PDC ENERGY

Project: WELD COUNTY, COLORADO (TRUE)
Site: NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
Well: STOUT 11N
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 & 2561ft FWL of Sec 18
800.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1426.50	1431.61	12.63	83.28	8.12	68.87	-1.45	69.34	EOB TO 12.63° INC
5790.31	5903.66	12.63	83.28	122.64	1040.13	-21.94	1047.34	END OF TANGENT
6416.81	6535.27	0.00	0.00	130.76	1109.00	-23.40	1116.68	EOD TO VERTICAL
6616.81	6735.27	0.00	0.00	130.76	1109.00	-23.40	1116.68	KOP (8°/100ft BUR)
7308.60	7672.77	75.00	180.74	-400.03	1102.14	504.27	1647.52	EP: 737ft FNL & 1940ft FEL of Sec 18
7333.00	7860.26	90.00	180.74	-585.37	1099.75	688.52	1832.88	HZ LANDING POINT
7333.00	17370.50	90.00	180.75	-10094.81	976.31	10141.91	11343.11	BHL: 150ft FSL & 1909ft FEL of Sec 19

PROPOSED LOCAL COORDINATES:

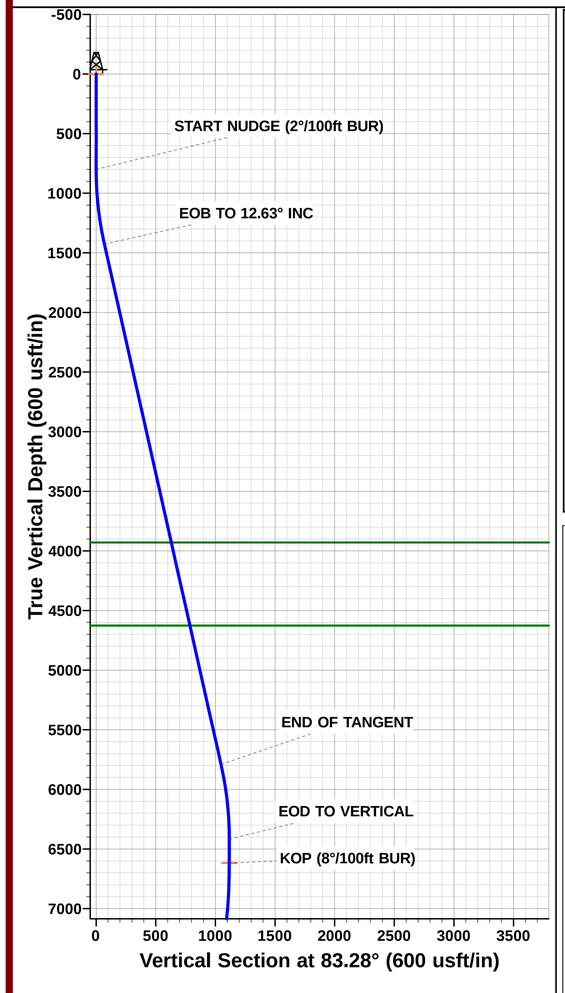
SHL: 288ft FNL & 2561ft FWL Sec 18

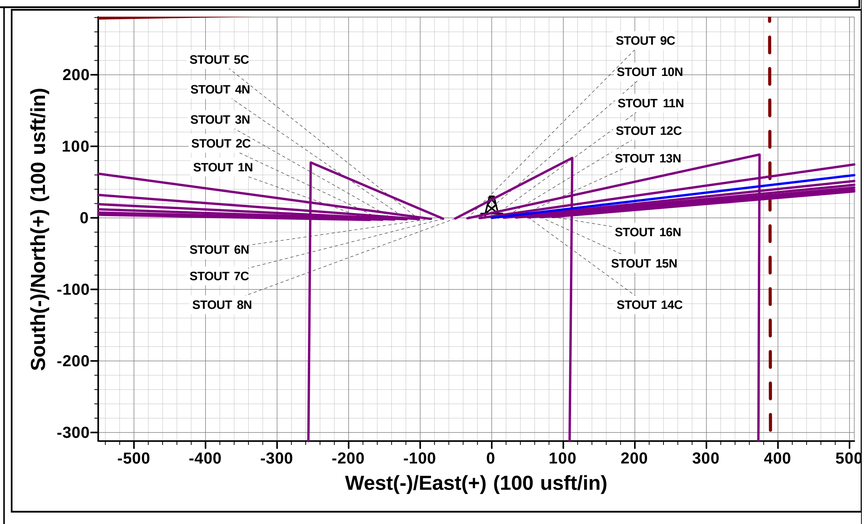
EP : 737ft FNL & 1940ft FEL Sec 18

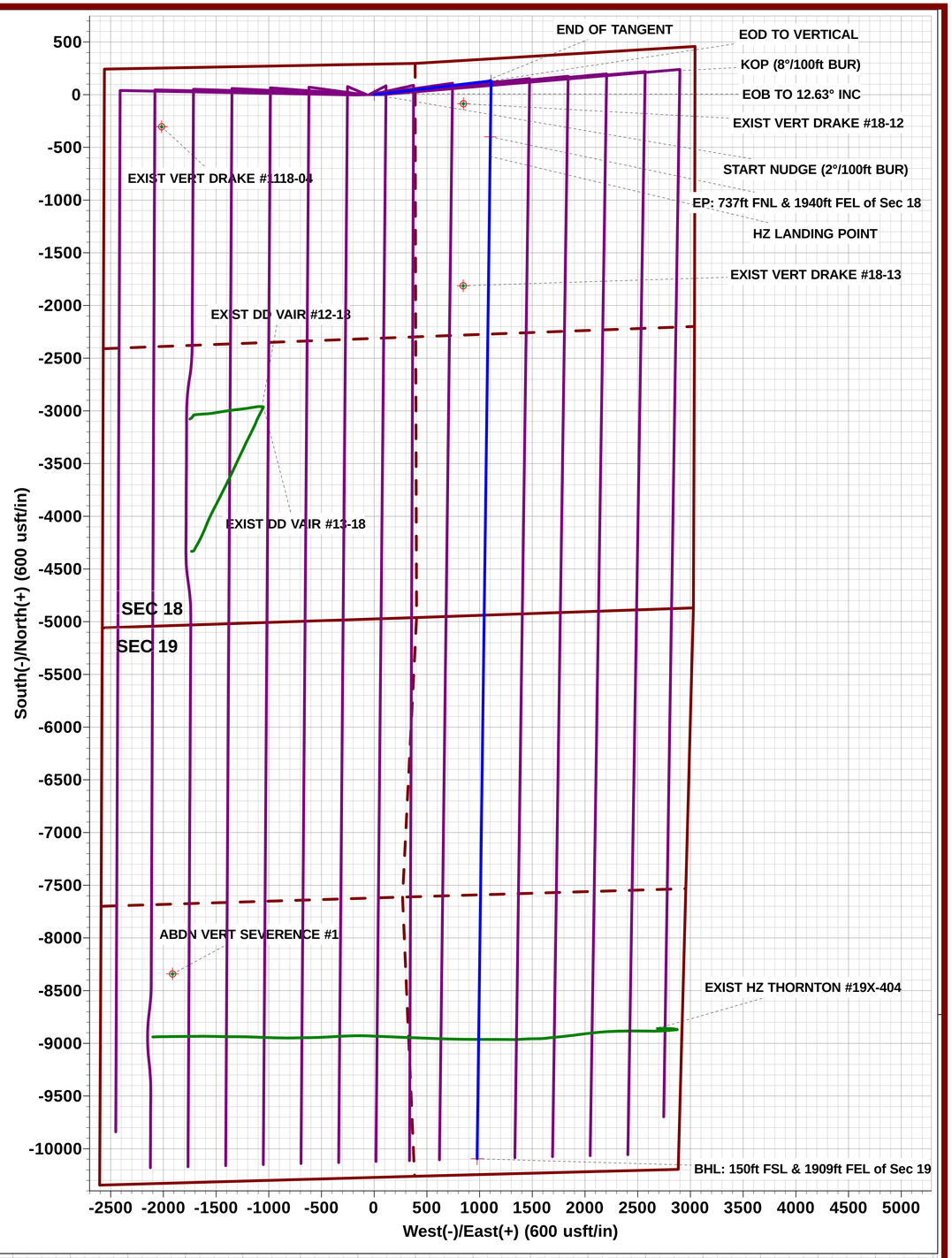
BHL: 150ft FSL & 1909ft FEL of Sec 19

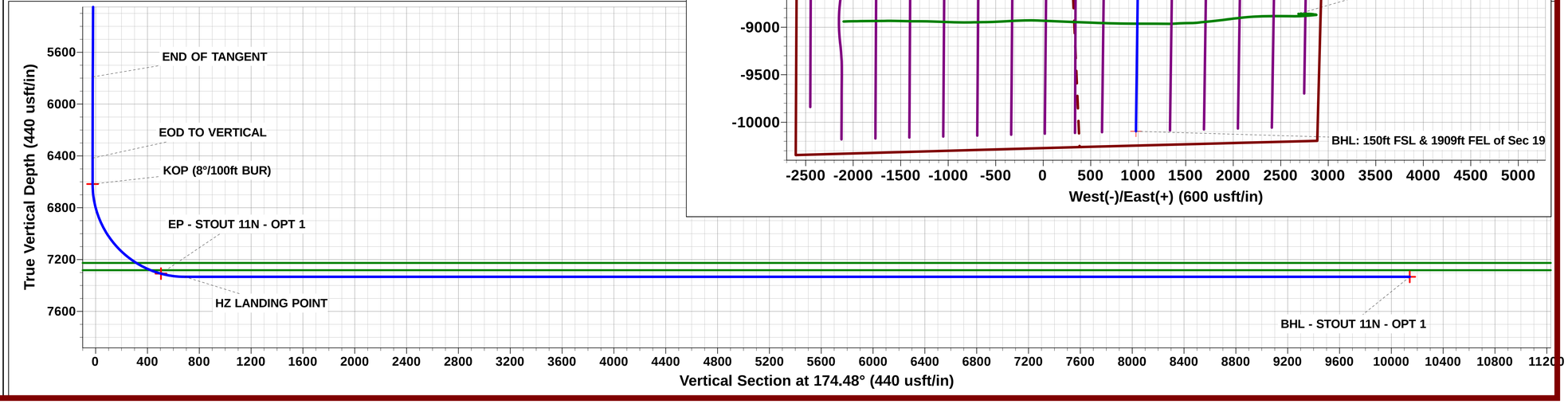
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - STOUT 11N - OPT 1	6616.81	130.76	1109.00	40.581254	-104.818595
EP - STOUT 11N - OPT 1	7308.60	-400.03	1102.14	40.579797	-104.818620
BHL - STOUT 11N - OPT 1	7333.00	-10094.81	976.31	40.553187	-104.819074
SHL - STOUT 11N - OPT 1	0.00	0.00	0.00	40.580895	-104.822588









PDC ENERGY

WELD COUNTY, COLORADO (TRUE)
NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
STOUT 11N

ORIGINAL WELLBORE
PROPOSAL #1

Anticollision Report

28 February, 2019

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STOUT 11N
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 11N	**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	17,370.49	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	15,654.71	7,244.00	2,911.32	2,606.16	9.540	CC
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	15,700.00	7,244.00	2,911.67	2,605.65	9.515	ES
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	16,200.00	7,244.00	2,961.94	2,646.38	9.386	SF
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	10,385.56	7,326.07	2,812.18	2,735.83	36.835	CC
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	10,400.00	7,326.22	2,812.21	2,735.61	36.709	ES
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	12,400.00	7,347.94	3,459.15	3,345.23	30.364	SF
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	11,643.09	7,537.58	2,781.49	2,668.52	24.622	CC
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	11,700.00	7,537.85	2,782.07	2,668.04	24.397	ES
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	12,900.00	7,543.28	3,052.28	2,915.64	22.338	SF
EXIST HZ THRONTON #19X-404 - Wellbore #1 - Wellbo	16,238.25	8,932.19	240.32	157.69	2.908	CC, ES, SF
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	800.00	822.00	2,039.06	2,021.41	115.527	CC
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	900.00	921.98	2,040.80	2,020.94	102.725	ES
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	8,500.00	7,355.00	3,241.24	3,065.33	18.426	SF
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	4,912.96	4,803.58	184.32	69.44	1.604	CC
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	5,000.00	4,888.52	185.30	68.35	1.584	ES, SF
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	9,090.76	7,308.00	240.04	56.36	1.307	Level 3, CC, ES
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	9,100.00	7,308.00	240.21	56.39	1.307	Level 3, SF
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	800.00	800.00	17.00	13.68	5.121	CC
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,371.89	363.96	-17.82	0.953	Level 1, ES, SF
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	700.00	700.00	17.00	14.13	5.924	CC, ES
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,655.17	408.05	63.95	1.186	Level 2, SF
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	600.00	600.00	34.00	31.58	14.047	CC, ES
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,671.92	721.51	340.09	1.892	SF
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	500.00	500.00	51.01	49.04	25.876	CC, ES
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,914.93	1,092.71	713.26	2.880	SF
STOUT 15N - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	67.98	66.46	44.675	CC, ES
STOUT 15N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,905.58	1,430.88	1,046.22	3.720	SF
STOUT 16N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	84.98	83.91	79.265	CC, ES
STOUT 16N - ORIGINAL WELLBORE - PROPOSAL #1	17,100.00	17,771.74	1,774.54	1,403.07	4.777	SF
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	169.97	168.89	158.530	CC, ES
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,316.07	3,437.32	3,053.81	8.963	SF
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	400.00	400.00	152.96	151.44	100.524	CC, ES
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,624.40	3,101.99	2,716.66	8.050	SF
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	500.00	500.00	135.96	133.99	68.974	CC, ES
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,439.65	2,742.27	2,357.43	7.126	SF
STOUT 4N - ORIGINAL WELLBORE - PROPOSAL #1	600.00	600.00	118.96	116.54	49.142	CC, ES

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 11N
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 11N	**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	17,370.50	17,270.30	2,385.12	1,999.64	6.187	SF
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	700.00	700.00	101.96	99.09	35.522	CC, ES
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,410.22	2,033.43	1,647.18	5.265	SF
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	800.00	800.00	84.98	81.66	25.599	CC, ES
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,291.45	1,671.05	1,285.90	4.339	SF
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	800.00	800.00	67.98	64.66	20.477	CC, ES
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,369.11	1,323.37	938.87	3.442	SF
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	800.00	800.00	50.98	47.66	15.356	CC, ES
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,210.79	959.13	573.87	2.490	SF
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	800.00	800.00	33.98	30.66	10.234	CC, ES
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	17,370.50	17,421.06	664.93	288.33	1.766	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	-167.09	-8,341.25	-1,912.40	8,558.14				
100.00	100.00	11.00	11.00	0.09	0.13	-167.09	-8,341.25	-1,912.40	8,557.67	8,557.46	0.21	N/A	
200.00	200.00	111.00	111.00	0.31	1.40	-167.09	-8,341.25	-1,912.40	8,557.67	8,555.96	1.71	5,006.118	
300.00	300.00	211.00	211.00	0.54	3.68	-167.09	-8,341.25	-1,912.40	8,557.67	8,553.46	4.21	2,032.058	
400.00	400.00	311.00	311.00	0.76	5.75	-167.09	-8,341.25	-1,912.40	8,557.67	8,551.16	6.51	1,314.285	
500.00	500.00	411.00	411.00	0.99	7.79	-167.09	-8,341.25	-1,912.40	8,557.67	8,548.90	8.78	975.012	
600.00	600.00	511.00	511.00	1.21	9.82	-167.09	-8,341.25	-1,912.40	8,557.67	8,546.64	11.03	775.841	
700.00	700.00	611.00	611.00	1.44	11.84	-167.09	-8,341.25	-1,912.40	8,557.67	8,544.40	13.28	644.531	
800.00	800.00	711.00	711.00	1.66	13.86	-167.09	-8,341.25	-1,912.40	8,557.67	8,542.15	15.52	551.354	
900.00	899.98	810.98	810.98	1.87	15.88	109.64	-8,341.25	-1,912.40	8,558.26	8,540.51	17.75	482.144	
1,000.00	999.84	910.84	910.84	2.08	17.89	109.64	-8,341.25	-1,912.40	8,560.02	8,540.05	19.97	428.660	
1,100.00	1,099.45	1,010.45	1,010.45	2.31	19.90	109.64	-8,341.25	-1,912.40	8,562.96	8,540.77	22.19	385.833	
1,200.00	1,198.70	1,109.70	1,109.70	2.56	21.90	109.64	-8,341.25	-1,912.40	8,567.08	8,542.66	24.43	350.712	
1,300.00	1,297.47	1,208.47	1,208.47	2.84	23.89	109.63	-8,341.25	-1,912.40	8,572.40	8,545.72	26.68	321.331	
1,400.00	1,395.62	1,306.62	1,306.62	3.17	25.86	109.63	-8,341.25	-1,912.40	8,578.92	8,549.97	28.95	296.334	
1,431.61	1,426.50	1,337.50	1,337.50	3.29	26.48	109.63	-8,341.25	-1,912.40	8,581.23	8,551.55	29.67	289.185	
1,500.00	1,493.24	1,404.24	1,404.24	3.55	27.83	109.72	-8,341.25	-1,912.40	8,586.37	8,555.11	31.26	274.641	
1,600.00	1,590.82	1,501.82	1,501.82	3.94	29.79	109.85	-8,341.25	-1,912.40	8,593.94	8,560.33	33.61	255.729	
1,700.00	1,688.40	1,599.40	1,599.40	4.36	31.75	109.99	-8,341.25	-1,912.40	8,601.55	8,565.59	35.96	239.183	
1,800.00	1,785.98	1,696.98	1,696.98	4.79	33.72	110.12	-8,341.25	-1,912.40	8,609.21	8,570.88	38.33	224.610	
1,900.00	1,883.56	1,794.56	1,794.56	5.22	35.68	110.25	-8,341.25	-1,912.40	8,616.92	8,576.22	40.71	211.691	
2,000.00	1,981.14	1,892.14	1,892.14	5.67	37.64	110.39	-8,341.25	-1,912.40	8,624.68	8,581.59	43.09	200.169	
2,100.00	2,078.72	1,989.72	1,989.72	6.11	39.61	110.52	-8,341.25	-1,912.40	8,632.49	8,587.02	45.47	189.837	
2,200.00	2,176.30	2,087.30	2,087.30	6.57	41.57	110.65	-8,341.25	-1,912.40	8,640.35	8,592.48	47.86	180.522	
2,300.00	2,273.88	2,184.88	2,184.88	7.02	43.53	110.79	-8,341.25	-1,912.40	8,648.25	8,597.99	50.26	172.085	
2,400.00	2,371.46	2,282.46	2,282.46	7.48	45.50	110.92	-8,341.25	-1,912.40	8,656.20	8,603.55	52.65	164.409	
2,500.00	2,469.03	2,380.03	2,380.03	7.95	47.46	111.05	-8,341.25	-1,912.40	8,664.20	8,609.15	55.05	157.397	
2,600.00	2,566.61	2,477.61	2,477.61	8.41	49.42	111.18	-8,341.25	-1,912.40	8,672.25	8,614.80	57.44	150.967	
2,700.00	2,664.19	2,575.19	2,575.19	8.88	51.38	111.31	-8,341.25	-1,912.40	8,680.34	8,620.50	59.84	145.051	
2,800.00	2,761.77	2,672.77	2,672.77	9.35	53.35	111.45	-8,341.25	-1,912.40	8,688.49	8,626.24	62.24	139.591	
2,900.00	2,859.35	2,770.35	2,770.35	9.81	55.31	111.58	-8,341.25	-1,912.40	8,696.68	8,632.04	64.64	134.535	

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