

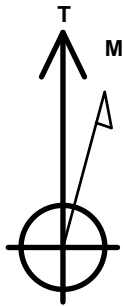
# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Josephine 190-314**

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 1385067.58 3253196.66 40.386850 -104.591050  
 Original Well Elev WELL @ 4649.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1834'FM; 2149'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 2330'FNL, 2453'FEL, SEC.24	6798.0	-483.9	-5476.9	Point
LPL 2330'FNL, 2316'FWL, SEC.19	6813.0	-499.1	-707.6	Point



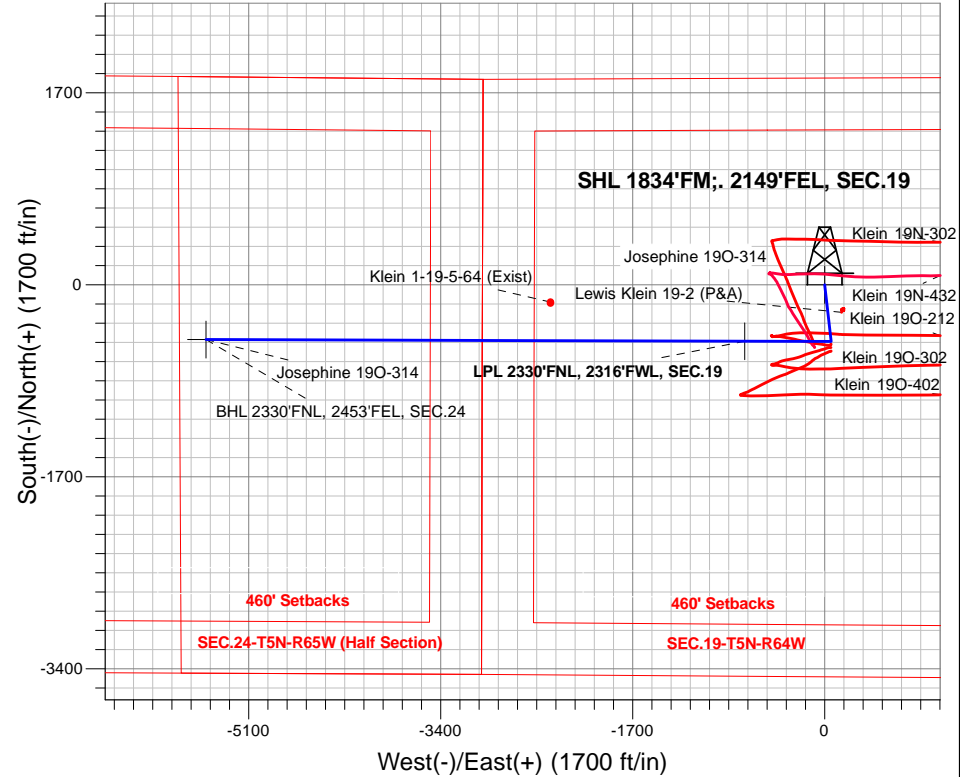
Azimuths to True North  
 Magnetic North: 8.02°

Magnetic Field  
 Strength: 52560.8snT  
 Dip Angle: 66.87°  
 Date: 12/27/2016  
 Model: IGRF2010

Josephine 5N64W19N Pad Sec.19-T5N-R64W  
 Josephine 190-314  
 Plan #1 (12-20-16)  
 9:41, December 27 2016

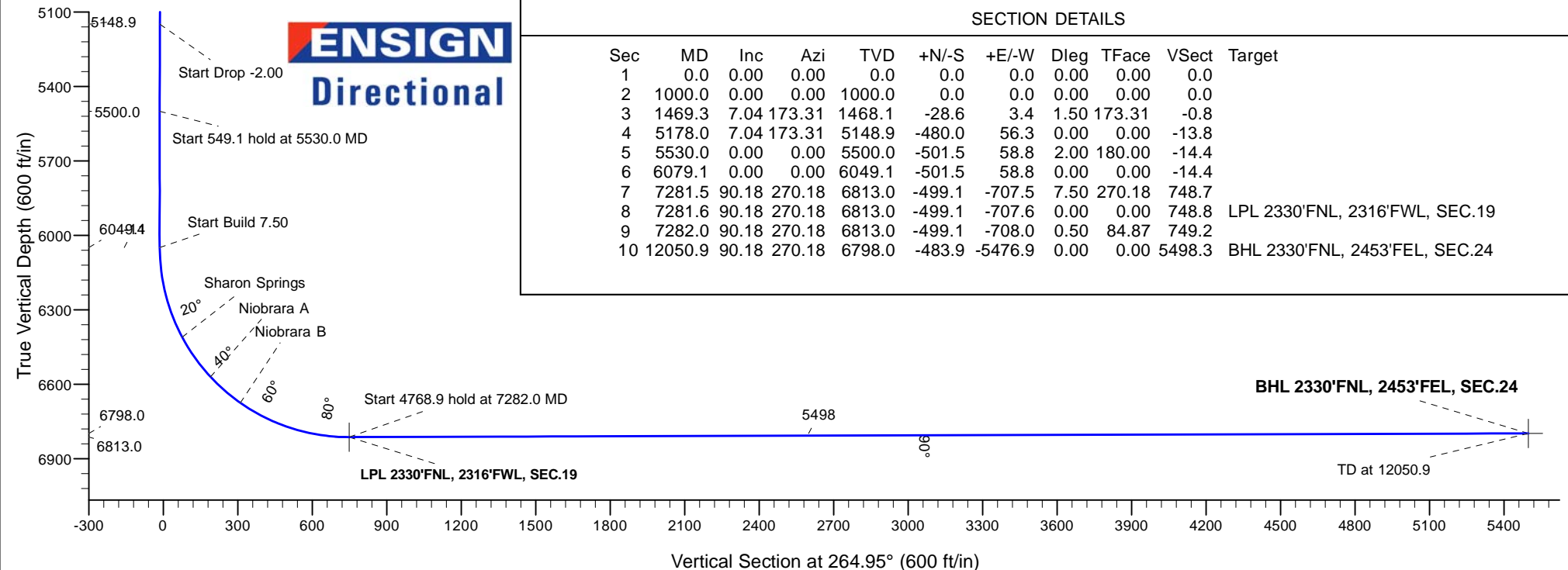
## ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP - Start Build 1.50
5148.9	5178.0	Start Drop -2.00
5500.0	5530.0	Start 549.1 hold at 5530.0 MD
6049.1	6079.1	Start Build 7.50
6813.0	7282.0	Start 4768.9 hold at 7282.0 MD
6798.0	12050.9	TD at 12050.9



## 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	1469.3	7.04	173.31	1468.1	-28.6	3.4	1.50	173.31	-0.8	
4	5178.0	7.04	173.31	5148.9	-480.0	56.3	0.00	0.00	-13.8	
5	5530.0	0.00	0.00	5500.0	-501.5	58.8	2.00	180.00	-14.4	
6	6079.1	0.00	0.00	6049.1	-501.5	58.8	0.00	0.00	-14.4	
7	7281.5	90.18	270.18	6813.0	-499.1	-707.5	7.50	270.18	748.7	
8	7281.6	90.18	270.18	6813.0	-499.1	-707.6	0.00	0.00	748.8	LPL 2330'FNL, 2316'FWL, SEC.19
9	7282.0	90.18	270.18	6813.0	-499.1	-708.0	0.50	84.87	749.2	
10	12050.9	90.18	270.18	6798.0	-483.9	-5476.9	0.00	0.00	5498.3	BHL 2330'FNL, 2453'FEL, SEC.24





# **PETROLEUM DEVELOPMENT CORP DJ Basin**

**SEC.19-T5N-R64W**

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

**Josephine 19O-314**

**Wellbore #1**

**Plan #1 (12-20-16)**

## **Anticollision Report**

**27 December, 2016**



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Josephine 190-314
<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 190-314	<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 #1 (12-20-16)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1 (12-20-16)		
<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 800.0 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>	12/27/2016		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,050.9	Plan #1 (12-20-16) (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>						
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	366.3	367.3	120.3	118.5	68.923	CC
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	400.0	400.0	120.3	118.3	62.393	ES
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	978.2	165.8	160.6	31.724	SF
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	105.7	102.7	34.895	CC, ES
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	987.9	126.0	120.8	24.153	SF
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	134.8	134.0	163.222	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	962.5	214.9	209.6	40.870	SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	1,000.0	43.7	38.5	8.357	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	1,100.0	1,100.0	45.0	39.3	7.832	SF
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	800.0	800.0	91.1	87.0	22.062	CC, ES
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	1,100.0	1,092.4	103.9	98.1	18.102	SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	1,000.0	72.9	67.6	13.927	CC, ES
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	1,100.0	1,098.1	75.4	69.7	13.134	SF
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	1,000.0	29.1	23.9	5.571	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	12,050.9	12,024.3	601.1	226.6	1.605	SF
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	1,000.0	58.3	53.1	11.142	CC, ES
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	1,200.0	1,199.9	63.5	57.3	10.179	SF
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	500.0	500.0	14.6	12.1	5.881	CC
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	12,050.9	11,979.3	239.8	-110.0	0.686	Level 1, ES, SF
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	1,000.0	14.6	9.3	2.785	CC
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	12,050.9	11,946.0	270.4	-83.2	0.765	Level 1, ES, SF
<b>Klein (Existing) Sec.19-T5N-R64W</b>						
Klein 1-19-5-64 (Exist) - Wellbore #1	9,001.5	6,790.6	340.7	90.9	1.364	Level 3, CC, ES, SF
Lewis Klein 19-2 (P&A) - Wellbore #1 - Wellbore #1	3,111.5	3,074.1	143.5	127.4	8.911	CC
Lewis Klein 19-2 (P&A) - Wellbore #1 - Wellbore #1	3,200.0	3,161.7	143.8	127.2	8.660	ES
Lewis Klein 19-2 (P&A) - Wellbore #1 - Wellbore #1	3,500.0	3,459.5	151.1	132.9	8.277	SF

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Josephine 190-314
<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 190-314	<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 #1 (12-20-16)	<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 190-HZ Pad Sec.19-T5N-R64W						
Klein 19N-302 - Wellbore #1 - Wellbore #1	2,245.4	2,253.0	256.1	240.6	16.533	CC, ES
Klein 19N-302 - Wellbore #1 - Wellbore #1	2,500.0	2,498.1	270.8	253.3	15.500	SF
Klein 19N-432 - Wellbore #1 - Wellbore #1	2,601.5	2,601.5	309.1	291.9	17.974	CC, ES
Klein 19N-432 - Wellbore #1 - Wellbore #1	6,950.0	6,746.4	613.0	573.0	15.315	SF
Klein 19O-212 - Wellbore #1 - Wellbore #1	6,737.4	6,736.9	75.9	38.6	2.034	CC, ES, SF
Klein 19O-302 - Wellbore #1 - Wellbore #1	6,851.3	6,751.4	232.2	193.4	5.988	CC, ES, SF
Klein 19O-402 - Wellbore #1 - Wellbore #1	6,989.5	6,964.4	477.1	432.7	10.755	CC
Klein 19O-402 - Wellbore #1 - Wellbore #1	7,000.0	6,958.1	477.2	432.6	10.708	ES
Klein 19O-402 - Wellbore #1 - Wellbore #1	7,150.0	6,874.7	494.3	446.7	10.376	SF

Offset Design													Josephine 5N64W19N Pad Sec.19-T5N-R64W - Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)		Offset Site Error:		0.0 ft
Survey Program: 0-MWD													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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
0.0	0.0	1.0	1.0	0.0	0.0	-1.33	120.2	-2.8	120.3	120.2	0.00	N/A					
100.0	100.0	101.0	101.0	0.1	0.1	-1.33	120.2	-2.8	120.3	120.0	0.28	432.414					
200.0	200.0	201.0	201.0	0.4	0.4	-1.33	120.2	-2.8	120.3	119.4	0.83	145.096					
300.0	300.0	301.0	301.0	0.7	0.7	-1.33	120.2	-2.8	120.3	118.9	1.38	87.173					
366.3	366.3	367.3	367.3	0.9	0.9	-1.33	120.2	-2.8	120.3	118.5	1.74	68.923	CC				
400.0	400.0	400.0	400.0	1.0	1.0	-1.33	120.2	-2.8	120.3	118.3	1.93	62.393	ES				
500.0	500.0	497.9	497.9	1.2	1.2	-1.30	121.5	-2.7	121.5	119.1	2.47	49.142					
600.0	600.0	594.7	594.6	1.5	1.5	-1.21	125.2	-2.6	125.4	122.3	3.02	41.509					
700.0	700.0	691.3	691.0	1.8	1.8	-1.07	131.3	-2.5	131.7	128.1	3.57	36.907					
800.0	800.0	787.4	786.8	2.1	2.1	-0.90	139.8	-2.2	140.6	136.5	4.12	34.128					
900.0	900.0	883.1	881.8	2.3	2.4	-0.71	150.7	-1.9	151.9	147.3	4.67	32.526					
1,000.0	1,000.0	978.2	976.0	2.6	2.7	-0.51	163.9	-1.5	165.8	160.6	5.23	31.724	SF				
1,100.0	1,100.0	1,072.4	1,068.9	2.9	3.1	-173.65	179.2	-1.0	183.3	177.6	5.75	31.870					
1,200.0	1,199.9	1,165.1	1,160.0	3.1	3.5	-173.55	196.5	-0.5	205.9	199.6	6.25	32.923					
1,300.0	1,299.7	1,256.0	1,248.9	3.3	3.9	-173.50	215.7	0.1	233.2	226.5	6.76	34.515					
1,400.0	1,399.3	1,345.0	1,335.3	3.5	4.4	-173.49	236.5	0.7	265.3	258.0	7.26	36.535					
1,469.3	1,468.1	1,405.3	1,393.7	3.7	4.7	-173.50	251.7	1.2	290.3	282.7	7.61	38.144					
1,500.0	1,498.6	1,431.6	1,419.1	3.8	4.9	-173.52	258.6	1.4	301.9	294.1	7.76	38.878					
1,600.0	1,597.8	1,516.4	1,500.6	4.1	5.4	-173.58	282.1	2.1	341.1	332.8	8.28	41.185					
1,700.0	1,697.1	1,600.0	1,580.4	4.4	5.9	-173.61	307.1	2.8	382.4	373.6	8.80	43.436					
1,800.0	1,796.3	1,688.0	1,664.0	4.8	6.6	-173.63	334.7	3.7	425.0	415.7	9.35	45.479					
1,900.0	1,895.6	1,778.4	1,749.8	5.1	7.2	-173.65	363.0	4.5	467.7	457.8	9.89	47.284					
2,000.0	1,994.8	1,868.9	1,835.6	5.4	7.9	-173.67	391.4	5.4	510.4	500.0	10.45	48.866					
2,100.0	2,094.1	1,959.3	1,921.5	5.8	8.5	-173.68	419.8	6.2	553.2	542.2	11.01	50.260					
2,200.0	2,193.3	2,049.7	2,007.3	6.2	9.2	-173.69	448.2	7.1	595.9	584.3	11.57	51.493					
2,300.0	2,292.6	2,140.1	2,093.2	6.5	9.8	-173.70	476.6	7.9	638.6	626.5	12.14	52.591					
2,400.0	2,391.8	2,230.5	2,179.0	6.9	10.5	-173.71	505.0	8.8	681.3	668.6	12.72	53.573					
2,500.0	2,491.0	2,320.9	2,264.8	7.3	11.2	-173.71	533.3	9.6	724.0	710.7	13.30	54.456					
2,600.0	2,590.3	2,411.4	2,350.7	7.6	11.9	-173.72	561.7	10.5	766.8	752.9	13.88	55.252					

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