

PETROLEUM DEVELOPMENT CORP DJ Basin

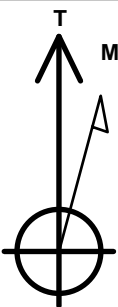
Well Name: **Josephine 19M-334**

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 1385173.19 3253192.79 40.387140 -104.591060
 Original Well Elev WELL @ 4649.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1729'FNL, 2150'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 490'FNL, 2468'FEL, SEC.24	6798.0	1250.2	-5482.1	Point
LPL 490'FNL, 2293'FWL, SEC.19	6813.0	1235.0	-724.3	Point



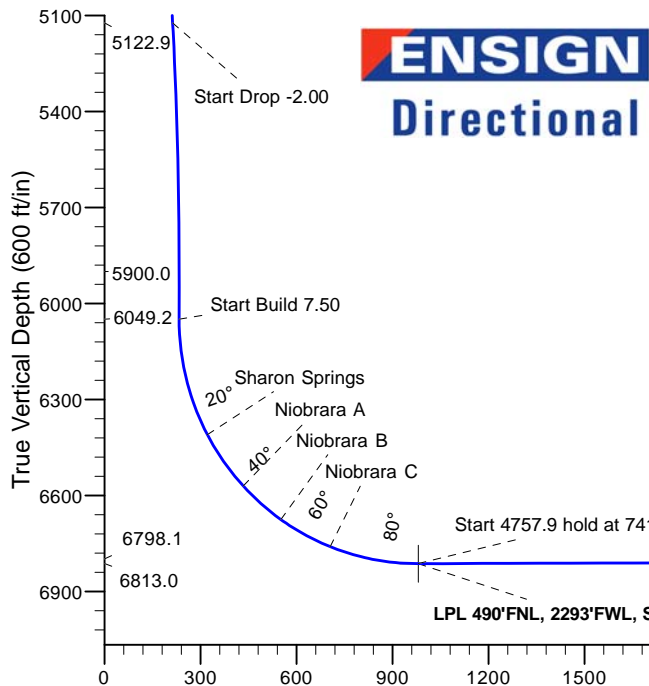
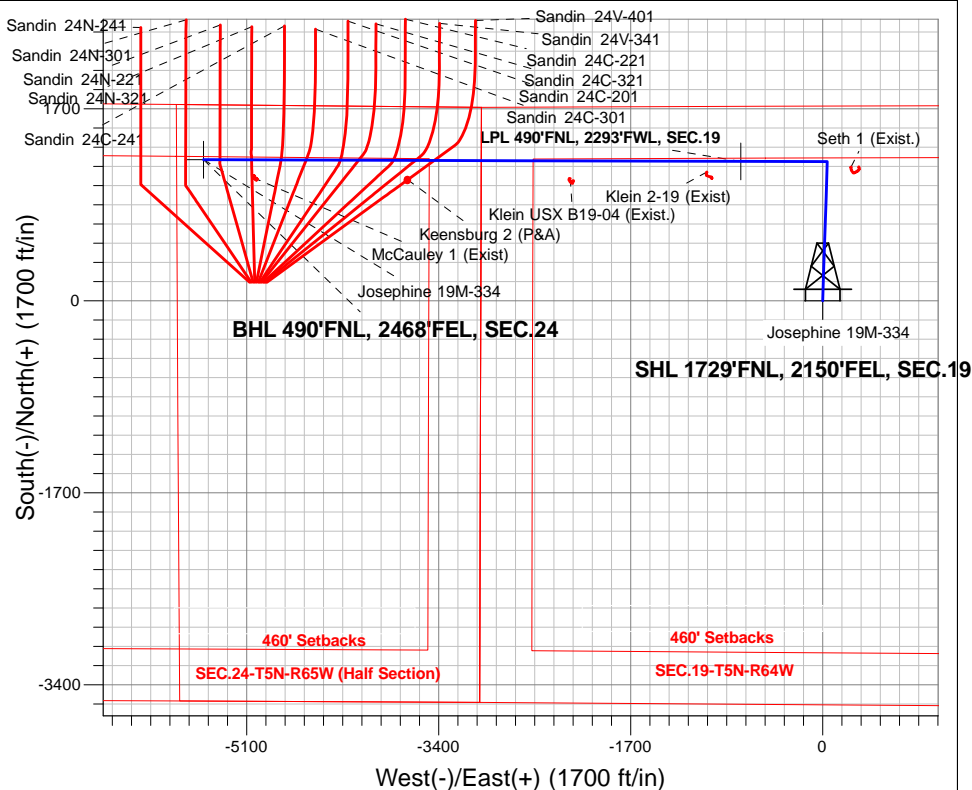
Azimuths to True North
 Magnetic North: 8.02°

Magnetic Field
 Strength: 52560.9snT
 Dip Angle: 66.87°
 Date: 12/27/2016
 Model: IGRF2010

Josephine 5N64W19N Pad Sec.19-T5N-R64W
 Josephine 19M-334
 Plan #1 (12-20-16)
 12:34, December 27 2016

ANNOTATIONS

TVD	MD	Annotation
600.0	600.0	KOP - Start Build 1.50
5122.9	5271.9	Start Drop -2.00
5900.0	6058.8	Start 149.1 hold at 6058.8 MD
6049.2	6208.0	Start Build 7.50
6813.0	7410.3	Start 4757.9 hold at 7410.3 MD
6798.1	12168.1	TD at 12168.1



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	1649.3	15.74	1.95	1636.2	143.1	4.9	1.50	1.95	27.1	
4	5271.9	15.74	1.95	5122.9	1125.2	38.3	0.00	0.00	212.8	
5	6058.8	0.00	0.00	5900.0	1232.6	42.0	2.00	180.00	233.1	
6	6208.0	0.00	0.00	6049.1	1232.6	42.0	0.00	0.00	233.1	
7	7410.3	90.18	270.18	6813.0	1235.0	-724.3	7.50	270.18	980.7	
8	7410.3	90.18	270.18	6813.0	1235.0	-724.3	0.00	0.00	980.7	LPL 490'FNL, 2293'FWL, SEC.19
9	12168.1	90.18	270.18	6798.1	1250.1	-5482.1	0.00	0.00	5622.8	BHL 490'FNL, 2468'FEL, SEC.24

Vertical Section at 282.85° (600 ft/in)



Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.19-T5N-R64W

Josephine 5N64W19N Pad Sec.19-T5N-R64W

Josephine 19M-334

Wellbore #1

Plan #1 (12-20-16)

Anticollision Report

27 December, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Josephine 19M-334
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 19M-334	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 #1 (12-20-16)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (12-20-16)		
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 800.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	12/22/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	12,168.1	Plan #1 (12-20-16) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance		Separation Factor	Warning
			Between Centres (ft)	Between Ellipses (ft)		
Existing Wells - Sec.24-T5N-R65W						
Klein 2-19 (Exist) - Wellbore #1 - Wellbore #1	7,711.3	6,794.8	97.8	43.2	1.791	CC, ES, SF
McCauley 1 (Exist) - Wellbore #1 - Wellbore #1	11,724.8	6,785.0	154.8	-32.7	0.826	Level 1, CC, ES, SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	366.3	367.3	14.6	12.8	8.350	CC
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	12,168.1	12,221.6	211.4	-163.9	0.563	Level 1, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	29.1	28.3	35.284	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	12,168.1	12,348.4	448.5	83.8	1.230	Level 2, SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	62.0	59.0	20.469	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	900.0	899.7	73.7	69.0	15.703	SF
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	14.6	11.5	4.813	CC
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	12,168.1	12,033.8	280.6	-74.1	0.791	Level 1, ES, SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	32.9	29.9	10.866	CC, ES
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	12,168.1	12,078.6	495.7	120.7	1.322	Level 3, SF
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	76.6	73.5	25.277	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	999.3	97.4	92.2	18.555	SF
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	47.4	44.4	15.664	CC, ES
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	12,168.1	12,131.3	760.6	387.9	2.041	SF
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	500.0	500.0	120.3	117.8	48.528	CC, ES
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	900.0	885.1	152.1	147.6	33.432	SF
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	91.1	88.1	30.087	CC, ES
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	1,100.0	1,098.6	123.8	117.9	21.318	SF
Josephine 19O-314 - Wellbore #1 - Plan #1 (12-20-16)	600.0	600.0	105.7	102.7	34.895	CC, ES
Josephine 19O-314 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	999.3	126.6	121.3	24.104	SF
Klein (Existing) Sec.19-T5N-R64W						
Keensburg 2 (P&A) - Wellbore #1 - Wellbore #1	10,362.5	6,783.7	169.4	-122.8	0.580	Level 1, CC, ES, SF
Seth 1 (Exist.) - Wellbore #1 - Wellbore #1	6,217.8	6,041.4	221.1	174.4	4.734	CC, ES, SF
McCauley B19-31D Pad Sec.24-T5N-R65W						
Klein USX B19-04 (Exist.) - Wellbore #1 - Wellbore #1	8,923.3	6,790.6	156.7	63.7	1.684	CC, ES, SF

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