

PDC Energy Inc. DJ Basin

Well Name: **Josephine 19N-314**

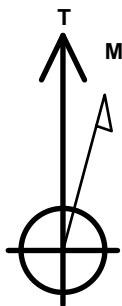
Surface Location: Josephine 5N64W19N Pad Sec.19-T5N-R64W
North American Datum 1983 , US State Plane 1983 Colorado Northern Zone
Ground Elevation: 4626.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1385139.74	3253129.06	40.387050	-104.591290	

Original Well Elev WELL @ 4649.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1759'FNL, 2215'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 982'FNL, 2464'FEL, SEC.24	6798.0	787.5	-5415.3	Point
LPL 982'FNL, 2042'FEL, SEC.19	6813.0	776.0	167.4	Point



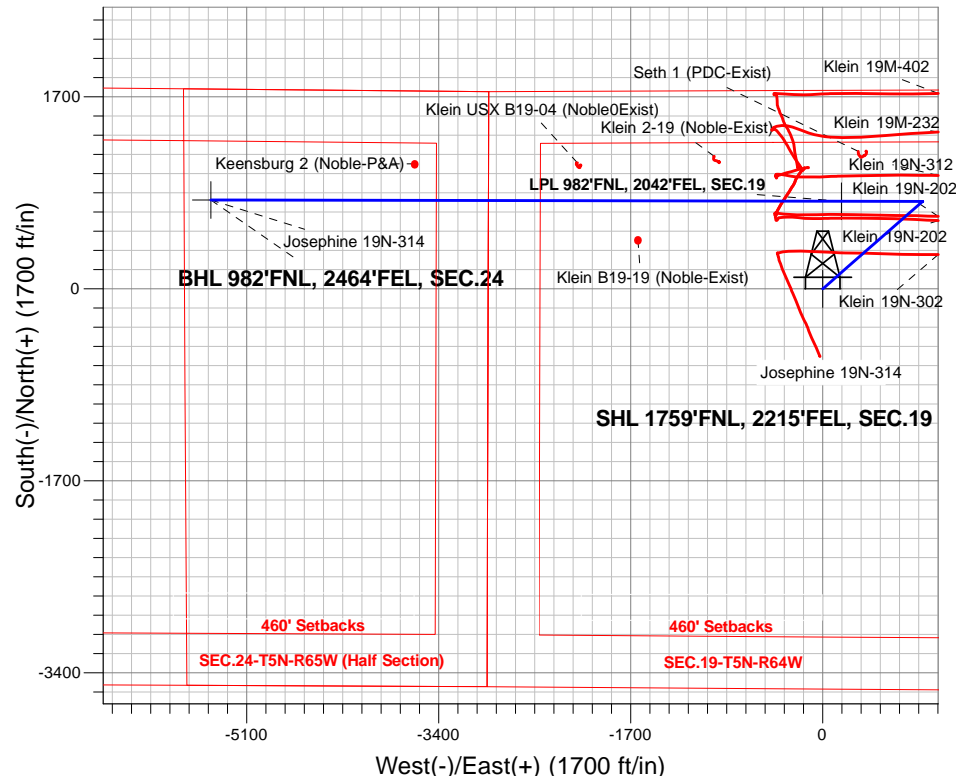
Azimuths to True North
Magnetic North: 8.00°

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

Josephine 5N64W19N Pad Sec.19-T5N-R64W
Josephine 19N-314
Plan #3 (3-09-17)
15:12, March 09 2017

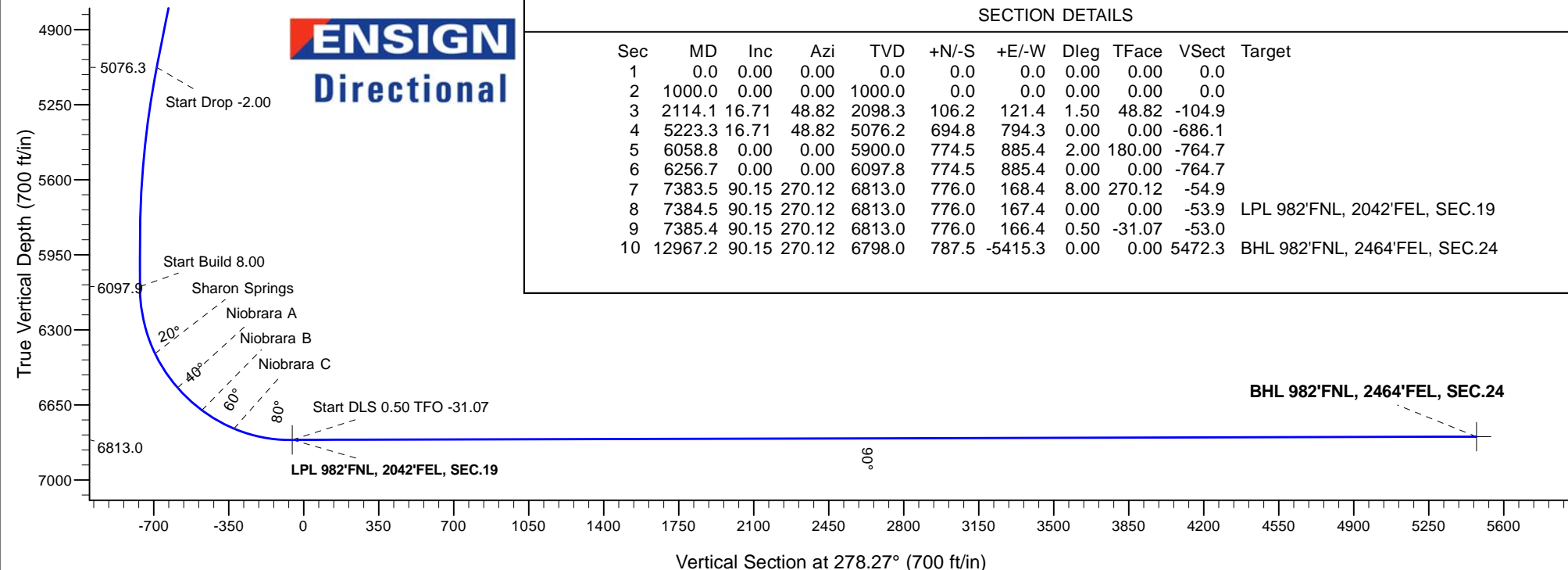
ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP - Start Build 1.50
5076.3	5223.3	Start Drop -2.00
6097.9	6256.7	Start Build 8.00
6813.0	7384.5	Start DLS 0.50 TFO -31.07
6813.0	7385.4	Start 5581.8 hold at 7385.4 MD
6798.0	12967.2	TD at 12967.2



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	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	2114.1	16.71	48.82	2098.3	106.2	121.4	1.50	48.82	-104.9	
4	5223.3	16.71	48.82	5076.2	694.8	794.3	0.00	0.00	-686.1	
5	6058.8	0.00	0.00	5900.0	774.5	885.4	2.00	180.00	-764.7	
6	6256.7	0.00	0.00	6097.8	774.5	885.4	0.00	0.00	-764.7	
7	7383.5	90.15	270.12	6813.0	776.0	168.4	8.00	270.12	-54.9	
8	7384.5	90.15	270.12	6813.0	776.0	167.4	0.00	0.00	-53.9	LPL 982'FNL, 2042'FEL, SEC.19
9	7385.4	90.15	270.12	6813.0	776.0	166.4	0.50	-31.07	-53.0	
10	12967.2	90.15	270.12	6798.0	787.5	-5415.3	0.00	0.00	5472.3	BHL 982'FNL, 2464'FEL, SEC.24





PDC Energy Inc. DJ Basin

SEC.19-T5N-R64W

Josephine 5N64W19N Pad Sec.19-T5N-R64W

Josephine 19N-314

Wellbore #1

Plan #3 (3-09-17)

Anticollision Report

09 March, 2017



Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Josephine 19N-314
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4649.0ft (Original Well Elev)
Reference Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Josephine 19N-314	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #3 (3-09-17)	Offset TVD Reference:	Offset Datum

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

Survey Tool Program	Date	3/9/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	12,966.4	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
Offset Well - Wellbore - Design						
Existing Wells Sec.19-T5N-R64W						
Klein B19-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	9,186.4	6,790.2	346.1	255.7	3.826	CC
Klein B19-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	9,200.0	6,790.1	346.4	255.5	3.810	ES, SF
Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1	7,235.2	6,776.2	441.0	397.3	10.083	CC, ES
Seth 1 (PDC-Exist) - Wellbore #1 - Wellbore #1	7,300.0	6,787.4	445.6	401.2	10.027	SF
Existing Wells Sec.19-T5N-R64W (GRID)						
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,514.2	6,785.2	392.5	319.2	5.352	CC, ES
Klein 2-19 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,600.0	6,784.6	401.8	325.8	5.287	SF
Klein USX B19-04 (Noble0Exist) - Wellbore #1 - Wellbore	9,726.3	6,790.5	335.0	222.4	2.975	CC, ES, SF
Existing Wells Sec.24-T5N-R65W						
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	11,165.5	6,782.8	324.0	12.2	1.039	Level 2, CC, ES, SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	400.0	400.0	47.4	45.4	24.570	CC, ES
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	4,100.0	4,028.0	488.3	453.1	13.882	SF
Josephine 19M-234 - Wellbore #1 - Spider Plot	366.3	367.3	47.4	45.6	27.164	CC
Josephine 19M-234 - Wellbore #1 - Spider Plot	400.0	401.0	47.4	45.4	24.554	ES
Josephine 19M-234 - Wellbore #1 - Spider Plot	4,100.0	4,029.7	489.4	453.3	13.545	SF
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	600.0	600.0	32.8	29.8	10.827	CC, ES
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	12,967.2	13,044.8	495.5	83.1	1.201	Level 2, SF
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	200.0	200.0	61.9	61.1	74.983	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	3,300.0	3,212.0	490.4	464.9	19.205	SF
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	1,000.0	29.1	23.9	5.570	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)	1,200.0	1,199.9	32.8	26.5	5.194	SF
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	800.0	800.0	14.6	10.5	3.530	CC
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	12,967.2	12,905.5	246.5	-142.3	0.634	Level 1, ES, SF
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	1,000.0	43.7	38.5	8.356	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)	1,200.0	1,199.9	47.3	41.0	7.488	SF
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	1,000.0	14.6	9.3	2.785	CC
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	12,967.2	13,028.2	277.3	-112.1	0.712	Level 1, ES, SF
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	500.0	500.0	87.5	85.0	35.300	CC, ES
Josephine 19O-204 - Wellbore #1 - Plan #3 (3-09-17)	1,100.0	1,085.8	125.1	119.4	22.054	SF
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	1,000.0	58.3	53.1	11.142	CC, ES
Josephine 19O-214 - Wellbore #1 - Plan #3 (3-09-17)	1,300.0	1,299.7	66.6	59.8	9.706	SF
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	1,000.0	1,000.0	72.9	67.6	13.927	CC, ES
Josephine 19O-314 - Wellbore #1 - Plan #3 (3-09-17)	1,200.0	1,197.8	79.0	72.8	12.649	SF

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

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Reference Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Josephine 19N-314	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #3 (3-09-17)	Offset TVD Reference:	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						Out of range
Klein 19M-402 - Wellbore #1 - Wellbore #1						Out of range
Klein 19N-202 - Wellbore #1 - Wellbore #1	7,000.0	7,363.0	123.0	65.6	2.141	ES, SF
Klein 19N-202 - Wellbore #1 - Wellbore #1	7,018.3	7,347.3	122.7	65.8	2.157	CC
Klein 19N-202 - Wellbore #2 - Sidetrack - Wellbore #2 - S	7,000.0	7,376.3	149.9	92.9	2.630	SF
Klein 19N-202 - Wellbore #2 - Sidetrack - Wellbore #2 - S	7,040.0	7,344.2	148.3	92.1	2.641	CC, ES
Klein 19N-312 - Wellbore #1 - Wellbore #1	7,521.2	6,988.1	218.2	166.6	4.233	CC, ES, SF
Klein 19O-HZ Pad Sec.19-T5N-R64W						
Klein 19N-302 - Wellbore #1 - Wellbore #1	6,850.0	7,688.1	494.6	431.2	7.798	SF
Klein 19N-302 - Wellbore #1 - Wellbore #1	7,609.4	6,986.8	449.1	396.5	8.534	CC, ES

Offset Design													
Existing Wells Sec.19-T5N-R64W - Klein B19-19 (Noble-Exist) - Wellbore #1 - Wellbore #1													
Survey Program: 7038-NS-GYRO-MS													
Reference Offset													
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis			Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
				Reference	Offset	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
8,900.0	6,808.9	6,790.9	6,790.9	70.3	11.0	-90.13	433.6	-1,635.2	449.2	368.0	81.25	5.529	
9,000.0	6,808.7	6,790.7	6,790.7	73.5	11.0	-90.08	433.6	-1,635.2	393.1	308.7	84.46	4.655	
9,100.0	6,808.4	6,790.4	6,790.4	76.7	11.0	-90.04	433.6	-1,635.2	356.8	269.1	87.68	4.069	
9,186.4	6,808.2	6,790.2	6,790.2	79.6	11.0	-90.00	433.6	-1,635.2	346.1	255.7	90.48	3.826	CC
9,200.0	6,808.1	6,790.1	6,790.1	80.0	11.0	-89.99	433.6	-1,635.2	346.4	255.5	90.92	3.810	ES, SF
9,300.0	6,807.9	6,789.9	6,789.9	83.3	11.0	-89.95	433.6	-1,635.2	364.3	270.1	94.18	3.868	
9,400.0	6,807.6	6,789.6	6,789.6	86.5	11.0	-89.90	433.6	-1,635.2	406.8	309.3	97.45	4.174	
9,500.0	6,807.3	6,789.3	6,789.3	89.8	11.0	-89.86	433.6	-1,635.2	467.1	366.4	100.74	4.637	