

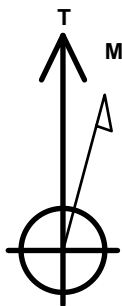
# PDC Energy Inc. DJ Basin

Well Name: **Josephine 19M-234**

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 Latitude Longitude Slot  
 0.0 0.0 1385187.09 3253128.58 40.387180 -104.591290  
 WELL @ 4649.0ft

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1714'FNL, 2215'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 278'FNL, 2469'FEL, SEC.24	6798.0	1446.9	-5420.7	Point
LPL 278'FNL, 2045'FEL, SEC.19	6813.0	1432.1	163.8	Point



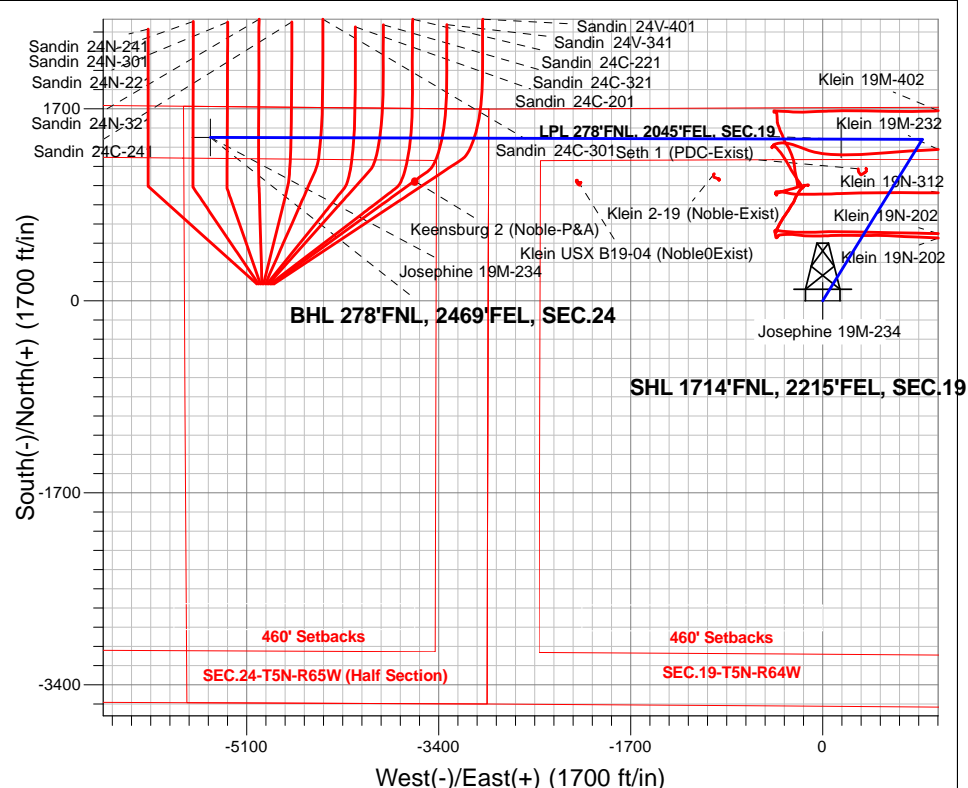
Azimuths to True North  
 Magnetic North: 8.00°

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

Josephine 5N64W19N Pad Sec.19-T5N-R64W  
 Josephine 19M-234  
 Plan #3 (3-09-17)  
 14:35, March 09 2017

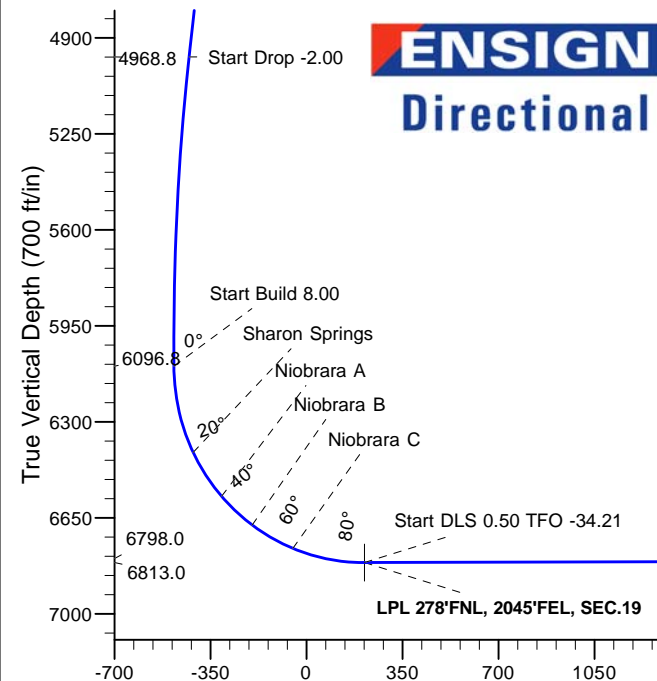
## ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
4968.8	5229.8	Start Drop -2.00
6096.8	6381.5	Start Build 8.00
6813.0	7508.5	Start DLS 0.50 TFO -34.21
6813.0	7509.5	Start 5583.6 hold at 7509.5 MD
6798.0	13093.1	TD at 13093.1



## 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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	1806.5	21.10	31.66	1774.9	217.9	134.4	1.50	31.66	-73.6	
4	5229.8	21.10	31.66	4968.8	1266.8	781.2	0.00	0.00	-428.1	
5	6284.7	0.00	0.00	6000.0	1430.2	882.0	2.00	180.00	-483.3	
6	6381.5	0.00	0.00	6096.8	1430.2	882.0	0.00	0.00	-483.3	
7	7508.4	90.15	270.15	6813.0	1432.1	163.9	8.00	270.15	211.0	
8	7508.5	90.15	270.15	6813.0	1432.1	163.8	0.00	0.00	211.1	LPL 278'FNL, 2045'FEL, SEC.19
9	7509.5	90.15	270.15	6813.0	1432.1	162.8	0.50	-37.37	212.1	
10	13093.1	90.15	270.15	6798.0	1446.9	-5420.7	0.00	0.00	5610.5	BHL 278'FNL, 2469'FEL, SEC.24



Vertical Section at 284.95° (700 ft/in)



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

**SEC.19-T5N-R64W**

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

**Josephine 19M-234**

**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-234
<b>Project:</b>	SEC.19-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4649.0ft
<b>Reference Site:</b>	Josephine 5N64W19N Pad Sec.19-T5N-R64W	<b>MD Reference:</b>	WELL @ 4649.0ft
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Josephine 19M-234	<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	13,093.1	Plan #3 (3-09-17) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
<b>Offset Well - Wellbore - Design</b>						
Existing Wells Sec.19-T5N-R64W						
Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1	7,355.9	6,778.9	262.4	217.7	5.880	CC, ES
Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1	7,400.0	6,786.7	265.9	220.7	5.879	SF
Existing Wells Sec.19-T5N-R64W (GRID)						
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,633.0	6,796.1	311.5	238.3	4.256	CC, ES
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,700.0	6,795.6	318.6	243.4	4.236	SF
Klein USX B19-04 (Noble0Exist) - Wellbore #1 - Wellbore	9,845.1	6,788.5	369.8	257.7	3.298	CC, ES
Klein USX B19-04 (Noble0Exist) - Wellbore #1 - Wellbore	9,900.0	6,787.8	373.8	259.9	3.282	SF
Existing Wells Sec.24-T5N-R65W						
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	11,284.3	6,782.9	381.7	70.6	1.227	Level 2, CC
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	11,300.0	6,782.8	382.1	70.4	1.226	Level 2, ES, SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	14.6	12.6	7.557	CC
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	13,093.1	13,051.1	211.3	-201.6	0.512	Level 1, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	200.0	200.0	14.6	13.8	17.652	CC
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	13,093.1	13,196.7	247.0	-130.1	0.655	Level 1, ES, SF
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	76.5	74.6	39.690	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	900.0	898.6	105.7	101.0	22.331	SF
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	32.8	30.8	17.005	CC, ES
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	13,093.1	12,909.9	485.7	79.9	1.197	Level 2, SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	47.4	45.4	24.570	CC, ES
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	4,100.0	4,113.5	493.4	457.8	13.866	SF
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	91.1	89.1	47.251	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	997.5	133.4	128.1	25.143	SF
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	61.9	60.0	32.129	CC, ES
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	900.0	898.6	91.4	86.6	19.304	SF
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	134.8	132.9	69.948	CC, ES
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	981.7	196.4	191.2	37.485	SF
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	105.6	103.7	54.814	CC, ES
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	1,100.0	1,096.1	163.6	157.7	27.816	SF
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	120.2	118.3	62.372	CC, ES
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	1,100.0	1,094.5	178.3	172.4	30.428	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-234
<b>Project:</b>	SEC.19-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4649.0ft
<b>Reference Site:</b>	Josephine 5N64W19N Pad Sec.19-T5N-R64W	<b>MD Reference:</b>	WELL @ 4649.0ft
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Josephine 19M-234	<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 Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Klein 19MN-HZ Pad Sec.19-T5N-R64W						
Klein 19M-232 - Wellbore #1 - Wellbore #1	6,950.0	7,557.9	116.8	50.2	1.753	SF
Klein 19M-232 - Wellbore #1 - Wellbore #1	6,987.6	7,530.7	113.8	49.6	1.772	CC, ES
Klein 19M-402 - Wellbore #1 - Wellbore #1	7,565.3	7,073.8	251.3	197.6	4.685	CC, ES
Klein 19M-402 - Wellbore #1 - Wellbore #1	7,600.0	7,041.7	251.6	197.8	4.673	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	7,050.0	7,561.0	495.5	433.1	7.938	SF
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,250.0	7,385.4	477.5	420.7	8.409	ES
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,294.6	7,347.2	477.0	421.2	8.541	CC
Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W						
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	11,820.4	7,050.0	103.4	9.3	1.099	Level 2, CC, ES, SF
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	11,300.0	7,118.4	107.1	19.0	1.216	Level 2, SF
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	11,317.2	7,117.2	105.7	18.8	1.217	Level 2, CC, ES
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	12,378.4	7,003.6	98.1	-2.4	0.976	Level 1, CC, ES, SF
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	12,112.3	6,977.4	94.3	-29.5	0.762	Level 1, CC, ES, SF
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	11,587.2	7,029.4	101.7	-13.7	0.881	Level 1, CC, ES, SF
Sandin 24N-221 - Wellbore #1 - Plan #1 (12-21-16)	12,943.9	7,004.5	91.6	-16.8	0.845	Level 1, 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)	13,093.1	7,071.7	155.4	33.6	1.276	Level 3, CC, ES, SF
Sandin 24N-321 - Wellbore #1 - Plan #1 (12-21-16)	12,665.7	6,957.5	96.8	-37.8	0.719	Level 1, CC, ES, SF
Sandin 24V-341 - Wellbore #1 - Plan #1 (12-20-16)	11,032.9	7,126.5	102.4	-5.8	0.947	Level 1, CC, ES, SF
Sandin 24V-401 - Wellbore #1 - Plan #1 (12-20-16)	10,740.1	7,174.0	95.4	-28.1	0.773	Level 1, 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	Vertical	Measured	Vertical	Semi Major Axis		Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning		
Measured Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	Reference (ft)	Offset (ft)	Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Separation (ft)	Factor			
3,200.0	3,075.0	3,056.9	3,056.4	19.4	8.8	-36.86	1,134.0	370.2	489.9	467.0	22.92	21.372			
3,300.0	3,168.3	3,147.7	3,147.3	20.3	9.0	-39.47	1,133.5	369.7	460.4	436.2	24.23	19.001			
3,400.0	3,261.6	3,240.7	3,240.3	21.2	9.2	-42.52	1,133.4	368.8	432.4	406.8	25.63	16.868			
3,500.0	3,354.9	3,336.9	3,336.5	22.1	9.5	-46.17	1,132.6	367.4	405.3	378.1	27.20	14.898			
3,600.0	3,448.2	3,430.5	3,430.0	22.9	9.8	-50.25	1,131.1	365.8	379.2	350.3	28.90	13.121			
3,700.0	3,541.5	3,521.6	3,521.1	23.8	10.0	-54.86	1,129.7	363.4	355.8	325.1	30.70	11.588			
3,800.0	3,634.8	3,616.0	3,615.4	24.7	10.3	-60.27	1,127.7	360.5	334.8	302.1	32.62	10.262			
3,900.0	3,728.1	3,707.0	3,706.3	25.5	10.6	-65.98	1,125.9	358.2	317.2	282.6	34.52	9.187			
4,000.0	3,821.4	3,797.2	3,796.5	26.4	10.9	-72.06	1,124.8	356.0	303.9	267.6	36.34	8.363			
4,100.0	3,914.7	3,890.4	3,889.7	27.3	11.1	-78.76	1,123.7	353.4	295.3	257.2	38.05	7.761			
4,200.0	4,008.0	3,983.8	3,983.1	28.2	11.4	-85.72	1,122.5	351.1	291.2	251.7	39.52	7.369			
4,240.3	4,045.6	4,021.6	4,020.9	28.5	11.5	-88.52	1,122.2	350.5	290.8	250.8	40.02	7.266			
4,300.0	4,101.3	4,077.8	4,077.0	29.1	11.7	-92.64	1,121.7	349.7	291.6	250.9	40.68	7.168			
4,400.0	4,194.6	4,169.2	4,168.4	29.9	11.9	-99.19	1,121.3	348.5	296.7	255.1	41.51	7.146			
4,500.0	4,287.9	4,263.5	4,262.7	30.8	12.2	-105.68	1,120.9	346.9	306.5	264.4	42.04	7.290			
4,600.0	4,381.2	4,356.6	4,355.8	31.7	12.5	-111.75	1,119.9	345.9	319.7	277.4	42.32	7.553			
4,700.0	4,474.5	4,449.0	4,448.2	32.6	12.8	-117.34	1,118.7	344.6	336.8	294.4	42.41	7.942			
4,800.0	4,567.8	4,541.5	4,540.7	33.4	13.0	-122.30	1,118.1	343.5	357.0	314.6	42.39	8.422			
4,900.0	4,661.1	4,632.6	4,631.8	34.3	13.3	-126.68	1,117.6	341.9	380.1	337.8	42.30	8.987			
5,000.0	4,754.4	4,725.8	4,724.9	35.2	13.5	-130.59	1,117.6	340.1	405.5	363.3	42.18	9.612			

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