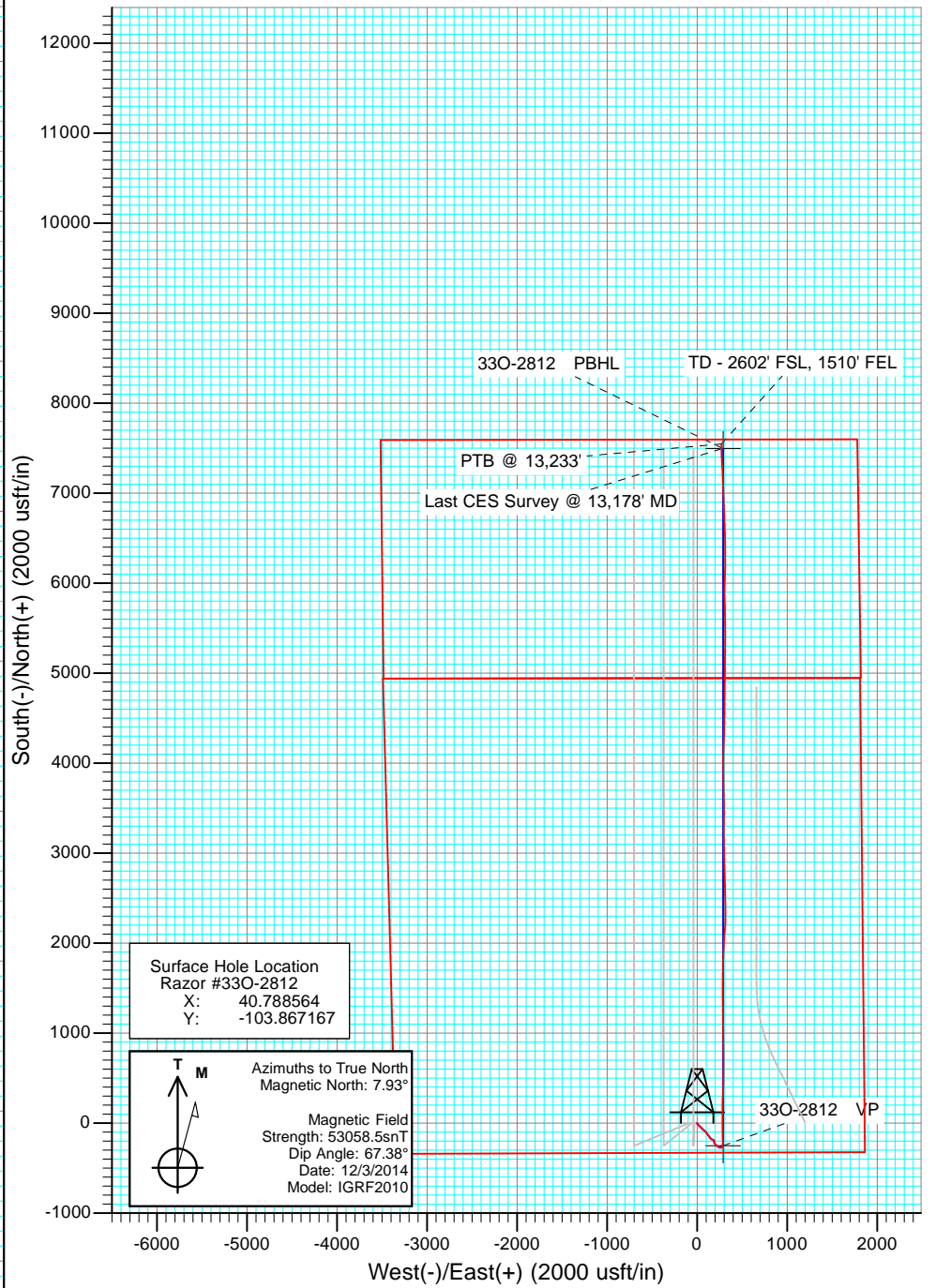
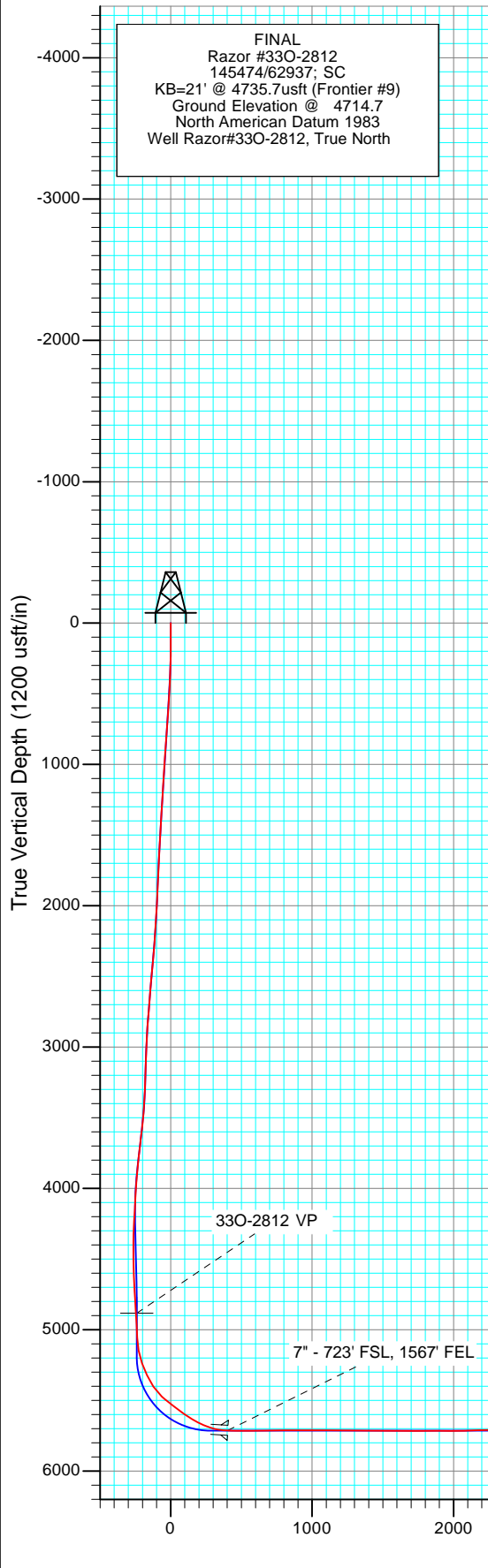
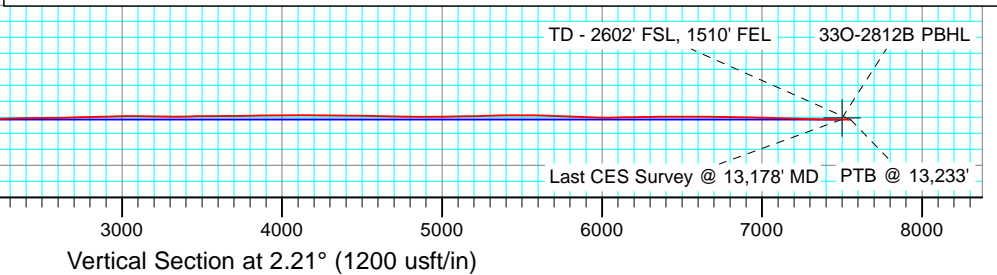


FINAL
 Razor #330-2812
 145474/62937: SC
 KB=21' @ 4735.7usft (Frontier #9)
 Ground Elevation @ 4714.7
 North American Datum 1983
 Well Razor#330-2812, True North



DESIGN TARGET DETAILS					
Name	TVD	+N/-S	+E/-W	Northing	Easting
330-2812 VP	4883.1	-251.0	289.1	1534037.24	3452422.51
330-2812 PBHL	5704.0	7494.3	289.1	1541781.19	3452279.90



Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #33O-2812
Project:	Weld County, CO	TVD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Site:	S33-T10N-R58W	MD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Well:	Razor #33O-2812	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		S33-T10N-R58W			
Site Position:		Northing:	1,534,460.86 usft	Latitude:	40.789186
From:	Lat/Long	Easting:	3,449,473.56 usft	Longitude:	-103.876742
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	1.05 °

Well	Razor #33O-2812					
Well Position	+N/-S	0.0 usft	Northing:	1,534,282.88 usft	Latitude:	40.788564
	+E/-W	0.0 usft	Easting:	3,452,128.80 usft	Longitude:	-103.867167
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,714.7 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/3/2014	7.93	67.38	53,058

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	2.21	

Survey Program	Date	1/8/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
142.0	1,517.0	Surface Surveys by Phoenix (HZ)	ISCWSA MWD	MWD - ISCWSA	
1,591.0	13,233.0	Survey #2 (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		
142.0	0.16	252.49	142.0	-0.1	-0.2	-0.1	0.11	0.11		
234.0	0.68	202.77	234.0	-0.6	-0.5	-0.6	0.64	0.57		
326.0	1.50	164.91	326.0	-2.3	-0.4	-2.3	1.14	0.89		
418.0	3.92	146.61	417.9	-6.1	1.6	-6.0	2.76	2.63		
511.0	4.85	137.24	510.6	-11.6	6.0	-11.4	1.26	1.00		
604.0	4.31	141.24	603.3	-17.2	10.9	-16.8	0.67	-0.58		
696.0	6.58	134.55	694.9	-23.6	16.8	-22.9	2.56	2.47		
788.0	6.46	136.23	786.3	-31.0	24.2	-30.1	0.24	-0.13		
881.0	5.61	132.86	878.8	-37.9	31.1	-36.7	0.99	-0.91		
973.0	5.37	135.43	970.4	-44.0	37.4	-42.6	0.37	-0.26		
1,064.0	5.09	136.18	1,061.0	-50.0	43.2	-48.3	0.32	-0.31		

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #33O-2812
Project:	Weld County, CO	TVD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Site:	S33-T10N-R58W	MD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Well:	Razor #33O-2812	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
1,157.0	5.24	132.44	1,153.6	-55.8	49.2	-53.9	0.40	0.16	
1,249.0	5.18	132.61	1,245.2	-61.5	55.4	-59.3	0.07	-0.07	
1,341.0	5.28	130.92	1,336.8	-67.1	61.6	-64.6	0.20	0.11	
1,433.0	4.90	133.21	1,428.5	-72.5	67.7	-69.9	0.47	-0.41	
1,517.0	4.43	134.36	1,512.2	-77.2	72.6	-74.4	0.57	-0.56	
1,591.0	4.45	135.05	1,586.0	-81.3	76.7	-78.3	0.08	0.03	
1,684.0	3.83	131.49	1,678.7	-85.9	81.6	-82.7	0.72	-0.67	
1,777.0	4.53	136.43	1,771.5	-90.6	86.4	-87.2	0.85	0.75	
1,869.0	4.35	135.05	1,863.2	-95.7	91.4	-92.1	0.23	-0.20	
1,962.0	4.12	131.89	1,955.9	-100.4	96.4	-96.6	0.35	-0.25	
2,037.0	4.00	126.70	2,030.8	-103.8	100.5	-99.8	0.52	-0.16	
2,129.0	4.59	152.50	2,122.5	-109.0	104.7	-104.9	2.17	0.64	
2,221.0	6.14	143.50	2,214.1	-116.2	109.4	-111.9	1.91	1.68	
2,314.0	5.84	141.87	2,306.6	-123.9	115.2	-119.4	0.37	-0.32	
2,406.0	5.78	145.05	2,398.1	-131.4	120.8	-126.6	0.36	-0.07	
2,498.0	6.27	147.01	2,489.6	-139.4	126.2	-134.4	0.58	0.53	
2,591.0	6.01	145.07	2,582.1	-147.7	131.7	-142.5	0.36	-0.28	
2,683.0	6.15	141.21	2,673.6	-155.4	137.6	-150.0	0.47	0.15	
2,775.0	5.99	138.25	2,765.0	-162.9	143.9	-157.2	0.38	-0.17	
2,868.0	6.08	134.77	2,857.5	-170.0	150.6	-164.0	0.41	0.10	
2,960.0	5.69	125.92	2,949.1	-176.1	157.7	-169.9	1.07	-0.42	
3,052.0	5.12	115.25	3,040.6	-180.5	165.1	-174.0	1.25	-0.62	
3,145.0	4.91	113.81	3,133.3	-183.9	172.5	-177.1	0.26	-0.23	
3,237.0	4.49	111.69	3,225.0	-186.8	179.5	-179.7	0.49	-0.46	
3,329.0	3.52	131.98	3,316.8	-190.0	184.9	-182.7	1.85	-1.05	
3,420.0	3.79	177.63	3,407.6	-194.9	187.1	-187.5	3.13	0.30	
3,511.0	6.22	169.39	3,498.2	-202.7	188.2	-195.3	2.78	2.67	
3,603.0	5.89	170.56	3,589.7	-212.3	189.9	-204.8	0.38	-0.36	
3,695.0	8.41	154.09	3,681.0	-223.0	193.6	-215.4	3.50	2.74	
3,788.0	8.29	139.07	3,773.0	-234.2	200.9	-226.3	2.34	-0.13	
3,880.0	7.55	143.17	3,864.2	-244.0	208.9	-235.8	1.01	-0.80	
3,972.0	6.83	120.63	3,955.5	-251.7	217.2	-243.1	3.14	-0.78	
4,064.0	6.86	121.85	4,046.8	-257.3	226.6	-248.4	0.16	0.03	
4,156.0	6.05	127.10	4,138.2	-263.2	235.1	-253.9	1.09	-0.88	
4,248.0	6.48	118.89	4,229.7	-268.6	243.6	-259.0	1.08	0.47	
4,341.0	5.48	117.69	4,322.2	-273.2	252.1	-263.3	1.08	-1.08	
4,433.0	5.10	84.18	4,413.8	-274.8	260.0	-264.6	3.33	-0.41	
4,525.0	4.11	76.08	4,505.5	-273.6	267.3	-263.1	1.28	-1.08	
4,617.0	3.79	73.24	4,597.3	-272.0	273.4	-261.2	0.41	-0.35	
4,709.0	4.46	41.97	4,689.0	-268.4	278.7	-257.5	2.51	0.73	
4,801.0	4.03	32.67	4,780.8	-263.0	282.9	-251.9	0.88	-0.47	
4,893.0	3.00	23.00	4,872.6	-258.1	285.6	-246.9	1.29	-1.12	
4,985.0	3.67	352.00	4,964.5	-253.0	286.1	-241.7	2.06	0.73	
5,077.0	2.49	345.33	5,056.3	-248.1	285.2	-236.9	1.34	-1.28	
5,169.0	10.69	4.39	5,147.7	-237.7	285.3	-226.5	9.10	8.91	
5,261.0	19.36	0.74	5,236.4	-213.9	286.2	-202.7	9.48	9.42	
5,353.0	25.44	356.94	5,321.5	-178.8	285.3	-167.7	6.79	6.61	
5,445.0	33.66	358.57	5,401.4	-133.5	283.6	-122.5	8.98	8.93	
5,537.0	46.23	359.44	5,471.8	-74.6	282.7	-63.6	13.68	13.66	
5,568.0	51.21	0.29	5,492.3	-51.3	282.6	-40.4	16.20	16.06	
5,598.0	52.77	1.02	5,510.7	-27.7	282.9	-16.8	5.54	5.20	
5,629.0	52.46	0.79	5,529.6	-3.0	283.3	7.9	1.16	-1.00	
5,660.0	52.51	0.21	5,548.4	21.5	283.5	32.5	1.49	0.16	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #33O-2812
Project:	Weld County, CO	TVD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Site:	S33-T10N-R58W	MD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Well:	Razor #33O-2812	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
5,690.0	52.72	359.75	5,566.6	45.4	283.5	56.3	1.41	0.70	
5,721.0	52.40	359.73	5,585.5	70.0	283.4	80.9	1.03	-1.03	
5,752.0	54.81	359.76	5,603.9	94.9	283.2	105.8	7.77	7.77	
5,783.0	57.91	359.59	5,621.1	120.7	283.1	131.6	10.01	10.00	
5,814.0	60.33	359.90	5,637.0	147.3	283.0	158.1	7.85	7.81	
5,845.0	63.49	0.13	5,651.6	174.7	283.0	185.5	10.21	10.19	
5,906.0	65.60	0.99	5,677.8	229.8	283.5	240.5	3.69	3.46	
5,998.0	79.79	3.02	5,705.1	317.3	286.7	328.1	15.57	15.42	
6,025.0	84.51	2.78	5,708.8	344.0	288.0	354.9	17.50	17.48	
6,137.0	89.07	0.13	5,715.0	455.8	290.8	466.6	4.71	4.07	
6,232.0	91.30	0.71	5,714.7	550.8	291.5	561.6	2.43	2.35	
6,327.0	90.90	0.22	5,712.9	645.7	292.3	656.5	0.67	-0.42	
6,422.0	90.19	359.06	5,712.0	740.7	291.7	751.4	1.43	-0.75	
6,517.0	89.74	359.33	5,712.1	835.7	290.4	846.3	0.55	-0.47	
6,611.0	90.74	0.45	5,711.7	929.7	290.2	940.2	1.60	1.06	
6,705.0	89.45	359.39	5,711.5	1,023.7	290.1	1,034.1	1.78	-1.37	
6,800.0	89.66	359.36	5,712.2	1,118.7	289.0	1,129.0	0.22	0.22	
6,895.0	89.71	359.52	5,712.8	1,213.7	288.1	1,223.9	0.18	0.05	
6,990.0	89.79	359.57	5,713.2	1,308.7	287.3	1,318.8	0.10	0.08	
7,085.0	89.75	358.92	5,713.6	1,403.7	286.1	1,413.7	0.69	-0.04	
7,179.0	89.53	358.34	5,714.2	1,497.7	283.9	1,507.5	0.66	-0.23	
7,273.0	88.88	0.96	5,715.5	1,591.6	283.3	1,601.4	2.87	-0.69	
7,367.0	91.17	2.78	5,715.4	1,685.6	286.3	1,695.4	3.11	2.44	
7,462.0	90.36	1.11	5,714.1	1,780.5	289.6	1,790.3	1.95	-0.85	
7,556.0	89.17	0.76	5,714.5	1,874.5	291.1	1,884.3	1.32	-1.27	
7,651.0	89.74	4.06	5,715.4	1,969.4	295.1	1,979.3	3.52	0.60	
7,746.0	91.87	4.25	5,714.1	2,064.1	302.0	2,074.2	2.25	2.24	
7,841.0	91.43	4.84	5,711.4	2,158.8	309.5	2,169.1	0.77	-0.46	
7,935.0	91.52	1.77	5,708.9	2,252.6	314.9	2,263.1	3.27	0.10	
8,030.0	91.15	359.51	5,706.7	2,347.6	316.0	2,358.0	2.41	-0.39	
8,125.0	91.08	359.34	5,704.9	2,442.5	315.0	2,452.9	0.19	-0.07	
8,218.0	90.84	358.43	5,703.3	2,535.5	313.2	2,545.7	1.01	-0.26	
8,310.0	90.73	357.27	5,702.1	2,627.4	309.8	2,637.4	1.27	-0.12	
8,402.0	91.58	358.86	5,700.2	2,719.3	306.7	2,729.1	1.96	0.92	
8,494.0	91.54	358.48	5,697.7	2,811.3	304.5	2,820.9	0.42	-0.04	
8,587.0	91.28	357.92	5,695.4	2,904.2	301.6	2,913.7	0.66	-0.28	
8,680.0	91.54	357.80	5,693.1	2,997.1	298.1	3,006.4	0.31	0.28	
8,772.0	89.08	0.51	5,692.6	3,089.1	296.8	3,098.2	3.98	-2.67	
8,865.0	88.56	359.94	5,694.5	3,182.1	297.1	3,191.2	0.83	-0.56	
8,957.0	90.18	0.34	5,695.6	3,274.1	297.4	3,283.1	1.81	1.76	
9,049.0	90.36	0.32	5,695.1	3,366.1	297.9	3,375.0	0.20	0.20	
9,141.0	91.58	0.33	5,693.6	3,458.0	298.4	3,467.0	1.33	1.33	
9,233.0	89.82	358.52	5,692.4	3,550.0	297.5	3,558.9	2.74	-1.91	
9,326.0	90.71	359.63	5,692.0	3,643.0	296.0	3,651.7	1.53	0.96	
9,418.0	90.00	358.40	5,691.4	3,735.0	294.4	3,743.6	1.54	-0.77	
9,510.0	90.57	359.29	5,691.0	3,827.0	292.6	3,835.4	1.15	0.62	
9,602.0	90.90	359.66	5,689.8	3,919.0	291.7	3,927.3	0.54	0.36	
9,695.0	90.62	359.92	5,688.6	4,012.0	291.4	4,020.2	0.41	-0.30	
9,787.0	90.24	0.57	5,687.9	4,103.9	291.8	4,112.1	0.82	-0.41	
9,880.0	90.86	3.46	5,687.0	4,196.9	295.0	4,205.1	3.18	0.67	
9,972.0	88.47	1.41	5,687.5	4,288.8	298.9	4,297.1	3.42	-2.60	
10,064.0	88.42	1.56	5,690.0	4,380.7	301.3	4,389.1	0.17	-0.05	
10,157.0	89.16	1.25	5,692.0	4,473.7	303.6	4,482.0	0.86	0.80	

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #33O-2812
Project:	Weld County, CO	TVD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Site:	S33-T10N-R58W	MD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Well:	Razor #33O-2812	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
10,249.0	89.14	0.75	5,693.4	4,565.6	305.2	4,574.0	0.54	-0.02	
10,341.0	89.07	0.14	5,694.8	4,657.6	305.9	4,666.0	0.67	-0.08	
10,432.0	89.54	0.40	5,695.9	4,748.6	306.4	4,756.9	0.59	0.52	
10,524.0	89.82	0.05	5,696.4	4,840.6	306.7	4,848.8	0.49	0.30	
10,616.0	90.47	0.35	5,696.2	4,932.6	307.0	4,940.8	0.78	0.71	
10,708.0	90.54	0.75	5,695.4	5,024.6	307.9	5,032.7	0.44	0.08	
10,801.0	90.74	0.79	5,694.3	5,117.6	309.2	5,125.7	0.22	0.22	
10,893.0	91.49	1.02	5,692.5	5,209.6	310.6	5,217.7	0.85	0.82	
10,985.0	91.89	0.58	5,689.8	5,301.5	311.9	5,309.6	0.65	0.43	
11,076.0	90.00	0.19	5,688.3	5,392.5	312.5	5,400.5	2.12	-2.08	
11,169.0	90.67	0.32	5,687.8	5,485.5	312.9	5,493.5	0.73	0.72	
11,260.0	88.46	358.83	5,688.5	5,576.5	312.3	5,584.4	2.93	-2.43	
11,353.0	88.33	358.12	5,691.1	5,669.4	309.8	5,677.1	0.78	-0.14	
11,445.0	87.61	357.64	5,694.3	5,761.3	306.4	5,768.8	0.94	-0.78	
11,538.0	87.95	359.96	5,697.9	5,854.2	304.4	5,861.6	2.52	0.37	
11,629.0	87.86	0.92	5,701.3	5,945.1	305.1	5,952.5	1.06	-0.10	
11,721.0	90.81	1.61	5,702.3	6,037.1	307.2	6,044.4	3.29	3.21	
11,813.0	91.10	1.57	5,700.8	6,129.0	309.7	6,136.4	0.32	0.32	
11,905.0	91.34	1.49	5,698.8	6,221.0	312.2	6,228.4	0.27	0.26	
11,997.0	91.52	0.73	5,696.5	6,312.9	314.0	6,320.3	0.85	0.20	
12,089.0	89.68	359.27	5,695.6	6,404.9	314.0	6,412.3	2.55	-2.00	
12,181.0	89.86	358.28	5,695.9	6,496.9	312.0	6,504.1	1.09	0.20	
12,273.0	89.82	358.14	5,696.2	6,588.9	309.1	6,595.9	0.16	-0.04	
12,365.0	89.53	356.92	5,696.7	6,680.8	305.2	6,687.6	1.36	-0.32	
12,457.0	88.86	357.88	5,698.0	6,772.7	301.0	6,779.2	1.27	-0.73	
12,549.0	88.15	357.28	5,700.4	6,864.5	297.1	6,870.9	1.01	-0.77	
12,641.0	89.04	358.36	5,702.7	6,956.5	293.6	6,962.6	1.52	0.97	
12,734.0	89.03	358.41	5,704.2	7,049.4	291.0	7,055.4	0.05	-0.01	
12,826.0	88.52	357.41	5,706.2	7,141.3	287.6	7,147.1	1.22	-0.55	
12,918.0	88.19	356.81	5,708.8	7,233.2	283.0	7,238.7	0.74	-0.36	
13,010.0	87.52	356.03	5,712.3	7,324.9	277.2	7,330.2	1.12	-0.73	
13,103.0	90.43	359.12	5,714.0	7,417.8	273.3	7,422.8	4.56	3.13	
13,178.0	89.61	358.41	5,713.9	7,492.8	271.7	7,497.7	1.45	-1.09	Last CES Survey @ 13,178' MD
13,233.0	89.61	358.41	5,714.3	7,547.8	270.2	7,552.6	0.00	0.00	PTB @ 13,233' - TD - 2602' FSL, 1510' FEL

Cathedral Energy Services

Survey Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well Razor #33O-2812
Project:	Weld County, CO	TVD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Site:	S33-T10N-R58W	MD Reference:	KB=21' @ 4735.7usft (Frontier #9)
Well:	Razor #33O-2812	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									
33O-2812 PBHL (P3)	0.00	1.06	5,714.0	7,494.3	289.1	1,541,781.19	3,452,279.90	40.809133	-103.866122
- actual wellpath misses target center by 17.5usft at 13178.0usft MD (5713.9 TVD, 7492.8 N, 271.7 E)									
- Point									
33O-2812 PBHL	0.00	1.06	5,704.0	7,494.3	289.1	1,541,781.19	3,452,279.90	40.809133	-103.866122
- actual wellpath misses target center by 20.1usft at 13178.0usft MD (5713.9 TVD, 7492.8 N, 271.7 E)									
- Point									
33O-2812 VP	0.00	1.06	4,883.1	-251.0	289.1	1,534,037.24	3,452,422.51	40.787875	-103.866123
- actual wellpath misses target center by 7.4usft at 4903.9usft MD (4883.5 TVD, -257.6 N, 285.8 E)									
- Point									
33O-2812 VP (P3)	0.00	1.06	4,893.1	-251.0	289.1	1,534,037.24	3,452,422.51	40.787875	-103.866123
- actual wellpath misses target center by 6.9usft at 4913.9usft MD (4893.5 TVD, -257.1 N, 285.9 E)									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(usft)	(usft)			(")	(")
6,075.0	5,712.7	7" - 723' FSL, 1567' FEL		0	0

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S	+E/-W		
(usft)	(usft)	(usft)	(usft)		
13,178.0	5,713.9	7,492.8	271.7	Last CES Survey @ 13,178' MD	
13,233.0	5,714.3	7,547.8	270.2	PTB @ 13,233'	
13,233.0	5,714.3	7,547.8	270.2	TD - 2602' FSL, 1510' FEL	

Checked By: _____ Approved By: _____ Date: _____