PDC ENERGY

Project: WELD COUNTY, COLORADO (TRUE)
Site: NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
Well: STOUT 16N
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 & 2646ft FWL of Sec 18
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2.25°/100ft BUR)
1581.37	1642.74	30.21	85.18	29.08	344.66	63.16	345.88	EOB TO 30.21° INC
5245.43	5882.69	30.21	85.18	208.43	2470.62	452.78	2479.40	END OF TANGENT
6526.80	7225.42	0.00	0.00	237.51	2815.28	515.95	2825.28	EOD TO VERTICAL
6726.80	7425.42	0.00	0.00	237.51	2815.28	515.95	2825.28	KOP (8°/100ft BUR)
7418.59	8362.92	75.00	180.89	-293.26	2807.03	1025.61	3356.11	EP: 737ft FNL & 150ft FEL of Sec 18
7443.00	8550.42	90.00	180.89	-478.60	2804.16	1203.58	3541.48	HZ LANDING POINT
7443.00	17771.74	90.00	180.88	-9698.82	2661.41	10057.34	12762.80	BHL: 500ft FSL & 150ft FEL of Sec 19

PROPOSED LOCAL COORDINATES:

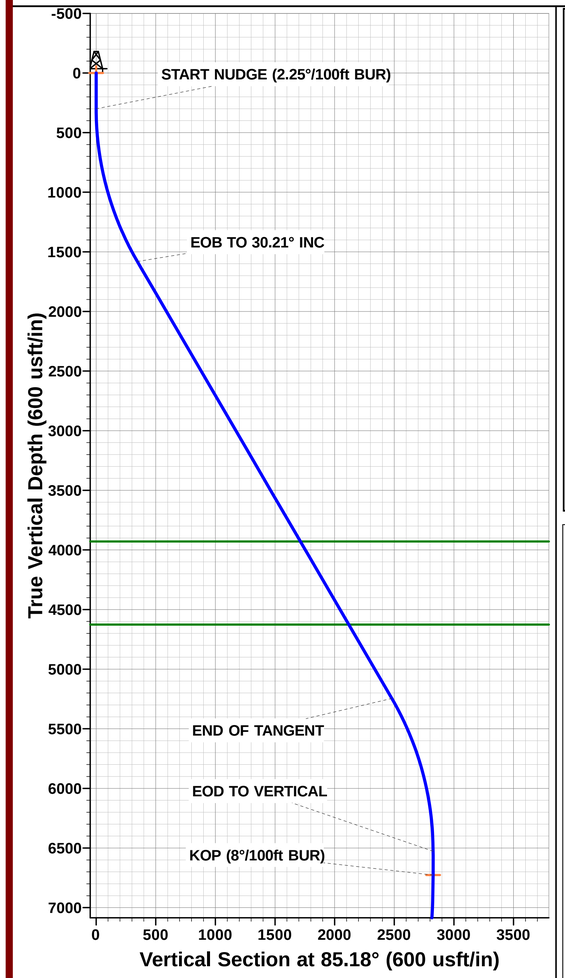
SHL: 288ft FNL & 2646ft FWL Sec 18

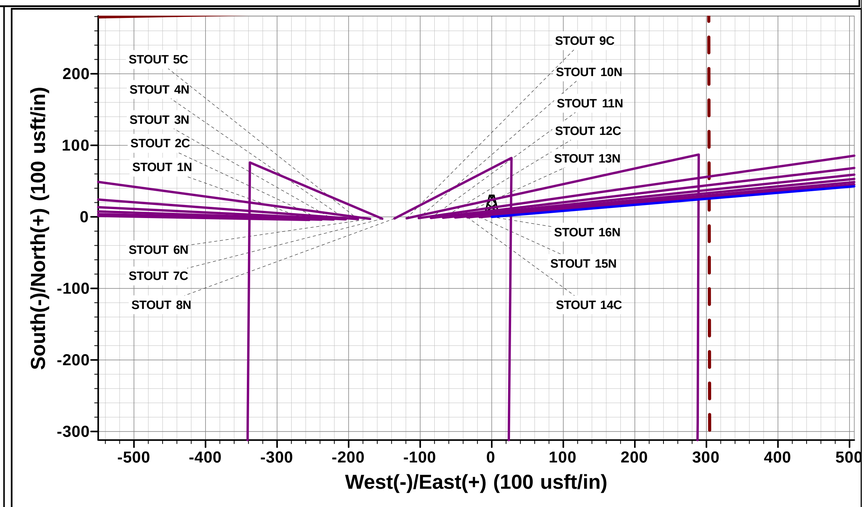
EP : 737ft FNL & 150ft FEL Sec 18

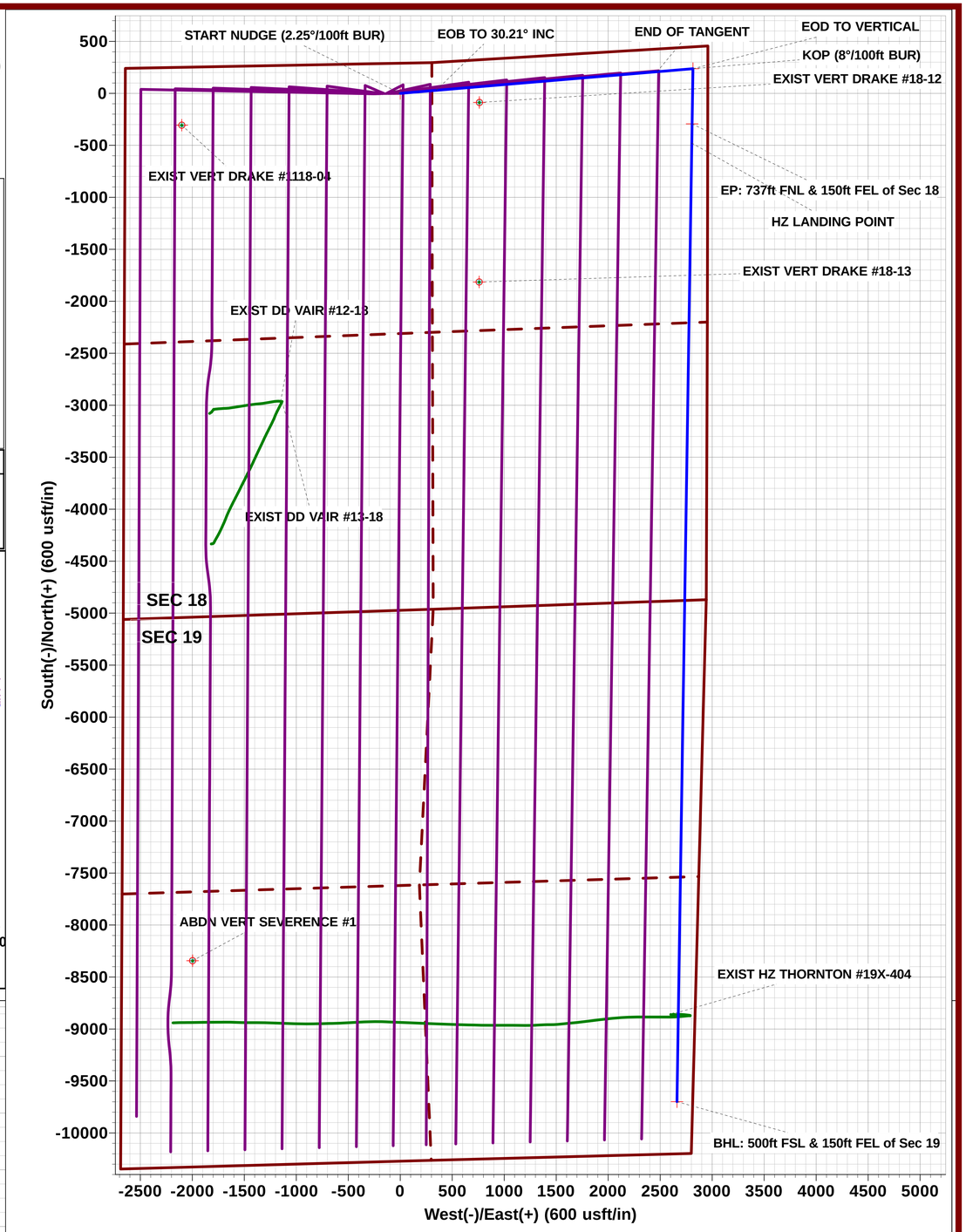
BHL: 500ft FSL & 150ft FEL of Sec 19

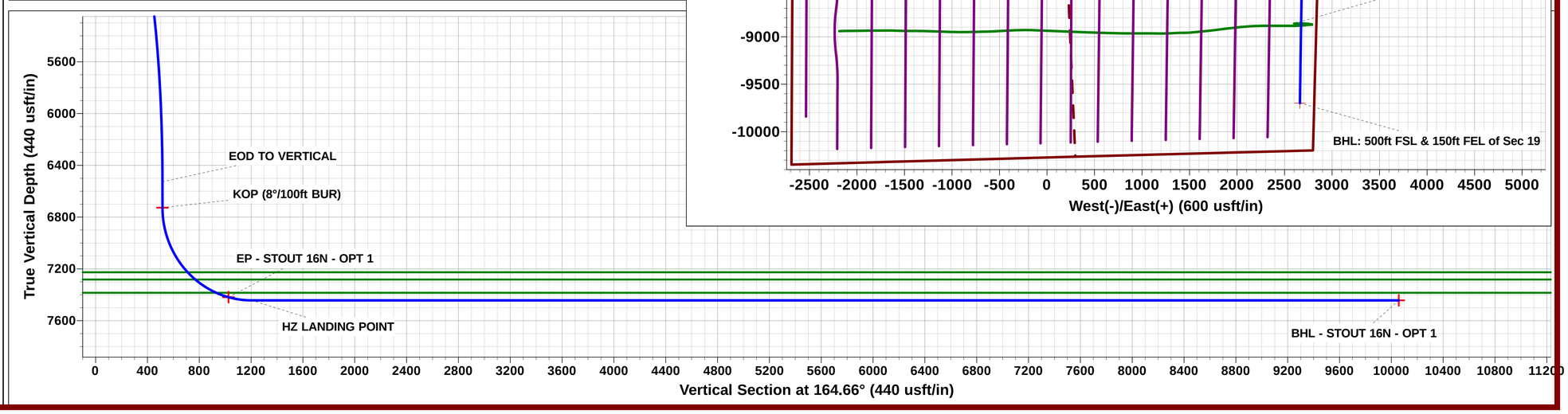
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - STOUT 16N - OPT 1	6726.80	237.51	2815.28	40.581551	-104.812146
BHL - STOUT 16N - OPT 1	7443.00	-9698.82	2661.41	40.554277	-104.812704
EP - STOUT 16N - OPT 1	7418.60	-293.26	2807.03	40.580094	-104.812176
SHL - STOUT 16N - OPT 1	0.00	0.00	0.00	40.580899	-104.822282









PDC ENERGY

WELD COUNTY, COLORADO (TRUE)
NE NW SEC. 18 T7N R66W 6th P.M. (STOUT - OPT 1)
STOUT 16N

ORIGINAL WELLBORE
PROPOSAL #1

Anticollision Report

28 February, 2019

Company:	PDC ENERGY	**Local Co-ordinate Reference:**	Well STOUT 16N
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 16N	**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	17,771.74	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	16,487.70	7,354.00	4,679.19	4,370.82	15.174	CC
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	16,600.00	7,354.00	4,680.53	4,370.04	15.074	ES
ABDN VERT SEVERENCE #1 - Wellbore #1 - Design #1	17,771.74	7,354.00	4,852.18	4,519.49	14.585	SF
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	262.72	241.24	3,178.94	3,178.21	4,360.783	CC
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	300.00	268.06	3,178.99	3,178.12	3,645.776	ES
EXIST DD VAIR #12-18 - Wellbore #1 - Wellbore #1	16,400.00	7,478.20	6,924.11	6,748.77	39.491	SF
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	0.00	0.00	3,173.44			
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	100.00	66.65	3,173.50	3,173.40	10,000.000	ES
EXIST DD VAIR #13-18 - Wellbore #1 - Wellbore #1	15,900.00	7,644.03	5,702.43	5,523.48	31.866	SF
EXIST HZ THRONTON #19X-404 - Wellbore #1 - Wellbo	16,960.10	7,248.28	217.88	79.15	1.571	CC, ES, SF
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	300.00	322.00	2,123.32	2,116.92	331.705	CC
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	400.00	421.97	2,125.28	2,116.63	245.687	ES
EXIST VERT DRAKE #1118-04 - ORIGINAL WELLBORE	11,000.00	7,465.00	5,528.71	5,320.11	26.503	SF
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	2,448.92	2,258.06	150.92	89.89	2.473	CC, ES
EXIST VERT DRAKE #18-12 - Wellbore #1 - Design #1	2,500.00	2,302.20	153.09	90.84	2.459	SF
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	2,155.03	1,999.08	1,871.47	1,818.86	35.577	CC
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	2,400.00	2,210.78	1,875.52	1,815.97	31.491	ES
EXIST VERT DRAKE #18-13 - Wellbore #1 - Design #1	10,300.00	7,418.00	2,060.14	1,864.88	10.551	SF
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	101.98	100.91	95.123	CC, ES
STOUT 10N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,952.93	2,122.67	1,751.54	5.719	SF
STOUT 11N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	84.98	83.91	79.265	CC, ES
STOUT 11N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,950.03	1,768.20	1,399.75	4.799	SF
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	67.98	66.91	63.407	CC, ES
STOUT 12C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,248.08	1,408.93	1,036.94	3.788	SF
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	50.98	49.91	47.549	CC, ES
STOUT 13N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,278.57	1,049.14	679.39	2.837	SF
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	33.98	32.90	31.691	CC, ES
STOUT 14C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,535.70	697.93	326.41	1.879	SF
STOUT 15N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	17.00	15.93	15.858	CC
STOUT 15N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,541.04	345.98	-10.06	0.972	Level 1, ES, SF
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	254.95	253.88	237.795	CC, ES
STOUT 1N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,152.54	5,199.17	4,826.30	13.943	SF
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	237.95	236.87	221.937	CC, ES
STOUT 2C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,219.55	4,867.34	4,496.62	13.129	SF
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	220.94	219.87	206.079	CC, ES
STOUT 3N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,033.25	4,510.28	4,140.53	12.198	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 16N
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 16N	**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	300.00	300.00	203.94	202.87	190.221	CC, ES
STOUT 4N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,862.61	4,155.17	3,785.16	11.230	SF
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	186.94	185.87	174.363	CC, ES
STOUT 5C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,000.90	3,795.49	3,423.54	10.204	SF
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	169.97	168.89	158.530	CC, ES
STOUT 6N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,880.79	3,437.41	3,067.47	9.292	SF
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	152.96	151.89	142.672	CC, ES
STOUT 7C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,957.05	3,080.29	2,708.74	8.291	SF
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	135.96	134.89	126.814	CC, ES
STOUT 8N - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	16,796.87	2,727.67	2,358.33	7.385	SF
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	300.00	300.00	118.96	117.89	110.956	CC, ES
STOUT 9C - ORIGINAL WELLBORE - PROPOSAL #1	17,771.74	17,016.73	2,410.91	2,038.95	6.482	SF

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

Survey Program: 0-INC

Offset Site Error: 0.00 usft

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	-166.54	-8,342.67	-1,997.40	8,578.91				
100.00	100.00	11.00	11.00	0.09	0.13	-166.54	-8,342.67	-1,997.40	8,578.44	8,578.23	0.21	N/A	
200.00	200.00	111.00	111.00	0.31	1.40	-166.54	-8,342.67	-1,997.40	8,578.44	8,576.74	1.71	5,018.268	
300.00	300.00	211.00	211.00	0.54	3.68	-166.54	-8,342.67	-1,997.40	8,578.44	8,574.23	4.21	2,036.990	
400.00	399.97	310.97	310.97	0.75	5.75	108.29	-8,342.67	-1,997.40	8,579.06	8,572.56	6.50	1,319.678	
500.00	499.79	410.79	410.79	0.97	7.79	108.28	-8,342.67	-1,997.40	8,580.91	8,572.15	8.76	979.805	
600.00	599.31	510.31	510.31	1.23	9.81	108.28	-8,342.67	-1,997.40	8,584.00	8,572.98	11.02	778.792	
700.00	698.36	609.36	609.36	1.52	11.81	108.27	-8,342.67	-1,997.40	8,588.33	8,575.03	13.31	645.355	
800.00	796.79	707.79	707.79	1.87	13.80	108.26	-8,342.67	-1,997.40	8,593.92	8,578.30	15.62	550.023	
900.00	894.46	805.46	805.46	2.28	15.77	108.25	-8,342.67	-1,997.40	8,600.78	8,582.80	17.98	478.380	
1,000.00	991.22	902.22	902.22	2.76	17.72	108.23	-8,342.67	-1,997.40	8,608.92	8,588.55	20.37	422.525	
1,100.00	1,086.91	997.91	997.91	3.32	19.64	108.20	-8,342.67	-1,997.40	8,618.36	8,595.55	22.81	377.754	
1,200.00	1,181.38	1,092.38	1,092.38	3.96	21.55	108.17	-8,342.67	-1,997.40	8,629.12	8,603.83	25.30	341.080	
1,300.00	1,274.50	1,185.50	1,185.50	4.69	23.42	108.12	-8,342.67	-1,997.40	8,641.23	8,613.40	27.83	310.509	
1,400.00	1,366.11	1,277.11	1,277.11	5.50	25.27	108.07	-8,342.67	-1,997.40	8,654.69	8,624.29	30.40	284.656	
1,500.00	1,456.08	1,367.08	1,367.08	6.40	27.08	107.99	-8,342.67	-1,997.40	8,669.54	8,636.51	33.02	262.526	
1,600.00	1,544.26	1,455.26	1,455.26	7.38	28.85	107.91	-8,342.67	-1,997.40	8,685.79	8,650.11	35.69	243.384	
1,642.74	1,581.37	1,492.37	1,492.37	7.84	29.60	107.86	-8,342.67	-1,997.40	8,693.18	8,656.34	36.84	235.974	
1,700.00	1,630.86	1,541.86	1,541.86	8.45	30.60	108.02	-8,342.67	-1,997.40	8,703.29	8,664.88	38.40	226.624	
1,800.00	1,717.28	1,628.28	1,628.28	9.54	32.33	108.30	-8,342.67	-1,997.40	8,721.14	8,680.00	41.14	211.978	
1,900.00	1,803.69	1,714.69	1,714.69	10.63	34.07	108.57	-8,342.67	-1,997.40	8,739.25	8,695.37	43.88	199.147	
2,000.00	1,890.11	1,801.11	1,801.11	11.73	35.81	108.85	-8,342.67	-1,997.40	8,757.61	8,710.99	46.63	187.824	
2,100.00	1,976.53	1,887.53	1,887.53	12.84	37.55	109.12	-8,342.67	-1,997.40	8,776.22	8,726.85	49.37	177.764	
2,200.00	2,062.95	1,973.95	1,973.95	13.95	39.29	109.39	-8,342.67	-1,997.40	8,795.08	8,742.97	52.11	168.771	
2,300.00	2,149.36	2,060.36	2,060.36	15.06	41.03	109.66	-8,342.67	-1,997.40	8,814.19	8,759.34	54.85	160.688	
2,400.00	2,235.78	2,146.78	2,146.78	16.17	42.77	109.94	-8,342.67	-1,997.40	8,833.54	8,775.95	57.59	153.385	
2,500.00	2,322.20	2,233.20	2,233.20	17.29	44.50	110.21	-8,342.67	-1,997.40	8,853.14	8,792.81	60.33	146.757	
2,600.00	2,408.62	2,319.62	2,319.62	18.40	46.24	110.47	-8,342.67	-1,997.40	8,872.97	8,809.92	63.06	140.714	
2,700.00	2,495.03	2,406.03	2,406.03	19.52	47.98	110.74	-8,342.67	-1,997.40	8,893.05	8,827.27	65.78	135.184	
2,800.00	2,581.45	2,492.45	2,492.45	20.64	49.72	111.01	-8,342.67	-1,997.40	8,913.37	8,844.86	68.51	130.106	

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