





Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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		S11-T10N-R58W			
Site Position:		Northing:	1,558,620.57 usft	Latitude:	40.854775
From:	Lat/Long	Easting:	3,463,389.92 usft	Longitude:	-103.824847
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.08 °

Well	Razor #11E-1401A					
Well Position	+N/-S	0.0 usft	Northing:	1,558,255.89 usft	Latitude:	40.853983
	+E/-W	0.0 usft	Easting:	3,459,340.16 usft	Longitude:	-103.839508
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,001.8 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/17/2013	8.11	67.49	53,240

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	184.17	

Survey Program	Date	2/21/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
348.0	13,465.0	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		
348.0	0.90	187.80	348.0	-2.7	-0.4	2.7	0.26	0.26		
440.0	2.10	238.80	440.0	-4.3	-1.9	4.4	1.83	1.30		
898.0	4.62	234.37	897.1	-19.4	-24.1	21.1	0.55	0.55		
989.0	4.44	213.64	987.9	-24.5	-29.0	26.5	1.80	-0.20		
1,171.0	5.63	211.76	1,169.1	-37.9	-37.6	40.6	0.66	0.65		
1,263.0	5.41	199.67	1,260.7	-45.8	-41.5	48.7	1.28	-0.24		
1,355.0	4.97	192.62	1,352.3	-53.8	-43.8	56.9	0.84	-0.48		
1,446.0	4.57	194.67	1,443.0	-61.2	-45.6	64.3	0.48	-0.44		
1,537.0	5.32	198.12	1,533.7	-68.7	-47.8	72.0	0.89	0.82		
1,629.0	5.32	197.88	1,625.3	-76.8	-50.4	80.3	0.02	0.00		
1,812.0	6.64	201.53	1,807.3	-94.7	-56.9	98.6	0.75	0.72		
1,943.0	6.29	194.00	1,937.5	-108.7	-61.4	112.9	0.70	-0.27		

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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
2,034.0	5.89	197.98	2,028.0	-118.0	-64.1	122.3	0.64	-0.44	
2,126.0	4.70	197.77	2,119.6	-126.1	-66.7	130.6	1.29	-1.29	
2,218.0	3.91	191.66	2,211.3	-132.7	-68.5	137.4	0.99	-0.86	
2,309.0	3.60	189.15	2,302.1	-138.6	-69.6	143.3	0.39	-0.34	
2,400.0	2.73	211.61	2,393.0	-143.3	-71.1	148.1	1.65	-0.96	
2,492.0	2.68	221.52	2,484.9	-146.7	-73.7	151.7	0.51	-0.05	
2,583.0	1.67	216.70	2,575.8	-149.4	-75.9	154.5	1.13	-1.11	
2,675.0	1.58	211.25	2,667.8	-151.6	-77.4	156.8	0.19	-0.10	
2,767.0	1.63	210.11	2,759.7	-153.8	-78.7	159.1	0.06	0.05	
2,859.0	1.63	221.76	2,851.7	-155.9	-80.2	161.3	0.36	0.00	
2,950.0	1.76	227.18	2,942.7	-157.8	-82.1	163.4	0.23	0.14	
3,042.0	1.27	242.03	3,034.6	-159.2	-84.0	164.9	0.68	-0.53	
3,133.0	3.16	226.31	3,125.5	-161.4	-86.7	167.3	2.16	2.08	
3,224.0	4.40	201.64	3,216.3	-166.4	-89.9	172.5	2.22	1.36	
3,316.0	4.13	184.26	3,308.1	-173.0	-91.4	179.2	1.43	-0.29	
3,407.0	4.35	172.19	3,398.8	-179.7	-91.2	185.8	1.01	0.24	
3,498.0	4.31	193.44	3,489.6	-186.4	-91.5	192.6	1.75	-0.04	
3,590.0	4.79	193.87	3,581.3	-193.5	-93.2	199.8	0.52	0.52	
3,681.0	4.62	190.83	3,672.0	-200.8	-94.8	207.2	0.33	-0.19	
3,773.0	2.90	229.58	3,763.8	-206.0	-97.3	212.5	3.23	-1.87	
3,864.0	3.08	234.82	3,854.7	-208.9	-101.0	215.7	0.36	0.20	
3,955.0	3.34	225.88	3,945.5	-212.1	-104.9	219.2	0.62	0.29	
4,046.0	3.69	215.18	4,036.4	-216.4	-108.5	223.7	0.82	0.38	
4,138.0	4.22	208.04	4,128.2	-221.8	-111.8	229.3	0.79	0.58	
4,229.0	3.91	194.75	4,218.9	-227.7	-114.2	235.4	1.09	-0.34	
4,321.0	3.34	184.57	4,310.7	-233.4	-115.2	241.2	0.93	-0.62	
4,413.0	3.43	174.51	4,402.6	-238.8	-115.2	246.6	0.65	0.10	
4,504.0	4.00	187.20	4,493.4	-244.7	-115.3	252.4	1.10	0.63	
4,594.0	3.43	185.34	4,583.2	-250.5	-115.9	258.3	0.65	-0.63	
4,686.0	3.87	208.23	4,675.0	-256.0	-117.7	263.8	1.64	0.48	
4,776.0	2.59	188.23	4,764.9	-260.7	-119.4	268.6	1.87	-1.42	
4,868.0	4.53	224.46	4,856.7	-265.3	-122.2	273.5	3.13	2.11	
4,959.0	3.21	218.66	4,947.5	-269.9	-126.3	278.3	1.51	-1.45	
5,051.0	4.44	238.78	5,039.3	-273.7	-131.0	282.5	1.96	1.34	
5,142.0	3.43	228.40	5,130.1	-277.3	-136.0	286.5	1.35	-1.11	
5,233.0	2.59	220.16	5,221.0	-280.7	-139.4	290.1	1.04	-0.92	
5,325.0	8.04	206.77	5,312.5	-288.1	-143.6	297.8	6.04	5.92	
5,416.0	16.35	217.78	5,401.4	-303.9	-154.4	314.3	9.44	9.13	
5,508.0	24.40	216.96	5,487.6	-329.4	-173.8	341.1	8.76	8.75	
5,600.0	34.99	217.69	5,567.4	-365.5	-201.4	379.2	11.52	11.51	
5,691.0	43.33	207.23	5,638.0	-414.1	-231.7	429.8	11.67	9.16	
5,721.0	47.65	208.13	5,659.0	-433.0	-241.7	449.4	14.56	14.40	
5,751.0	49.27	209.43	5,678.9	-452.7	-252.5	469.9	6.30	5.40	
5,782.0	49.45	207.03	5,699.1	-473.4	-263.6	491.3	5.90	0.58	
5,813.0	51.38	203.15	5,718.8	-495.0	-273.7	513.6	11.48	6.23	
5,843.0	52.18	198.31	5,737.4	-517.1	-282.1	536.2	12.95	2.67	
5,873.0	54.51	197.28	5,755.3	-540.0	-289.4	559.6	8.24	7.77	
5,904.0	54.81	197.84	5,773.2	-564.1	-297.0	584.2	1.76	0.97	
5,934.0	55.91	197.95	5,790.3	-587.6	-304.6	608.2	3.68	3.67	
5,965.0	58.20	198.43	5,807.1	-612.3	-312.7	633.4	7.50	7.39	
5,996.0	61.01	199.24	5,822.8	-637.6	-321.4	659.3	9.34	9.06	
6,028.0	63.16	202.24	5,837.8	-664.0	-331.4	686.4	10.67	6.72	
6,060.0	65.76	204.50	5,851.6	-690.5	-342.9	713.7	10.33	8.13	

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Survey									
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6,091.0	69.27	205.36	5,863.5	-716.5	-354.9	740.4	11.61	11.32	
6,123.0	72.66	205.09	5,873.9	-743.9	-367.8	768.7	10.62	10.59	
6,155.0	75.65	204.59	5,882.6	-771.8	-380.7	797.5	9.46	9.34	
6,186.0	79.25	204.07	5,889.4	-799.4	-393.2	825.9	11.73	11.61	
6,218.0	83.34	203.85	5,894.2	-828.3	-406.1	855.6	12.80	12.78	
6,249.0	85.14	204.18	5,897.3	-856.4	-418.6	884.6	5.90	5.81	
6,315.0	88.04	203.86	5,901.2	-916.6	-445.4	946.6	4.42	4.39	
6,392.0	91.56	201.37	5,901.5	-987.7	-475.0	1,019.6	5.60	4.57	
6,487.0	88.62	199.41	5,901.4	-1,076.7	-508.1	1,110.8	3.72	-3.09	
6,581.0	88.48	196.67	5,903.7	-1,166.0	-537.2	1,202.0	2.92	-0.15	
6,676.0	88.22	193.84	5,906.5	-1,257.7	-562.2	1,295.2	2.99	-0.27	
6,771.0	89.80	192.35	5,908.1	-1,350.2	-583.7	1,389.1	2.29	1.66	
6,865.0	90.42	188.54	5,907.9	-1,442.6	-600.8	1,482.5	4.11	0.66	
6,960.0	90.37	185.22	5,907.3	-1,536.9	-612.1	1,577.4	3.50	-0.05	
7,054.0	91.16	181.12	5,906.0	-1,630.7	-617.3	1,671.3	4.44	0.84	
7,148.0	89.85	179.34	5,905.2	-1,724.7	-617.7	1,765.1	2.35	-1.39	
7,243.0	90.10	177.80	5,905.2	-1,819.7	-615.3	1,859.6	1.64	0.26	
7,337.0	89.70	177.70	5,905.4	-1,913.6	-611.6	1,953.0	0.44	-0.43	
7,432.0	89.60	177.60	5,906.0	-2,008.5	-607.7	2,047.4	0.15	-0.11	
7,527.0	90.60	178.70	5,905.8	-2,103.5	-604.7	2,141.9	1.56	1.05	
7,622.0	90.00	178.80	5,905.3	-2,198.4	-602.6	2,236.5	0.64	-0.63	
7,717.0	89.80	179.40	5,905.5	-2,293.4	-601.1	2,331.1	0.67	-0.21	
7,812.0	89.40	179.20	5,906.2	-2,388.4	-600.0	2,425.7	0.47	-0.42	
7,906.0	90.40	178.60	5,906.3	-2,482.4	-598.2	2,519.3	1.24	1.06	
8,001.0	90.30	178.80	5,905.7	-2,577.4	-596.0	2,613.9	0.24	-0.11	
8,096.0	90.55	179.11	5,905.0	-2,672.4	-594.3	2,708.5	0.42	0.26	
8,191.0	90.46	179.99	5,904.2	-2,767.3	-593.5	2,803.2	0.93	-0.09	
8,283.0	90.24	180.37	5,903.6	-2,859.3	-593.8	2,895.0	0.48	-0.24	
8,375.0	89.85	180.44	5,903.6	-2,951.3	-594.5	2,986.8	0.43	-0.42	
8,467.0	89.49	180.45	5,904.1	-3,043.3	-595.2	3,078.6	0.39	-0.39	
8,557.0	89.27	180.56	5,905.1	-3,133.3	-596.0	3,168.4	0.27	-0.24	
8,649.0	89.98	179.52	5,905.7	-3,225.3	-596.0	3,260.1	1.37	0.77	
8,741.0	90.77	178.99	5,905.1	-3,317.3	-594.8	3,351.8	1.03	0.86	
8,833.0	90.65	179.03	5,903.9	-3,409.3	-593.2	3,443.4	0.14	-0.13	
8,923.0	90.29	178.89	5,903.2	-3,499.3	-591.6	3,533.0	0.43	-0.40	
9,015.0	90.24	178.86	5,902.8	-3,591.3	-589.8	3,624.6	0.06	-0.05	
9,106.0	90.11	178.90	5,902.5	-3,682.2	-588.0	3,715.3	0.15	-0.14	
9,197.0	92.13	178.08	5,900.7	-3,773.2	-585.6	3,805.8	2.40	2.22	
9,289.0	92.79	180.23	5,896.8	-3,865.1	-584.3	3,897.3	2.44	0.72	
9,381.0	90.81	181.31	5,893.9	-3,957.0	-585.5	3,989.1	2.45	-2.15	
9,472.0	90.68	181.17	5,892.7	-4,048.0	-587.5	4,080.0	0.21	-0.14	
9,564.0	90.51	182.58	5,891.7	-4,139.9	-590.5	4,171.9	1.54	-0.18	
9,655.0	89.23	182.42	5,891.9	-4,230.8	-594.5	4,262.9	1.42	-1.41	
9,747.0	88.88	182.12	5,893.5	-4,322.8	-598.1	4,354.8	0.50	-0.38	
9,839.0	88.35	180.69	5,895.7	-4,414.7	-600.4	4,446.7	1.66	-0.58	
9,930.0	87.87	180.44	5,898.7	-4,505.6	-601.3	4,537.5	0.59	-0.53	
10,022.0	89.67	179.69	5,900.7	-4,597.6	-601.4	4,629.2	2.12	1.96	
10,113.0	89.14	179.45	5,901.6	-4,688.6	-600.7	4,719.9	0.64	-0.58	
10,204.0	90.20	179.11	5,902.1	-4,779.6	-599.5	4,810.6	1.22	1.16	
10,296.0	89.58	178.94	5,902.3	-4,871.6	-598.0	4,902.2	0.70	-0.67	
10,387.0	90.59	179.99	5,902.2	-4,962.6	-597.1	4,992.9	1.60	1.11	
10,479.0	90.15	180.35	5,901.6	-5,054.6	-597.4	5,084.6	0.62	-0.48	
10,570.0	89.54	180.33	5,901.8	-5,145.6	-597.9	5,175.4	0.67	-0.67	

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10,661.0	89.32	180.23	5,902.7	-5,236.6	-598.4	5,266.2	0.27	-0.24	
10,753.0	91.34	179.82	5,902.2	-5,328.6	-598.4	5,358.0	2.24	2.20	
10,845.0	91.16	179.82	5,900.2	-5,420.5	-598.1	5,449.7	0.20	-0.20	
10,936.0	90.64	179.50	5,898.8	-5,511.5	-597.6	5,540.4	0.67	-0.57	
11,027.0	90.68	179.41	5,897.7	-5,602.5	-596.7	5,631.1	0.11	0.04	
11,118.0	92.70	179.84	5,895.0	-5,693.5	-596.1	5,721.8	2.27	2.22	
11,210.0	90.99	181.18	5,892.1	-5,785.4	-596.9	5,813.5	2.36	-1.86	
11,301.0	89.36	181.80	5,891.8	-5,876.4	-599.3	5,904.4	1.92	-1.79	
11,393.0	88.88	181.10	5,893.2	-5,968.3	-601.6	5,996.3	0.92	-0.52	
11,484.0	88.70	181.03	5,895.1	-6,059.3	-603.3	6,087.1	0.21	-0.20	
11,576.0	88.53	180.69	5,897.3	-6,151.3	-604.7	6,179.0	0.41	-0.18	
11,666.0	88.18	180.38	5,899.9	-6,241.2	-605.5	6,268.7	0.52	-0.39	
11,757.0	87.65	179.84	5,903.2	-6,332.2	-605.7	6,359.5	0.83	-0.58	
11,848.0	88.04	178.83	5,906.7	-6,423.1	-604.7	6,450.1	1.19	0.43	
11,939.0	90.11	179.00	5,908.1	-6,514.1	-602.9	6,540.7	2.28	2.27	
12,031.0	89.98	178.41	5,908.1	-6,606.0	-600.9	6,632.2	0.66	-0.14	
12,123.0	89.93	178.51	5,908.1	-6,698.0	-598.4	6,723.8	0.12	-0.05	
12,214.0	89.36	177.08	5,908.7	-6,788.9	-594.9	6,814.2	1.69	-0.63	
12,305.0	90.37	177.76	5,908.9	-6,879.8	-590.8	6,904.6	1.34	1.11	
12,397.0	90.86	177.91	5,907.9	-6,971.8	-587.3	6,996.0	0.56	0.53	
12,488.0	91.65	180.05	5,905.9	-7,062.7	-585.7	7,086.6	2.51	0.87	
12,580.0	90.24	180.73	5,904.4	-7,154.7	-586.3	7,178.4	1.70	-1.53	
12,672.0	89.67	179.92	5,904.5	-7,246.7	-586.8	7,270.2	1.08	-0.62	
12,762.0	89.32	179.62	5,905.3	-7,336.7	-586.5	7,359.9	0.51	-0.39	
12,854.0	89.10	179.36	5,906.5	-7,428.7	-585.7	7,451.6	0.37	-0.24	
12,945.0	89.01	178.90	5,908.0	-7,519.7	-584.3	7,542.2	0.52	-0.10	
13,037.0	90.42	179.96	5,908.5	-7,611.6	-583.4	7,633.9	1.92	1.53	
13,131.0	90.20	180.08	5,908.0	-7,705.6	-583.4	7,727.7	0.27	-0.23	
13,226.0	89.89	179.34	5,907.9	-7,800.6	-582.9	7,822.4	0.84	-0.33	
13,321.0	89.49	179.01	5,908.4	-7,895.6	-581.6	7,917.0	0.55	-0.42	
13,415.0	89.05	178.70	5,909.6	-7,989.6	-579.7	8,010.6	0.57	-0.47	Last Cathedral Survey @ 13,415' MD
13,465.0	89.05	178.70	5,910.5	-8,039.6	-578.5	8,060.4	0.00	0.00	TD - 153' FSL, 176' FWL - Projection to Bit @ 13

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	North Reference:	True
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Razor #11E-1401A 7000	0.00	0.00	5,915.0	-6,975.5	-590.3	1,551,270.57	3,458,880.58	40.834838	-103.841642
- actual wellpath misses target center by 7.8usft at 12400.5usft MD (5907.9 TVD, -6975.3 N, -587.2 E)									
- Point									
Razor #11E-1401A BHL	0.00	0.00	5,915.0	-8,092.4	-590.4	1,550,153.81	3,458,901.42	40.831772	-103.841642
- actual wellpath misses target center by 54.4usft at 13465.0usft MD (5910.5 TVD, -8039.6 N, -578.5 E)									
- Point									
Razor #11E-1401A BHL	0.00	0.00	5,902.0	-1,634.4	-589.9	1,556,610.73	3,458,780.97	40.849497	-103.841641
- actual wellpath misses target center by 27.8usft at 7057.6usft MD (5906.0 TVD, -1634.3 N, -617.4 E)									
- Point									
Razor #11E-1401A BHL	0.00	0.00	5,903.0	-8,092.4	-590.4	1,550,153.81	3,458,901.42	40.831772	-103.841642
- actual wellpath misses target center by 54.7usft at 13465.0usft MD (5910.5 TVD, -8039.6 N, -578.5 E)									
- Point									
Razor #11E-1401A PBH	0.00	0.00	5,912.0	-8,092.4	-590.4	1,550,153.81	3,458,901.42	40.831772	-103.841642
- actual wellpath misses target center by 54.2usft at 13465.0usft MD (5910.5 TVD, -8039.6 N, -578.5 E)									
- Point									
Razor #11E-1401A 6400	0.00	0.00	5,902.0	-6,373.9	-590.3	1,551,872.06	3,458,869.31	40.836489	-103.841642
- actual wellpath misses target center by 15.4usft at 11798.8usft MD (5904.9 TVD, -6374.0 N, -605.4 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,344.9	5,901.9	7" - 1,962' FSL, 330' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
13,415.0	5,909.6	-7,989.6	-579.7	Last Cathedral Survey @ 13,415' MD	
13,465.0	5,910.5	-8,039.6	-578.5	TD - 153' FSL, 176' FWL	
13,465.0	5,910.5	-8,039.6	-578.5	Projection to Bit @ 13,465'	

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

Weld County, CO

S11-T10N-R58W

Razor #11E-1401A

HZ

Design: FINAL

Survey Report - Geographic

21 February, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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	S11-T10N-R58W				
Site Position:		Northing:	1,558,620.57 usft	Latitude:	40.854775
From:	Lat/Long	Easting:	3,463,389.92 usft	Longitude:	-103.824847
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.08 °

Well	Razor #11E-1401A					
Well Position	+N/-S	0.0 usft	Northing:	1,558,255.89 usft	Latitude:	40.853983
	+E/-W	0.0 usft	Easting:	3,459,340.16 usft	Longitude:	-103.839509
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,001.8 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/17/2013	8.11	67.49	53,240

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	184.17	

Survey Program	Date	2/21/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
348.0	13,465.0	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	1,558,255.89	3,459,340.16	40.853983	-103.839509
348.0	0.90	187.80	348.0	-2.7	-0.4	1,558,253.18	3,459,339.84	40.853976	-103.839510
440.0	2.10	238.80	440.0	-4.3	-1.9	1,558,251.56	3,459,338.33	40.853972	-103.839516
898.0	4.62	234.37	897.1	-19.4	-24.1	1,558,236.05	3,459,316.44	40.853930	-103.839596
989.0	4.44	213.64	987.9	-24.5	-29.0	1,558,230.89	3,459,311.61	40.853916	-103.839613
1,171.0	5.63	211.76	1,169.1	-37.9	-37.6	1,558,217.28	3,459,303.26	40.853879	-103.839645
1,263.0	5.41	199.67	1,260.7	-45.8	-41.5	1,558,209.29	3,459,299.57	40.853858	-103.839658
1,355.0	4.97	192.62	1,352.3	-53.8	-43.8	1,558,201.27	3,459,297.39	40.853836	-103.839667
1,446.0	4.57	194.67	1,443.0	-61.2	-45.6	1,558,193.89	3,459,295.75	40.853816	-103.839673
1,537.0	5.32	198.12	1,533.7	-68.7	-47.8	1,558,186.33	3,459,293.66	40.853795	-103.839681
1,629.0	5.32	197.88	1,625.3	-76.8	-50.4	1,558,178.17	3,459,291.18	40.853773	-103.839691
1,812.0	6.64	201.53	1,807.3	-94.7	-56.9	1,558,160.13	3,459,285.03	40.853723	-103.839714

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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
1,943.0	6.29	194.00	1,937.5	-108.7	-61.4	1,558,146.04	3,459,280.77	40.853685	-103.839731
2,034.0	5.89	197.98	2,028.0	-118.0	-64.1	1,558,136.72	3,459,278.30	40.853660	-103.839740
2,126.0	4.70	197.77	2,119.6	-126.1	-66.7	1,558,128.59	3,459,275.85	40.853637	-103.839750
2,218.0	3.91	191.66	2,211.3	-132.7	-68.5	1,558,121.90	3,459,274.19	40.853619	-103.839756
2,309.0	3.60	189.15	2,302.1	-138.6	-69.6	1,558,116.02	3,459,273.21	40.853603	-103.839760
2,400.0	2.73	211.61	2,393.0	-143.3	-71.1	1,558,111.32	3,459,271.71	40.853590	-103.839766
2,492.0	2.68	221.52	2,484.9	-146.7	-73.7	1,558,107.80	3,459,269.20	40.853581	-103.839775
2,583.0	1.67	216.70	2,575.8	-149.4	-75.9	1,558,105.10	3,459,267.05	40.853573	-103.839783
2,675.0	1.58	211.25	2,667.8	-151.6	-77.4	1,558,102.92	3,459,265.63	40.853567	-103.839788
2,767.0	1.63	210.11	2,759.7	-153.8	-78.7	1,558,100.67	3,459,264.36	40.853561	-103.839793
2,859.0	1.63	221.76	2,851.7	-155.9	-80.2	1,558,098.54	3,459,262.87	40.853556	-103.839799
2,950.0	1.76	227.18	2,942.7	-157.8	-82.1	1,558,096.59	3,459,261.02	40.853550	-103.839805
3,042.0	1.27	242.03	3,034.6	-159.2	-84.0	1,558,095.11	3,459,259.11	40.853546	-103.839812
3,133.0	3.16	226.31	3,125.5	-161.4	-86.7	1,558,092.86	3,459,256.45	40.853540	-103.839822
3,224.0	4.40	201.64	3,216.3	-166.4	-89.9	1,558,087.82	3,459,253.44	40.853527	-103.839833
3,316.0	4.13	184.26	3,308.1	-173.0	-91.4	1,558,081.21	3,459,252.02	40.853509	-103.839839
3,407.0	4.35	172.19	3,398.8	-179.7	-91.2	1,558,074.53	3,459,252.37	40.853490	-103.839838
3,498.0	4.31	193.44	3,489.6	-186.4	-91.5	1,558,067.78	3,459,252.17	40.853472	-103.839839
3,590.0	4.79	193.87	3,581.3	-193.5	-93.2	1,558,060.66	3,459,250.58	40.853452	-103.839846
3,681.0	4.62	190.83	3,672.0	-200.8	-94.8	1,558,053.34	3,459,249.11	40.853432	-103.839851
3,773.0	2.90	229.58	3,763.8	-206.0	-97.3	1,558,048.15	3,459,246.74	40.853418	-103.839860
3,864.0	3.08	234.82	3,854.7	-208.9	-101.0	1,558,045.17	3,459,243.05	40.853410	-103.839874
3,955.0	3.34	225.88	3,945.5	-212.1	-104.9	1,558,041.85	3,459,239.21	40.853401	-103.839888
4,046.0	3.69	215.18	4,036.4	-216.4	-108.5	1,558,037.54	3,459,235.70	40.853390	-103.839901
4,138.0	4.22	208.04	4,128.2	-221.8	-111.8	1,558,032.07	3,459,232.50	40.853375	-103.839913
4,229.0	3.91	194.75	4,218.9	-227.7	-114.2	1,558,026.08	3,459,230.25	40.853358	-103.839921
4,321.0	3.34	184.57	4,310.7	-233.4	-115.2	1,558,020.35	3,459,229.34	40.853343	-103.839925
4,413.0	3.43	174.51	4,402.6	-238.8	-115.2	1,558,014.94	3,459,229.50	40.853328	-103.839925
4,504.0	4.00	187.20	4,493.4	-244.7	-115.3	1,558,009.08	3,459,229.47	40.853312	-103.839925
4,594.0	3.43	185.34	4,583.2	-250.5	-115.9	1,558,003.28	3,459,228.93	40.853296	-103.839928
4,686.0	3.87	208.23	4,675.0	-256.0	-117.7	1,557,997.77	3,459,227.31	40.853281	-103.839934
4,776.0	2.59	188.23	4,764.9	-260.7	-119.4	1,557,993.05	3,459,225.67	40.853268	-103.839940
4,868.0	4.53	224.46	4,856.7	-265.3	-122.2	1,557,988.35	3,459,222.92	40.853255	-103.839950
4,959.0	3.21	218.66	4,947.5	-269.9	-126.3	1,557,983.71	3,459,218.89	40.853243	-103.839965
5,051.0	4.44	238.78	5,039.3	-273.7	-131.0	1,557,979.77	3,459,214.31	40.853232	-103.839982
5,142.0	3.43	228.40	5,130.1	-277.3	-136.0	1,557,976.04	3,459,209.33	40.853222	-103.840000
5,233.0	2.59	220.16	5,221.0	-280.7	-139.4	1,557,972.60	3,459,206.03	40.853213	-103.840013
5,325.0	8.04	206.77	5,312.5	-288.1	-143.6	1,557,965.19	3,459,201.93	40.853193	-103.840028
5,416.0	16.35	217.78	5,401.4	-303.9	-154.4	1,557,949.15	3,459,191.50	40.853149	-103.840067
5,508.0	24.40	216.96	5,487.6	-329.4	-173.8	1,557,923.33	3,459,172.59	40.853079	-103.840137
5,600.0	34.99	217.69	5,567.4	-365.5	-201.4	1,557,886.66	3,459,145.64	40.852980	-103.840237
5,691.0	43.33	207.23	5,638.0	-414.1	-231.7	1,557,837.55	3,459,116.23	40.852847	-103.840346
5,721.0	47.65	208.13	5,659.0	-433.0	-241.7	1,557,818.43	3,459,106.64	40.852795	-103.840382
5,751.0	49.27	209.43	5,678.9	-452.7	-252.5	1,557,798.56	3,459,096.20	40.852741	-103.840421
5,782.0	49.45	207.03	5,699.1	-473.4	-263.6	1,557,777.63	3,459,085.46	40.852684	-103.840461
5,813.0	51.38	203.15	5,718.8	-495.0	-273.7	1,557,755.81	3,459,075.75	40.852625	-103.840498
5,843.0	52.18	198.31	5,737.4	-517.1	-282.1	1,557,733.63	3,459,067.83	40.852564	-103.840528
5,873.0	54.51	197.28	5,755.3	-540.0	-289.4	1,557,710.58	3,459,060.91	40.852501	-103.840555
5,904.0	54.81	197.84	5,773.2	-564.1	-297.0	1,557,686.33	3,459,053.74	40.852435	-103.840582
5,934.0	55.91	197.95	5,790.3	-587.6	-304.6	1,557,662.70	3,459,046.59	40.852371	-103.840610
5,965.0	58.20	198.43	5,807.1	-612.3	-312.7	1,557,637.84	3,459,038.94	40.852303	-103.840639
5,996.0	61.01	199.24	5,822.8	-637.6	-321.4	1,557,612.38	3,459,030.78	40.852233	-103.840670
6,028.0	63.16	202.24	5,837.8	-664.0	-331.4	1,557,585.76	3,459,021.26	40.852161	-103.840706
6,060.0	65.76	204.50	5,851.6	-690.5	-342.9	1,557,559.06	3,459,010.30	40.852088	-103.840748
6,091.0	69.27	205.36	5,863.5	-716.5	-354.9	1,557,532.87	3,458,998.71	40.852017	-103.840792

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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
6,123.0	72.66	205.09	5,873.9	-743.9	-367.8	1,557,505.27	3,458,986.34	40.851942	-103.840838
6,155.0	75.65	204.59	5,882.6	-771.8	-380.7	1,557,477.10	3,458,973.93	40.851865	-103.840885
6,186.0	79.25	204.07	5,889.4	-799.4	-393.2	1,557,449.30	3,458,961.99	40.851789	-103.840930
6,218.0	83.34	203.85	5,894.2	-828.3	-406.1	1,557,420.17	3,458,949.69	40.851710	-103.840976
6,249.0	85.14	204.18	5,897.3	-856.4	-418.6	1,557,391.76	3,458,937.67	40.851633	-103.841022
6,315.0	88.04	203.86	5,901.2	-916.6	-445.4	1,557,331.10	3,458,911.98	40.851468	-103.841119
6,392.0	91.56	201.37	5,901.5	-987.7	-475.0	1,557,259.50	3,458,883.72	40.851273	-103.841226
6,487.0	88.62	199.41	5,901.4	-1,076.7	-508.1	1,557,169.86	3,458,852.30	40.851028	-103.841345
6,581.0	88.48	196.67	5,903.7	-1,166.0	-537.2	1,557,079.99	3,458,824.88	40.850783	-103.841450
6,676.0	88.22	193.84	5,906.5	-1,257.7	-562.2	1,556,987.93	3,458,801.61	40.850532	-103.841541
6,771.0	89.80	192.35	5,908.1	-1,350.2	-583.7	1,556,895.04	3,458,781.83	40.850278	-103.841618
6,865.0	90.42	188.54	5,907.9	-1,442.6	-600.8	1,556,802.31	3,458,766.52	40.850024	-103.841680
6,960.0	90.37	185.22	5,907.3	-1,536.9	-612.1	1,556,707.81	3,458,756.91	40.849765	-103.841721
7,054.0	91.16	181.12	5,906.0	-1,630.7	-617.3	1,556,613.90	3,458,753.48	40.849508	-103.841740
7,148.0	89.85	179.34	5,905.2	-1,724.7	-617.7	1,556,519.92	3,458,754.86	40.849250	-103.841741
7,243.0	90.10	177.80	5,905.2	-1,819.7	-615.3	1,556,425.02	3,458,759.01	40.848989	-103.841733
7,337.0	89.70	177.70	5,905.4	-1,913.6	-611.6	1,556,331.18	3,458,764.46	40.848731	-103.841719
7,432.0	89.60	177.60	5,906.0	-2,008.5	-607.7	1,556,236.35	3,458,770.13	40.848471	-103.841705
7,527.0	90.60	178.70	5,905.8	-2,103.5	-604.7	1,556,141.47	3,458,774.97	40.848210	-103.841694
7,622.0	90.00	178.80	5,905.3	-2,198.4	-602.6	1,556,046.55	3,458,778.82	40.847949	-103.841687
7,717.0	89.80	179.40	5,905.5	-2,293.4	-601.1	1,555,951.61	3,458,782.09	40.847689	-103.841681
7,812.0	89.40	179.20	5,906.2	-2,388.4	-600.0	1,555,856.66	3,458,785.03	40.847428	-103.841677
7,906.0	90.40	178.60	5,906.3	-2,482.4	-598.2	1,555,762.73	3,458,788.60	40.847170	-103.841671
8,001.0	90.30	178.80	5,905.7	-2,577.4	-596.0	1,555,667.81	3,458,792.53	40.846909	-103.841663
8,096.0	90.55	179.11	5,905.0	-2,672.4	-594.3	1,555,572.88	3,458,796.04	40.846649	-103.841656
8,191.0	90.46	179.99	5,904.2	-2,767.3	-593.5	1,555,477.92	3,458,798.56	40.846388	-103.841654
8,283.0	90.24	180.37	5,903.6	-2,859.3	-593.8	1,555,385.93	3,458,800.00	40.846135	-103.841655
8,375.0	89.85	180.44	5,903.6	-2,951.3	-594.5	1,555,293.94	3,458,801.07	40.845883	-103.841657
8,467.0	89.49	180.45	5,904.1	-3,043.3	-595.2	1,555,201.95	3,458,802.08	40.845630	-103.841660
8,557.0	89.27	180.56	5,905.1	-3,133.3	-596.0	1,555,111.96	3,458,802.97	40.845383	-103.841663
8,649.0	89.98	179.52	5,905.7	-3,225.3	-596.0	1,555,019.97	3,458,804.63	40.845131	-103.841663
8,741.0	90.77	178.99	5,905.1	-3,317.3	-594.8	1,554,928.02	3,458,807.55	40.844878	-103.841658
8,833.0	90.65	179.03	5,903.9	-3,409.3	-593.2	1,554,836.09	3,458,810.86	40.844626	-103.841653
8,923.0	90.29	178.89	5,903.2	-3,499.3	-591.6	1,554,746.16	3,458,814.18	40.844379	-103.841647
9,015.0	90.24	178.86	5,902.8	-3,591.3	-589.8	1,554,654.22	3,458,817.70	40.844127	-103.841640
9,106.0	90.11	178.90	5,902.5	-3,682.2	-588.0	1,554,563.29	3,458,821.19	40.843877	-103.841634
9,197.0	92.13	178.08	5,900.7	-3,773.2	-585.6	1,554,472.41	3,458,825.29	40.843627	-103.841625
9,289.0	92.79	180.23	5,896.8	-3,865.1	-584.3	1,554,380.55	3,458,828.36	40.843375	-103.841620
9,381.0	90.81	181.31	5,893.9	-3,957.0	-585.5	1,554,288.60	3,458,828.85	40.843123	-103.841625
9,472.0	90.68	181.17	5,892.7	-4,048.0	-587.5	1,554,197.61	3,458,828.58	40.842873	-103.841632
9,564.0	90.51	182.58	5,891.7	-4,139.9	-590.5	1,554,105.63	3,458,827.29	40.842621	-103.841643
9,655.0	89.23	182.42	5,891.9	-4,230.8	-594.5	1,554,014.66	3,458,825.03	40.842371	-103.841657
9,747.0	88.88	182.12	5,893.5	-4,322.8	-598.1	1,553,922.69	3,458,823.11	40.842119	-103.841670
9,839.0	88.35	180.69	5,895.7	-4,414.7	-600.4	1,553,830.72	3,458,822.57	40.841867	-103.841678
9,930.0	87.87	180.44	5,898.7	-4,505.6	-601.3	1,553,739.78	3,458,823.38	40.841617	-103.841682
10,022.0	89.67	179.69	5,900.7	-4,597.6	-601.4	1,553,647.82	3,458,825.00	40.841364	-103.841682
10,113.0	89.14	179.45	5,901.6	-4,688.6	-600.7	1,553,556.85	3,458,827.38	40.841115	-103.841679
10,204.0	90.20	179.11	5,902.1	-4,779.6	-599.5	1,553,465.90	3,458,830.23	40.840865	-103.841675
10,296.0	89.58	178.94	5,902.3	-4,871.6	-598.0	1,553,373.96	3,458,833.52	40.840613	-103.841670
10,387.0	90.59	179.99	5,902.2	-4,962.6	-597.1	1,553,283.00	3,458,836.07	40.840363	-103.841667
10,479.0	90.15	180.35	5,901.6	-5,054.6	-597.4	1,553,191.01	3,458,837.52	40.840110	-103.841668
10,570.0	89.54	180.33	5,901.8	-5,145.6	-597.9	1,553,100.02	3,458,838.69	40.839861	-103.841669
10,661.0	89.32	180.23	5,902.7	-5,236.6	-598.4	1,553,009.03	3,458,839.95	40.839611	-103.841671
10,753.0	91.34	179.82	5,902.2	-5,328.6	-598.4	1,552,917.06	3,458,841.63	40.839358	-103.841671
10,845.0	91.16	179.82	5,900.2	-5,420.5	-598.1	1,552,825.10	3,458,843.64	40.839106	-103.841670

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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
10,936.0	90.64	179.50	5,898.8	-5,511.5	-597.6	1,552,734.14	3,458,845.88	40.838856	-103.841668
11,027.0	90.68	179.41	5,897.7	-5,602.5	-596.7	1,552,643.18	3,458,848.45	40.838606	-103.841665
11,118.0	92.70	179.84	5,895.0	-5,693.5	-596.1	1,552,552.26	3,458,850.75	40.838357	-103.841663
11,210.0	90.99	181.18	5,892.1	-5,785.4	-596.9	1,552,460.31	3,458,851.65	40.838104	-103.841666
11,301.0	89.36	181.80	5,891.8	-5,876.4	-599.3	1,552,369.32	3,458,850.99	40.837855	-103.841674
11,393.0	88.88	181.10	5,893.2	-5,968.3	-601.6	1,552,277.33	3,458,850.38	40.837602	-103.841683
11,484.0	88.70	181.03	5,895.1	-6,059.3	-603.3	1,552,186.35	3,458,850.40	40.837353	-103.841689
11,576.0	88.53	180.69	5,897.3	-6,151.3	-604.7	1,552,094.38	3,458,850.74	40.837100	-103.841694
11,666.0	88.18	180.38	5,899.9	-6,241.2	-605.5	1,552,004.42	3,458,851.58	40.836853	-103.841697
11,757.0	87.65	179.84	5,903.2	-6,332.2	-605.7	1,551,913.50	3,458,853.11	40.836604	-103.841698
11,848.0	88.04	178.83	5,906.7	-6,423.1	-604.7	1,551,822.61	3,458,855.87	40.836354	-103.841694
11,939.0	90.11	179.00	5,908.1	-6,514.1	-602.9	1,551,731.69	3,458,859.30	40.836104	-103.841687
12,031.0	89.98	178.41	5,908.1	-6,606.0	-600.9	1,551,639.77	3,458,863.10	40.835852	-103.841680
12,123.0	89.93	178.51	5,908.1	-6,698.0	-598.4	1,551,547.86	3,458,867.29	40.835600	-103.841671
12,214.0	89.36	177.08	5,908.7	-6,788.9	-594.9	1,551,457.02	3,458,872.49	40.835350	-103.841658
12,305.0	90.37	177.76	5,908.9	-6,879.8	-590.8	1,551,366.20	3,458,878.29	40.835101	-103.841644
12,397.0	90.86	177.91	5,907.9	-6,971.8	-587.3	1,551,274.36	3,458,883.49	40.834848	-103.841631
12,488.0	91.65	180.05	5,905.9	-7,062.7	-585.7	1,551,183.44	3,458,886.81	40.834599	-103.841625
12,580.0	90.24	180.73	5,904.4	-7,154.7	-586.3	1,551,091.47	3,458,887.91	40.834346	-103.841627
12,672.0	89.67	179.92	5,904.5	-7,246.7	-586.8	1,550,999.48	3,458,889.11	40.834094	-103.841629
12,762.0	89.32	179.62	5,905.3	-7,336.7	-586.5	1,550,909.50	3,458,891.15	40.833847	-103.841628
12,854.0	89.10	179.36	5,906.5	-7,428.7	-585.7	1,550,817.55	3,458,893.69	40.833594	-103.841625
12,945.0	89.01	178.90	5,908.0	-7,519.7	-584.3	1,550,726.61	3,458,896.78	40.833344	-103.841620
13,037.0	90.42	179.96	5,908.5	-7,611.6	-583.4	1,550,634.65	3,458,899.42	40.833092	-103.841617
13,131.0	90.20	180.08	5,908.0	-7,705.6	-583.4	1,550,540.67	3,458,901.14	40.832834	-103.841617
13,226.0	89.89	179.34	5,907.9	-7,800.6	-582.9	1,550,445.70	3,458,903.40	40.832573	-103.841615
13,321.0	89.49	179.01	5,908.4	-7,895.6	-581.6	1,550,350.75	3,458,906.55	40.832313	-103.841610
13,415.0	89.05	178.70	5,909.6	-7,989.6	-579.7	1,550,256.83	3,458,910.19	40.832055	-103.841603
Last Cathedral Survey @ 13,415' MD									
13,465.0	89.05	178.70	5,910.5	-8,039.6	-578.5	1,550,206.88	3,458,912.26	40.831917	-103.841599
TD - 153' FSL, 176' FWL - Projection to Bit @ 13,465'									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Razor #11E-1401A 6400	0.00	0.00	5,902.0	-6,373.9	-590.3	1,551,872.07	3,458,869.31	40.836489	-103.841642
- hit/miss target									
- actual wellpath misses target center by 15.4usft at 11798.8usft MD (5904.9 TVD, -6374.0 N, -605.4 E)									
- Point									
Razor #11E-1401A 7000	0.00	0.00	5,915.0	-6,975.5	-590.3	1,551,270.58	3,458,880.58	40.834838	-103.841642
- hit/miss target									
- actual wellpath misses target center by 7.8usft at 12400.5usft MD (5907.9 TVD, -6975.3 N, -587.2 E)									
- Point									
Razor #11E-1401A BHL	0.00	0.00	5,915.0	-8,092.4	-590.4	1,550,153.81	3,458,901.42	40.831772	-103.841642
- hit/miss target									
- actual wellpath misses target center by 54.4usft at 13465.0usft MD (5910.5 TVD, -8039.6 N, -578.5 E)									
- Point									

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #11E-1401A
Project:	Weld County, CO	TVD Reference:	WELL @ 5018.6usft (Original Well Elev)
Site:	S11-T10N-R58W	MD Reference:	WELL @ 5018.6usft (Original Well Elev)
Well:	Razor #11E-1401A	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 (")	
6,344.9	5,901.9	7" - 1,962' FSL, 330' FWL	0	0	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
13,415.0	5,909.6	-7,989.6	-579.7	Last Cathedral Survey @ 13,415' MD	
13,465.0	5,910.5	-8,039.6	-578.5	TD - 153' FSL, 176' FWL	
13,465.0	5,910.5	-8,039.6	-578.5	Projection to Bit @ 13,465'	

Checked By: _____ Approved By: _____ Date: _____