

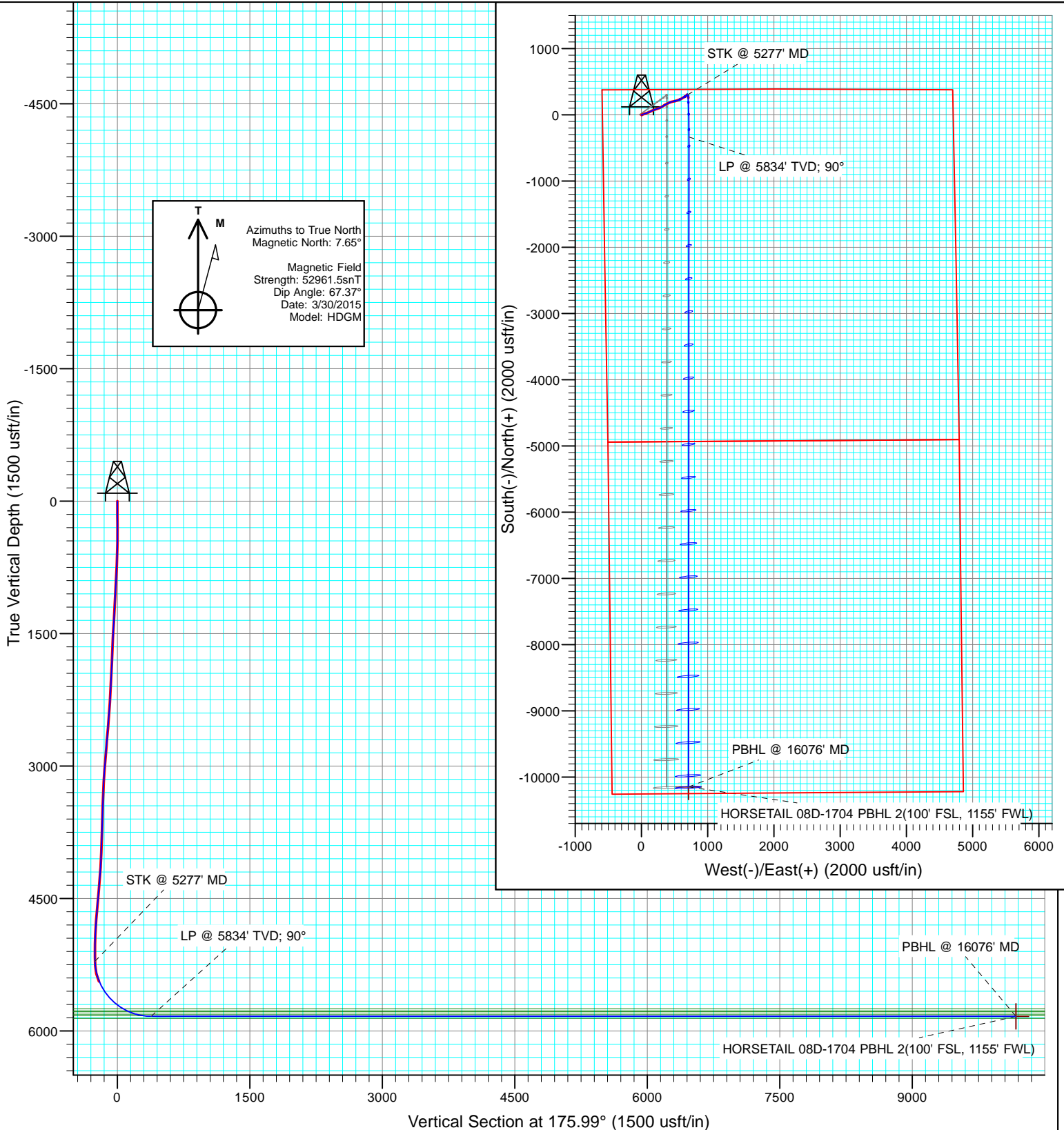


Project: Weld County, CO
Site: S8-T10N-R57W
Well: HORSETAIL 08D-1704
Wellbore: HZ
Design: ST Plan #1



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target	Annotation
1	5277.0	2.19	125.29	5212.0	302.3	697.5	0.00	0.00	-252.8		STK @ 5277' MD
2	6262.9	90.00	180.03	5834.3	-334.2	716.6	9.00	54.76	383.4		LP @ 5834' TVD; 90°
3	16076.7	90.00	180.03	5835.0	-10148.0	711.1	0.00	0.00	10172.8	HORSETAIL 08D-1704 PBHL 2(100' FSL, 1155' FWL)	PBHL @ 16076' MD



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Company:	Whiting Petroleum Corporation	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Project:	Weld County, CO	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site:	S8-T10N-R57W	North Reference:	True
Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	ST Plan #1		

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		S8-T10N-R57W			
Site Position:		Northing:	1,560,717.72 usft	Latitude:	40.859783
From:	Lat/Long	Easting:	3,477,578.15 usft	Longitude:	-103.773422
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.12 °

Well	HORSETAIL 08D-1704					
Well Position	+N/-S	0.0 usft	Northing:	1,560,656.79 usft	Latitude:	40.859761
	+E/-W	0.0 usft	Easting:	3,474,851.73 usft	Longitude:	-103.783281
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,958.2 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	HDGM	3/30/2015	7.65	67.37	52,962

Design	ST Plan #1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	5,277.0	
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	175.99	

Plan Sections										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Dogleg Rate	Build Rate	Turn Rate	TFO	Target
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
5,277.0	2.19	125.29	5,212.0	302.3	697.5	0.00	0.00	0.00	0.00	
6,262.9	90.00	180.03	5,834.3	-334.2	716.6	9.00	8.91	5.55	54.76	
16,076.7	90.00	180.03	5,835.0	-10,148.0	711.1	0.00	0.00	0.00	0.00	HORSETAIL 08D-170

Cathedral Energy Services

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Project:	Weld County, CO	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site:	S8-T10N-R57W	North Reference:	True
Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	ST Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.32	165.68	100.0	-0.3	0.1	0.3	0.32	0.32	
200.0	0.55	170.87	200.0	-1.1	0.3	1.1	0.23	0.22	
300.0	0.52	146.94	300.0	-2.0	0.4	2.0	0.22	-0.02	
400.0	1.38	83.66	400.0	-2.4	1.7	2.5	1.24	0.86	
500.0	3.54	69.32	499.9	-1.2	5.6	1.6	2.23	2.16	
600.0	6.02	64.87	599.5	2.1	13.3	-1.2	2.50	2.48	
700.0	8.41	67.23	698.7	7.3	24.7	-5.6	2.41	2.40	
800.0	11.13	69.06	797.3	13.5	40.4	-10.7	2.74	2.72	
900.0	11.25	70.41	895.3	20.4	59.0	-16.2	0.29	0.11	
1,000.0	10.14	70.90	993.5	26.6	76.6	-21.1	1.11	-1.11	
1,100.0	8.75	70.10	1,092.2	32.0	92.1	-25.5	1.40	-1.39	
1,200.0	7.99	69.48	1,191.1	36.9	105.6	-29.5	0.77	-0.76	
1,300.0	9.45	62.75	1,289.9	43.3	119.6	-34.9	1.78	1.47	
1,400.0	8.91	62.53	1,388.7	50.7	133.8	-41.2	0.54	-0.54	
1,500.0	8.52	64.19	1,487.5	57.5	147.3	-47.1	0.46	-0.39	
1,600.0	8.07	65.93	1,586.5	63.5	160.5	-52.1	0.52	-0.46	
1,700.0	7.63	67.81	1,685.5	68.8	172.9	-56.5	0.51	-0.44	
1,800.0	8.34	68.74	1,784.6	73.9	185.4	-60.8	0.73	0.71	
1,900.0	9.55	71.53	1,883.3	79.3	200.6	-65.1	1.28	1.20	
2,000.0	10.38	72.33	1,981.9	84.5	216.5	-69.1	0.84	0.83	
2,100.0	11.62	71.88	2,080.0	90.4	235.1	-73.7	1.24	1.23	
2,200.0	11.43	70.06	2,177.9	96.9	254.1	-78.9	0.41	-0.18	
2,300.0	10.95	67.54	2,276.0	103.9	272.2	-84.6	0.69	-0.48	
2,400.0	10.68	62.88	2,374.3	111.7	289.2	-91.2	0.92	-0.27	
2,500.0	10.17	59.36	2,472.6	120.5	305.1	-98.9	0.82	-0.51	
2,600.0	9.55	55.57	2,571.1	129.7	319.6	-107.0	0.89	-0.62	
2,700.0	10.59	57.88	2,669.6	139.3	334.0	-115.6	1.11	1.03	
2,800.0	11.62	64.34	2,767.7	148.5	350.9	-123.6	1.62	1.04	
2,900.0	11.42	61.94	2,865.7	157.5	368.8	-131.4	0.52	-0.21	
3,000.0	10.80	60.50	2,963.8	166.8	385.7	-139.4	0.67	-0.61	
3,100.0	10.45	61.08	3,062.1	176.1	401.5	-147.6	0.37	-0.35	
3,200.0	10.07	68.61	3,160.5	183.3	418.1	-153.7	1.39	-0.38	
3,300.0	9.19	69.72	3,259.1	189.5	433.1	-158.8	0.90	-0.88	
3,400.0	9.07	73.68	3,357.8	194.2	448.7	-162.4	0.64	-0.12	
3,500.0	9.67	75.97	3,456.6	198.7	463.5	-165.8	0.71	0.60	
3,600.0	10.59	77.85	3,554.9	202.4	481.4	-168.3	0.98	0.92	
3,700.0	10.40	75.49	3,653.3	206.6	499.0	-171.2	0.47	-0.20	
3,800.0	10.10	73.74	3,751.7	211.4	516.2	-174.8	0.43	-0.30	
3,900.0	9.08	73.05	3,850.2	216.2	532.3	-178.4	1.02	-1.02	
4,000.0	9.43	71.91	3,949.0	220.9	547.4	-182.1	0.39	0.34	
4,100.0	8.21	72.29	4,047.8	225.7	562.2	-185.9	1.21	-1.21	
4,200.0	10.18	66.58	4,146.5	231.3	576.9	-190.4	2.16	1.97	
4,300.0	11.50	63.83	4,244.7	239.2	594.1	-197.1	1.42	1.32	
4,400.0	10.83	59.58	4,342.8	248.4	611.2	-205.1	1.06	-0.67	
4,500.0	10.18	56.27	4,441.2	258.2	626.2	-213.8	0.89	-0.65	
4,600.0	10.90	60.16	4,539.4	267.7	642.2	-222.2	1.01	0.72	
4,700.0	9.74	55.80	4,637.8	277.2	657.6	-230.5	1.40	-1.16	
4,800.0	8.26	50.07	4,736.5	286.6	670.0	-239.1	1.73	-1.48	
4,900.0	6.21	55.40	4,835.7	294.9	679.9	-246.7	2.16	-2.05	
5,000.0	4.47	63.01	4,935.3	299.0	687.8	-250.2	1.87	-1.74	
5,100.0	2.48	58.70	5,035.1	302.3	693.4	-253.1	2.01	-2.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Company:	Whiting Petroleum Corporation	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Project:	Weld County, CO	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site:	S8-T10N-R57W	North Reference:	True
Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	ST Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,200.0	1.09	98.61	5,135.0	303.2	695.8	-253.9	1.78	-1.39	
5,277.0	2.19	125.29	5,212.0	302.3	697.5	-252.8	1.71	1.44	STK @ 5277' MD
5,300.0	3.79	151.83	5,235.0	301.3	698.2	-251.8	9.00	6.92	
5,400.0	12.46	171.90	5,333.9	287.7	701.3	-238.0	9.00	8.68	
5,500.0	21.41	175.46	5,429.5	258.8	704.2	-208.9	9.00	8.94	
5,600.0	30.38	176.97	5,519.3	215.3	707.0	-165.3	9.00	8.98	
5,700.0	39.37	177.85	5,601.3	158.2	709.6	-108.2	9.00	8.99	
5,800.0	48.36	178.44	5,673.3	89.0	711.8	-39.0	9.00	8.99	
5,900.0	57.35	178.88	5,733.6	9.4	713.6	40.5	9.00	8.99	
5,929.6	60.01	179.00	5,749.0	-15.9	714.1	65.7	9.00	8.99	TOP A MARL
5,981.3	64.66	179.18	5,773.0	-61.6	714.8	111.4	9.00	8.99	A MARL
6,000.0	66.35	179.25	5,780.8	-78.7	715.0	128.5	9.00	8.99	
6,010.8	67.32	179.28	5,785.0	-88.6	715.2	138.3	9.00	8.99	TOP UPPER B
6,086.5	74.13	179.52	5,810.0	-160.0	715.9	209.7	9.00	9.00	BASE UPPER B
6,100.0	75.34	179.56	5,813.5	-173.0	716.0	222.7	9.00	9.00	
6,173.5	81.95	179.78	5,828.0	-245.0	716.4	294.5	9.00	9.00	TOP LOWER B
6,197.1	84.08	179.85	5,830.9	-268.5	716.5	317.9	9.00	9.00	7" (610' FNL, 1296' FWL)
6,200.0	84.34	179.85	5,831.2	-271.4	716.5	320.8	9.00	9.00	
6,262.9	90.00	180.03	5,834.3	-334.2	716.6	383.4	9.00	9.00	LP @ 5834' TVD; 90°
6,300.0	90.00	180.03	5,834.3	-371.3	716.5	420.4	0.00	0.00	
6,400.0	90.00	180.03	5,834.3	-471.3	716.5	520.2	0.00	0.00	
6,500.0	90.00	180.03	5,834.3	-571.3	716.4	619.9	0.00	0.00	
6,600.0	90.00	180.03	5,834.3	-671.3	716.4	719.7	0.00	0.00	
6,700.0	90.00	180.03	5,834.3	-771.3	716.3	819.4	0.00	0.00	
6,800.0	90.00	180.03	5,834.3	-871.3	716.3	919.2	0.00	0.00	
6,900.0	90.00	180.03	5,834.3	-971.3	716.2	1,018.9	0.00	0.00	
7,000.0	90.00	180.03	5,834.3	-1,071.3	716.1	1,118.7	0.00	0.00	
7,100.0	90.00	180.03	5,834.3	-1,171.3	716.1	1,218.5	0.00	0.00	
7,200.0	90.00	180.03	5,834.3	-1,271.3	716.0	1,318.2	0.00	0.00	
7,300.0	90.00	180.03	5,834.3	-1,371.3	716.0	1,418.0	0.00	0.00	
7,400.0	90.00	180.03	5,834.4	-1,471.3	715.9	1,517.7	0.00	0.00	
7,500.0	90.00	180.03	5,834.4	-1,571.3	715.9	1,617.5	0.00	0.00	
7,600.0	90.00	180.03	5,834.4	-1,671.3	715.8	1,717.2	0.00	0.00	
7,700.0	90.00	180.03	5,834.4	-1,771.3	715.8	1,817.0	0.00	0.00	
7,800.0	90.00	180.03	5,834.4	-1,871.3	715.7	1,916.7	0.00	0.00	
7,900.0	90.00	180.03	5,834.4	-1,971.3	715.6	2,016.5	0.00	0.00	
8,000.0	90.00	180.03	5,834.4	-2,071.3	715.6	2,116.2	0.00	0.00	
8,100.0	90.00	180.03	5,834.4	-2,171.3	715.5	2,216.0	0.00	0.00	
8,200.0	90.00	180.03	5,834.4	-2,271.3	715.5	2,315.7	0.00	0.00	
8,300.0	90.00	180.03	5,834.4	-2,371.3	715.4	2,415.5	0.00	0.00	
8,400.0	90.00	180.03	5,834.4	-2,471.3	715.4	2,515.2	0.00	0.00	
8,500.0	90.00	180.03	5,834.4	-2,571.3	715.3	2,615.0	0.00	0.00	
8,600.0	90.00	180.03	5,834.4	-2,671.3	715.2	2,714.7	0.00	0.00	
8,700.0	90.00	180.03	5,834.5	-2,771.3	715.2	2,814.5	0.00	0.00	
8,800.0	90.00	180.03	5,834.5	-2,871.3	715.1	2,914.2	0.00	0.00	
8,900.0	90.00	180.03	5,834.5	-2,971.3	715.1	3,014.0	0.00	0.00	
9,000.0	90.00	180.03	5,834.5	-3,071.3	715.0	3,113.7	0.00	0.00	
9,100.0	90.00	180.03	5,834.5	-3,171.3	715.0	3,213.5	0.00	0.00	
9,200.0	90.00	180.03	5,834.5	-3,271.3	714.9	3,313.2	0.00	0.00	
9,300.0	90.00	180.03	5,834.5	-3,371.3	714.9	3,413.0	0.00	0.00	
9,400.0	90.00	180.03	5,834.5	-3,471.3	714.8	3,512.7	0.00	0.00	
9,500.0	90.00	180.03	5,834.5	-3,571.3	714.7	3,612.5	0.00	0.00	

Cathedral Energy Services

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Wellbore:	HZ		
Design:	ST Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
9,600.0	90.00	180.03	5,834.5	-3,671.3	714.7	3,712.2	0.00	0.00	
9,700.0	90.00	180.03	5,834.5	-3,771.3	714.6	3,812.0	0.00	0.00	
9,800.0	90.00	180.03	5,834.5	-3,871.3	714.6	3,911.7	0.00	0.00	
9,900.0	90.00	180.03	5,834.5	-3,971.3	714.5	4,011.5	0.00	0.00	
10,000.0	90.00	180.03	5,834.5	-4,071.3	714.5	4,111.2	0.00	0.00	
10,100.0	90.00	180.03	5,834.6	-4,171.3	714.4	4,211.0	0.00	0.00	
10,200.0	90.00	180.03	5,834.6	-4,271.3	714.4	4,310.7	0.00	0.00	
10,300.0	90.00	180.03	5,834.6	-4,371.3	714.3	4,410.5	0.00	0.00	
10,400.0	90.00	180.03	5,834.6	-4,471.3	714.2	4,510.3	0.00	0.00	
10,500.0	90.00	180.03	5,834.6	-4,571.3	714.2	4,610.0	0.00	0.00	
10,600.0	90.00	180.03	5,834.6	-4,671.3	714.1	4,709.8	0.00	0.00	
10,700.0	90.00	180.03	5,834.6	-4,771.3	714.1	4,809.5	0.00	0.00	
10,800.0	90.00	180.03	5,834.6	-4,871.3	714.0	4,909.3	0.00	0.00	
10,900.0	90.00	180.03	5,834.6	-4,971.3	714.0	5,009.0	0.00	0.00	
11,000.0	90.00	180.03	5,834.6	-5,071.3	713.9	5,108.8	0.00	0.00	
11,100.0	90.00	180.03	5,834.6	-5,171.3	713.8	5,208.5	0.00	0.00	
11,200.0	90.00	180.03	5,834.6	-5,271.3	713.8	5,308.3	0.00	0.00	
11,300.0	90.00	180.03	5,834.6	-5,371.3	713.7	5,408.0	0.00	0.00	
11,400.0	90.00	180.03	5,834.7	-5,471.3	713.7	5,507.8	0.00	0.00	
11,500.0	90.00	180.03	5,834.7	-5,571.3	713.6	5,607.5	0.00	0.00	
11,600.0	90.00	180.03	5,834.7	-5,671.3	713.6	5,707.3	0.00	0.00	
11,700.0	90.00	180.03	5,834.7	-5,771.3	713.5	5,807.0	0.00	0.00	
11,800.0	90.00	180.03	5,834.7	-5,871.3	713.5	5,906.8	0.00	0.00	
11,900.0	90.00	180.03	5,834.7	-5,971.3	713.4	6,006.5	0.00	0.00	
12,000.0	90.00	180.03	5,834.7	-6,071.3	713.3	6,106.3	0.00	0.00	
12,100.0	90.00	180.03	5,834.7	-6,171.3	713.3	6,206.0	0.00	0.00	
12,200.0	90.00	180.03	5,834.7	-6,271.3	713.2	6,305.8	0.00	0.00	
12,300.0	90.00	180.03	5,834.7	-6,371.3	713.2	6,405.5	0.00	0.00	
12,400.0	90.00	180.03	5,834.7	-6,471.3	713.1	6,505.3	0.00	0.00	
12,500.0	90.00	180.03	5,834.7	-6,571.3	713.1	6,605.0	0.00	0.00	
12,600.0	90.00	180.03	5,834.7	-6,671.3	713.0	6,704.8	0.00	0.00	
12,700.0	90.00	180.03	5,834.7	-6,771.3	713.0	6,804.5	0.00	0.00	
12,800.0	90.00	180.03	5,834.8	-6,871.3	712.9	6,904.3	0.00	0.00	
12,900.0	90.00	180.03	5,834.8	-6,971.3	712.8	7,004.0	0.00	0.00	
13,000.0	90.00	180.03	5,834.8	-7,071.3	712.8	7,103.8	0.00	0.00	
13,100.0	90.00	180.03	5,834.8	-7,171.3	712.7	7,203.5	0.00	0.00	
13,200.0	90.00	180.03	5,834.8	-7,271.3	712.7	7,303.3	0.00	0.00	
13,300.0	90.00	180.03	5,834.8	-7,371.3	712.6	7,403.0	0.00	0.00	
13,400.0	90.00	180.03	5,834.8	-7,471.3	712.6	7,502.8	0.00	0.00	
13,500.0	90.00	180.03	5,834.8	-7,571.3	712.5	7,602.5	0.00	0.00	
13,600.0	90.00	180.03	5,834.8	-7,671.3	712.4	7,702.3	0.00	0.00	
13,700.0	90.00	180.03	5,834.8	-7,771.3	712.4	7,802.1	0.00	0.00	
13,800.0	90.00	180.03	5,834.8	-7,871.3	712.3	7,901.8	0.00	0.00	
13,900.0	90.00	180.03	5,834.8	-7,971.3	712.3	8,001.6	0.00	0.00	
14,000.0	90.00	180.03	5,834.8	-8,071.3	712.2	8,101.3	0.00	0.00	
14,100.0	90.00	180.03	5,834.9	-8,171.3	712.2	8,201.1	0.00	0.00	
14,200.0	90.00	180.03	5,834.9	-8,271.3	712.1	8,300.8	0.00	0.00	
14,300.0	90.00	180.03	5,834.9	-8,371.3	712.1	8,400.6	0.00	0.00	
14,400.0	90.00	180.03	5,834.9	-8,471.3	712.0	8,500.3	0.00	0.00	
14,500.0	90.00	180.03	5,834.9	-8,571.3	711.9	8,600.1	0.00	0.00	
14,600.0	90.00	180.03	5,834.9	-8,671.3	711.9	8,699.8	0.00	0.00	
14,700.0	90.00	180.03	5,834.9	-8,771.3	711.8	8,799.6	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Company:	Whiting Petroleum Corporation	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Project:	Weld County, CO	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site:	S8-T10N-R57W	North Reference:	True
Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	ST Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
14,800.0	90.00	180.03	5,834.9	-8,871.3	711.8	8,899.3	0.00	0.00	
14,900.0	90.00	180.03	5,834.9	-8,971.3	711.7	8,999.1	0.00	0.00	
15,000.0	90.00	180.03	5,834.9	-9,071.3	711.7	9,098.8	0.00	0.00	
15,100.0	90.00	180.03	5,834.9	-9,171.3	711.6	9,198.6	0.00	0.00	
15,200.0	90.00	180.03	5,834.9	-9,271.3	711.5	9,298.3	0.00	0.00	
15,300.0	90.00	180.03	5,834.9	-9,371.3	711.5	9,398.1	0.00	0.00	
15,400.0	90.00	180.03	5,834.9	-9,471.3	711.4	9,497.8	0.00	0.00	
15,500.0	90.00	180.03	5,835.0	-9,571.3	711.4	9,597.6	0.00	0.00	
15,600.0	90.00	180.03	5,835.0	-9,671.3	711.3	9,697.3	0.00	0.00	
15,700.0	90.00	180.03	5,835.0	-9,771.3	711.3	9,797.1	0.00	0.00	
15,800.0	90.00	180.03	5,835.0	-9,871.3	711.2	9,896.8	0.00	0.00	
15,900.0	90.00	180.03	5,835.0	-9,971.3	711.2	9,996.6	0.00	0.00	
16,000.0	90.00	180.03	5,835.0	-10,071.3	711.1	10,096.3	0.00	0.00	
16,076.7	90.00	180.03	5,835.0	-10,148.0	711.1	10,172.8	0.00	0.00	PBHL @ 16076' MD

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									
HORSETAIL 08D-1704 f	0.00	0.00	5,835.0	-10,148.0	711.1	1,550,524.50	3,475,759.11	40.831908	-103.780711
- plan hits target center									
- Point									
HORSETAIL 08D-1704 f	0.00	0.00	5,964.0	-10,148.0	711.1	1,550,524.50	3,475,759.11	40.831908	-103.780711
- plan misses target center by 129.0usft at 16076.7usft MD (5835.0 TVD, -10148.0 N, 711.1 E)									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,197.1	5,830.9	7" (610' FNL, 1296' FWL)	0	0

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,929.6	5,749.0	TOP A MARL		0.00	
5,981.3	5,773.0	A MARL		0.00	
6,010.8	5,785.0	TOP UPPER B		0.00	
6,086.5	5,810.0	BASE UPPER B		0.00	
6,173.5	5,828.0	TOP LOWER B		0.00	
3,977.7	5,858.0	BASE LOWER B		0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Company:	Whiting Petroleum Corporation	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Project:	Weld County, CO	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site:	S8-T10N-R57W	North Reference:	True
Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Wellbore:	HZ		
Design:	ST Plan #1		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,277.0	5,212.0	302.3	697.5	STK @ 5277' MD
6,262.9	5,834.3	-334.2	716.6	LP @ 5834' TVD; 90°
16,076.7	5,835.0	-10,148.0	711.1	PBHL @ 16076' MD

Whiting Petroleum Corporation

Weld County, CO

S8-T10N-R57W

HORSETAIL 08D-1704

HZ

ST Plan #1

Anticollision Report

14 April, 2015

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Reference	ST Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	4/14/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
165.0	5,277.0	Survey #1 (HZ)	ISCWSA MWD	MWD - ISCWSA
5,277.0	16,076.7	ST Plan #1 (HZ)	ISCWSA MWD	MWD - ISCWSA

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
S8-T10N-R57W						
HORSETAIL 08D-1703 - HZ - Plan #2	0.0	0.0	30.0			
HORSETAIL 08D-1703 - HZ - Plan #2	16,077.0	16,120.7	340.1	-44.0	0.885	Level 1, ES, SF
HORSETAIL 08D-1704 - HZ - HZ	5,277.0	5,277.0	0.0	0.0	0.000	Level 1, CC, ES, SF

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1703 - HZ - Plan #2													Offset Site Error: 0.0 usft	
Survey Program: 0-ISCSWA MWD													Offset Well Error: 0.0 usft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	0.0	-30.0	30.0					
165.0	165.0	165.0	165.0	0.2	0.2	105.73	0.0	-30.0	30.2	29.8	0.40	74.732		
259.0	259.0	259.0	259.0	0.4	0.4	94.23	0.0	-30.0	30.3	29.5	0.82	36.989		
352.0	352.0	352.4	352.4	0.6	0.7	162.85	0.3	-29.6	30.5	29.3	1.22	25.071		
446.0	446.0	447.1	447.1	0.8	0.9	-157.26	2.2	-26.9	30.3	28.7	1.62	18.651		
463.7	463.7	465.0	464.9	0.8	0.9	-153.86	2.8	-26.1	30.3	28.6	1.70	17.766		
539.0	538.8	540.8	540.5	1.0	1.1	-145.69	5.9	-21.8	30.6	28.6	2.05	14.939		
632.0	631.3	634.4	633.6	1.2	1.3	-139.88	11.4	-14.2	31.8	29.3	2.49	12.739		
726.0	724.4	728.3	727.0	1.5	1.6	-143.53	17.7	-5.6	35.2	32.2	2.98	11.793		
819.0	815.9	821.1	819.1	1.8	1.8	-146.80	23.9	2.9	42.1	38.6	3.48	12.083		
913.0	908.0	914.6	912.1	2.1	2.1	-150.55	30.1	11.5	50.8	46.9	3.95	12.862		
1,006.0	999.5	1,007.3	1,004.1	2.4	2.4	-151.72	36.2	20.0	58.5	54.1	4.41	13.269		
1,100.0	1,092.2	1,101.1	1,097.3	2.7	2.7	-150.80	42.5	28.6	64.5	59.6	4.89	13.205		
1,193.0	1,184.2	1,194.0	1,189.6	3.0	3.0	-150.08	48.7	37.2	68.9	63.5	5.37	12.817		
1,287.0	1,277.1	1,287.9	1,282.9	3.4	3.2	-142.98	54.9	45.8	73.3	67.4	5.87	12.481		
1,380.0	1,368.9	1,380.8	1,375.2	3.7	3.5	-143.61	61.1	54.3	77.9	71.5	6.35	12.262		
1,474.0	1,461.8	1,474.7	1,468.5	4.0	3.8	-145.37	67.3	62.9	82.0	75.1	6.84	11.988		
1,567.0	1,553.8	1,567.6	1,560.8	4.3	4.1	-148.43	73.5	71.5	85.8	78.5	7.33	11.712		
1,615.0	1,601.3	1,615.6	1,608.5	4.5	4.2	-147.70	76.7	75.9	87.7	80.1	7.59	11.559		
1,674.0	1,659.8	1,674.5	1,667.1	4.6	4.4	-149.78	80.6	81.3	89.7	81.8	7.90	11.352		
1,768.0	1,752.9	1,768.5	1,760.4	4.9	4.7	-147.97	86.9	89.9	92.8	84.4	8.42	11.031		
1,861.0	1,844.9	1,861.3	1,852.7	5.3	5.0	-152.03	93.1	98.4	97.6	88.7	8.91	10.949		
1,954.0	1,936.6	1,954.1	1,944.9	5.6	5.3	-152.20	99.2	106.9	103.8	94.4	9.42	11.020		
2,048.0	2,029.0	2,047.8	2,037.9	5.9	5.5	-153.34	105.5	115.5	111.5	101.6	9.92	11.244		
2,141.0	2,120.1	2,140.3	2,129.9	6.3	5.8	-152.17	111.6	124.0	120.8	110.4	10.41	11.603		
2,235.0	2,212.3	2,233.9	2,222.8	6.7	6.1	-151.13	117.9	132.6	129.7	118.8	10.91	11.894		
2,328.0	2,303.5	2,326.5	2,314.9	7.1	6.4	-149.14	124.0	141.1	137.6	126.2	11.40	12.076		
2,422.0	2,395.9	2,420.3	2,408.0	7.4	6.7	-145.09	130.3	149.7	144.6	132.7	11.88	12.169		
2,515.0	2,487.4	2,513.0	2,500.2	7.8	7.0	-143.39	136.4	158.2	150.4	138.1	12.35	12.178		
2,609.0	2,580.0	2,606.9	2,593.4	8.1	7.3	-140.82	142.7	166.8	155.0	142.2	12.82	12.095		
2,702.0	2,671.6	2,699.7	2,685.6	8.5	7.5	-144.63	148.8	175.4	159.9	146.6	13.26	12.057		
2,796.0	2,763.8	2,793.4	2,778.7	8.8	7.8	-152.05	155.1	184.0	167.1	153.4	13.70	12.197		
2,890.0	2,855.9	2,887.0	2,871.7	9.2	8.1	-150.52	161.3	192.5	175.3	161.1	14.17	12.370		
2,983.0	2,947.1	2,979.7	2,963.8	9.6	8.4	-150.30	167.5	201.0	182.6	168.0	14.63	12.479		
3,077.0	3,039.5	3,073.4	3,056.9	10.0	8.7	-148.47	173.7	209.7	189.0	173.9	15.10	12.520		
3,171.0	3,131.9	3,167.1	3,150.1	10.3	9.0	-160.05	179.9	218.3	195.8	180.3	15.56	12.589		
3,264.0	3,223.6	3,259.9	3,242.3	10.7	9.3	-156.54	186.1	226.8	202.0	185.9	16.07	12.571		
3,358.0	3,316.4	3,353.8	3,335.5	11.0	9.6	-165.21	192.4	235.4	207.7	191.1	16.56	12.542		
3,451.0	3,408.2	3,446.6	3,427.7	11.3	9.8	-161.11	198.5	243.9	213.1	196.0	17.09	12.472		
3,545.0	3,500.9	3,540.3	3,520.8	11.7	10.1	-167.94	204.8	252.5	219.8	202.2	17.57	12.509		
3,639.0	3,593.3	3,633.9	3,613.8	12.0	10.4	-165.16	211.0	261.1	228.3	210.1	18.12	12.596		
3,732.0	3,684.7	3,726.5	3,705.8	12.4	10.7	-162.53	217.2	269.6	236.1	217.5	18.65	12.661		
3,826.0	3,777.3	3,820.2	3,798.9	12.7	11.0	-160.82	223.4	278.2	243.6	224.4	19.18	12.699		
3,919.0	3,869.0	3,913.0	3,891.1	13.1	11.3	-160.13	229.6	286.7	249.7	230.0	19.72	12.667		
4,013.0	3,961.8	4,006.8	3,984.3	13.4	11.6	-158.59	235.8	295.3	255.5	235.3	20.23	12.632		
4,107.0	4,054.7	4,100.7	4,077.6	13.7	11.9	-158.87	242.1	303.9	260.7	240.0	20.76	12.558		
4,200.0	4,146.5	4,193.5	4,169.8	14.1	12.1	-152.96	248.2	312.5	266.1	244.8	21.26	12.517		
4,294.0	4,238.8	4,287.2	4,262.9	14.4	12.4	-150.75	254.5	321.0	273.5	251.8	21.72	12.590		
4,387.0	4,330.0	4,379.8	4,354.9	14.8	12.7	-147.54	260.6	329.6	281.0	258.8	22.20	12.657		
4,481.0	4,422.5	4,473.6	4,448.1	15.2	13.0	-142.95	266.9	338.2	286.7	264.0	22.67	12.649		
4,575.0	4,514.9	4,567.4	4,541.3	15.5	13.3	-149.44	273.1	346.8	292.6	269.5	23.10	12.669		
4,668.0	4,606.3	4,660.1	4,633.4	15.9	13.6	-147.01	279.3	355.3	299.0	275.4	23.56	12.690		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1703 - HZ - Plan #2												Offset Site Error:	0.0 usft
Survey Program: 0-ISCSA MWD												Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor	Warning
4,762.0	4,699.0	4,754.0	4,726.7	16.2	13.9	-140.73	285.5	363.9	303.0	279.0	24.02	12.617	
4,855.0	4,791.0	4,843.2	4,815.3	16.5	14.1	-138.71	291.3	371.8	304.9	280.4	24.42	12.482	
4,949.0	4,884.5	4,929.6	4,901.5	16.8	14.3	-157.46	295.5	377.6	306.9	282.1	24.79	12.378	
5,042.0	4,977.2	5,015.1	4,986.9	17.0	14.5	-149.51	298.2	381.3	309.4	284.3	25.13	12.313	
5,136.0	5,071.1	5,101.5	5,073.2	17.2	14.6	-148.69	299.3	383.0	311.6	286.2	25.37	12.279	
5,230.0	5,165.0	5,193.3	5,165.0	17.3	14.7	148.85	299.4	383.0	313.3	287.6	25.69	12.196	
5,277.0	5,212.0	5,240.3	5,212.0	17.4	14.8	144.17	299.4	383.0	314.4	288.5	25.89	12.145	
5,300.0	5,235.0	5,263.3	5,235.0	17.4	14.9	117.76	299.4	383.0	315.2	289.2	25.96	12.139	
5,350.0	5,284.7	5,313.0	5,284.7	17.4	14.9	103.16	299.4	383.0	316.7	290.6	26.12	12.125	
5,400.0	5,333.9	5,363.1	5,334.7	17.4	15.0	99.60	297.2	383.0	318.4	292.1	26.28	12.116	
5,450.0	5,382.3	5,413.6	5,384.9	17.4	15.0	98.46	290.9	383.0	320.1	293.8	26.38	12.134	
5,500.0	5,429.5	5,464.7	5,434.9	17.4	15.1	98.20	280.6	383.0	322.0	295.6	26.44	12.179	
5,550.0	5,475.3	5,516.4	5,484.5	17.3	15.1	98.37	266.1	383.0	323.9	297.5	26.45	12.248	
5,600.0	5,519.3	5,568.6	5,533.2	17.3	15.0	98.75	247.5	383.0	325.9	299.5	26.41	12.339	
5,650.0	5,561.4	5,621.4	5,580.7	17.2	15.0	99.24	224.6	383.0	327.9	301.5	26.34	12.448	
5,700.0	5,601.3	5,674.7	5,626.7	17.2	15.0	99.79	197.6	383.0	329.9	303.6	26.25	12.567	
5,750.0	5,638.7	5,728.6	5,670.7	17.1	14.9	100.36	166.5	383.0	331.9	305.7	26.16	12.687	
5,800.0	5,673.3	5,783.0	5,712.3	17.1	14.9	100.93	131.4	383.0	333.8	307.7	26.08	12.796	
5,850.0	5,705.0	5,837.9	5,751.1	17.1	14.8	101.48	92.5	383.0	335.6	309.5	26.05	12.881	
5,900.0	5,733.6	5,893.3	5,786.6	17.1	14.8	101.99	50.1	383.0	337.3	311.2	26.10	12.926	
5,950.0	5,758.9	5,949.2	5,818.6	17.1	14.8	102.46	4.3	383.0	338.9	312.6	26.23	12.917	
6,000.0	5,780.8	6,005.5	5,846.7	17.2	14.8	102.89	-44.5	383.0	340.3	313.8	26.50	12.840	
6,050.0	5,799.0	6,062.2	5,870.5	17.2	14.9	103.25	-95.9	383.0	341.5	314.6	26.91	12.689	
6,100.0	5,813.5	6,119.1	5,889.7	17.3	15.0	103.56	-149.5	383.0	342.5	315.0	27.48	12.464	
6,150.0	5,824.3	6,176.3	5,904.1	17.5	15.3	103.80	-204.8	382.9	343.2	315.0	28.20	12.169	
6,200.0	5,831.2	6,233.7	5,913.5	17.6	15.6	103.97	-261.4	382.9	343.7	314.6	29.09	11.815	
6,250.0	5,834.1	6,291.3	5,917.7	17.9	16.1	104.07	-318.8	382.9	344.0	313.8	30.13	11.417	
6,262.9	5,834.3	6,306.1	5,918.0	18.0	16.2	104.09	-333.6	382.9	344.0	313.6	30.41	11.310	
6,300.0	5,834.3	6,343.7	5,918.0	18.2	16.6	104.09	-371.2	382.9	344.0	312.8	31.19	11.029	
6,400.0	5,834.3	6,443.7	5,918.0	19.0	17.6	104.09	-471.2	382.9	343.9	310.5	33.42	10.290	
6,500.0	5,834.3	6,543.7	5,918.0	20.1	18.8	104.09	-571.2	382.9	343.9	308.0	35.91	9.577	
6,600.0	5,834.3	6,643.7	5,918.0	21.3	20.1	104.09	-671.2	382.9	343.8	305.3	38.59	8.910	
6,700.0	5,834.3	6,743.7	5,918.0	22.7	21.5	104.09	-771.2	382.9	343.8	302.4	41.44	8.296	
6,800.0	5,834.3	6,843.7	5,918.0	24.1	23.0	104.09	-871.2	382.8	343.8	299.3	44.43	7.738	
6,900.0	5,834.3	6,943.7	5,918.0	25.7	24.5	104.09	-971.2	382.8	343.7	296.2	47.52	7.234	
7,000.0	5,834.3	7,043.7	5,918.0	27.2	26.1	104.09	-1,071.2	382.8	343.7	293.0	50.70	6.779	
7,100.0	5,834.3	7,143.7	5,918.0	28.9	27.7	104.09	-1,171.2	382.8	343.6	289.7	53.95	6.370	
7,200.0	5,834.3	7,243.7	5,918.0	30.5	29.4	104.09	-1,271.2	382.8	343.6	286.3	57.26	6.001	
7,300.0	5,834.3	7,343.7	5,918.0	32.2	31.1	104.09	-1,371.2	382.8	343.6	282.9	60.62	5.668	
7,400.0	5,834.4	7,443.7	5,918.0	33.9	32.8	104.09	-1,471.2	382.7	343.5	279.5	64.02	5.366	
7,500.0	5,834.4	7,543.7	5,918.0	35.7	34.5	104.09	-1,571.2	382.7	343.5	276.0	67.46	5.092	
7,600.0	5,834.4	7,643.7	5,918.0	37.4	36.3	104.09	-1,671.2	382.7	343.4	272.5	70.93	4.842	
7,700.0	5,834.4	7,743.7	5,918.0	39.2	38.0	104.09	-1,771.2	382.7	343.4	269.0	74.43	4.614	
7,800.0	5,834.4	7,843.7	5,918.0	41.0	39.8	104.09	-1,871.2	382.7	343.4	265.4	77.95	4.405	
7,900.0	5,834.4	7,943.7	5,918.0	42.7	41.6	104.09	-1,971.2	382.7	343.3	261.8	81.49	4.213	
8,000.0	5,834.4	8,043.7	5,918.0	44.6	43.4	104.09	-2,071.2	382.6	343.3	258.2	85.04	4.037	
8,100.0	5,834.4	8,143.7	5,918.0	46.4	45.2	104.10	-2,171.2	382.6	343.2	254.6	88.61	3.874	
8,200.0	5,834.4	8,243.7	5,918.0	48.2	47.1	104.10	-2,271.2	382.6	343.2	251.0	92.20	3.722	
8,300.0	5,834.4	8,343.7	5,918.0	50.0	48.9	104.10	-2,371.2	382.6	343.2	247.4	95.79	3.582	
8,400.0	5,834.4	8,443.7	5,918.0	51.9	50.7	104.10	-2,471.2	382.6	343.1	243.7	99.40	3.452	
8,500.0	5,834.4	8,543.7	5,918.0	53.7	52.6	104.10	-2,571.2	382.6	343.1	240.1	103.02	3.330	
8,600.0	5,834.4	8,643.7	5,918.0	55.5	54.4	104.10	-2,671.2	382.5	343.0	236.4	106.65	3.217	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1703 - HZ - Plan #2													Offset Site Error: 0.0 usft	
Survey Program: 0-ISCSWA MWD													Offset Well Error: 0.0 usft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor		
8,700.0	5,834.5	8,743.7	5,918.0	57.4	56.3	104.10	-2,771.2	382.5	343.0	232.7	110.28	3.110		
8,800.0	5,834.5	8,843.7	5,918.0	59.2	58.1	104.10	-2,871.2	382.5	343.0	229.0	113.92	3.011		
8,900.0	5,834.5	8,943.7	5,918.0	61.1	60.0	104.10	-2,971.2	382.5	342.9	225.4	117.57	2.917		
9,000.0	5,834.5	9,043.7	5,918.0	63.0	61.8	104.10	-3,071.2	382.5	342.9	221.7	121.22	2.829		
9,100.0	5,834.5	9,143.7	5,918.0	64.8	63.7	104.10	-3,171.2	382.5	342.8	218.0	124.88	2.746		
9,200.0	5,834.5	9,243.7	5,918.0	66.7	65.6	104.10	-3,271.2	382.4	342.8	214.3	128.54	2.667		
9,300.0	5,834.5	9,343.7	5,918.0	68.6	67.5	104.10	-3,371.2	382.4	342.8	210.6	132.20	2.593		
9,400.0	5,834.5	9,443.7	5,918.0	70.5	69.3	104.10	-3,471.2	382.4	342.7	206.9	135.88	2.522		
9,500.0	5,834.5	9,543.7	5,918.0	72.3	71.2	104.10	-3,571.2	382.4	342.7	203.1	139.55	2.456		
9,600.0	5,834.5	9,643.7	5,918.0	74.2	73.1	104.10	-3,671.2	382.4	342.6	199.4	143.23	2.392		
9,700.0	5,834.5	9,743.7	5,918.0	76.1	75.0	104.10	-3,771.2	382.4	342.6	195.7	146.91	2.332		
9,800.0	5,834.5	9,843.7	5,918.0	78.0	76.9	104.10	-3,871.2	382.3	342.6	192.0	150.59	2.275		
9,900.0	5,834.5	9,943.7	5,918.0	79.9	78.7	104.10	-3,971.2	382.3	342.5	188.2	154.28	2.220		
10,000.0	5,834.5	10,043.7	5,918.0	81.7	80.6	104.10	-4,071.2	382.3	342.5	184.5	157.97	2.168		
10,100.0	5,834.6	10,143.7	5,918.0	83.6	82.5	104.10	-4,171.2	382.3	342.4	180.8	161.66	2.118		
10,200.0	5,834.6	10,243.7	5,918.0	85.5	84.4	104.10	-4,271.2	382.3	342.4	177.1	165.36	2.071		
10,300.0	5,834.6	10,343.7	5,918.0	87.4	86.3	104.10	-4,371.2	382.2	342.4	173.3	169.05	2.025		
10,400.0	5,834.6	10,443.7	5,918.0	89.3	88.2	104.10	-4,471.2	382.2	342.3	169.6	172.75	1.982		
10,500.0	5,834.6	10,543.7	5,918.0	91.2	90.1	104.10	-4,571.2	382.2	342.3	165.8	176.45	1.940		
10,600.0	5,834.6	10,643.7	5,918.0	93.1	92.0	104.11	-4,671.2	382.2	342.2	162.1	180.15	1.900		
10,700.0	5,834.6	10,743.7	5,918.0	95.0	93.9	104.11	-4,771.2	382.2	342.2	158.4	183.85	1.861		
10,800.0	5,834.6	10,843.7	5,918.0	96.9	95.8	104.11	-4,871.2	382.2	342.2	154.6	187.56	1.824		
10,900.0	5,834.6	10,943.7	5,918.0	98.8	97.7	104.11	-4,971.2	382.1	342.1	150.9	191.26	1.789		
11,000.0	5,834.6	11,043.7	5,918.0	100.7	99.6	104.11	-5,071.2	382.1	342.1	147.1	194.97	1.755		
11,100.0	5,834.6	11,143.7	5,918.0	102.6	101.5	104.11	-5,171.2	382.1	342.0	143.4	198.68	1.722		
11,200.0	5,834.6	11,243.7	5,918.0	104.5	103.4	104.11	-5,271.2	382.1	342.0	139.6	202.39	1.690		
11,300.0	5,834.6	11,343.7	5,918.0	106.4	105.3	104.11	-5,371.2	382.1	342.0	135.9	206.10	1.659		
11,400.0	5,834.7	11,443.7	5,918.0	108.3	107.2	104.11	-5,471.2	382.1	341.9	132.1	209.81	1.630		
11,500.0	5,834.7	11,543.7	5,918.0	110.2	109.1	104.11	-5,571.2	382.0	341.9	128.4	213.53	1.601		
11,600.0	5,834.7	11,643.7	5,918.0	112.1	111.0	104.11	-5,671.2	382.0	341.8	124.6	217.24	1.574		
11,700.0	5,834.7	11,743.7	5,918.0	114.0	112.9	104.11	-5,771.2	382.0	341.8	120.9	220.95	1.547		
11,800.0	5,834.7	11,843.7	5,918.0	115.9	114.8	104.11	-5,871.2	382.0	341.8	117.1	224.67	1.521		
11,900.0	5,834.7	11,943.7	5,918.0	117.8	116.7	104.11	-5,971.2	382.0	341.7	113.3	228.39	1.496 Level 3		
12,000.0	5,834.7	12,043.7	5,918.0	119.7	118.6	104.11	-6,071.2	382.0	341.7	109.6	232.10	1.472 Level 3		
12,100.0	5,834.7	12,143.7	5,918.0	121.6	120.5	104.11	-6,171.2	381.9	341.6	105.8	235.82	1.449 Level 3		
12,200.0	5,834.7	12,243.7	5,918.0	123.5	122.4	104.11	-6,271.2	381.9	341.6	102.1	239.54	1.426 Level 3		
12,300.0	5,834.7	12,343.7	5,918.0	125.4	124.3	104.11	-6,371.2	381.9	341.6	98.3	243.26	1.404 Level 3		
12,400.0	5,834.7	12,443.7	5,918.0	127.3	126.2	104.11	-6,471.2	381.9	341.5	94.5	246.98	1.383 Level 3		
12,500.0	5,834.7	12,543.7	5,918.0	129.2	128.1	104.11	-6,571.2	381.9	341.5	90.8	250.70	1.362 Level 3		
12,600.0	5,834.7	12,643.7	5,918.0	131.1	130.0	104.11	-6,671.2	381.9	341.4	87.0	254.42	1.342 Level 3		
12,700.0	5,834.7	12,743.7	5,918.0	133.0	131.9	104.11	-6,771.2	381.8	341.4	83.3	258.14	1.323 Level 3		
12,800.0	5,834.8	12,843.7	5,918.0	134.9	133.8	104.11	-6,871.2	381.8	341.4	79.5	261.87	1.304 Level 3		
12,900.0	5,834.8	12,943.7	5,918.0	136.8	135.7	104.11	-6,971.2	381.8	341.3	75.7	265.59	1.285 Level 3		
13,000.0	5,834.8	13,043.7	5,918.0	138.7	137.7	104.11	-7,071.2	381.8	341.3	72.0	269.31	1.267 Level 3		
13,100.0	5,834.8	13,143.7	5,918.0	140.7	139.6	104.12	-7,171.2	381.8	341.2	68.2	273.04	1.250 Level 2		
13,200.0	5,834.8	13,243.7	5,918.0	142.6	141.5	104.12	-7,271.2	381.8	341.2	64.4	276.76	1.233 Level 2		
13,300.0	5,834.8	13,343.7	5,918.0	144.5	143.4	104.12	-7,371.2	381.7	341.2	60.7	280.48	1.216 Level 2		
13,400.0	5,834.8	13,443.7	5,918.0	146.4	145.3	104.12	-7,471.2	381.7	341.1	56.9	284.21	1.200 Level 2		
13,500.0	5,834.8	13,543.7	5,918.0	148.3	147.2	104.12	-7,571.2	381.7	341.1	53.2	287.93	1.185 Level 2		
13,600.0	5,834.8	13,643.7	5,918.0	150.2	149.1	104.12	-7,671.2	381.7	341.0	49.4	291.66	1.169 Level 2		
13,700.0	5,834.8	13,743.7	5,918.0	152.1	151.0	104.12	-7,771.2	381.7	341.0	45.6	295.39	1.154 Level 2		
13,800.0	5,834.8	13,843.7	5,918.0	154.0	152.9	104.12	-7,871.2	381.7	341.0	41.9	299.11	1.140 Level 2		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1703 - HZ - Plan #2													Offset Site Error: 0.0 usft	
Survey Program: 0-ISCSWA MWD													Offset Well Error: 0.0 usft	
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor		
13,900.0	5,834.8	13,943.7	5,918.0	155.9	154.8	104.12	-7,971.2	381.6	340.9	38.1	302.84	1.126	Level 2	
14,000.0	5,834.8	14,043.7	5,918.0	157.8	156.8	104.12	-8,071.2	381.6	340.9	34.3	306.57	1.112	Level 2	
14,100.0	5,834.9	14,143.7	5,918.0	159.8	158.7	104.12	-8,171.2	381.6	340.9	30.6	310.29	1.098	Level 2	
14,200.0	5,834.9	14,243.7	5,918.0	161.7	160.6	104.12	-8,271.2	381.6	340.8	26.8	314.02	1.085	Level 2	
14,300.0	5,834.9	14,343.7	5,918.0	163.6	162.5	104.12	-8,371.2	381.6	340.8	23.0	317.75	1.072	Level 2	
14,400.0	5,834.9	14,443.7	5,918.0	165.5	164.4	104.12	-8,471.2	381.6	340.7	19.3	321.48	1.060	Level 2	
14,500.0	5,834.9	14,543.7	5,918.0	167.4	166.3	104.12	-8,571.2	381.5	340.7	15.5	325.21	1.048	Level 2	
14,600.0	5,834.9	14,643.7	5,918.0	169.3	168.2	104.12	-8,671.2	381.5	340.7	11.7	328.94	1.036	Level 2	
14,700.0	5,834.9	14,743.7	5,918.0	171.2	170.1	104.12	-8,771.2	381.5	340.6	7.9	332.67	1.024	Level 2	
14,800.0	5,834.9	14,843.7	5,918.0	173.1	172.1	104.12	-8,871.2	381.5	340.6	4.2	336.39	1.012	Level 2	
14,900.0	5,834.9	14,943.7	5,918.0	175.0	174.0	104.12	-8,971.2	381.5	340.5	0.4	340.12	1.001	Level 2	
15,000.0	5,834.9	15,043.7	5,918.0	177.0	175.9	104.12	-9,071.2	381.5	340.5	-3.4	343.85	0.990	Level 1	
15,100.0	5,834.9	15,143.7	5,918.0	178.9	177.8	104.12	-9,171.2	381.4	340.5	-7.1	347.58	0.979	Level 1	
15,200.0	5,834.9	15,243.7	5,918.0	180.8	179.7	104.12	-9,271.2	381.4	340.4	-10.9	351.31	0.969	Level 1	
15,300.0	5,834.9	15,343.7	5,918.0	182.7	181.6	104.12	-9,371.2	381.4	340.4	-14.7	355.05	0.959	Level 1	
15,400.0	5,834.9	15,443.7	5,918.0	184.6	183.5	104.12	-9,471.2	381.4	340.3	-18.4	358.78	0.949	Level 1	
15,500.0	5,835.0	15,543.7	5,918.0	186.5	185.4	104.12	-9,571.2	381.4	340.3	-22.2	362.51	0.939	Level 1	
15,600.0	5,835.0	15,643.7	5,918.0	188.4	187.4	104.13	-9,671.2	381.4	340.3	-26.0	366.24	0.929	Level 1	
15,700.0	5,835.0	15,743.7	5,918.0	190.4	189.3	104.13	-9,771.2	381.3	340.2	-29.8	369.97	0.920	Level 1	
15,800.0	5,835.0	15,843.7	5,918.0	192.3	191.2	104.13	-9,871.2	381.3	340.2	-33.5	373.70	0.910	Level 1	
15,900.0	5,835.0	15,943.7	5,918.0	194.2	193.1	104.13	-9,971.2	381.3	340.1	-37.3	377.43	0.901	Level 1	
16,000.0	5,835.0	16,043.7	5,918.0	196.1	195.0	104.13	-10,071.2	381.3	340.1	-41.1	381.16	0.892	Level 1	
16,076.7	5,835.0	16,120.4	5,918.0	197.6	196.5	104.13	-10,147.9	381.3	340.1	-44.0	384.03	0.886	Level 1	
16,077.0	5,835.0	16,120.7	5,918.0	197.6	196.5	104.13	-10,148.3	381.3	340.1	-44.0	384.04	0.885	Level 1, ES, SF	

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1704 - HZ - HZ													Offset Site Error:	0.0 usft
Survey Program: 165-ISCWSA MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Between Centres (usft)	Between Ellipses (usft)						
5,277.0	5,212.0	5,277.0	5,212.0	0.0	0.0	0.00	302.3	697.5	0.0	0.0	0.00	Level 1, CC, ES, SF		
5,286.7	5,221.8	5,286.7	5,221.8	0.0	0.0	-127.69	302.0	697.8	0.1	0.0	0.03	2.458		
5,300.0	5,235.0	5,300.0	5,235.0	0.0	0.0	-139.34	301.7	698.3	0.4	0.3	0.06	5.881		
5,350.0	5,284.7	5,350.1	5,285.0	0.1	0.1	-153.93	299.2	700.4	2.8	2.7	0.16	17.605		
5,400.0	5,333.9	5,400.5	5,334.7	0.1	0.2	-155.13	291.6	702.5	4.1	3.8	0.30	13.672		
5,433.2	5,366.1	5,433.9	5,367.1	0.2	0.3	-152.21	283.5	703.8	4.1	3.6	0.45	9.003		
5,450.0	5,382.3	5,450.8	5,383.3	0.3	0.4	-149.71	278.7	704.5	4.1	3.6	0.55	7.519		
5,500.0	5,429.5	5,501.0	5,430.7	0.5	0.5	-140.91	262.6	707.0	4.8	3.9	0.90	5.346		
5,550.0	5,475.3	5,511.0	5,440.1	0.7	0.6	-129.39	258.9	707.6	40.6	39.5	1.14	35.473		
5,600.0	5,519.3	5,511.0	5,440.1	1.0	0.6	-48.69	258.9	707.6	90.5	89.3	1.23	73.822		
5,650.0	5,561.4	5,511.0	5,440.1	1.3	0.6	-11.58	258.9	707.6	140.4	139.5	0.95	147.189		
5,700.0	5,601.3	5,511.0	5,440.1	1.7	0.6	-4.18	258.9	707.6	190.1	189.2	0.94	203.180		
5,750.0	5,638.7	5,511.0	5,440.1	2.2	0.6	-1.58	258.9	707.6	239.6	238.7	0.85	282.533		
5,800.0	5,673.3	5,511.0	5,440.1	2.8	0.6	-0.39	258.9	707.6	288.6	287.9	0.72	399.179		
5,850.0	5,705.0	5,511.0	5,440.1	3.5	0.6	0.24	258.9	707.6	337.3	336.7	0.54	628.115		
5,900.0	5,733.6	5,511.0	5,440.1	4.4	0.6	0.61	258.9	707.6	385.4	384.9	0.42	912.730		
5,950.0	5,758.9	5,511.0	5,440.1	5.9	0.6	0.84	258.9	707.6	432.9	432.1	0.73	593.629		
6,000.0	5,780.8	5,511.0	5,440.1	9.8	0.6	0.99	258.9	707.6	479.7	478.5	1.18	405.167		
6,050.0	5,799.0	5,511.0	5,440.1	11.1	0.6	1.09	258.9	707.6	525.8	524.4	1.38	380.593		
6,100.0	5,813.5	5,511.0	5,440.1	12.1	0.6	1.17	258.9	707.6	571.1	569.6	1.49	382.083		
6,150.0	5,824.3	5,511.0	5,440.1	13.0	0.6	1.24	258.9	707.6	615.5	614.0	1.55	398.097		
6,200.0	5,831.2	5,511.0	5,440.1	13.7	0.6	1.29	258.9	707.6	659.0	657.5	1.54	428.610		
6,250.0	5,834.1	5,511.0	5,440.1	14.4	0.6	1.34	258.9	707.6	701.4	700.0	1.44	486.932		
6,262.9	5,834.3	5,511.0	5,440.1	14.6	0.6	1.36	258.9	707.6	712.2	710.9	1.32	537.695		
6,300.0	5,834.3	5,511.0	5,440.1	15.1	0.6	1.36	258.9	707.6	743.4	741.8	1.56	475.841		
6,400.0	5,834.3	5,511.0	5,440.1	16.2	0.6	1.36	258.9	707.6	829.9	827.7	2.22	373.823		
6,500.0	5,834.3	5,511.0	5,440.1	17.4	0.6	1.36	258.9	707.6	919.1	916.2	2.90	317.368		
6,600.0	5,834.3	5,511.0	5,440.1	18.4	0.6	1.36	258.9	707.6	1,010.3	1,006.8	3.58	281.850		
6,700.0	5,834.3	5,511.0	5,440.1	19.5	0.6	1.36	258.9	707.6	1,103.1	1,098.8	4.28	257.589		
6,800.0	5,834.3	5,511.0	5,440.1	20.6	0.6	1.36	258.9	707.6	1,197.0	1,192.0	4.99	240.040		
6,900.0	5,834.3	5,511.0	5,440.1	21.7	0.6	1.36	258.9	707.6	1,291.9	1,286.2	5.70	226.795		
7,000.0	5,834.3	5,511.0	5,440.1	22.8	0.6	1.36	258.9	707.6	1,387.4	1,381.0	6.41	216.466		
7,100.0	5,834.3	5,511.0	5,440.1	24.0	0.6	1.36	258.9	707.6	1,483.6	1,476.5	7.13	208.197		
7,200.0	5,834.3	5,511.0	5,440.1	25.2	0.6	1.36	258.9	707.6	1,580.2	1,572.4	7.84	201.438		
7,300.0	5,834.3	5,511.0	5,440.1	26.4	0.6	1.36	258.9	707.6	1,677.2	1,668.7	8.57	195.813		
7,400.0	5,834.4	5,511.0	5,440.1	27.7	0.6	1.36	258.9	707.6	1,774.6	1,765.3	9.29	191.064		
7,500.0	5,834.4	5,511.0	5,440.1	29.0	0.6	1.36	258.9	707.6	1,872.2	1,862.2	10.01	187.003		
7,600.0	5,834.4	5,511.0	5,440.1	30.3	0.6	1.36	258.9	707.6	1,970.1	1,959.4	10.74	183.491		
7,700.0	5,834.4	5,511.0	5,440.1	31.7	0.6	1.36	258.9	707.6	2,068.2	2,056.7	11.46	180.427		
7,800.0	5,834.4	5,511.0	5,440.1	33.1	0.6	1.36	258.9	707.6	2,166.4	2,154.2	12.19	177.729		
7,900.0	5,834.4	5,511.0	5,440.1	34.6	0.6	1.36	258.9	707.6	2,264.8	2,251.9	12.92	175.338		
8,000.0	5,834.4	5,511.0	5,440.1	36.0	0.6	1.36	258.9	707.6	2,363.4	2,349.7	13.65	173.203		
8,100.0	5,834.4	5,511.0	5,440.1	37.6	0.6	1.36	258.9	707.6	2,462.0	2,447.6	14.37	171.286		
8,200.0	5,834.4	5,511.0	5,440.1	39.1	0.6	1.36	258.9	707.6	2,560.8	2,545.7	15.10	169.555		
8,300.0	5,834.4	5,511.0	5,440.1	40.7	0.6	1.36	258.9	707.6	2,659.6	2,643.8	15.83	167.986		
8,400.0	5,834.4	5,511.0	5,440.1	42.3	0.6	1.36	258.9	707.6	2,758.6	2,742.0	16.56	166.556		
8,500.0	5,834.4	5,511.0	5,440.1	43.9	0.6	1.36	258.9	707.6	2,857.6	2,840.3	17.29	165.247		
8,600.0	5,834.4	5,511.0	5,440.1	45.6	0.6	1.36	258.9	707.6	2,956.6	2,938.6	18.02	164.046		
8,700.0	5,834.5	5,511.0	5,440.1	47.2	0.6	1.36	258.9	707.6	3,055.8	3,037.0	18.75	162.939		
8,800.0	5,834.5	5,511.0	5,440.1	48.9	0.6	1.36	258.9	707.6	3,155.0	3,135.5	19.49	161.916		
8,900.0	5,834.5	5,511.0	5,440.1	50.6	0.6	1.36	258.9	707.6	3,254.2	3,234.0	20.22	160.967		
9,000.0	5,834.5	5,511.0	5,440.1	52.4	0.6	1.36	258.9	707.6	3,353.5	3,332.5	20.95	160.086		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1704 - HZ - HZ												Offset Site Error:	0.0 usft
Survey Program: 165-ISCWSA MWD												Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor	Warning
9,100.0	5,834.5	5,511.0	5,440.1	54.1	0.6	1.36	258.9	707.6	3,452.8	3,431.1	21.68	159.264	
9,200.0	5,834.5	5,511.0	5,440.1	55.8	0.6	1.36	258.9	707.6	3,552.2	3,529.8	22.41	158.497	
9,300.0	5,834.5	5,511.0	5,440.1	57.6	0.6	1.36	258.9	707.6	3,651.6	3,628.4	23.14	157.779	
9,400.0	5,834.5	5,511.0	5,440.1	59.4	0.6	1.36	258.9	707.6	3,751.0	3,727.1	23.88	157.105	
9,500.0	5,834.5	5,511.0	5,440.1	61.1	0.6	1.36	258.9	707.6	3,850.5	3,825.9	24.61	156.471	
9,600.0	5,834.5	5,511.0	5,440.1	62.9	0.6	1.36	258.9	707.6	3,950.0	3,924.6	25.34	155.875	
9,700.0	5,834.5	5,511.0	5,440.1	64.7	0.6	1.36	258.9	707.6	4,049.5	4,023.4	26.07	155.312	
9,800.0	5,834.5	5,511.0	5,440.1	66.5	0.6	1.36	258.9	707.6	4,149.0	4,122.2	26.81	154.781	
9,900.0	5,834.5	5,511.0	5,440.1	68.3	0.6	1.36	258.9	707.6	4,248.6	4,221.0	27.54	154.277	
10,000.0	5,834.5	5,511.0	5,440.1	70.2	0.6	1.36	258.9	707.6	4,348.1	4,319.9	28.27	153.801	
10,100.0	5,834.6	5,511.0	5,440.1	72.0	0.6	1.36	258.9	707.6	4,447.7	4,418.7	29.00	153.348	
10,200.0	5,834.6	5,511.0	5,440.1	73.8	0.6	1.36	258.9	707.6	4,547.4	4,517.6	29.74	152.918	
10,300.0	5,834.6	5,511.0	5,440.1	75.7	0.6	1.36	258.9	707.6	4,647.0	4,616.5	30.47	152.509	
10,400.0	5,834.6	5,511.0	5,440.1	77.5	0.6	1.36	258.9	707.6	4,746.6	4,715.4	31.20	152.120	
10,500.0	5,834.6	5,511.0	5,440.1	79.3	0.6	1.36	258.9	707.6	4,846.3	4,814.4	31.94	151.748	
10,600.0	5,834.6	5,511.0	5,440.1	81.2	0.6	1.36	258.9	707.6	4,946.0	4,913.3	32.67	151.393	
10,700.0	5,834.6	5,511.0	5,440.1	83.0	0.6	1.36	258.9	707.6	5,045.7	5,012.3	33.40	151.054	
10,800.0	5,834.6	5,511.0	5,440.1	84.9	0.6	1.36	258.9	707.6	5,145.4	5,111.2	34.14	150.730	
10,900.0	5,834.6	5,511.0	5,440.1	86.7	0.6	1.36	258.9	707.6	5,245.1	5,210.2	34.87	150.419	
11,000.0	5,834.6	5,511.0	5,440.1	88.6	0.6	1.36	258.9	707.6	5,344.8	5,309.2	35.60	150.121	
11,100.0	5,834.6	5,511.0	5,440.1	90.5	0.6	1.36	258.9	707.6	5,444.5	5,408.2	36.34	149.836	
11,200.0	5,834.6	5,511.0	5,440.1	92.3	0.6	1.36	258.9	707.6	5,544.3	5,507.2	37.07	149.561	
11,300.0	5,834.6	5,511.0	5,440.1	94.2	0.6	1.36	258.9	707.6	5,644.0	5,606.2	37.80	149.298	
11,400.0	5,834.7	5,511.0	5,440.1	96.1	0.6	1.36	258.9	707.6	5,743.8	5,705.2	38.54	149.045	
11,500.0	5,834.7	5,511.0	5,440.1	98.0	0.6	1.36	258.9	707.6	5,843.6	5,804.3	39.27	148.801	
11,600.0	5,834.7	5,511.0	5,440.1	99.8	0.6	1.36	258.9	707.6	5,943.3	5,903.3	40.00	148.566	
11,700.0	5,834.7	5,511.0	5,440.1	101.7	0.6	1.36	258.9	707.6	6,043.1	6,002.4	40.74	148.340	
11,800.0	5,834.7	5,511.0	5,440.1	103.6	0.6	1.36	258.9	707.6	6,142.9	6,101.4	41.47	148.122	
11,900.0	5,834.7	5,511.0	5,440.1	105.5	0.6	1.36	258.9	707.6	6,242.7	6,200.5	42.21	147.911	
12,000.0	5,834.7	5,511.0	5,440.1	107.4	0.6	1.36	258.9	707.6	6,342.5	6,299.6	42.94	147.708	
12,100.0	5,834.7	5,511.0	5,440.1	109.2	0.6	1.36	258.9	707.6	6,442.3	6,398.6	43.67	147.511	
12,200.0	5,834.7	5,511.0	5,440.1	111.1	0.6	1.36	258.9	707.6	6,542.1	6,497.7	44.41	147.321	
12,300.0	5,834.7	5,511.0	5,440.1	113.0	0.6	1.36	258.9	707.6	6,641.9	6,596.8	45.14	147.138	
12,400.0	5,834.7	5,511.0	5,440.1	114.9	0.6	1.36	258.9	707.6	6,741.8	6,695.9	45.87	146.960	
12,500.0	5,834.7	5,511.0	5,440.1	116.8	0.6	1.36	258.9	707.6	6,841.6	6,795.0	46.61	146.788	
12,600.0	5,834.7	5,511.0	5,440.1	118.7	0.6	1.36	258.9	707.6	6,941.4	6,894.1	47.34	146.621	
12,700.0	5,834.7	5,511.0	5,440.1	120.6	0.6	1.36	258.9	707.6	7,041.3	6,993.2	48.08	146.460	
12,800.0	5,834.8	5,511.0	5,440.1	122.5	0.6	1.36	258.9	707.6	7,141.1	7,092.3	48.81	146.303	
12,900.0	5,834.8	5,511.0	5,440.1	124.4	0.6	1.36	258.9	707.6	7,241.0	7,191.4	49.54	146.151	
13,000.0	5,834.8	5,511.0	5,440.1	126.3	0.6	1.36	258.9	707.6	7,340.8	7,290.6	50.28	146.003	
13,100.0	5,834.8	5,511.0	5,440.1	128.1	0.6	1.36	258.9	707.6	7,440.7	7,389.7	51.01	145.860	
13,200.0	5,834.8	5,511.0	5,440.1	130.0	0.6	1.36	258.9	707.6	7,540.6	7,488.8	51.75	145.721	
13,300.0	5,834.8	5,511.0	5,440.1	131.9	0.6	1.36	258.9	707.6	7,640.4	7,587.9	52.48	145.586	
13,400.0	5,834.8	5,511.0	5,440.1	133.8	0.6	1.36	258.9	707.6	7,740.3	7,687.1	53.21	145.454	
13,500.0	5,834.8	5,511.0	5,440.1	135.7	0.6	1.36	258.9	707.6	7,840.2	7,786.2	53.95	145.326	
13,600.0	5,834.8	5,511.0	5,440.1	137.6	0.6	1.36	258.9	707.6	7,940.0	7,885.3	54.68	145.202	
13,700.0	5,834.8	5,511.0	5,440.1	139.5	0.6	1.36	258.9	707.6	8,039.9	7,984.5	55.42	145.081	
13,800.0	5,834.8	5,511.0	5,440.1	141.4	0.6	1.36	258.9	707.6	8,139.8	8,083.6	56.15	144.963	
13,900.0	5,834.8	5,511.0	5,440.1	143.3	0.6	1.36	258.9	707.6	8,239.7	8,182.8	56.89	144.848	
14,000.0	5,834.8	5,511.0	5,440.1	145.2	0.6	1.36	258.9	707.6	8,339.6	8,281.9	57.62	144.736	
14,100.0	5,834.9	5,511.0	5,440.1	147.1	0.6	1.36	258.9	707.6	8,439.5	8,381.1	58.35	144.627	
14,200.0	5,834.9	5,511.0	5,440.1	149.0	0.6	1.36	258.9	707.6	8,539.3	8,480.3	59.09	144.520	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Offset Design S8-T10N-R57W - HORSETAIL 08D-1704 - HZ - HZ													Offset Site Error: 0.0 usft	
Survey Program: 165-ISCWSA MWD													Offset Well Error: 0.0 usft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Total Uncertainty Axis	Separation Factor		
14,300.0	5,834.9	5,511.0	5,440.1	150.9	0.6	1.36	258.9	707.6	8,639.2	8,579.4	59.82	144.417		
14,400.0	5,834.9	5,511.0	5,440.1	152.8	0.6	1.36	258.9	707.6	8,739.1	8,678.6	60.56	144.315		
14,500.0	5,834.9	5,511.0	5,440.1	154.8	0.6	1.36	258.9	707.6	8,839.0	8,777.7	61.29	144.217		
14,600.0	5,834.9	5,511.0	5,440.1	156.7	0.6	1.36	258.9	707.6	8,938.9	8,876.9	62.02	144.120		
14,700.0	5,834.9	5,511.0	5,440.1	158.6	0.6	1.36	258.9	707.6	9,038.8	8,976.1	62.76	144.026		
14,800.0	5,834.9	5,511.0	5,440.1	160.5	0.6	1.36	258.9	707.6	9,138.7	9,075.3	63.49	143.934		
14,900.0	5,834.9	5,511.0	5,440.1	162.4	0.6	1.36	258.9	707.6	9,238.7	9,174.4	64.23	143.844		
15,000.0	5,834.9	5,511.0	5,440.1	164.3	0.6	1.36	258.9	707.6	9,338.6	9,273.6	64.96	143.757		
15,100.0	5,834.9	5,511.0	5,440.1	166.2	0.6	1.36	258.9	707.6	9,438.5	9,372.8	65.70	143.671		
15,200.0	5,834.9	5,511.0	5,440.1	168.1	0.6	1.36	258.9	707.6	9,538.4	9,472.0	66.43	143.587		
15,300.0	5,834.9	5,511.0	5,440.1	170.0	0.6	1.36	258.9	707.6	9,638.3	9,571.1	67.16	143.505		
15,400.0	5,834.9	5,511.0	5,440.1	171.9	0.6	1.36	258.9	707.6	9,738.2	9,670.3	67.90	143.424		
15,500.0	5,835.0	5,511.0	5,440.1	173.8	0.6	1.36	258.9	707.6	9,838.1	9,769.5	68.63	143.346		
15,600.0	5,835.0	5,511.0	5,440.1	175.7	0.6	1.36	258.9	707.6	9,938.1	9,868.7	69.37	143.269		

Cathedral Energy Services

Anticollision Report

Company:	Whiting Petroleum Corporation	Local Co-ordinate Reference:	Well HORSETAIL 08D-1704
Project:	Weld County, CO	TVD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Reference Site:	S8-T10N-R57W	MD Reference:	18.5' KB @ 4976.7usft (UNIT 406)
Site Error:	0.0usft	North Reference:	True
Reference Well:	HORSETAIL 08D-1704	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0usft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	ST Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 18.5' KB @ 4976.7usft (UNIT 406)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: HORSETAIL 08D-1704
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 1.11°

