PDC ENERGY

Project: WELD COUNTY, COLORADO (TRUE)
Site: NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
Well: STOUT 15N
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 288ft FNL & 2629ft FWL of Sec 18
400.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1781.25	1841.28	28.83	85.03	30.78	353.64	50.11	354.97	EOB TO 28.83° INC
5055.55	5578.69	28.83	85.03	187.05	2148.82	304.46	2156.95	END OF TANGENT
6436.80	7019.97	0.00	0.00	217.83	2502.46	354.57	2511.92	EOD TO VERTICAL
6636.80	7219.97	0.00	0.00	217.83	2502.46	354.57	2511.92	KOP (8°/100ft BUR)
7328.60	8157.47	75.00	180.91	-312.93	2494.03	869.63	3042.75	EP: 737ft FNL & 480ft FEL of Sec 18
7353.01	8344.99	90.00	180.91	-498.28	2491.09	1049.50	3228.13	HZ LANDING POINT
7353.00	17905.58	90.00	180.92	-10057.67	2338.54	10325.96	12788.73	BHL: 150ft FSL & 480ft FEL of Sec 19

PROPOSED LOCAL COORDINATES:

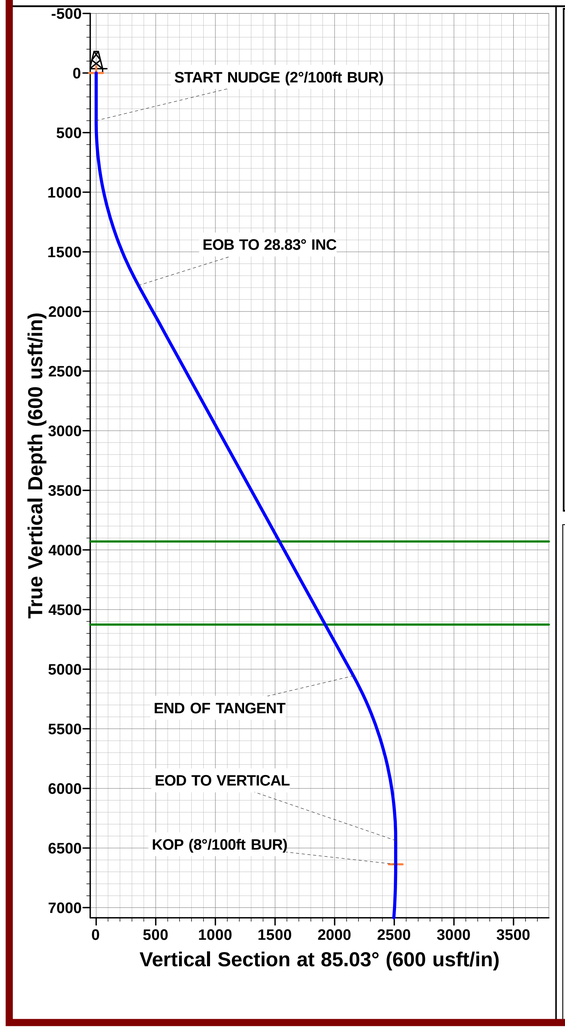
SHL: 288ft FNL & 2629ft FWL Sec 18

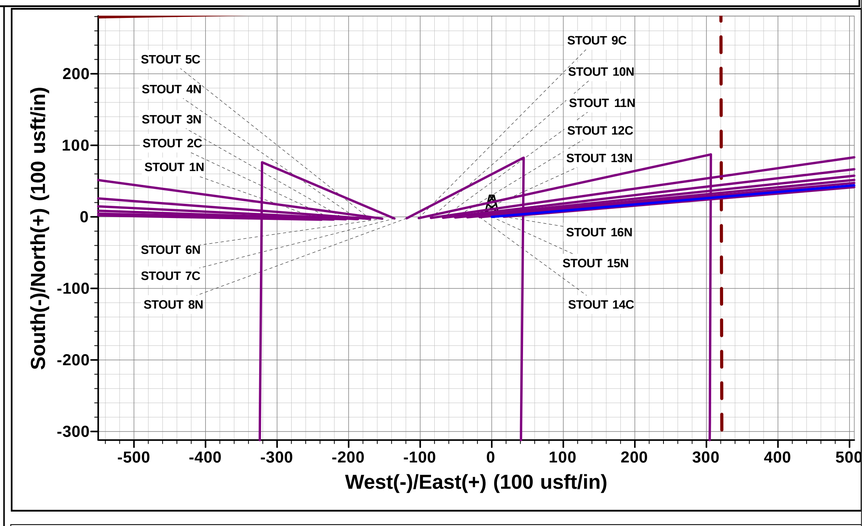
EP : 737ft FNL & 480ft FEL Sec 18

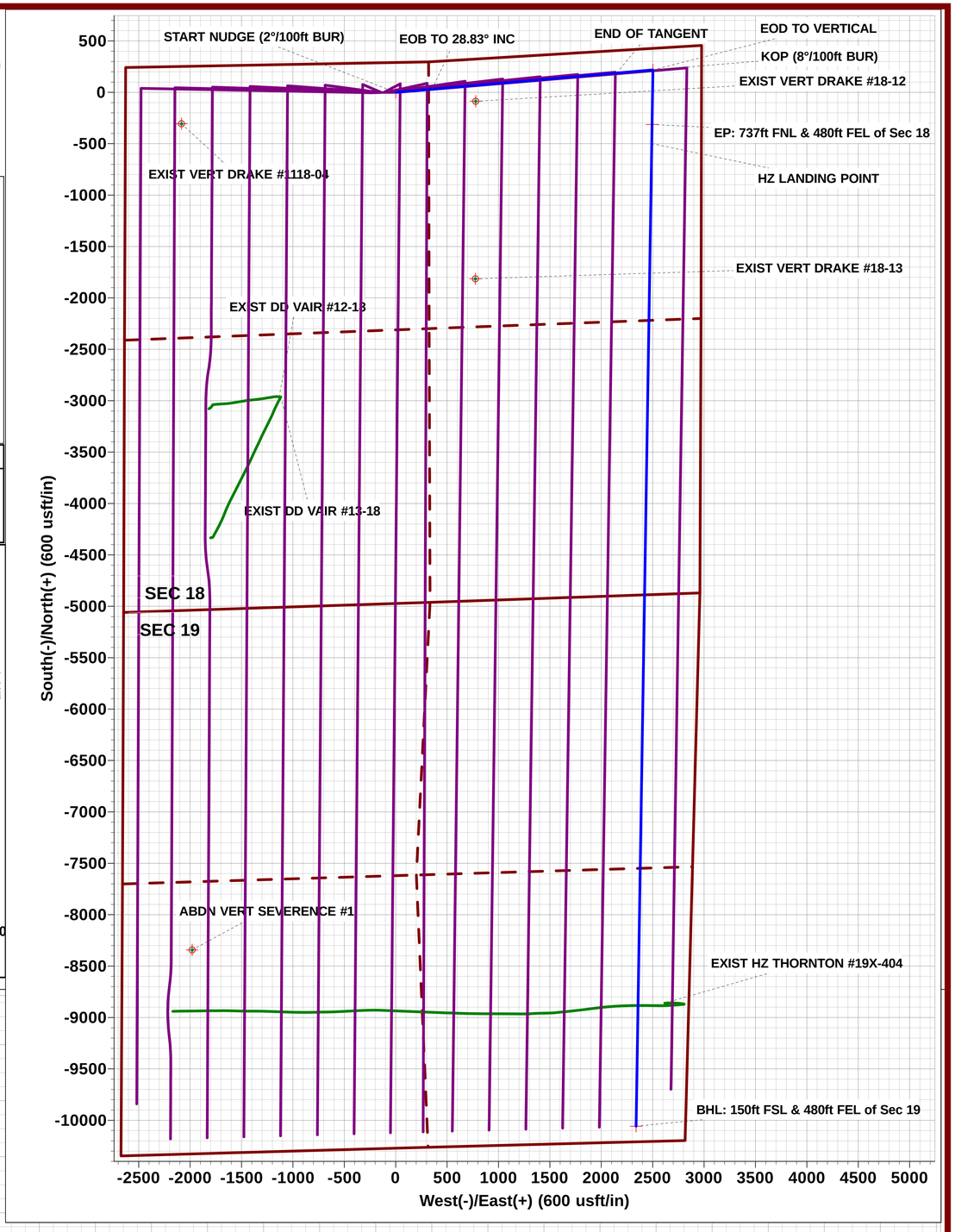
BHL: 150ft FSL & 480ft FEL of Sec 19

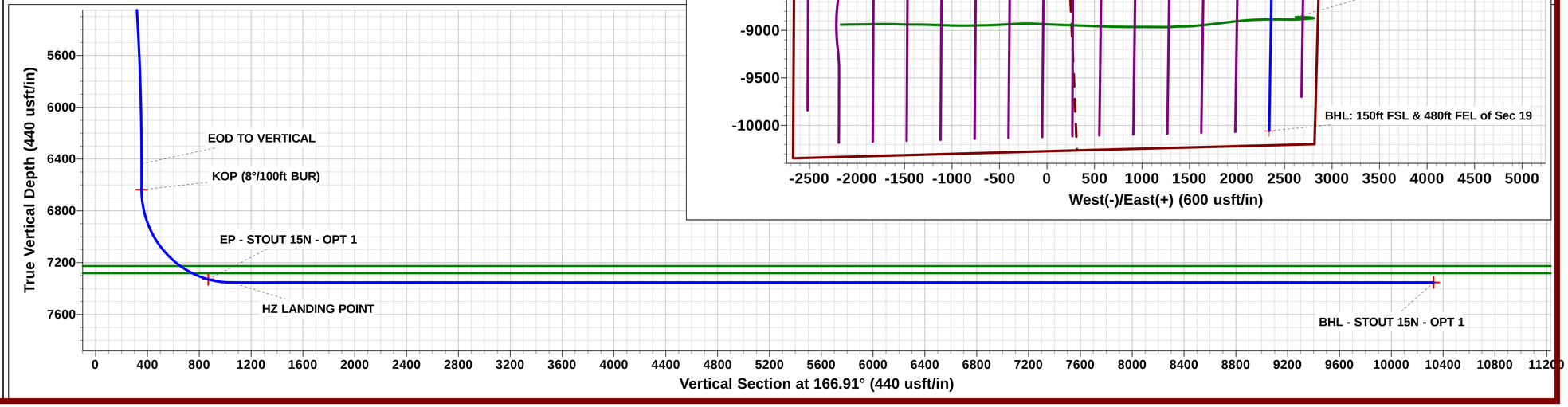
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - STOUT 15N - OPT 1	6636.80	217.83	2502.46	40.581496	-104.813334
EP - STOUT 15N - OPT 1	7328.60	-312.93	2494.03	40.580039	-104.813364
BHL - STOUT 15N - OPT 1	7353.00	-10057.67	2338.54	40.553292	-104.813928
SHL - STOUT 15N - OPT 1	0.00	0.00	0.00	40.580899	-104.822343









PDC ENERGY

WELD COUNTY, COLORADO (TRUE)
NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
STOUT 15N

ORIGINAL WELLBORE
PROPOSAL #1

Anticollision Report

28 February, 2019

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STOUT 15N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 5103.00usft (Original Well Elev)
Reference Site:	NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)	**MD Reference:**	KB 23' @ 5103.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STOUT 15N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**Offset TVD Reference:**	Offset Datum

Reference	PROPOSAL #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 100.00usft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 28/02/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	17,905.58	PROPOSAL #1 (ORIGINAL WELLBORE)	MWD	MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)						
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	16,259.64	7,264.00	4,345.86	4,039.35	14.178	CC
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	16,300.00	7,264.00	4,346.05	4,038.77	14.144	ES
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	17,400.00	7,264.00	4,492.97	4,164.77	13.690	SF
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	263.93	242.61	3,172.55	3,171.81	4,317.728	CC
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	300.00	268.26	3,172.60	3,171.72	3,636.562	ES
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	15,500.00	7,374.34	6,205.25	6,042.95	38.231	SF
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	0.00	0.00	3,167.12			
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	100.00	66.68	3,167.19	3,167.09	10,000.000	ES
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	15,200.00	7,554.22	5,156.85	4,986.99	30.360	SF
EXIST HZ THRONTON #19X-404 - Wellbore #1 - Wellbo	16,730.23	7,428.64	71.74	-50.37	0.587	Level 1, CC, ES, SF
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	400.00	422.00	2,106.46	2,097.79	243.079	CC
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	500.00	521.98	2,108.20	2,097.30	193.390	ES
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	10,500.00	7,375.01	5,111.96	4,910.33	25.354	SF
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	2,698.14	2,511.93	154.10	87.59	2.317	CC
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	2,700.00	2,513.56	154.11	87.54	2.315	ES, SF
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	9,687.61	7,328.01	1,694.11	1,507.47	9.077	CC
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	9,700.00	7,328.01	1,694.16	1,507.32	9.067	ES
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	9,900.00	7,328.01	1,707.37	1,517.33	8.984	SF
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	84.98	83.46	55.848	CC, ES
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,316.19	1,787.53	1,402.08	4.638	SF
STOUT 11N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	67.98	66.46	44.675	CC, ES
STOUT 11N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,313.57	1,429.75	1,046.28	3.728	SF
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	50.98	49.46	33.502	CC, ES
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,611.84	1,085.63	702.28	2.832	SF
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	33.98	32.45	22.328	CC, ES
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,642.56	717.69	333.99	1.870	SF
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	16.97	15.45	11.155	CC, ES
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,899.96	402.13	45.01	1.126	Level 2, SF
STOUT 16N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	17.00	15.93	15.858	CC
STOUT 16N - ORIGINAL WELLBORE - PROPOSAL #1	17,511.73	17,742.24	345.97	-8.96	0.975	Level 1, ES, SF
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	237.95	236.87	221.937	CC, ES
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,316.07	4,863.03	4,479.89	12.693	SF
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	220.94	219.42	145.199	CC, ES
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,580.12	4,530.48	4,145.96	11.782	SF
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	203.94	202.42	134.025	CC, ES
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,394.12	4,171.95	3,788.23	10.872	SF

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

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STOUT 15N
Project:	WELD COUNTY, COLORADO (TRUE)	**TVD Reference:**	KB 23' @ 5103.00usft (Original Well Elev)
Reference Site:	NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)	**MD Reference:**	KB 23' @ 5103.00usft (Original Well Elev)
Site Error:	0.00 usft	**North Reference:**	True
Reference Well:	STOUT 15N	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.00 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	**Database:**	Database 1
Reference Design:	PROPOSAL #1	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)						
STOUT 4N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	186.94	185.42	122.852	CC, ES
STOUT 4N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,223.75	3,815.25	3,431.08	9.931	SF
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	169.94	168.42	111.679	CC, ES
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,362.31	3,460.27	3,074.53	8.970	SF
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	152.96	151.44	100.524	CC, ES
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,242.45	3,100.13	2,716.12	8.073	SF
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	135.96	134.44	89.351	CC, ES
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,318.99	2,746.74	2,361.49	7.130	SF
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	118.96	117.44	78.177	CC, ES
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,159.18	2,389.02	2,005.25	6.225	SF
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	101.96	100.44	67.004	CC, ES
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	17,905.58	17,377.20	2,077.35	1,691.94	5.390	SF

Offset Design NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1) - ABDN VERT SEVERENCE #1 - Wellbore #1

Offset Site Error: 0.00 usft

Survey Program: 0-INC

Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-166.65	-8,342.38	-1,980.40	8,574.68				
100.00	100.00	11.00	11.00	0.09	0.13	-166.65	-8,342.38	-1,980.40	8,574.22	8,574.01	0.21	N/A	
200.00	200.00	111.00	111.00	0.31	1.40	-166.65	-8,342.38	-1,980.40	8,574.22	8,572.51	1.71	5,015.796	
300.00	300.00	211.00	211.00	0.54	3.68	-166.65	-8,342.38	-1,980.40	8,574.22	8,570.01	4.21	2,035.986	
400.00	400.00	311.00	311.00	0.76	5.75	-166.65	-8,342.38	-1,980.40	8,574.22	8,567.71	6.51	1,316.826	
500.00	499.98	410.98	410.98	0.98	7.79	108.33	-8,342.38	-1,980.40	8,574.77	8,566.00	8.77	978.217	
600.00	599.84	510.84	510.84	1.19	9.82	108.33	-8,342.38	-1,980.40	8,576.42	8,565.41	11.01	779.304	
700.00	699.45	610.45	610.45	1.43	11.83	108.33	-8,342.38	-1,980.40	8,579.17	8,565.91	13.25	647.325	
800.00	798.70	709.70	709.70	1.70	13.84	108.34	-8,342.38	-1,980.40	8,583.03	8,567.51	15.52	553.100	
900.00	897.47	808.47	808.47	2.01	15.83	108.34	-8,342.38	-1,980.40	8,588.01	8,570.20	17.81	482.282	
1,000.00	995.62	906.62	906.62	2.38	17.81	108.34	-8,342.38	-1,980.40	8,594.11	8,573.99	20.13	427.010	
1,100.00	1,093.06	1,004.06	1,004.06	2.80	19.77	108.34	-8,342.38	-1,980.40	8,601.36	8,578.88	22.48	382.621	
1,200.00	1,189.64	1,100.64	1,100.64	3.29	21.71	108.34	-8,342.38	-1,980.40	8,609.76	8,584.89	24.87	346.170	
1,300.00	1,285.27	1,196.27	1,196.27	3.85	23.64	108.34	-8,342.38	-1,980.40	8,619.34	8,592.04	27.30	315.704	
1,400.00	1,379.82	1,290.82	1,290.82	4.47	25.54	108.33	-8,342.38	-1,980.40	8,630.11	8,600.34	29.77	289.869	
1,500.00	1,473.17	1,384.17	1,384.17	5.18	27.42	108.31	-8,342.38	-1,980.40	8,642.09	8,609.81	32.28	267.697	
1,600.00	1,565.21	1,476.21	1,476.21	5.95	29.27	108.29	-8,342.38	-1,980.40	8,655.30	8,620.47	34.83	248.475	
1,700.00	1,655.84	1,566.84	1,566.84	6.81	31.10	108.25	-8,342.38	-1,980.40	8,669.77	8,632.34	37.42	231.663	
1,800.00	1,744.94	1,655.94	1,655.94	7.75	32.89	108.21	-8,342.38	-1,980.40	8,685.51	8,645.45	40.05	216.847	
1,841.28	1,781.25	1,692.25	1,692.25	8.16	33.62	108.18	-8,342.38	-1,980.40	8,692.38	8,651.23	41.15	211.233	
1,900.00	1,832.69	1,743.69	1,743.69	8.76	34.66	108.34	-8,342.38	-1,980.40	8,702.36	8,659.63	42.73	203.641	
2,000.00	1,920.30	1,831.30	1,831.30	9.78	36.42	108.61	-8,342.38	-1,980.40	8,719.54	8,674.10	45.44	191.908	
2,100.00	2,007.91	1,918.91	1,918.91	10.82	38.18	108.87	-8,342.38	-1,980.40	8,736.95	8,688.81	48.14	181.479	
2,200.00	2,095.52	2,006.52	2,006.52	11.86	39.94	109.14	-8,342.38	-1,980.40	8,754.59	8,703.74	50.85	172.157	
2,300.00	2,183.12	2,094.12	2,094.12	12.90	41.71	109.40	-8,342.38	-1,980.40	8,772.47	8,718.90	53.56	163.779	
2,400.00	2,270.73	2,181.73	2,181.73	13.95	43.47	109.67	-8,342.38	-1,980.40	8,790.57	8,734.29	56.27	156.214	
2,500.00	2,358.34	2,269.34	2,269.34	15.00	45.23	109.93	-8,342.38	-1,980.40	8,808.89	8,749.91	58.98	149.351	
2,600.00	2,445.95	2,356.95	2,356.95	16.06	46.99	110.19	-8,342.38	-1,980.40	8,827.44	8,765.76	61.69	143.098	
2,700.00	2,533.56	2,444.56	2,444.56	17.11	48.76	110.46	-8,342.38	-1,980.40	8,846.22	8,781.83	64.39	137.380	
2,800.00	2,621.17	2,532.17	2,532.17	18.17	50.52	110.72	-8,342.38	-1,980.40	8,865.22	8,798.12	67.09	132.131	

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