

# PDC Energy Inc. DJ Basin

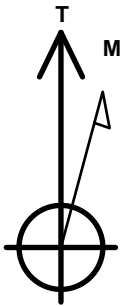
Well Name: **Josephine 19M-334**

Surface Location: Josephine 5N64W19N Pad Sec.19-T5N-R64W  
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone  
 Ground Elevation: 4626.0  
 +N/-S +E/-W Northing Easting Longitude Slot  
 0.0 0.0 1385172.53 3253128.72 40.387140 -104.591290  
 Original Well Elev WELL @ 4649.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1729'FNL, 2215'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 490'FNL, 2468'FEL, SEC.24	6798.0	1250.2	-5418.0	Point
LPL 493'FNL, 2046'FEL, SEC.19	6813.0	1232.0	162.8	Point

Josephine 5N64W19N Pad Sec.19-T5N-R64W  
 Josephine 19M-334  
 Plan #3 (3-09-17)  
 14:49, March 09 2017

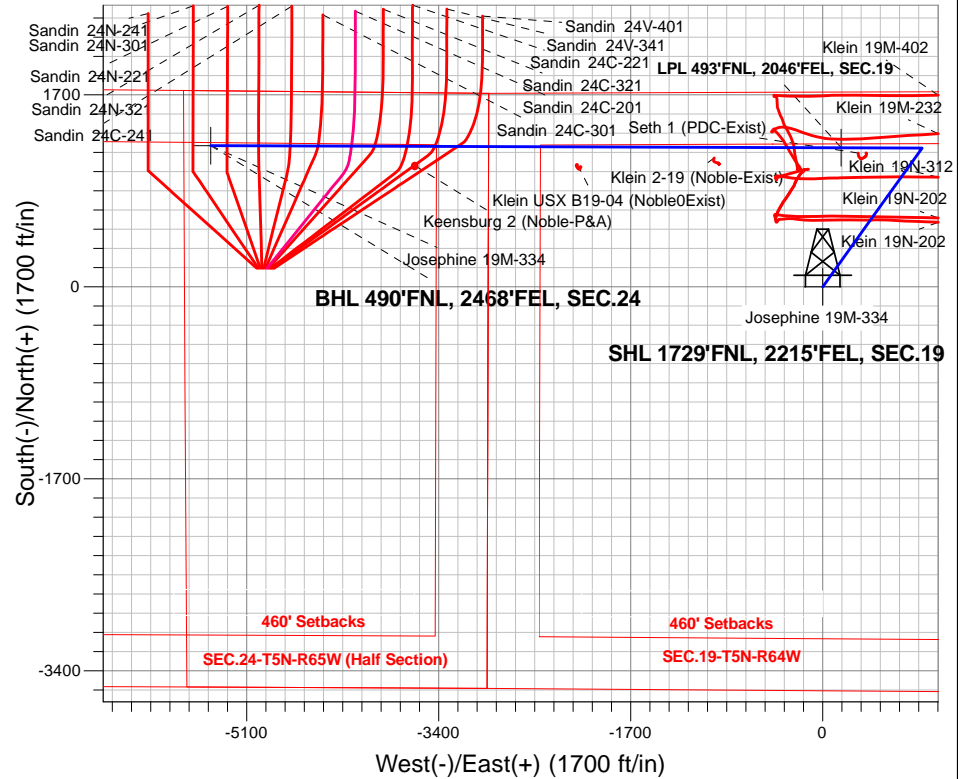


Azimuths to True North  
 Magnetic North: 8.00°

Magnetic Field  
 Strength: 52540.1snT  
 Dip Angle: 66.87°  
 Date: 3/9/2017  
 Model: IGRF2010

## ANNOTATIONS

TVD	MD	Annotation
600.0	600.0	KOP - Start Build 1.50
4910.4	5134.4	Start Drop -2.00
6097.0	6341.8	Start Build 8.00
6813.0	7468.3	Start DLS 0.50 TFO -54.15
6813.0	7469.7	Start 5579.5 hold at 7469.7 MD
6798.0	13049.1	TD at 13049.1

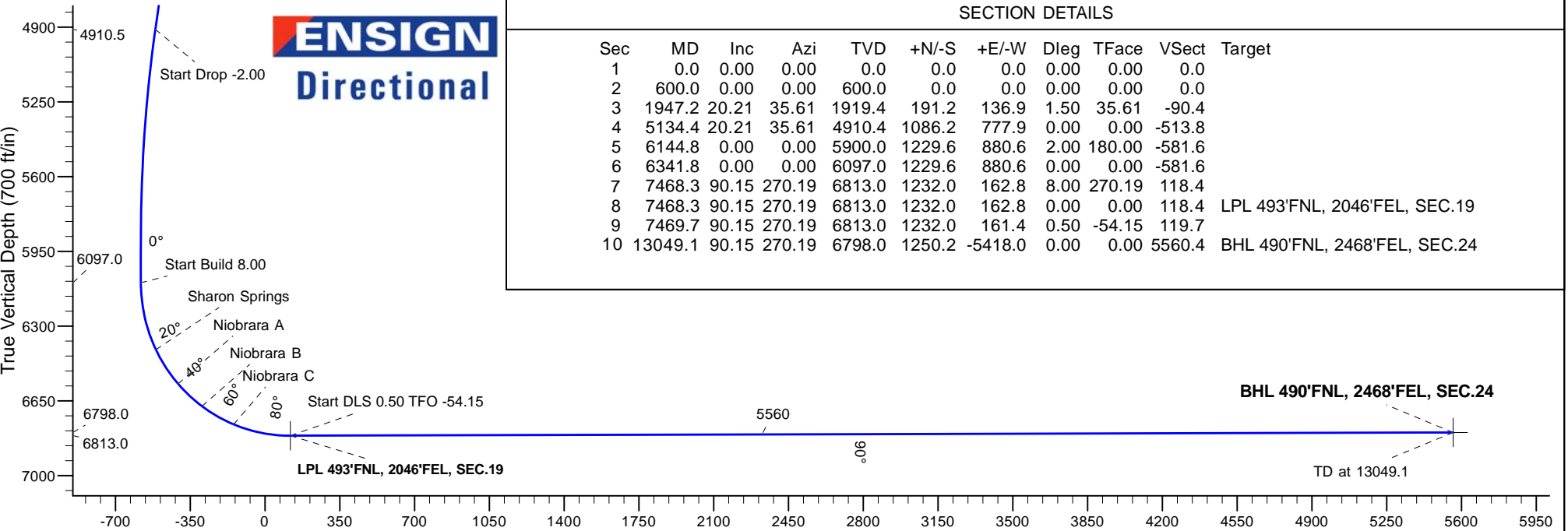


## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	
3	1947.2	20.21	35.61	1919.4	191.2	136.9	1.50	35.61	-90.4	
4	5134.4	20.21	35.61	4910.4	1086.2	777.9	0.00	0.00	-513.8	
5	6144.8	0.00	0.00	5900.0	1229.6	880.6	2.00	180.00	-581.6	
6	6341.8	0.00	0.00	6097.0	1229.6	880.6	0.00	0.00	-581.6	
7	7468.3	90.15	270.19	6813.0	1232.0	162.8	8.00	270.19	118.4	
8	7468.3	90.15	270.19	6813.0	1232.0	162.8	0.00	0.00	118.4	LPL 493'FNL, 2046'FEL, SEC.19
9	7469.7	90.15	270.19	6813.0	1232.0	161.4	0.50	-54.15	119.7	
10	13049.1	90.15	270.19	6798.0	1250.2	-5418.0	0.00	0.00	5560.4	BHL 490'FNL, 2468'FEL, SEC.24

**BHL 490'FNL, 2468'FEL, SEC.24**

TD at 13049.1



Vertical Section at 282.99° (700 ft/in)



# Directional

## **PDC Energy Inc. DJ Basin**

**SEC.19-T5N-R64W**

**Josephine 5N64W19N Pad Sec.19-T5N-R64W**

**Josephine 19M-334**

**Wellbore #1**

**Plan #3 (3-09-17)**

## **Anticollision Report**

**09 March, 2017**



<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Josephine 19M-334
<b>Project:</b>	SEC.19-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4649.0ft (Original Well Elev)
<b>Reference Site:</b>	Josephine 5N64W19N Pad Sec.19-T5N-R64W	<b>MD Reference:</b>	WELL @ 4649.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Josephine 19M-334	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #3 (3-09-17)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #3 (3-09-17)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	Stations	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 500.0 ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.45 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b>	3/9/2017		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	13,049.1	Plan #3 (3-09-17) (Wellbore #1)	MWD	MWD - Standard

Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
<b>Existing Wells Sec.19-T5N-R64W</b>						
Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1	7,314.9	6,777.4	47.6	3.4	1.077	Level 2, CC, ES, SF
<b>Existing Wells Sec.19-T5N-R64W (GRID)</b>						
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,592.3	6,792.7	97.5	24.4	1.334	Level 3, CC, ES
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,600.0	6,792.7	97.8	24.5	1.334	Level 3, SF
Klein USX B19-04 (Noble0Exist) - Wellbore #1 - Wellbore	9,804.3	6,789.1	156.5	44.3	1.395	Level 3, CC, ES, SF
<b>Existing Wells Sec.24-T5N-R65W</b>						
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	11,243.5	6,782.9	169.3	-141.9	0.544	Level 1, CC, ES, SF
<b>Josephine 5N64W19N Pad Sec.19-T5N-R64W</b>						
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	14.6	12.6	7.557	CC
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	13,049.1	13,089.8	211.3	-201.5	0.512	Level 1, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	200.0	200.0	29.1	28.3	35.284	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	13,049.1	13,192.5	448.4	47.0	1.117	Level 2, SF
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	61.9	58.9	20.449	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	999.3	79.9	74.6	15.232	SF
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	18.2	15.2	6.013	CC
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	13,049.1	12,909.9	280.8	-110.8	0.717	Level 1, ES, SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	32.8	29.8	10.827	CC, ES
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	13,049.1	12,967.2	495.5	82.9	1.201	Level 2, SF
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	76.5	73.5	25.260	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	999.3	94.3	89.1	17.982	SF
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	47.4	44.3	15.637	CC, ES
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	900.0	899.7	57.3	52.7	12.238	SF
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	500.0	500.0	120.3	117.8	48.528	CC, ES
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	985.4	159.7	154.5	30.999	SF
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	91.1	88.1	30.073	CC, ES
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	1,100.0	1,098.6	119.2	113.4	20.525	SF
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	105.7	102.6	34.883	CC, ES
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	1,100.0	1,097.2	134.1	128.3	23.194	SF

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

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Josephine 19M-334
<b>Project:</b>	SEC.19-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4649.0ft (Original Well Elev)
<b>Reference Site:</b>	Josephine 5N64W19N Pad Sec.19-T5N-R64W	<b>MD Reference:</b>	WELL @ 4649.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Josephine 19M-334	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #3 (3-09-17)	<b>Offset TVD Reference:</b>	Offset Datum

Summary						
Site Name	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (ft)	Measured Depth (ft)	Between Centres (ft)	Between Ellipses (ft)		
Klein 19MN-HZ Pad Sec.19-T5N-R64W						
Klein 19M-232 - Wellbore #1 - Wellbore #1	6,973.1	7,496.4	100.1	37.6	1.603	CC, ES, SF
Klein 19M-402 - Wellbore #1 - Wellbore #1	7,573.0	7,020.7	465.2	412.0	8.742	CC, ES
Klein 19M-402 - Wellbore #1 - Wellbore #1	7,700.0	6,918.0	469.6	415.4	8.658	SF
Klein 19N-202 - Wellbore #1 - Wellbore #1						Out of range
Klein 19N-202 - Wellbore #2 - Sidetrack - Wellbore #2 - S						Out of range
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,150.0	7,433.6	270.5	213.3	4.726	SF
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,250.0	7,345.1	263.9	208.6	4.774	ES
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,290.9	7,306.5	263.5	208.9	4.830	CC
Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W						
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	11,790.8	6,888.6	198.7	81.0	1.689	CC, ES, SF
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	11,292.7	6,957.7	201.1	88.9	1.793	CC, ES, SF
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	12,341.5	6,850.0	197.3	66.0	1.503	CC, ES, SF
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	12,080.2	6,838.9	225.5	79.2	1.541	CC, ES, SF
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	11,562.3	6,889.8	230.9	93.9	1.685	CC, ES, SF
Sandin 24N-221 - Wellbore #1 - Plan #1 (12-21-16)	12,903.6	6,850.0	190.0	47.1	1.330	Level 3, CC, ES, SF
Sandin 24N-241 - Wellbore #1 - Plan #1 (12-21-16)						Out of range
Sandin 24N-301 - Wellbore #1 - Plan #1 (12-21-16)	13,049.1	6,905.8	203.2	49.4	1.321	Level 3, CC, ES, SF
Sandin 24N-321 - Wellbore #1 - Plan #1 (12-21-16)	12,625.4	6,820.7	228.9	70.6	1.446	Level 3, CC, ES, SF
Sandin 24V-341 - Wellbore #1 - Plan #1 (12-20-16)	11,000.0	6,986.3	229.9	99.8	1.767	ES, SF
Sandin 24V-341 - Wellbore #1 - Plan #1 (12-20-16)	11,014.8	6,984.3	229.4	100.0	1.772	CC
Sandin 24V-401 - Wellbore #1 - Plan #1 (12-20-16)	10,725.7	7,050.0	244.9	103.4	1.730	CC, ES, SF

Offset Design													Existing Wells Sec.19-T5N-R64W - Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1		Offset Site Error: 0.0 ft	
Survey Program: 100-NS-GYRO-MS													Offset Well Error: 0.0 ft			
Reference		Offset		Semi Major Axis			Distance						Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor				
3,700.0	3,564.3	3,547.9	3,547.4	21.8	10.1	-52.95	1,143.8	362.6	477.6	448.7	28.89	16.529				
3,800.0	3,658.2	3,641.8	3,641.1	22.7	10.4	-56.68	1,141.7	359.8	455.5	425.1	30.46	14.956				
3,900.0	3,752.0	3,732.1	3,731.5	23.5	10.7	-60.50	1,140.1	357.6	436.0	403.9	32.03	13.611				
4,000.0	3,845.9	3,823.3	3,822.6	24.4	10.9	-64.63	1,139.1	355.3	419.3	385.7	33.62	12.472				
4,100.0	3,939.7	3,917.6	3,916.9	25.2	11.2	-69.22	1,137.9	352.7	405.2	370.0	35.24	11.501				
4,200.0	4,033.6	4,010.9	4,010.1	26.0	11.5	-73.94	1,136.8	350.7	394.0	357.2	36.80	10.707				
4,300.0	4,127.4	4,104.8	4,104.1	26.9	11.7	-78.78	1,136.2	349.4	385.7	347.5	38.28	10.077				
4,400.0	4,221.3	4,195.4	4,194.6	27.7	12.0	-83.58	1,135.8	348.0	380.9	341.3	39.61	9.616				
4,500.0	4,315.1	4,293.3	4,292.5	28.6	12.3	-88.87	1,135.2	346.6	379.3	338.4	40.85	9.285				
4,517.9	4,331.9	4,310.2	4,309.4	28.7	12.3	-89.79	1,135.0	346.4	379.2	338.2	41.05	9.238				
4,600.0	4,408.9	4,385.9	4,385.1	29.4	12.6	-93.91	1,134.0	345.5	380.5	338.6	41.92	9.077				
4,700.0	4,502.8	4,478.7	4,477.8	30.3	12.9	-98.90	1,133.0	344.2	385.3	342.5	42.80	9.002				
4,800.0	4,596.6	4,570.3	4,569.5	31.1	13.1	-103.62	1,132.5	343.0	393.5	350.0	43.50	9.046				
4,900.0	4,690.5	4,662.0	4,661.2	32.0	13.4	-108.15	1,132.1	341.3	405.2	361.2	44.03	9.203				
5,000.0	4,784.3	4,755.8	4,754.9	32.8	13.6	-112.46	1,132.1	339.5	419.8	375.4	44.42	9.452				
5,100.0	4,878.2	4,851.8	4,850.9	33.6	13.9	-116.63	1,131.8	338.0	436.6	391.9	44.67	9.773				
5,134.4	4,910.4	4,885.3	4,884.4	33.9	13.9	-117.99	1,131.9	337.6	442.7	397.9	44.74	9.895				
5,200.0	4,972.3	4,946.3	4,945.4	34.4	14.1	-120.49	1,132.1	337.1	454.5	409.7	44.77	10.151				
5,300.0	5,067.4	5,040.0	5,039.1	35.0	14.2	-123.77	1,133.0	335.9	472.8	428.0	44.74	10.566				
5,400.0	5,163.6	5,135.7	5,134.8	35.6	14.4	-126.51	1,134.2	334.6	490.2	445.5	44.73	10.961				
6,700.0	6,440.5	6,417.5	6,415.5	37.7	16.0	-7.51	1,176.1	315.0	480.9	440.3	40.63	11.835				

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