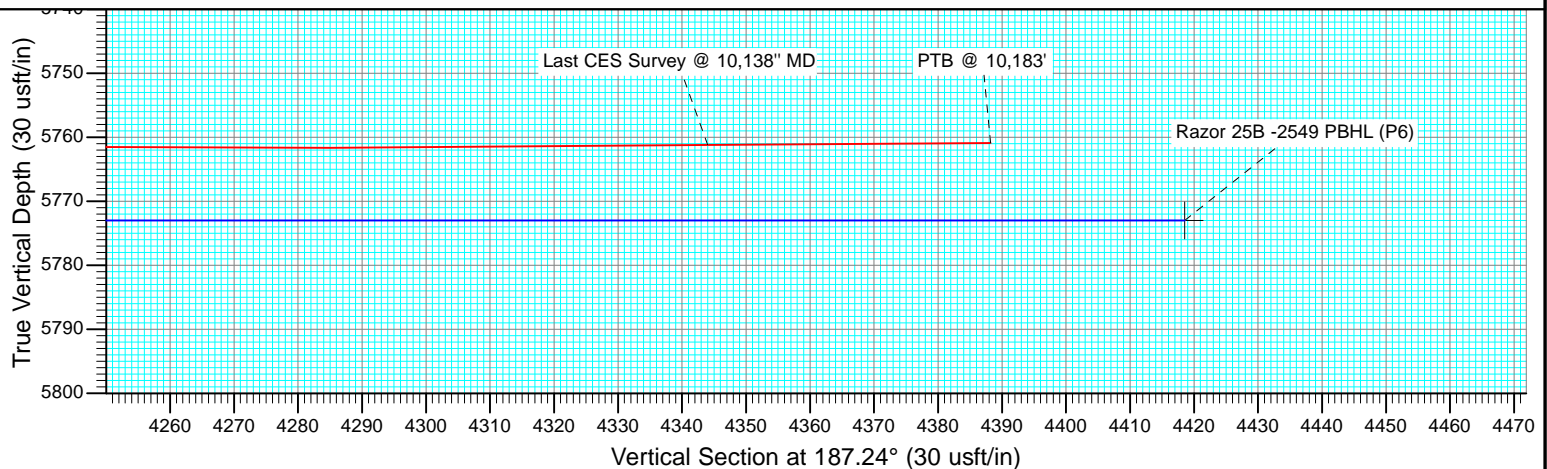
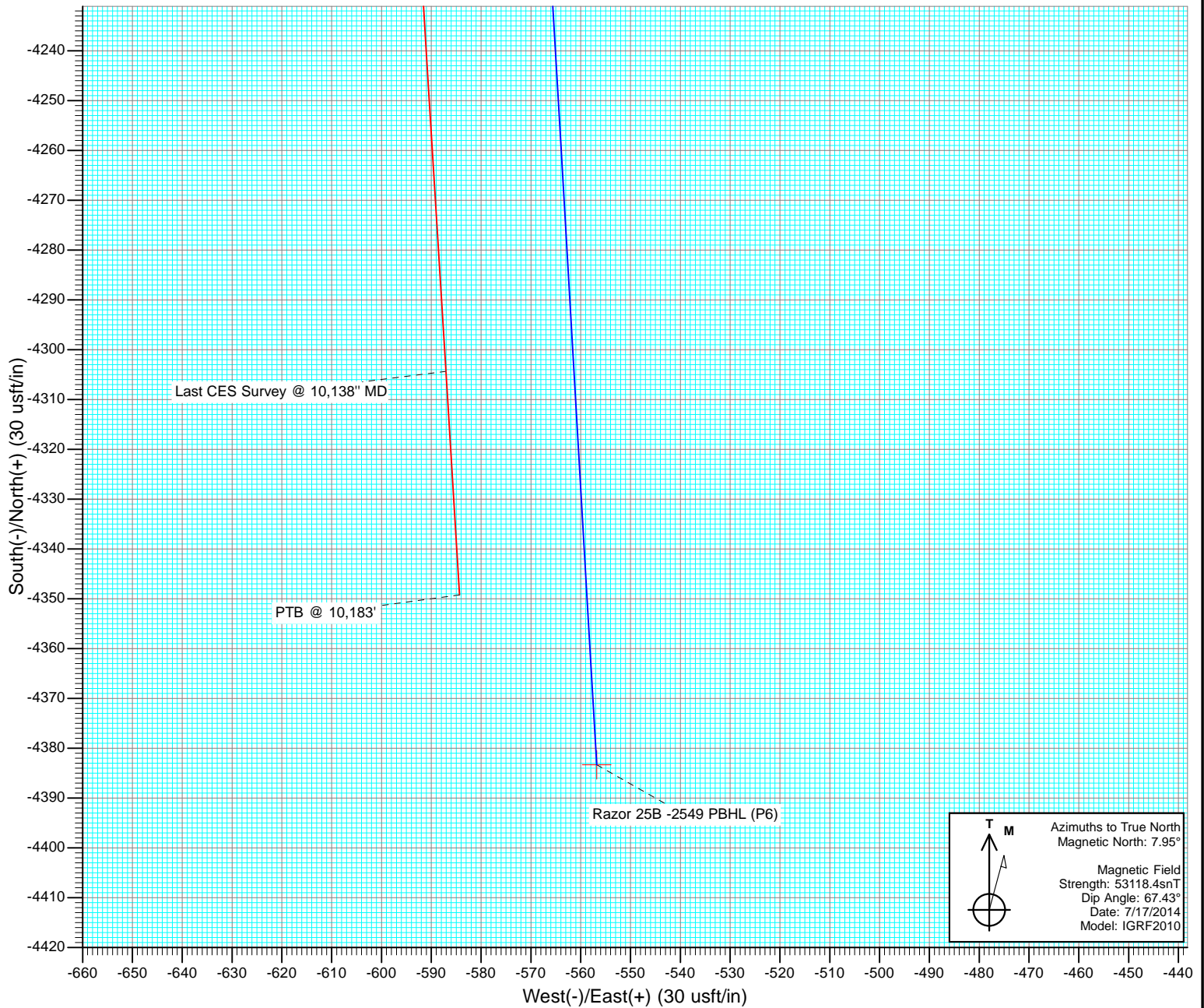




Project: Weld County, CO
Site: S25-T10N-R58W
Well: Razor 25B -2549
Wellbore: HZ
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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		S25-T10N-R58W			
Site Position:		Northing:	1,544,670.15 usft	Latitude:	40.816275
From:	Lat/Long	Easting:	3,467,568.48 usft	Longitude:	-103.810706
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.09 °

Well	Razor 25B -2549					
Well Position	+N/-S	0.0 usft	Northing:	1,544,620.00 usft	Latitude:	40.816139
	+E/-W	0.0 usft	Easting:	3,467,539.54 usft	Longitude:	-103.810814
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,756.4 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/17/2014	7.95	67.43	53,118

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	187.24	

Survey Program	Date	8/5/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
414.0	10,183.0	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		
414.0	0.68	210.92	414.0	-2.1	-1.3	2.2	0.16	0.16		
505.0	1.62	270.02	505.0	-2.6	-2.8	2.9	1.54	1.03		
597.0	3.53	280.28	596.9	-2.1	-6.9	2.9	2.13	2.08		
689.0	5.42	283.45	688.6	-0.5	-13.9	2.3	2.07	2.05		
781.0	7.11	290.28	780.0	2.4	-23.5	0.5	2.00	1.84		
872.0	8.30	293.58	870.2	7.0	-34.8	-2.6	1.39	1.31		
964.0	9.53	295.73	961.1	13.0	-47.7	-6.9	1.38	1.34		
1,054.0	10.98	297.28	1,049.7	20.1	-62.1	-12.2	1.64	1.61		
1,146.0	11.37	297.10	1,139.9	28.3	-77.9	-18.2	0.43	0.42		
1,474.0	10.36	301.44	1,462.0	58.4	-131.9	-41.3	0.40	-0.31		
1,581.0	10.25	298.58	1,567.3	68.0	-148.4	-48.7	0.49	-0.10		
1,673.0	11.60	289.87	1,657.7	75.0	-164.3	-53.7	2.31	1.47		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
1,764.0	13.04	284.71	1,746.6	80.8	-182.9	-57.1	1.99	1.58	
1,856.0	12.43	270.95	1,836.3	83.6	-202.8	-57.3	3.35	-0.66	
1,947.0	11.89	270.23	1,925.3	83.8	-222.0	-55.1	0.62	-0.59	
2,039.0	11.60	267.60	2,015.3	83.4	-240.7	-52.4	0.66	-0.32	
2,130.0	12.80	271.40	2,104.3	83.3	-259.9	-49.8	1.59	1.32	
2,222.0	12.39	270.09	2,194.1	83.5	-280.0	-47.6	0.54	-0.45	
2,313.0	11.89	273.89	2,283.0	84.2	-299.1	-45.8	1.04	-0.55	
2,404.0	11.60	273.83	2,372.1	85.4	-317.6	-44.7	0.32	-0.32	
2,496.0	12.02	283.57	2,462.2	88.3	-336.1	-45.2	2.21	0.46	
2,587.0	12.48	282.37	2,551.1	92.6	-354.9	-47.2	0.58	0.51	
2,679.0	13.70	284.97	2,640.7	97.6	-375.2	-49.5	1.47	1.33	
2,770.0	12.97	282.58	2,729.3	102.6	-395.6	-51.9	1.01	-0.80	
2,861.0	12.38	282.41	2,818.1	106.9	-415.0	-53.7	0.65	-0.65	
2,953.0	12.27	287.20	2,907.9	111.9	-434.0	-56.3	1.12	-0.12	
3,044.0	11.17	281.80	2,997.0	116.6	-451.9	-58.7	1.71	-1.21	
3,136.0	11.71	280.53	3,087.2	120.1	-469.8	-59.9	0.65	0.59	
3,227.0	14.85	285.63	3,175.8	124.9	-490.1	-62.2	3.68	3.45	
3,319.0	14.85	285.02	3,264.7	131.2	-512.8	-65.5	0.17	0.00	
3,410.0	14.68	283.58	3,352.7	136.9	-535.3	-68.3	0.44	-0.19	
3,501.0	14.94	283.52	3,440.7	142.3	-557.9	-70.9	0.29	0.29	
3,592.0	14.86	282.83	3,528.6	147.7	-580.7	-73.3	0.21	-0.09	
3,684.0	13.73	281.87	3,617.8	152.5	-602.9	-75.3	1.25	-1.23	
3,775.0	12.15	280.22	3,706.5	156.5	-622.9	-76.7	1.78	-1.74	
3,867.0	10.78	278.62	3,796.6	159.5	-640.9	-77.4	1.53	-1.49	
3,959.0	9.32	275.88	3,887.2	161.5	-656.8	-77.5	1.67	-1.59	
4,050.0	9.02	291.10	3,977.1	164.8	-670.8	-79.0	2.68	-0.33	
4,142.0	9.11	292.62	4,067.9	170.2	-684.3	-82.7	0.28	0.10	
4,233.0	8.87	290.21	4,157.8	175.4	-697.5	-86.1	0.49	-0.26	
4,324.0	8.21	286.06	4,247.8	179.7	-710.3	-88.7	0.99	-0.73	
4,416.0	7.97	287.44	4,338.9	183.4	-722.7	-90.8	0.34	-0.26	
4,507.0	7.99	286.97	4,429.0	187.1	-734.8	-93.0	0.07	0.02	
4,598.0	6.80	283.66	4,519.2	190.2	-746.1	-94.7	1.39	-1.31	
4,690.0	5.93	280.90	4,610.7	192.4	-756.1	-95.6	1.00	-0.95	
4,782.0	4.85	277.49	4,702.2	193.8	-764.6	-95.9	1.22	-1.17	
4,874.0	4.36	274.61	4,793.9	194.6	-771.9	-95.8	0.59	-0.53	
4,965.0	3.96	271.50	4,884.7	195.0	-778.5	-95.3	0.50	-0.44	
5,057.0	3.36	270.90	4,976.5	195.1	-784.4	-94.7	0.65	-0.65	
5,147.0	2.64	258.54	5,066.4	194.7	-789.0	-93.8	1.07	-0.80	
5,239.0	2.34	256.64	5,158.3	193.9	-792.9	-92.4	0.34	-0.33	
5,300.0	3.94	210.16	5,219.2	191.8	-795.2	-90.0	4.72	2.62	
5,330.0	3.98	209.87	5,249.2	190.0	-796.2	-88.1	0.15	0.13	
5,360.0	4.56	205.21	5,279.1	188.0	-797.3	-86.0	2.25	1.93	
5,421.0	8.27	202.99	5,339.7	181.8	-800.0	-79.5	6.09	6.08	
5,452.0	13.18	199.17	5,370.1	176.4	-802.1	-73.9	16.00	15.84	
5,483.0	18.38	195.99	5,399.9	168.3	-804.6	-65.6	17.00	16.77	
5,513.0	23.30	192.99	5,428.0	158.0	-807.2	-55.0	16.78	16.40	
5,544.0	27.74	187.21	5,455.9	144.9	-809.5	-41.7	16.41	14.32	
5,575.0	31.70	182.73	5,482.9	129.6	-810.8	-26.4	14.64	12.77	
5,605.0	33.63	175.39	5,508.1	113.4	-810.5	-10.4	14.68	6.43	
5,636.0	33.81	170.65	5,533.9	96.3	-808.4	6.3	8.51	0.58	
5,666.0	33.88	169.03	5,558.8	79.9	-805.5	22.3	3.02	0.23	
5,697.0	34.45	169.45	5,584.5	62.8	-802.2	38.8	1.99	1.84	
5,727.0	36.99	175.19	5,608.8	45.4	-799.9	55.7	14.01	8.47	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
5,757.0	40.58	178.52	5,632.2	26.7	-798.9	74.2	13.84	11.97	
5,788.0	46.04	180.41	5,654.8	5.4	-798.7	95.3	18.10	17.61	
5,818.0	53.28	182.72	5,674.2	-17.4	-799.3	118.0	24.83	24.13	
5,848.0	59.91	184.00	5,690.7	-42.4	-800.8	143.0	22.38	22.10	
5,878.0	63.34	182.38	5,705.0	-68.7	-802.3	169.3	12.38	11.43	
5,910.0	63.08	181.38	5,719.4	-97.3	-803.2	197.7	2.91	-0.81	
5,942.0	64.98	180.00	5,733.4	-126.1	-803.6	226.3	7.09	5.94	
5,973.0	69.09	179.07	5,745.5	-154.6	-803.3	254.6	13.54	13.26	
6,005.0	72.88	178.36	5,755.9	-184.8	-802.7	284.5	12.03	11.84	
6,037.0	76.36	179.64	5,764.4	-215.7	-802.1	315.0	11.54	10.88	
6,068.0	78.81	181.56	5,771.1	-246.0	-802.4	345.1	9.95	7.90	
6,100.0	82.46	184.55	5,776.3	-277.5	-804.1	376.6	14.67	11.41	
6,228.0	88.15	182.92	5,786.7	-404.7	-812.4	503.9	4.62	4.44	
6,319.0	90.18	183.58	5,788.1	-495.6	-817.6	594.6	2.35	2.23	
6,411.0	91.05	180.94	5,787.1	-587.5	-821.2	686.3	3.02	0.95	
6,502.0	93.27	179.43	5,783.6	-678.4	-821.5	776.5	2.95	2.44	
6,594.0	93.58	176.72	5,778.2	-770.2	-818.4	867.2	2.96	0.34	
6,684.0	91.48	176.52	5,774.2	-859.9	-813.1	955.5	2.34	-2.33	
6,776.0	90.65	175.51	5,772.5	-951.7	-806.7	1,045.8	1.42	-0.90	
6,867.0	90.22	175.08	5,771.8	-1,042.4	-799.3	1,134.8	0.67	-0.47	
6,959.0	90.09	174.98	5,771.5	-1,134.0	-791.3	1,224.7	0.18	-0.14	
7,051.0	89.85	174.48	5,771.6	-1,225.6	-782.8	1,314.5	0.60	-0.26	
7,142.0	89.08	174.11	5,772.4	-1,316.2	-773.8	1,403.2	0.94	-0.85	
7,233.0	88.52	174.30	5,774.3	-1,406.7	-764.6	1,491.8	0.65	-0.62	
7,325.0	89.23	173.78	5,776.1	-1,498.2	-755.1	1,581.4	0.96	0.77	
7,416.0	90.74	175.05	5,776.2	-1,588.7	-746.2	1,670.1	2.17	1.66	
7,507.0	90.18	174.44	5,775.4	-1,679.4	-737.9	1,758.9	0.91	-0.62	
7,598.0	89.91	174.91	5,775.4	-1,770.0	-729.4	1,847.8	0.60	-0.30	
7,690.0	90.15	175.99	5,775.3	-1,861.7	-722.1	1,937.8	1.20	0.26	
7,782.0	89.48	174.72	5,775.6	-1,953.4	-714.7	2,027.9	1.56	-0.73	
7,874.0	90.62	177.12	5,775.5	-2,045.1	-708.1	2,118.1	2.89	1.24	
7,965.0	92.28	177.27	5,773.2	-2,136.0	-703.7	2,207.6	1.83	1.82	
8,056.0	92.40	179.11	5,769.5	-2,226.9	-700.8	2,297.4	2.02	0.13	
8,147.0	90.86	180.31	5,766.9	-2,317.8	-700.3	2,387.6	2.15	-1.69	
8,239.0	89.51	179.49	5,766.6	-2,409.8	-700.2	2,478.8	1.72	-1.47	
8,330.0	89.08	179.45	5,767.7	-2,500.8	-699.3	2,569.0	0.47	-0.47	
8,421.0	88.92	178.11	5,769.3	-2,591.8	-697.4	2,659.0	1.48	-0.18	
8,513.0	89.57	176.97	5,770.5	-2,683.7	-693.5	2,749.7	1.43	0.71	
8,605.0	88.89	177.12	5,771.8	-2,775.5	-688.7	2,840.2	0.76	-0.74	
8,697.0	89.85	176.24	5,772.8	-2,867.4	-683.4	2,930.6	1.42	1.04	
8,788.0	88.89	175.02	5,773.8	-2,958.1	-676.5	3,019.8	1.71	-1.05	
8,879.0	90.52	174.53	5,774.3	-3,048.7	-668.2	3,108.6	1.87	1.79	
8,971.0	91.54	175.39	5,772.6	-3,140.3	-660.1	3,198.5	1.45	1.11	
9,062.0	90.96	175.69	5,770.6	-3,231.0	-653.0	3,287.6	0.72	-0.64	
9,154.0	89.94	176.40	5,769.9	-3,322.8	-646.7	3,377.8	1.35	-1.11	
9,245.0	89.20	174.42	5,770.6	-3,413.5	-639.4	3,466.9	2.32	-0.81	
9,336.0	90.80	173.34	5,770.6	-3,504.0	-629.7	3,555.4	2.12	1.76	
9,428.0	91.82	174.55	5,768.5	-3,595.5	-620.0	3,644.9	1.72	1.11	
9,520.0	91.91	175.19	5,765.5	-3,687.0	-611.8	3,734.7	0.70	0.10	
9,611.0	91.14	177.46	5,763.1	-3,777.8	-605.9	3,824.1	2.63	-0.85	
9,702.0	91.63	177.94	5,760.9	-3,868.7	-602.3	3,913.8	0.75	0.54	
9,793.0	90.15	179.71	5,759.5	-3,959.7	-600.4	4,003.8	2.54	-1.63	
9,888.0	89.20	179.38	5,760.0	-4,054.7	-599.7	4,097.9	1.06	-1.00	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
9,983.0	89.14	176.69	5,761.4	-4,149.6	-596.4	4,191.7	2.83	-0.06	
10,078.0	90.52	176.48	5,761.7	-4,244.4	-590.7	4,285.0	1.47	1.45	
10,138.0	90.37	176.49	5,761.2	-4,304.3	-587.1	4,344.0	0.25	-0.25	Last CES Survey @ 10,138" MD
10,183.0	90.37	176.49	5,760.9	-4,349.2	-584.3	4,388.2	0.00	0.00	PTB @ 10,183' - TD - 635' FSL, 2696' FEL

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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 25B -2549 VP (P6 - actual wellpath misses target center by 38.3usft at 5035.0usft MD (4954.5 TVD, 195.1 N, -783.1 E) - Point	0.00	0.00	4,952.1	200.0	-821.0	1,544,804.34	3,466,714.87	40.816688	-103.813780
Razor 25B -2549 PBHL (P6 - actual wellpath misses target center by 45.5usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E) - Point	90.00	0.00	5,773.0	-4,383.3	-556.8	1,540,226.87	3,467,066.33	40.804108	-103.812825
Razor 25B -2549 PBHL (P6 - actual wellpath misses target center by 70.1usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E) - Point	90.00	0.00	5,782.0	-4,383.3	-526.8	1,540,227.44	3,467,096.28	40.804108	-103.812717
Razor 25B -2549 VP (2) - actual wellpath misses target center by 9.0usft at 5042.0usft MD (4961.6 TVD, 195.1 N, -783.5 E) - Point	0.00	0.00	4,961.1	200.0	-791.0	1,544,804.91	3,466,744.90	40.816688	-103.813672
Razor 25B -2549 VP (P6 - actual wellpath misses target center by 9.2usft at 5038.0usft MD (4957.6 TVD, 195.1 N, -783.2 E) - Point	0.00	0.00	4,957.1	200.0	-791.0	1,544,804.91	3,466,744.90	40.816688	-103.813672
Razor 25B -2549 PBHL (P6 - actual wellpath misses target center by 44.7usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E) - Point	90.00	0.00	5,770.0	-4,383.3	-556.8	1,540,226.87	3,467,066.33	40.804108	-103.812825
Razor 25B -2549 VP - actual wellpath misses target center by 59.0usft at 5037.8usft MD (4957.4 TVD, 195.1 N, -783.2 E) - Point	0.00	0.00	4,961.1	200.0	-724.6	1,544,806.19	3,466,811.29	40.816688	-103.813432
Razor 25B -2549 VP (P4 - actual wellpath misses target center by 9.6usft at 5030.1usft MD (4949.6 TVD, 195.1 N, -782.8 E) - Point	0.00	0.00	4,949.1	200.0	-791.0	1,544,804.91	3,466,744.90	40.816688	-103.813672
Razor 25B -2549 PBHL (P6 - actual wellpath misses target center by 69.0usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E) - Point	90.00	0.00	5,778.0	-4,383.3	-526.8	1,540,227.44	3,467,096.28	40.804108	-103.812717
Razor 25B -2549 PBHL (P6 - actual wellpath misses target center by 67.4usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E) - Point	90.00	0.00	5,770.0	-4,383.3	-526.8	1,540,227.44	3,467,096.28	40.804108	-103.812717
Razor 25B -2549 VP (P6 - actual wellpath misses target center by 38.5usft at 5032.0usft MD (4951.5 TVD, 195.1 N, -782.9 E) - Point	0.00	0.00	4,949.1	200.0	-821.0	1,544,804.34	3,466,714.87	40.816688	-103.813780

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,133.2	5,780.2	7" - 634' FNL, 2839' FEL		

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,138.0	5,761.2	-4,304.3	-587.1	Last CES Survey @ 10,138" MD
10,183.0	5,760.9	-4,349.2	-584.3	PTB @ 10,183'
10,183.0	5,760.9	-4,349.2	-584.3	TD - 635' FSL, 2696' FEL

Checked By: _____ Approved By: _____ Date: _____

Whiting Petroleum Corporation

Weld County, CO

S25-T10N-R58W

Razor 25B -2549

HZ

Design: FINAL

Survey Report - Geographic

05 August, 2014

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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	S25-T10N-R58W				
Site Position:		Northing:	1,544,670.15 usft	Latitude:	40.816275
From:	Lat/Long	Easting:	3,467,568.48 usft	Longitude:	-103.810706
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.09 °

Well	Razor 25B -2549					
Well Position	+N/-S	0.0 usft	Northing:	1,544,620.00 usft	Latitude:	40.816139
	+E/-W	0.0 usft	Easting:	3,467,539.53 usft	Longitude:	-103.810814
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,756.4 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/17/2014	7.95	67.43	53,118

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	187.24	

Survey Program	Date	8/5/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
414.0	10,183.0	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	1,544,620.00	3,467,539.53	40.816139	-103.810814	
414.0	0.68	210.92	414.0	-2.1	-1.3	1,544,617.87	3,467,538.31	40.816133	-103.810819	
505.0	1.62	270.02	505.0	-2.6	-2.8	1,544,617.38	3,467,536.76	40.816132	-103.810824	
597.0	3.53	280.28	596.9	-2.1	-6.9	1,544,617.81	3,467,532.66	40.816133	-103.810839	
689.0	5.42	283.45	688.6	-0.5	-13.9	1,544,619.19	3,467,525.62	40.816137	-103.810865	
781.0	7.11	290.28	780.0	2.4	-23.5	1,544,621.99	3,467,516.00	40.816146	-103.810899	
872.0	8.30	293.58	870.2	7.0	-34.8	1,544,626.36	3,467,504.61	40.816158	-103.810940	
964.0	9.53	295.73	961.1	13.0	-47.7	1,544,632.07	3,467,491.55	40.816175	-103.810987	
1,054.0	10.98	297.28	1,049.7	20.1	-62.1	1,544,638.96	3,467,477.09	40.816194	-103.811039	
1,146.0	11.37	297.10	1,139.9	28.3	-77.9	1,544,646.80	3,467,461.07	40.816217	-103.811096	
1,474.0	10.36	301.44	1,462.0	58.4	-131.9	1,544,675.88	3,467,406.56	40.816299	-103.811291	
1,581.0	10.25	298.58	1,567.3	68.0	-148.4	1,544,685.14	3,467,389.82	40.816326	-103.811351	

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
1,673.0	11.60	289.87	1,657.7	75.0	-164.3	1,544,691.89	3,467,373.79	40.816345	-103.811408
1,764.0	13.04	284.71	1,746.6	80.8	-182.9	1,544,697.26	3,467,355.15	40.816361	-103.811475
1,856.0	12.43	270.95	1,836.3	83.6	-202.8	1,544,699.68	3,467,335.16	40.816368	-103.811547
1,947.0	11.89	270.23	1,925.3	83.8	-222.0	1,544,699.51	3,467,315.99	40.816369	-103.811616
2,039.0	11.60	267.60	2,015.3	83.4	-240.7	1,544,698.81	3,467,297.28	40.816368	-103.811684
2,130.0	12.80	271.40	2,104.3	83.3	-259.9	1,544,698.30	3,467,278.07	40.816368	-103.811753
2,222.0	12.39	270.09	2,194.1	83.5	-280.0	1,544,698.19	3,467,258.01	40.816368	-103.811826
2,313.0	11.89	273.89	2,283.0	84.2	-299.1	1,544,698.47	3,467,238.89	40.816370	-103.811895
2,404.0	11.60	273.83	2,372.1	85.4	-317.6	1,544,699.37	3,467,220.38	40.816373	-103.811962
2,496.0	12.02	283.57	2,462.2	88.3	-336.1	1,544,701.88	3,467,201.79	40.816381	-103.812029
2,587.0	12.48	282.37	2,551.1	92.6	-354.9	1,544,705.85	3,467,182.90	40.816393	-103.812097
2,679.0	13.70	284.97	2,640.7	97.6	-375.2	1,544,710.41	3,467,162.57	40.816407	-103.812170
2,770.0	12.97	282.58	2,729.3	102.6	-395.6	1,544,715.03	3,467,142.10	40.816421	-103.812243
2,861.0	12.38	282.41	2,818.1	106.9	-415.0	1,544,718.98	3,467,122.53	40.816432	-103.812314
2,953.0	12.27	287.20	2,907.9	111.9	-434.0	1,544,723.62	3,467,103.46	40.816446	-103.812382
3,044.0	11.17	281.80	2,997.0	116.6	-451.9	1,544,727.94	3,467,085.51	40.816459	-103.812447
3,136.0	11.71	280.53	3,087.2	120.1	-469.8	1,544,731.13	3,467,067.55	40.816469	-103.812511
3,227.0	14.85	285.63	3,175.8	124.9	-490.1	1,544,735.57	3,467,047.14	40.816482	-103.812585
3,319.0	14.85	285.02	3,264.7	131.2	-512.8	1,544,741.37	3,467,024.29	40.816499	-103.812667
3,410.0	14.68	283.58	3,352.7	136.9	-535.3	1,544,746.67	3,467,001.71	40.816515	-103.812748
3,501.0	14.94	283.52	3,440.7	142.3	-557.9	1,544,751.69	3,466,979.00	40.816530	-103.812830
3,592.0	14.86	282.83	3,528.6	147.7	-580.7	1,544,756.59	3,466,956.12	40.816544	-103.812912
3,684.0	13.73	281.87	3,617.8	152.5	-602.9	1,544,761.03	3,466,933.84	40.816558	-103.812992
3,775.0	12.15	280.22	3,706.5	156.5	-622.9	1,544,764.57	3,466,913.78	40.816568	-103.813065
3,867.0	10.78	278.62	3,796.6	159.5	-640.9	1,544,767.23	3,466,895.69	40.816577	-103.813130
3,959.0	9.32	275.88	3,887.2	161.5	-656.8	1,544,768.98	3,466,879.73	40.816582	-103.813187
4,050.0	9.02	291.10	3,977.0	164.8	-670.8	1,544,772.04	3,466,865.69	40.816591	-103.813238
4,142.0	9.11	292.62	4,067.9	170.2	-684.3	1,544,777.18	3,466,852.14	40.816606	-103.813286
4,233.0	8.87	290.21	4,157.8	175.4	-697.5	1,544,782.12	3,466,838.80	40.816620	-103.813334
4,324.0	8.21	286.06	4,247.8	179.7	-710.3	1,544,786.10	3,466,825.90	40.816632	-103.813381
4,416.0	7.97	287.44	4,338.9	183.4	-722.7	1,544,789.59	3,466,813.43	40.816642	-103.813425
4,507.0	7.99	286.97	4,429.0	187.1	-734.8	1,544,793.10	3,466,801.30	40.816653	-103.813469
4,598.0	6.80	283.66	4,519.2	190.2	-746.1	1,544,796.00	3,466,789.95	40.816661	-103.813510
4,690.0	5.93	280.90	4,610.7	192.4	-756.1	1,544,797.99	3,466,779.95	40.816667	-103.813546
4,782.0	4.85	277.49	4,702.2	193.8	-764.6	1,544,799.24	3,466,771.41	40.816671	-103.813576
4,874.0	4.36	274.61	4,793.9	194.6	-771.9	1,544,799.88	3,466,764.05	40.816673	-103.813603
4,965.0	3.96	271.50	4,884.7	195.0	-778.5	1,544,800.12	3,466,757.46	40.816674	-103.813627
5,057.0	3.36	270.90	4,976.5	195.1	-784.4	1,544,800.13	3,466,751.58	40.816674	-103.813648
5,147.0	2.64	258.54	5,066.4	194.7	-789.0	1,544,799.67	3,466,746.92	40.816673	-103.813665
5,239.0	2.34	256.64	5,158.3	193.9	-792.9	1,544,798.74	3,466,743.04	40.816671	-103.813679
5,300.0	3.94	210.16	5,219.2	191.8	-795.2	1,544,796.60	3,466,740.81	40.816665	-103.813687
5,330.0	3.98	209.87	5,249.2	190.0	-796.2	1,544,794.79	3,466,739.81	40.816660	-103.813691
5,360.0	4.56	205.21	5,279.1	188.0	-797.3	1,544,792.79	3,466,738.82	40.816655	-103.813695
5,421.0	8.27	202.99	5,339.7	181.8	-800.0	1,544,786.50	3,466,736.19	40.816638	-103.813705
5,452.0	13.18	199.17	5,370.1	176.4	-802.1	1,544,781.07	3,466,734.26	40.816623	-103.813712
5,483.0	18.38	195.99	5,399.9	168.3	-804.6	1,544,772.98	3,466,731.91	40.816601	-103.813721
5,513.0	23.30	192.99	5,428.0	158.0	-807.2	1,544,762.60	3,466,729.47	40.816573	-103.813730
5,544.0	27.74	187.21	5,455.9	144.9	-809.5	1,544,749.42	3,466,727.43	40.816537	-103.813739
5,575.0	31.70	182.73	5,482.9	129.6	-810.8	1,544,734.09	3,466,726.43	40.816495	-103.813743
5,605.0	33.63	175.39	5,508.1	113.4	-810.5	1,544,717.94	3,466,727.03	40.816450	-103.813742
5,636.0	33.81	170.65	5,533.9	96.3	-808.4	1,544,700.91	3,466,729.45	40.816403	-103.813735
5,666.0	33.88	169.03	5,558.8	79.9	-805.5	1,544,684.53	3,466,732.71	40.816358	-103.813724
5,697.0	34.45	169.45	5,584.5	62.8	-802.2	1,544,667.49	3,466,736.28	40.816311	-103.813712
5,727.0	36.99	175.19	5,608.8	45.4	-799.9	1,544,650.19	3,466,738.92	40.816264	-103.813704
5,757.0	40.58	178.52	5,632.2	26.7	-798.9	1,544,631.46	3,466,740.29	40.816212	-103.813700

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
5,788.0	46.04	180.41	5,654.8	5.4	-798.7	1,544,610.21	3,466,740.88	40.816154	-103.813700
5,818.0	53.28	182.72	5,674.2	-17.4	-799.3	1,544,587.37	3,466,740.66	40.816091	-103.813702
5,848.0	59.91	184.00	5,690.7	-42.4	-800.8	1,544,562.36	3,466,739.66	40.816023	-103.813707
5,878.0	63.34	182.38	5,705.0	-68.7	-802.3	1,544,535.98	3,466,738.70	40.815950	-103.813713
5,910.0	63.08	181.38	5,719.4	-97.3	-803.2	1,544,507.42	3,466,738.31	40.815872	-103.813716
5,942.0	64.98	180.00	5,733.4	-126.1	-803.6	1,544,478.66	3,466,738.51	40.815793	-103.813717
5,973.0	69.09	179.07	5,745.5	-154.6	-803.3	1,544,450.13	3,466,739.29	40.815715	-103.813716
6,005.0	72.88	178.36	5,755.9	-184.8	-802.7	1,544,419.91	3,466,740.55	40.815632	-103.813714
6,037.0	76.36	179.64	5,764.4	-215.7	-802.1	1,544,389.08	3,466,741.67	40.815547	-103.813712
6,068.0	78.81	181.56	5,771.1	-246.0	-802.4	1,544,358.81	3,466,741.93	40.815464	-103.813713
6,100.0	82.46	184.55	5,776.3	-277.5	-804.1	1,544,327.27	3,466,740.84	40.815377	-103.813719
6,228.0	88.15	182.92	5,786.7	-404.7	-812.4	1,544,199.87	3,466,734.97	40.815028	-103.813749
6,319.0	90.18	183.58	5,788.1	-495.6	-817.6	1,544,108.95	3,466,731.54	40.814779	-103.813768
6,411.0	91.05	180.94	5,787.1	-587.5	-821.2	1,544,016.99	3,466,729.66	40.814526	-103.813781
6,502.0	93.27	179.43	5,783.6	-678.4	-821.5	1,543,926.07	3,466,731.10	40.814277	-103.813782
6,594.0	93.58	176.72	5,778.2	-770.2	-818.4	1,543,834.39	3,466,735.93	40.814025	-103.813771
6,684.0	91.48	176.52	5,774.2	-859.9	-813.1	1,543,744.75	3,466,742.94	40.813779	-103.813752
6,776.0	90.65	175.51	5,772.5	-951.7	-806.7	1,543,653.13	3,466,751.08	40.813527	-103.813729
6,867.0	90.22	175.08	5,771.8	-1,042.4	-799.3	1,543,562.60	3,466,760.27	40.813278	-103.813702
6,959.0	90.09	174.98	5,771.5	-1,134.0	-791.3	1,543,471.11	3,466,769.98	40.813026	-103.813673
7,051.0	89.85	174.48	5,771.6	-1,225.6	-782.8	1,543,379.68	3,466,780.18	40.812775	-103.813642
7,142.0	89.08	174.11	5,772.4	-1,316.2	-773.8	1,543,289.33	3,466,790.95	40.812526	-103.813610
7,233.0	88.52	174.30	5,774.3	-1,406.7	-764.6	1,543,199.00	3,466,801.86	40.812278	-103.813576
7,325.0	89.23	173.78	5,776.1	-1,498.2	-755.1	1,543,107.72	3,466,813.15	40.812027	-103.813542
7,416.0	90.74	175.05	5,776.2	-1,588.7	-746.2	1,543,017.34	3,466,823.73	40.811778	-103.813510
7,507.0	90.18	174.44	5,775.4	-1,679.4	-737.9	1,542,926.90	3,466,833.79	40.811530	-103.813480
7,598.0	89.91	174.91	5,775.4	-1,770.0	-729.4	1,542,836.47	3,466,843.95	40.811281	-103.813449
7,690.0	90.15	175.99	5,775.3	-1,861.7	-722.1	1,542,744.92	3,466,853.00	40.811029	-103.813423
7,782.0	89.48	174.72	5,775.6	-1,953.4	-714.7	1,542,653.38	3,466,862.19	40.810778	-103.813396
7,874.0	90.62	177.12	5,775.5	-2,045.1	-708.1	1,542,561.77	3,466,870.49	40.810526	-103.813372
7,965.0	92.28	177.27	5,773.2	-2,136.0	-703.7	1,542,471.01	3,466,876.67	40.810276	-103.813356
8,056.0	92.40	179.11	5,769.5	-2,226.9	-700.8	1,542,380.20	3,466,881.27	40.810027	-103.813346
8,147.0	90.86	180.31	5,766.9	-2,317.8	-700.3	1,542,289.27	3,466,883.46	40.809777	-103.813344
8,239.0	89.51	179.49	5,766.6	-2,409.8	-700.2	1,542,197.30	3,466,885.37	40.809525	-103.813344
8,330.0	89.08	179.45	5,767.7	-2,500.8	-699.3	1,542,106.34	3,466,887.95	40.809275	-103.813341
8,421.0	88.92	178.11	5,769.3	-2,591.8	-697.4	1,542,015.43	3,466,891.62	40.809025	-103.813334
8,513.0	89.57	176.97	5,770.5	-2,683.7	-693.5	1,541,923.62	3,466,897.32	40.808773	-103.813319
8,605.0	88.89	177.12	5,771.8	-2,775.5	-688.7	1,541,831.86	3,466,903.81	40.808521	-103.813302
8,697.0	89.85	176.24	5,772.8	-2,867.4	-683.4	1,541,740.14	3,466,910.88	40.808269	-103.813283
8,788.0	88.89	175.02	5,773.8	-2,958.1	-676.5	1,541,649.56	3,466,919.54	40.808020	-103.813258
8,879.0	90.52	174.53	5,774.3	-3,048.7	-668.2	1,541,559.11	3,466,929.56	40.807771	-103.813228
8,971.0	91.54	175.39	5,772.6	-3,140.3	-660.1	1,541,467.66	3,466,939.38	40.807520	-103.813199
9,062.0	90.96	175.69	5,770.6	-3,231.0	-653.0	1,541,377.11	3,466,948.18	40.807271	-103.813173
9,154.0	89.94	176.40	5,769.9	-3,322.8	-646.7	1,541,285.47	3,466,956.27	40.807019	-103.813150
9,245.0	89.20	174.42	5,770.6	-3,413.5	-639.4	1,541,194.92	3,466,965.28	40.806770	-103.813124
9,336.0	90.80	173.34	5,770.6	-3,504.0	-629.7	1,541,104.65	3,466,976.70	40.806522	-103.813089
9,428.0	91.82	174.55	5,768.5	-3,595.5	-620.0	1,541,013.39	3,466,988.15	40.806271	-103.813054
9,520.0	91.91	175.19	5,765.5	-3,687.0	-611.8	1,540,921.98	3,466,998.11	40.806019	-103.813024
9,611.0	91.14	177.46	5,763.1	-3,777.8	-605.9	1,540,831.33	3,467,005.67	40.805770	-103.813003
9,702.0	91.63	177.94	5,760.9	-3,868.7	-602.3	1,540,740.52	3,467,011.05	40.805521	-103.812990
9,793.0	90.15	179.71	5,759.5	-3,959.7	-600.4	1,540,649.61	3,467,014.65	40.805271	-103.812983
9,888.0	89.20	179.38	5,760.0	-4,054.7	-599.7	1,540,554.65	3,467,017.21	40.805010	-103.812980
9,983.0	89.14	176.69	5,761.4	-4,149.6	-596.4	1,540,459.80	3,467,022.28	40.804750	-103.812969
10,078.0	90.52	176.48	5,761.7	-4,244.4	-590.7	1,540,365.10	3,467,029.74	40.804489	-103.812948

Cathedral Energy Services

Survey Report - Geographic

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor 25B -2549
Project:	Weld County, CO	TVD Reference:	KB=17' @ 4773.4usft (Cade #23)
Site:	S25-T10N-R58W	MD Reference:	KB=17' @ 4773.4usft (Cade #23)
Well:	Razor 25B -2549	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
10,138.0	90.37	176.49	5,761.2	-4,304.3	-587.1	1,540,305.27	3,467,034.56	40.804325	-103.812935
Last CES Survey @ 10,138" MD									
10,183.0	90.37	176.49	5,760.9	-4,349.2	-584.3	1,540,260.44	3,467,038.17	40.804202	-103.812925
PTB @ 10,183' - TD - 635' FSL, 2696' FEL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Razor 25B -2549 VP (Pc	0.00	0.00	4,952.1	200.0	-821.0	1,544,804.35	3,466,714.87	40.816688	-103.813780
- actual wellpath misses target center by 38.3usft at 5035.0usft MD (4954.5 TVD, 195.1 N, -783.1 E)									
- Point									
Razor 25B -2549 PBHL	90.00	0.00	5,773.0	-4,383.3	-556.8	1,540,226.88	3,467,066.33	40.804108	-103.812825
- actual wellpath misses target center by 45.5usft at 10183.0usft MD (5760.9 TVD, -4349.2 N, -584.3 E)									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
6,133.2	5,780.2	7" - 634' FNL, 2839' FEL			

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
10,138.0	5,761.2	-4,304.3	-587.1	Last CES Survey @ 10,138" MD	
10,183.0	5,760.9	-4,349.2	-584.3	PTB @ 10,183'	
10,183.0	5,760.9	-4,349.2	-584.3	TD - 635' FSL, 2696' FEL	

Checked By: _____ Approved By: _____ Date: _____