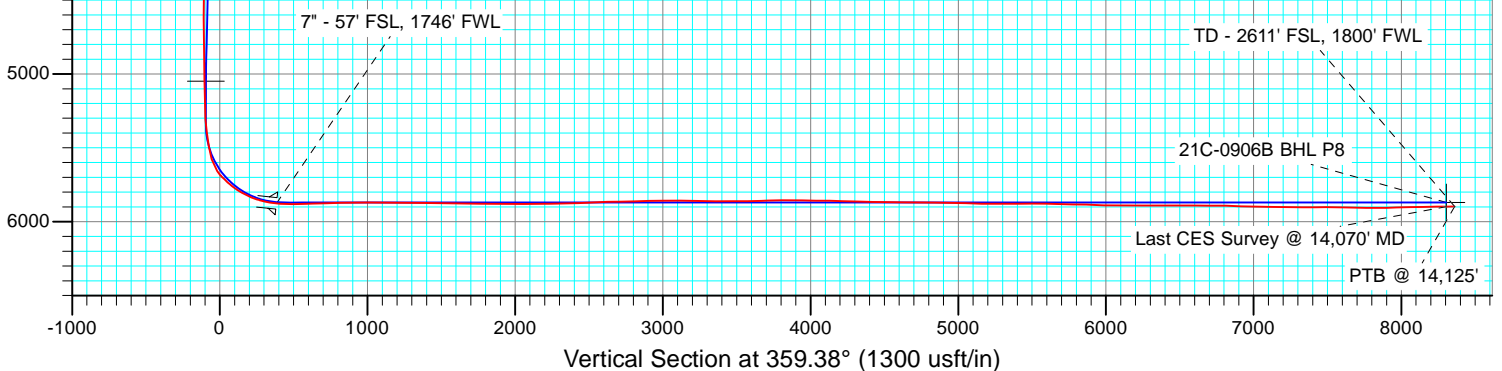


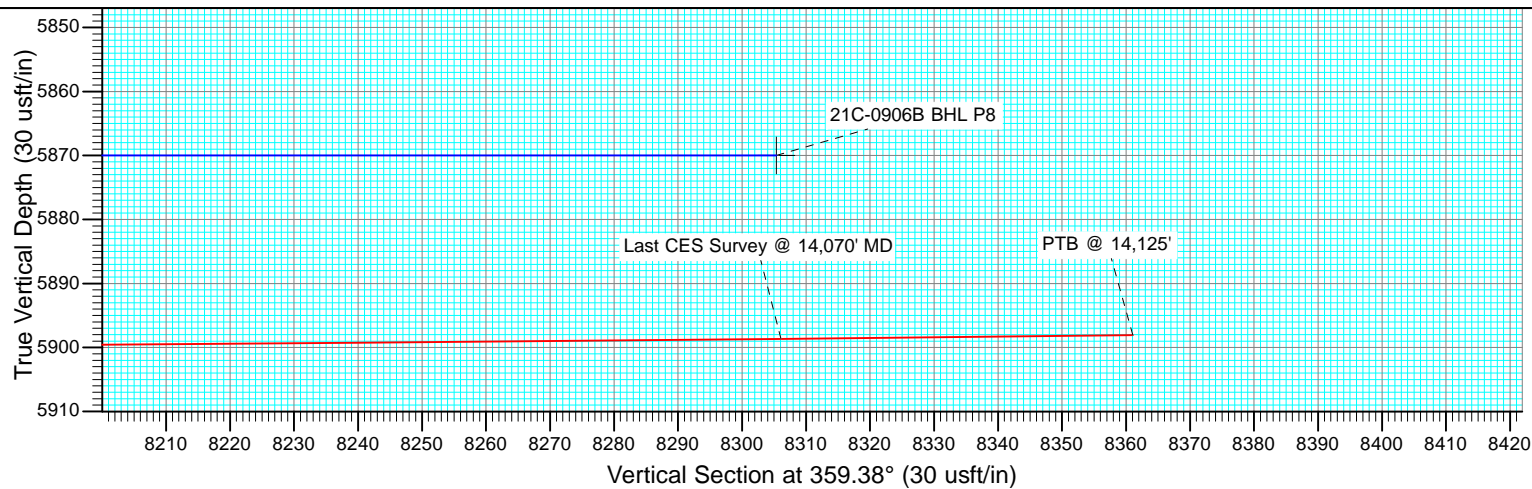
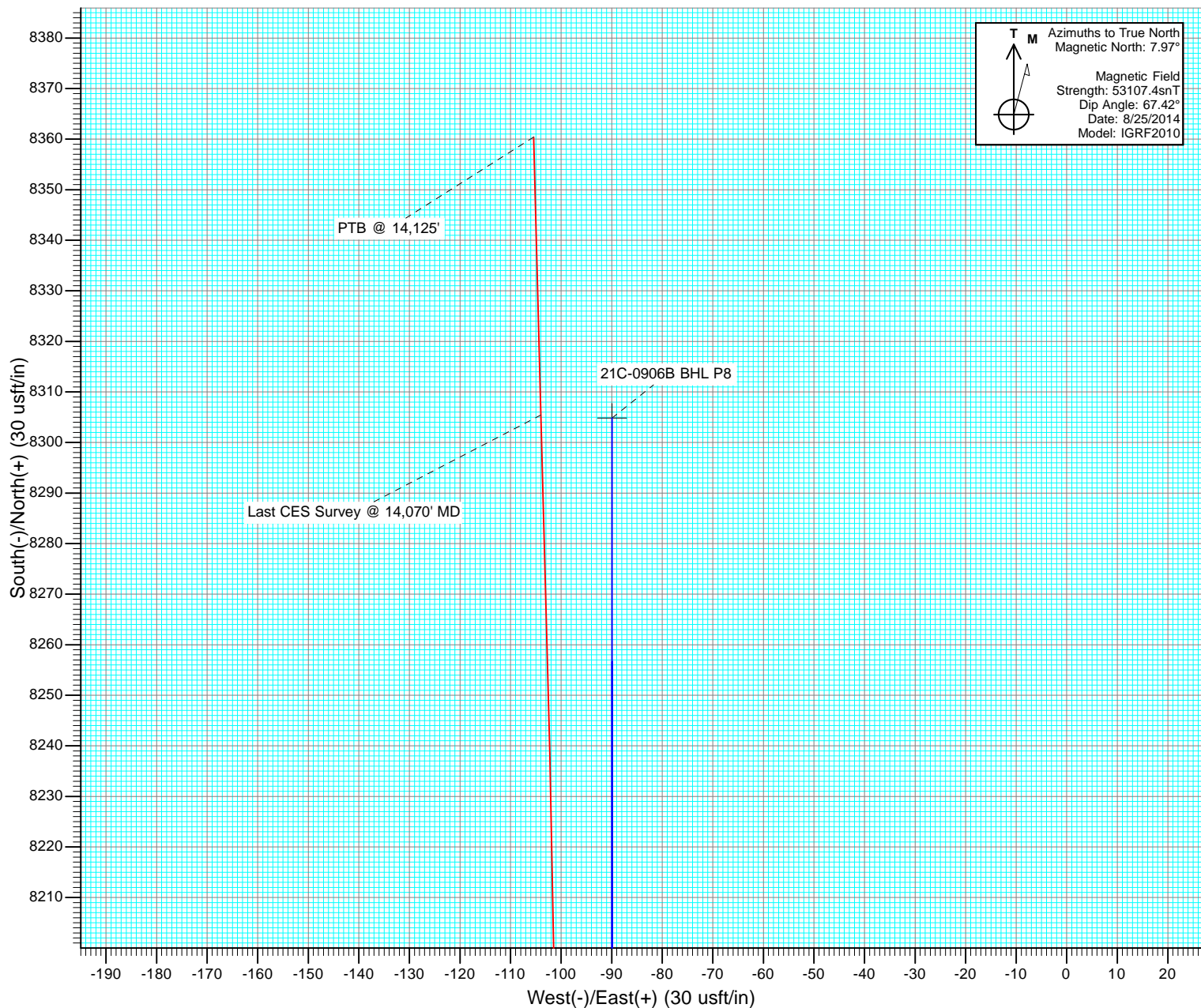
FINAL
Razor #21C-0906B
145270/23937; SC
KB=17' @ 4861.0usft
Ground Elevation @ 4844.0
North American Datum 1983
Well Razor #21C-0906B, True North



DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
21C-0906B VP P8	5049.1	-94.9	-89.9	1549294.52	3449982.58
21C-0906B BHL P8	5870.0	8304.8	-89.9	1557692.86	3449828.51





Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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-0906B					
Well Position	+N/-S	0.0 usft	Northing:	1,549,391.05 usft	Latitude:	40.830128
	+E/-W	0.0 usft	Easting:	3,450,070.72 usft	Longitude:	-103.873597
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	8/25/2014	7.97	67.42	53,107

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	359.38	

Survey Program	Date	9/10/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
213.0	14,125.0	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		
213.0	0.42	188.44	213.0	-0.8	-0.1	-0.8	0.20	0.20		
306.0	0.83	220.76	306.0	-1.6	-0.6	-1.6	0.57	0.44		
399.0	0.97	223.82	399.0	-2.7	-1.6	-2.7	0.16	0.15		
491.0	0.83	231.70	491.0	-3.7	-2.7	-3.6	0.20	-0.15		
583.0	1.03	234.48	583.0	-4.6	-3.8	-4.5	0.22	0.22		
675.0	1.71	222.89	674.9	-6.1	-5.5	-6.0	0.79	0.74		
767.0	1.66	227.23	766.9	-8.0	-7.4	-7.9	0.15	-0.05		
859.0	1.49	228.67	858.9	-9.7	-9.2	-9.6	0.19	-0.18		
950.0	1.31	237.78	949.8	-11.0	-11.0	-10.9	0.31	-0.20		
1,042.0	1.91	225.61	1,041.8	-12.6	-13.0	-12.5	0.75	0.65		
1,133.0	1.80	228.93	1,132.7	-14.6	-15.2	-14.5	0.17	-0.12		
1,225.0	1.71	229.95	1,224.7	-16.5	-17.3	-16.3	0.10	-0.10		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
1,316.0	2.02	234.13	1,315.7	-18.3	-19.6	-18.1	0.37	0.34	
1,408.0	2.13	238.22	1,407.6	-20.1	-22.4	-19.9	0.20	0.12	
1,498.0	2.42	241.94	1,497.5	-21.9	-25.5	-21.6	0.36	0.32	
1,590.0	1.68	260.50	1,589.5	-23.0	-28.5	-22.7	1.07	-0.80	
1,695.0	1.91	259.68	1,694.4	-23.6	-31.8	-23.3	0.22	0.22	
1,837.0	1.91	269.62	1,836.3	-24.0	-36.5	-23.6	0.23	0.00	
1,929.0	1.74	250.78	1,928.3	-24.5	-39.3	-24.1	0.67	-0.18	
2,020.0	1.16	222.97	2,019.3	-25.6	-41.3	-25.2	0.98	-0.64	
2,111.0	1.52	207.49	2,110.2	-27.4	-42.5	-26.9	0.56	0.40	
2,203.0	1.62	207.59	2,202.2	-29.6	-43.6	-29.1	0.11	0.11	
2,295.0	1.70	206.36	2,294.2	-32.0	-44.8	-31.5	0.10	0.09	
2,386.0	1.56	222.75	2,385.1	-34.1	-46.3	-33.6	0.53	-0.15	
2,477.0	2.28	220.76	2,476.1	-36.4	-48.3	-35.9	0.79	0.79	
2,568.0	2.23	222.71	2,567.0	-39.1	-50.7	-38.5	0.10	-0.05	
2,660.0	2.25	228.45	2,658.9	-41.6	-53.2	-41.0	0.24	0.02	
2,751.0	2.15	224.63	2,749.9	-44.0	-55.8	-43.4	0.19	-0.11	
2,842.0	2.01	224.14	2,840.8	-46.3	-58.1	-45.7	0.16	-0.15	
2,934.0	1.88	210.76	2,932.8	-48.8	-60.0	-48.1	0.51	-0.14	
3,026.0	1.84	207.18	3,024.7	-51.4	-61.4	-50.7	0.13	-0.04	
3,118.0	1.35	173.52	3,116.7	-53.8	-62.0	-53.1	1.13	-0.53	
3,209.0	1.64	151.05	3,207.6	-56.0	-61.2	-55.3	0.71	0.32	
3,300.0	1.99	161.74	3,298.6	-58.6	-60.1	-58.0	0.53	0.38	
3,391.0	2.74	208.94	3,389.5	-62.0	-60.7	-61.4	2.21	0.82	
3,482.0	2.98	208.98	3,480.4	-66.0	-62.9	-65.3	0.26	0.26	
3,573.0	2.62	207.31	3,571.3	-69.9	-65.0	-69.2	0.41	-0.40	
3,665.0	2.54	200.73	3,663.2	-73.7	-66.6	-73.0	0.33	-0.09	
3,757.0	3.41	201.25	3,755.1	-78.2	-68.4	-77.4	0.95	0.95	
3,848.0	3.12	201.71	3,845.9	-83.0	-70.3	-82.2	0.32	-0.32	
3,939.0	2.79	195.97	3,936.8	-87.4	-71.8	-86.6	0.49	-0.36	
4,031.0	3.42	203.84	4,028.7	-92.1	-73.5	-91.3	0.83	0.68	
4,122.0	3.51	194.84	4,119.5	-97.3	-75.3	-96.4	0.61	0.10	
4,214.0	3.40	194.49	4,211.3	-102.6	-76.7	-101.8	0.12	-0.12	
4,305.0	2.61	200.14	4,302.2	-107.2	-78.1	-106.3	0.93	-0.87	
4,396.0	2.42	257.80	4,393.1	-109.5	-80.7	-108.7	2.67	-0.21	
4,487.0	3.07	273.52	4,484.0	-109.8	-85.0	-108.9	1.09	0.71	
4,579.0	2.40	272.69	4,575.9	-109.5	-89.4	-108.6	0.73	-0.73	
4,670.0	1.96	262.38	4,666.9	-109.7	-92.8	-108.7	0.65	-0.48	
4,762.0	2.36	292.17	4,758.8	-109.2	-96.2	-108.1	1.28	0.43	
4,853.0	1.20	297.31	4,849.8	-108.0	-98.7	-106.9	1.29	-1.27	
4,946.0	1.26	312.70	4,942.7	-106.9	-100.3	-105.8	0.36	0.06	
5,037.0	1.42	330.18	5,033.7	-105.2	-101.6	-104.1	0.48	0.18	
5,127.0	1.12	334.68	5,123.7	-103.5	-102.6	-102.3	0.35	-0.33	
5,218.0	1.70	354.56	5,214.7	-101.3	-103.1	-100.2	0.82	0.64	
5,310.0	2.53	7.10	5,306.6	-97.9	-103.0	-96.8	1.03	0.90	
5,401.0	9.00	5.24	5,397.1	-88.8	-102.1	-87.7	7.11	7.11	
5,492.0	7.75	11.87	5,487.1	-75.7	-100.2	-74.7	1.73	-1.37	
5,583.0	16.26	4.74	5,576.1	-57.0	-97.8	-55.9	9.48	9.35	
5,674.0	34.56	4.81	5,657.9	-18.3	-94.6	-17.2	20.11	20.11	
5,704.0	40.70	5.20	5,681.7	0.0	-93.0	1.0	20.48	20.47	
5,735.0	45.70	5.80	5,704.2	21.1	-90.9	22.1	16.18	16.13	
5,765.0	47.03	4.66	5,724.9	42.7	-89.0	43.7	5.22	4.43	
5,797.0	49.49	3.63	5,746.3	66.5	-87.2	67.5	8.05	7.69	
5,828.0	52.89	0.73	5,765.7	90.7	-86.3	91.6	13.17	10.97	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
5,860.0	56.29	359.63	5,784.2	116.7	-86.3	117.7	10.99	10.62	
5,892.0	60.00	359.40	5,801.1	143.9	-86.5	144.8	11.61	11.59	
5,923.0	62.17	359.54	5,816.1	171.0	-86.8	172.0	7.01	7.00	
5,955.0	66.10	359.56	5,830.1	199.8	-87.0	200.8	12.28	12.28	
5,987.0	70.02	359.45	5,842.0	229.5	-87.2	230.4	12.25	12.25	
6,018.0	72.36	359.49	5,852.0	258.8	-87.5	259.8	7.55	7.55	
6,050.0	76.42	359.37	5,860.6	289.7	-87.8	290.6	12.69	12.69	
6,085.0	79.28	359.17	5,868.0	323.9	-88.2	324.8	8.19	8.17	
6,198.0	88.39	358.16	5,880.1	436.0	-90.9	437.0	8.11	8.06	
6,292.0	91.58	357.84	5,880.1	530.0	-94.2	531.0	3.41	3.39	
6,388.0	91.00	358.74	5,878.0	625.9	-97.0	626.9	1.12	-0.60	
6,483.0	91.39	1.01	5,876.0	720.9	-97.2	721.9	2.42	0.41	
6,578.0	92.65	1.69	5,872.6	815.8	-95.0	816.8	1.51	1.33	
6,673.0	90.48	0.66	5,870.0	910.7	-93.0	911.7	2.53	-2.28	
6,768.0	90.53	1.36	5,869.2	1,005.7	-91.4	1,006.6	0.74	0.05	
6,862.0	88.95	1.84	5,869.6	1,099.7	-88.7	1,100.6	1.76	-1.68	
6,958.0	89.18	1.71	5,871.2	1,195.6	-85.8	1,196.5	0.28	0.24	
7,053.0	88.85	0.40	5,872.8	1,290.6	-84.0	1,291.4	1.42	-0.35	
7,148.0	89.16	0.08	5,874.5	1,385.6	-83.6	1,386.4	0.47	0.33	
7,243.0	88.74	358.30	5,876.2	1,480.5	-85.0	1,481.4	1.92	-0.44	
7,338.0	88.75	359.85	5,878.3	1,575.5	-86.5	1,576.3	1.63	0.01	
7,433.0	90.75	1.54	5,878.7	1,670.5	-85.3	1,671.3	2.76	2.11	
7,528.0	90.19	1.01	5,877.9	1,765.5	-83.2	1,766.2	0.81	-0.59	
7,623.0	89.70	0.15	5,878.0	1,860.4	-82.3	1,861.2	1.04	-0.52	
7,718.0	88.78	359.31	5,879.3	1,955.4	-82.7	1,956.2	1.31	-0.97	
7,813.0	89.49	0.98	5,880.7	2,050.4	-82.5	2,051.2	1.91	0.75	
7,908.0	91.71	1.29	5,879.7	2,145.4	-80.6	2,146.1	2.36	2.34	
8,003.0	90.71	0.28	5,877.7	2,240.4	-79.3	2,241.1	1.50	-1.05	
8,098.0	90.31	359.94	5,876.9	2,335.4	-79.1	2,336.1	0.55	-0.42	
8,193.0	92.47	0.89	5,874.6	2,430.3	-78.4	2,431.0	2.48	2.27	
8,288.0	92.78	359.75	5,870.2	2,525.2	-77.9	2,525.9	1.24	0.33	
8,383.0	91.26	1.30	5,866.9	2,620.1	-77.0	2,620.8	2.28	-1.60	
8,478.0	90.89	0.07	5,865.1	2,715.1	-75.9	2,715.8	1.35	-0.39	
8,573.0	91.82	358.65	5,862.8	2,810.1	-76.9	2,810.7	1.79	0.98	
8,668.0	91.44	358.27	5,860.1	2,905.0	-79.5	2,905.7	0.57	-0.40	
8,763.0	90.66	359.08	5,858.4	3,000.0	-81.7	3,000.7	1.18	-0.82	
8,858.0	89.69	1.21	5,858.1	3,095.0	-81.5	3,095.7	2.46	-1.02	
8,953.0	89.14	0.74	5,859.1	3,189.9	-79.8	3,190.6	0.76	-0.58	
9,048.0	88.85	0.65	5,860.7	3,284.9	-78.7	3,285.6	0.32	-0.31	
9,143.0	90.08	359.30	5,861.6	3,379.9	-78.7	3,380.6	1.92	1.29	
9,238.0	90.31	0.09	5,861.3	3,474.9	-79.2	3,475.6	0.87	0.24	
9,334.0	90.06	359.91	5,861.0	3,570.9	-79.2	3,571.6	0.32	-0.26	
9,429.0	92.10	1.85	5,859.2	3,665.9	-77.8	3,666.5	2.96	2.15	
9,521.0	91.76	0.96	5,856.1	3,757.8	-75.5	3,758.4	1.04	-0.37	
9,613.0	89.74	0.93	5,854.9	3,849.8	-74.0	3,850.3	2.20	-2.20	
9,706.0	88.50	359.27	5,856.3	3,942.7	-73.8	3,943.3	2.23	-1.33	
9,799.0	89.49	359.81	5,858.0	4,035.7	-74.6	4,036.3	1.21	1.06	
9,891.0	89.16	359.34	5,859.0	4,127.7	-75.3	4,128.3	0.62	-0.36	
9,982.0	88.30	358.29	5,861.1	4,218.7	-77.2	4,219.3	1.49	-0.95	
10,075.0	89.21	359.97	5,863.1	4,311.6	-78.6	4,312.2	2.05	0.98	
10,167.0	88.10	358.97	5,865.2	4,403.6	-79.4	4,404.2	1.62	-1.21	
10,259.0	89.36	359.88	5,867.3	4,495.6	-80.3	4,496.2	1.69	1.37	
10,350.0	88.01	358.97	5,869.4	4,586.5	-81.2	4,587.1	1.79	-1.48	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
10,441.0	89.30	359.70	5,871.5	4,677.5	-82.3	4,678.1	1.63	1.42	
10,533.0	90.22	359.97	5,871.9	4,769.5	-82.6	4,770.1	1.04	1.00	
10,625.0	89.57	359.25	5,872.1	4,861.5	-83.2	4,862.1	1.05	-0.71	
10,716.0	89.58	0.65	5,872.7	4,952.5	-83.3	4,953.1	1.54	0.01	
10,807.0	88.47	359.62	5,874.3	5,043.5	-83.1	5,044.1	1.66	-1.22	
10,898.0	87.00	1.29	5,877.9	5,134.4	-82.3	5,135.0	2.44	-1.62	
10,989.0	90.76	0.34	5,879.7	5,225.4	-81.0	5,225.9	4.26	4.13	
11,081.0	90.45	0.61	5,878.7	5,317.3	-80.3	5,317.9	0.45	-0.34	
11,172.0	89.58	359.24	5,878.7	5,408.3	-80.4	5,408.9	1.78	-0.96	
11,264.0	90.85	1.19	5,878.3	5,500.3	-80.1	5,500.9	2.53	1.38	
11,356.0	88.75	0.65	5,878.6	5,592.3	-78.6	5,592.8	2.36	-2.28	
11,448.0	88.77	0.33	5,880.6	5,684.3	-77.8	5,684.8	0.35	0.02	
11,538.0	88.67	359.57	5,882.6	5,774.3	-77.9	5,774.8	0.85	-0.11	
11,630.0	88.37	358.60	5,885.0	5,866.2	-79.3	5,866.8	1.10	-0.33	
11,721.0	87.56	358.64	5,888.2	5,957.2	-81.5	5,957.7	0.89	-0.89	
11,812.0	89.97	359.03	5,890.2	6,048.1	-83.4	6,048.7	2.68	2.65	
11,903.0	89.30	359.01	5,890.8	6,139.1	-84.9	6,139.7	0.74	-0.74	
11,995.0	90.08	359.60	5,891.3	6,231.1	-86.1	6,231.7	1.06	0.85	
12,087.0	90.06	0.09	5,891.2	6,323.1	-86.3	6,323.7	0.53	-0.02	
12,178.0	89.67	0.87	5,891.4	6,414.1	-85.5	6,414.6	0.96	-0.43	
12,269.0	90.36	1.66	5,891.4	6,505.1	-83.5	6,505.6	1.15	0.76	
12,361.0	89.86	359.57	5,891.2	6,597.1	-82.5	6,597.6	2.34	-0.54	
12,452.0	89.55	358.46	5,891.7	6,688.0	-84.1	6,688.6	1.27	-0.34	
12,543.0	89.51	1.06	5,892.4	6,779.0	-84.5	6,779.5	2.86	-0.04	
12,634.0	88.14	359.59	5,894.3	6,870.0	-84.0	6,870.5	2.21	-1.51	
12,726.0	88.43	358.65	5,897.0	6,961.9	-85.4	6,962.5	1.07	0.32	
12,817.0	88.73	357.72	5,899.3	7,052.9	-88.3	7,053.4	1.07	0.33	
12,909.0	89.34	358.80	5,900.8	7,144.8	-91.1	7,145.4	1.35	0.66	
13,000.0	89.37	1.11	5,901.9	7,235.8	-91.1	7,236.4	2.54	0.03	
13,091.0	89.74	0.61	5,902.6	7,326.8	-89.8	7,327.3	0.68	0.41	
13,183.0	90.09	359.95	5,902.7	7,418.8	-89.3	7,419.3	0.81	0.38	
13,275.0	90.57	358.80	5,902.2	7,510.8	-90.3	7,511.3	1.35	0.52	
13,366.0	88.67	358.37	5,902.8	7,601.7	-92.6	7,602.3	2.14	-2.09	
13,457.0	88.49	358.61	5,905.0	7,692.7	-95.0	7,693.3	0.33	-0.20	
13,548.0	88.89	357.69	5,907.1	7,783.6	-97.9	7,784.2	1.10	0.44	
13,639.0	91.39	359.26	5,906.9	7,874.6	-100.3	7,875.2	3.24	2.75	
13,731.0	91.61	0.33	5,904.5	7,966.5	-100.7	7,967.2	1.19	0.24	
13,822.0	91.80	0.26	5,901.8	8,057.5	-100.2	8,058.1	0.22	0.21	
13,913.0	90.50	359.32	5,899.9	8,148.5	-100.5	8,149.1	1.76	-1.43	
14,003.0	90.35	358.49	5,899.3	8,238.5	-102.2	8,239.1	0.94	-0.17	
14,070.0	90.65	358.49	5,898.7	8,305.4	-104.0	8,306.1	0.45	0.45	Last CES Survey @ 14,070' MD
14,125.0	90.65	358.49	5,898.1	8,360.4	-105.4	8,361.1	0.00	0.00	PTB @ 14,125' - TD - 2611' FSL, 1800' FWL

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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-0906B VP P4	0.00	1.05	5,203.1	-94.9	-89.9	1,549,294.52	3,449,982.58	40.829867	-103.873922
- actual wellpath misses target center by 14.8usft at 5206.5usft MD (5203.2 TVD, -101.6 N, -103.0 E)									
- Point									
21C-0906B VP P8	0.00	1.05	5,049.1	-94.9	-89.9	1,549,294.52	3,449,982.58	40.829867	-103.873922
- actual wellpath misses target center by 15.6usft at 5052.5usft MD (5049.2 TVD, -104.9 N, -101.8 E)									
- Point									
21C-0906B VP P5	0.00	1.05	5,063.1	-94.9	-89.9	1,549,294.52	3,449,982.58	40.829867	-103.873922
- actual wellpath misses target center by 15.5usft at 5066.5usft MD (5063.2 TVD, -104.6 N, -102.0 E)									
- Point									
21C-0906B TGT P2	0.00	1.05	6,024.0	7,805.0	-85.5	1,557,193.14	3,449,842.10	40.851550	-103.873906
- actual wellpath misses target center by 117.3usft at 13568.7usft MD (5907.4 TVD, 7804.3 N, -98.7 E)									
- Point									
21C-0906B TGT	0.00	1.05	5,892.5	7,805.0	-85.5	1,557,193.14	3,449,842.10	40.851550	-103.873906
- actual wellpath misses target center by 19.9usft at 13569.1usft MD (5907.4 TVD, 7804.7 N, -98.7 E)									
- Point									
21C-0906B VP	0.00	1.05	5,203.1	-220.9	-89.9	1,549,168.54	3,449,984.89	40.829522	-103.873922
- actual wellpath misses target center by 119.9usft at 5203.5usft MD (5200.2 TVD, -101.7 N, -103.0 E)									
- Point									
21C-0906B BHL P2	0.00	1.05	6,024.0	8,304.8	-89.9	1,557,692.86	3,449,828.51	40.852922	-103.873922
- actual wellpath misses target center by 126.1usft at 14068.0usft MD (5898.7 TVD, 8303.4 N, -103.9 E)									
- Point									
21C-0906B BHL	0.00	1.05	5,892.5	8,304.8	-89.9	1,557,692.86	3,449,828.51	40.852922	-103.873922
- actual wellpath misses target center by 15.4usft at 14069.1usft MD (5898.7 TVD, 8304.5 N, -104.0 E)									
- Point									
21C-0906B BHL P8	0.00	1.05	5,870.0	8,304.8	-89.9	1,557,692.86	3,449,828.51	40.852922	-103.873922
- actual wellpath misses target center by 32.0usft at 14069.3usft MD (5898.7 TVD, 8304.7 N, -104.0 E)									
- Point									
21C-0906B BHL P5	0.00	1.05	5,884.0	8,304.8	-89.9	1,557,692.86	3,449,828.51	40.852922	-103.873922
- actual wellpath misses target center by 20.3usft at 14069.2usft MD (5898.7 TVD, 8304.6 N, -104.0 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,145.0	5,876.6	7" - 57' FSL, 1746' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
14,070.0	5,898.7	8,305.4	-104.0	Last CES Survey @ 14,070' MD	
14,125.0	5,898.1	8,360.4	-105.4	PTB @ 14,125'	
14,125.0	5,898.1	8,360.4	-105.4	TD - 2611' FSL, 1800' FWL	

Checked By: _____ Approved By: _____ Date: _____

Whiting Petroleum Corporation

Weld County, CO

S21-T10N-R58W

Razor #21C-0906B

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-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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-0906B					
Well Position	+N-S	0.0 usft	Northing:	1,549,391.06 usft	Latitude:	40.830128
	+E-W	0.0 usft	Easting:	3,450,070.72 usft	Longitude:	-103.873597
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	8/25/2014	7.97	67.42	53,107

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	359.38	

Survey Program	Date	9/10/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
213.0	14,125.0	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	1,549,391.06	3,450,070.72	40.830128	-103.873597
213.0	0.42	188.44	213.0	-0.8	-0.1	1,549,390.28	3,450,070.62	40.830126	-103.873598
306.0	0.83	220.76	306.0	-1.6	-0.6	1,549,389.43	3,450,070.14	40.830124	-103.873599
399.0	0.97	223.82	399.0	-2.7	-1.6	1,549,388.33	3,450,069.18	40.830121	-103.873603
491.0	0.83	231.70	491.0	-3.7	-2.7	1,549,387.34	3,450,068.13	40.830118	-103.873607
583.0	1.03	234.48	583.0	-4.6	-3.8	1,549,386.42	3,450,066.95	40.830116	-103.873611
675.0	1.71	222.89	674.9	-6.1	-5.5	1,549,384.91	3,450,065.38	40.830111	-103.873617
767.0	1.66	227.23	766.9	-8.0	-7.4	1,549,382.96	3,450,063.50	40.830106	-103.873624
859.0	1.49	228.67	858.9	-9.7	-9.2	1,549,381.23	3,450,061.65	40.830102	-103.873631
950.0	1.31	237.78	949.8	-11.0	-11.0	1,549,379.86	3,450,059.91	40.830098	-103.873637
1,042.0	1.91	225.61	1,041.8	-12.6	-13.0	1,549,378.19	3,450,057.95	40.830093	-103.873644
1,133.0	1.80	228.93	1,132.7	-14.6	-15.2	1,549,376.16	3,450,055.83	40.830088	-103.873652

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
1,225.0	1.71	229.95	1,224.7	-16.5	-17.3	1,549,374.28	3,450,053.72	40.830083	-103.873660
1,316.0	2.02	234.13	1,315.7	-18.3	-19.6	1,549,372.43	3,450,051.42	40.830078	-103.873668
1,408.0	2.13	238.22	1,407.6	-20.1	-22.4	1,549,370.53	3,450,048.69	40.830073	-103.873678
1,498.0	2.42	241.94	1,497.5	-21.9	-25.5	1,549,368.70	3,450,045.62	40.830068	-103.873689
1,590.0	1.68	260.50	1,589.5	-23.0	-28.5	1,549,367.50	3,450,042.60	40.830065	-103.873700
1,695.0	1.91	259.68	1,694.4	-23.6	-31.8	1,549,366.88	3,450,039.37	40.830063	-103.873712
1,837.0	1.91	269.62	1,836.3	-24.0	-36.5	1,549,366.35	3,450,034.68	40.830062	-103.873729
1,929.0	1.74	250.78	1,928.3	-24.5	-39.3	1,549,365.83	3,450,031.84	40.830061	-103.873739
2,020.0	1.16	222.97	2,019.3	-25.6	-41.3	1,549,364.67	3,450,029.93	40.830058	-103.873746
2,111.0	1.52	207.49	2,110.2	-27.4	-42.5	1,549,362.90	3,450,028.78	40.830053	-103.873751
2,203.0	1.62	207.59	2,202.2	-29.6	-43.6	1,549,360.64	3,450,027.65	40.830047	-103.873755
2,295.0	1.70	206.36	2,294.2	-32.0	-44.8	1,549,358.25	3,450,026.49	40.830040	-103.873759
2,386.0	1.56	222.75	2,385.1	-34.1	-46.3	1,549,356.10	3,450,025.09	40.830034	-103.873764
2,477.0	2.28	220.76	2,476.1	-36.4	-48.3	1,549,353.78	3,450,023.11	40.830028	-103.873772
2,568.0	2.23	222.71	2,567.0	-39.1	-50.7	1,549,351.07	3,450,020.77	40.830021	-103.873780
2,660.0	2.25	228.45	2,658.9	-41.6	-53.2	1,549,348.51	3,450,018.25	40.830014	-103.873790
2,751.0	2.15	224.63	2,749.9	-44.0	-55.8	1,549,346.06	3,450,015.76	40.830007	-103.873799
2,842.0	2.01	224.14	2,840.8	-46.3	-58.1	1,549,343.66	3,450,013.49	40.830001	-103.873807
2,934.0	1.88	210.76	2,932.8	-48.8	-60.0	1,549,341.17	3,450,011.64	40.829994	-103.873814
3,026.0	1.84	207.18	3,024.7	-51.4	-61.4	1,549,338.54	3,450,010.25	40.829987	-103.873819
3,118.0	1.35	173.52	3,116.7	-53.8	-62.0	1,549,336.13	3,450,009.74	40.829980	-103.873821
3,209.0	1.64	151.05	3,207.6	-56.0	-61.2	1,549,333.94	3,450,010.53	40.829974	-103.873818
3,300.0	1.99	161.74	3,298.6	-58.6	-60.1	1,549,331.33	3,450,011.70	40.829967	-103.873814
3,391.0	2.74	208.94	3,389.5	-62.0	-60.7	1,549,327.91	3,450,011.21	40.829958	-103.873816
3,482.0	2.98	208.98	3,480.4	-66.0	-62.9	1,549,323.90	3,450,009.08	40.829947	-103.873824
3,573.0	2.62	207.31	3,571.3	-69.9	-65.0	1,549,319.94	3,450,007.05	40.829936	-103.873832
3,665.0	2.54	200.73	3,663.2	-73.7	-66.6	1,549,316.14	3,450,005.44	40.829926	-103.873838
3,757.0	3.41	201.25	3,755.1	-78.2	-68.4	1,549,311.65	3,450,003.81	40.829914	-103.873844
3,848.0	3.12	201.71	3,845.9	-83.0	-70.3	1,549,306.79	3,450,002.00	40.829900	-103.873851
3,939.0	2.79	195.97	3,936.8	-87.4	-71.8	1,549,302.34	3,450,000.55	40.829888	-103.873857
4,031.0	3.42	203.84	4,028.7	-92.1	-73.5	1,549,297.64	3,449,998.92	40.829875	-103.873863
4,122.0	3.51	194.84	4,119.5	-97.3	-75.3	1,549,292.44	3,449,997.20	40.829861	-103.873869
4,214.0	3.40	194.49	4,211.3	-102.6	-76.7	1,549,287.05	3,449,995.89	40.829846	-103.873874
4,305.0	2.61	200.14	4,302.2	-107.2	-78.1	1,549,282.46	3,449,994.59	40.829834	-103.873879
4,396.0	2.42	257.80	4,393.1	-109.5	-80.7	1,549,280.07	3,449,992.04	40.829827	-103.873889
4,487.0	3.07	273.52	4,484.0	-109.8	-85.0	1,549,279.73	3,449,987.74	40.829827	-103.873904
4,579.0	2.40	272.69	4,575.9	-109.5	-89.4	1,549,279.89	3,449,983.35	40.829827	-103.873920
4,670.0	1.96	262.38	4,666.9	-109.7	-92.8	1,549,279.71	3,449,979.91	40.829827	-103.873933
4,762.0	2.36	292.17	4,758.8	-109.2	-96.2	1,549,280.16	3,449,976.58	40.829828	-103.873945
4,853.0	1.20	297.31	4,849.8	-108.0	-98.7	1,549,281.25	3,449,973.98	40.829832	-103.873954
4,946.0	1.26	312.70	4,942.7	-106.9	-100.3	1,549,282.36	3,449,972.35	40.829835	-103.873960
5,037.0	1.42	330.18	5,033.7	-105.2	-101.6	1,549,284.00	3,449,971.02	40.829839	-103.873965
5,127.0	1.12	334.68	5,123.7	-103.5	-102.6	1,549,285.74	3,449,970.06	40.829844	-103.873968
5,218.0	1.70	354.56	5,214.7	-101.3	-103.1	1,549,287.88	3,449,969.51	40.829850	-103.873970
5,310.0	2.53	7.10	5,306.6	-97.9	-103.0	1,549,291.25	3,449,969.57	40.829859	-103.873969
5,401.0	9.00	5.24	5,397.1	-88.8	-102.1	1,549,300.36	3,449,970.30	40.829884	-103.873966
5,492.0	7.75	11.87	5,487.1	-75.7	-100.2	1,549,313.49	3,449,971.97	40.829920	-103.873959
5,583.0	16.26	4.74	5,576.1	-57.0	-97.8	1,549,332.26	3,449,973.95	40.829972	-103.873951
5,674.0	34.56	4.81	5,657.9	-18.3	-94.6	1,549,371.06	3,449,976.48	40.830078	-103.873939
5,704.0	40.70	5.20	5,681.7	0.0	-93.0	1,549,389.33	3,449,977.75	40.830128	-103.873933
5,735.0	45.70	5.80	5,704.2	21.1	-90.9	1,549,410.48	3,449,979.40	40.830186	-103.873926
5,765.0	47.03	4.66	5,724.9	42.7	-89.0	1,549,432.13	3,449,980.98	40.830245	-103.873919
5,797.0	49.49	3.63	5,746.3	66.5	-87.2	1,549,455.97	3,449,982.26	40.830311	-103.873913
5,828.0	52.89	0.73	5,765.7	90.7	-86.3	1,549,480.11	3,449,982.72	40.830377	-103.873909
5,860.0	56.29	359.63	5,784.2	116.7	-86.3	1,549,506.19	3,449,982.32	40.830448	-103.873909

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
5,892.0	60.00	359.40	5,801.1	143.9	-86.5	1,549,533.35	3,449,981.59	40.830523	-103.873910
5,923.0	62.17	359.54	5,816.1	171.0	-86.8	1,549,560.48	3,449,980.84	40.830597	-103.873911
5,955.0	66.10	359.56	5,830.1	199.8	-87.0	1,549,589.25	3,449,980.09	40.830677	-103.873912
5,987.0	70.02	359.45	5,842.0	229.5	-87.2	1,549,618.92	3,449,979.29	40.830758	-103.873912
6,018.0	72.36	359.49	5,852.0	258.8	-87.5	1,549,648.25	3,449,978.48	40.830838	-103.873913
6,050.0	76.42	359.37	5,860.6	289.7	-87.8	1,549,679.05	3,449,977.61	40.830923	-103.873915
6,085.0	79.28	359.17	5,868.0	323.9	-88.2	1,549,713.25	3,449,976.55	40.831017	-103.873916
6,198.0	88.39	358.16	5,880.1	436.0	-90.9	1,549,825.36	3,449,971.87	40.831325	-103.873926
6,292.0	91.58	357.84	5,880.1	530.0	-94.2	1,549,919.22	3,449,966.86	40.831583	-103.873937
6,388.0	91.00	358.74	5,878.0	625.9	-97.0	1,550,015.08	3,449,962.24	40.831846	-103.873948
6,483.0	91.39	1.01	5,876.0	720.9	-97.2	1,550,110.03	3,449,960.29	40.832107	-103.873949
6,578.0	92.65	1.69	5,872.6	815.8	-95.0	1,550,204.97	3,449,960.79	40.832367	-103.873940
6,673.0	90.48	0.66	5,870.0	910.7	-93.0	1,550,299.93	3,449,960.99	40.832628	-103.873933
6,768.0	90.53	1.36	5,869.2	1,005.7	-91.4	1,550,394.92	3,449,960.92	40.832888	-103.873927
6,862.0	88.95	1.84	5,869.6	1,099.7	-88.7	1,550,488.92	3,449,961.82	40.833146	-103.873918
6,958.0	89.18	1.71	5,871.2	1,195.6	-85.8	1,550,584.90	3,449,963.04	40.833410	-103.873907
7,053.0	88.85	0.40	5,872.8	1,290.6	-84.0	1,550,679.88	3,449,963.04	40.833670	-103.873901
7,148.0	89.16	0.08	5,874.5	1,385.6	-83.6	1,550,774.85	3,449,961.70	40.833931	-103.873899
7,243.0	88.74	358.30	5,876.2	1,480.5	-85.0	1,550,869.78	3,449,958.62	40.834192	-103.873904
7,338.0	88.75	359.85	5,878.3	1,575.5	-86.5	1,550,964.70	3,449,955.34	40.834452	-103.873910
7,433.0	90.75	1.54	5,878.7	1,670.5	-85.3	1,551,059.69	3,449,954.75	40.834713	-103.873906
7,528.0	90.19	1.01	5,877.9	1,765.5	-83.2	1,551,154.69	3,449,955.12	40.834974	-103.873898
7,623.0	89.70	0.15	5,878.0	1,860.4	-82.3	1,551,249.68	3,449,954.34	40.835234	-103.873895
7,718.0	88.78	359.31	5,879.3	1,955.4	-82.7	1,551,344.65	3,449,952.15	40.835495	-103.873896
7,813.0	89.49	0.98	5,880.7	2,050.4	-82.5	1,551,439.62	3,449,950.65	40.835756	-103.873895
7,908.0	91.71	1.29	5,879.7	2,145.4	-80.6	1,551,534.61	3,449,950.79	40.836016	-103.873889
8,003.0	90.71	0.28	5,877.7	2,240.4	-79.3	1,551,629.58	3,449,950.35	40.836277	-103.873884
8,098.0	90.31	359.94	5,876.9	2,335.4	-79.1	1,551,724.57	3,449,948.79	40.836538	-103.873883
8,193.0	92.47	0.89	5,874.6	2,430.3	-78.4	1,551,819.52	3,449,947.74	40.836798	-103.873881
8,288.0	92.78	359.75	5,870.2	2,525.2	-77.9	1,551,914.42	3,449,946.53	40.837059	-103.873879
8,383.0	91.26	1.30	5,866.9	2,620.1	-77.0	1,552,009.35	3,449,945.65	40.837319	-103.873876
8,478.0	90.89	0.07	5,865.1	2,715.1	-75.9	1,552,104.33	3,449,945.05	40.837580	-103.873872
8,573.0	91.82	358.65	5,862.8	2,810.1	-76.9	1,552,199.25	3,449,942.25	40.837841	-103.873875
8,668.0	91.44	358.27	5,860.1	2,905.0	-79.5	1,552,294.12	3,449,937.95	40.838101	-103.873885
8,763.0	90.66	359.08	5,858.4	3,000.0	-81.7	1,552,389.02	3,449,934.02	40.838362	-103.873893
8,858.0	89.69	1.21	5,858.1	3,095.0	-81.5	1,552,484.00	3,449,932.51	40.838623	-103.873892
8,953.0	89.14	0.74	5,859.1	3,189.9	-79.8	1,552,578.99	3,449,932.39	40.838883	-103.873886
9,048.0	88.85	0.65	5,860.7	3,284.9	-78.7	1,552,673.98	3,449,931.80	40.839144	-103.873882
9,143.0	90.08	359.30	5,861.6	3,379.9	-78.7	1,552,768.95	3,449,930.02	40.839405	-103.873882
9,238.0	90.31	0.09	5,861.3	3,474.9	-79.2	1,552,863.92	3,449,927.77	40.839666	-103.873884
9,334.0	90.06	359.91	5,861.0	3,570.9	-79.2	1,552,959.91	3,449,926.01	40.839929	-103.873884
9,429.0	92.10	1.85	5,859.2	3,665.9	-77.8	1,553,054.88	3,449,925.72	40.840190	-103.873878
9,521.0	91.76	0.96	5,856.1	3,757.8	-75.5	1,553,146.82	3,449,926.29	40.840442	-103.873870
9,613.0	89.74	0.93	5,854.9	3,849.8	-74.0	1,553,238.81	3,449,926.12	40.840694	-103.873865
9,706.0	88.50	359.27	5,856.3	3,942.7	-73.8	1,553,331.78	3,449,924.58	40.840950	-103.873864
9,799.0	89.49	359.81	5,858.0	4,035.7	-74.6	1,553,424.73	3,449,922.13	40.841205	-103.873867
9,891.0	89.16	359.34	5,859.0	4,127.7	-75.3	1,553,516.70	3,449,919.76	40.841457	-103.873869
9,982.0	88.30	358.29	5,861.1	4,218.7	-77.2	1,553,607.60	3,449,916.21	40.841707	-103.873876
10,075.0	89.21	359.97	5,863.1	4,311.6	-78.6	1,553,700.52	3,449,913.09	40.841962	-103.873881
10,167.0	88.10	358.97	5,865.2	4,403.6	-79.4	1,553,792.46	3,449,910.55	40.842214	-103.873884
10,259.0	89.36	359.88	5,867.3	4,495.6	-80.3	1,553,884.40	3,449,907.95	40.842467	-103.873888
10,350.0	88.01	358.97	5,869.4	4,586.5	-81.2	1,553,975.33	3,449,905.36	40.842717	-103.873891
10,441.0	89.30	359.70	5,871.5	4,677.5	-82.3	1,554,066.27	3,449,902.64	40.842966	-103.873895
10,533.0	90.22	359.97	5,871.9	4,769.5	-82.6	1,554,158.24	3,449,900.69	40.843219	-103.873896
10,625.0	89.57	359.25	5,872.1	4,861.5	-83.2	1,554,250.21	3,449,898.38	40.843471	-103.873898

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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
10,716.0	89.58	0.65	5,872.7	4,952.5	-83.3	1,554,341.19	3,449,896.63	40.843721	-103.873898
10,807.0	88.47	359.62	5,874.3	5,043.5	-83.1	1,554,432.16	3,449,895.17	40.843971	-103.873897
10,898.0	87.00	1.29	5,877.9	5,134.4	-82.3	1,554,523.08	3,449,894.23	40.844220	-103.873895
10,989.0	90.76	0.34	5,879.7	5,225.4	-81.0	1,554,614.05	3,449,893.85	40.844470	-103.873890
11,081.0	90.45	0.61	5,878.7	5,317.3	-80.3	1,554,706.04	3,449,892.93	40.844722	-103.873887
11,172.0	89.58	359.24	5,878.7	5,408.3	-80.4	1,554,797.01	3,449,891.14	40.844972	-103.873888
11,264.0	90.85	1.19	5,878.3	5,500.3	-80.1	1,554,889.00	3,449,889.80	40.845225	-103.873887
11,356.0	88.75	0.65	5,878.6	5,592.3	-78.6	1,554,980.99	3,449,889.59	40.845477	-103.873881
11,448.0	88.77	0.33	5,880.6	5,684.3	-77.8	1,555,072.96	3,449,888.69	40.845730	-103.873878
11,538.0	88.67	359.57	5,882.6	5,774.3	-77.9	1,555,162.95	3,449,886.96	40.845977	-103.873879
11,630.0	88.37	358.60	5,885.0	5,866.2	-79.3	1,555,254.86	3,449,883.80	40.846229	-103.873884
11,721.0	87.56	358.64	5,888.2	5,957.2	-81.5	1,555,345.72	3,449,879.95	40.846478	-103.873892
11,812.0	89.97	359.03	5,890.2	6,048.1	-83.4	1,555,436.63	3,449,876.43	40.846728	-103.873899
11,903.0	89.30	359.01	5,890.8	6,139.1	-84.9	1,555,527.57	3,449,873.20	40.846978	-103.873904
11,995.0	90.08	359.60	5,891.3	6,231.1	-86.1	1,555,619.52	3,449,870.40	40.847230	-103.873908
12,087.0	90.06	0.09	5,891.2	6,323.1	-86.3	1,555,711.50	3,449,868.46	40.847483	-103.873909
12,178.0	89.67	0.87	5,891.4	6,414.1	-85.5	1,555,802.49	3,449,867.56	40.847733	-103.873906
12,269.0	90.36	1.66	5,891.4	6,505.1	-83.5	1,555,893.49	3,449,867.90	40.847982	-103.873899
12,361.0	89.86	359.57	5,891.2	6,597.1	-82.5	1,555,985.48	3,449,867.20	40.848235	-103.873896
12,452.0	89.55	358.46	5,891.7	6,688.0	-84.1	1,556,076.42	3,449,863.96	40.848484	-103.873901
12,543.0	89.51	1.06	5,892.4	6,779.0	-84.5	1,556,167.39	3,449,861.92	40.848734	-103.873903
12,634.0	88.14	359.59	5,894.3	6,870.0	-84.0	1,556,258.36	3,449,860.76	40.848984	-103.873901
12,726.0	88.43	358.65	5,897.0	6,961.9	-85.4	1,556,350.26	3,449,857.66	40.849236	-103.873906
12,817.0	88.73	357.72	5,899.3	7,052.9	-88.3	1,556,441.12	3,449,853.12	40.849486	-103.873916
12,909.0	89.34	358.80	5,900.8	7,144.8	-91.1	1,556,533.00	3,449,848.64	40.849738	-103.873926
13,000.0	89.37	1.11	5,901.9	7,235.8	-91.1	1,556,623.97	3,449,846.90	40.849988	-103.873927
13,091.0	89.74	0.61	5,902.6	7,326.8	-89.8	1,556,714.97	3,449,846.59	40.850238	-103.873922
13,183.0	90.09	359.95	5,902.7	7,418.8	-89.3	1,556,806.96	3,449,845.36	40.850490	-103.873920
13,275.0	90.57	358.80	5,902.2	7,510.8	-90.3	1,556,898.91	3,449,842.67	40.850743	-103.873924
13,366.0	88.67	358.37	5,902.8	7,601.7	-92.6	1,556,989.82	3,449,838.75	40.850992	-103.873932
13,457.0	88.49	358.61	5,905.0	7,692.7	-95.0	1,557,080.70	3,449,834.69	40.851242	-103.873941
13,548.0	88.89	357.69	5,907.1	7,783.6	-97.9	1,557,171.56	3,449,830.08	40.851491	-103.873951
13,639.0	91.39	359.26	5,906.9	7,874.6	-100.3	1,557,262.46	3,449,825.99	40.851741	-103.873960
13,731.0	91.61	0.33	5,904.5	7,966.5	-100.7	1,557,354.41	3,449,823.98	40.851994	-103.873961
13,822.0	91.80	0.26	5,901.8	8,057.5	-100.2	1,557,445.36	3,449,822.78	40.852243	-103.873959
13,913.0	90.50	359.32	5,899.9	8,148.5	-100.5	1,557,536.31	3,449,820.77	40.852493	-103.873961
14,003.0	90.35	358.49	5,899.3	8,238.5	-102.2	1,557,626.25	3,449,817.41	40.852740	-103.873967
14,070.0	90.65	358.49	5,898.7	8,305.4	-104.0	1,557,693.18	3,449,814.41	40.852924	-103.873973
Last CES Survey @ 14,070' MD									
14,125.0	90.65	358.49	5,898.1	8,360.4	-105.4	1,557,748.12	3,449,811.95	40.853075	-103.873978
TD - 2611' FSL, 1800' FWL - PTB @ 14,125'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
21C-0906B VP P8	0.00	1.05	5,049.1	-94.9	-89.9	1,549,294.52	3,449,982.57	40.829868	-103.873922
- actual wellpath misses target center by 15.6usft at 5052.5usft MD (5049.2 TVD, -104.9 N, -101.8 E)									
- Point									
21C-0906B BHL P8	0.00	1.05	5,870.0	8,304.8	-89.9	1,557,692.86	3,449,828.51	40.852922	-103.873922
- actual wellpath misses target center by 32.0usft at 14069.3usft MD (5898.7 TVD, 8304.7 N, -104.0 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #21C-0906B
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4861.0usft
Site:	S21-T10N-R58W	MD Reference:	KB=17' @ 4861.0usft
Well:	Razor #21C-0906B	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 (")
6,145.0	5,876.6	7" - 57' FSL, 1746' FWL		0	0

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
14,070.0	5,898.7	8,305.4	-104.0	Last CES Survey @ 14,070' MD	
14,125.0	5,898.1	8,360.4	-105.4	PTB @ 14,125'	
14,125.0	5,898.1	8,360.4	-105.4	TD - 2611' FSL, 1800' FWL	

Checked By: _____ Approved By: _____ Date: _____