PETROLEUM DEVELOPMENT CORP DJ Basin

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

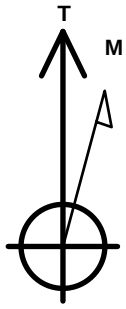
Surface Location: Josephine 5N64W19N Pad Sec.19-T5N-R64W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4627.0

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude	Slot
0.0	0.0	1385187.76	3253192.64	40.387180	-104.591060	

Original Well Elev WELL @ 4650.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1714'FNL, 2150'FEL, SEC.19	1.0	0.0	0.0	Point
BHL 278'FNL, 2469'FEL, SEC.24	6798.0	1446.9	-5484.8	Point
LPL 278'FNL, 2291'FWL, SEC.19	6813.0	1431.8	-724.3	Point



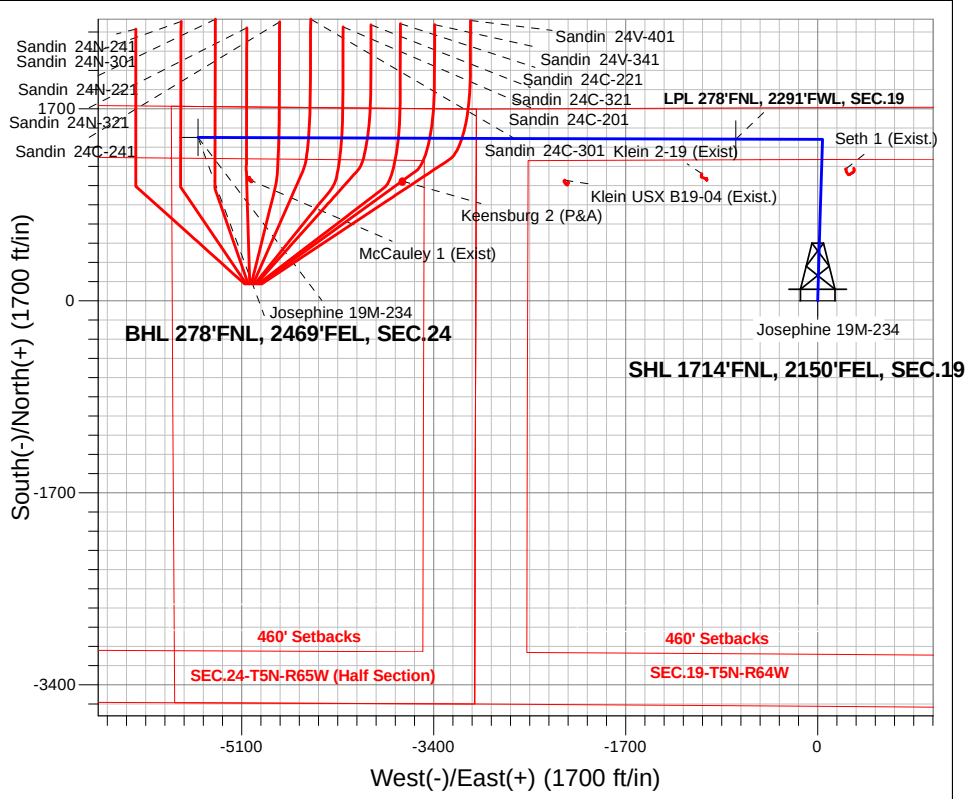
Azimuths to True North
Magnetic North: 8.02°

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

Josephine 5N64W19N Pad Sec.19-T5N-R64W
Josephine 19M-234
Plan #1 (12-20-16)
13:06, December 27 2016

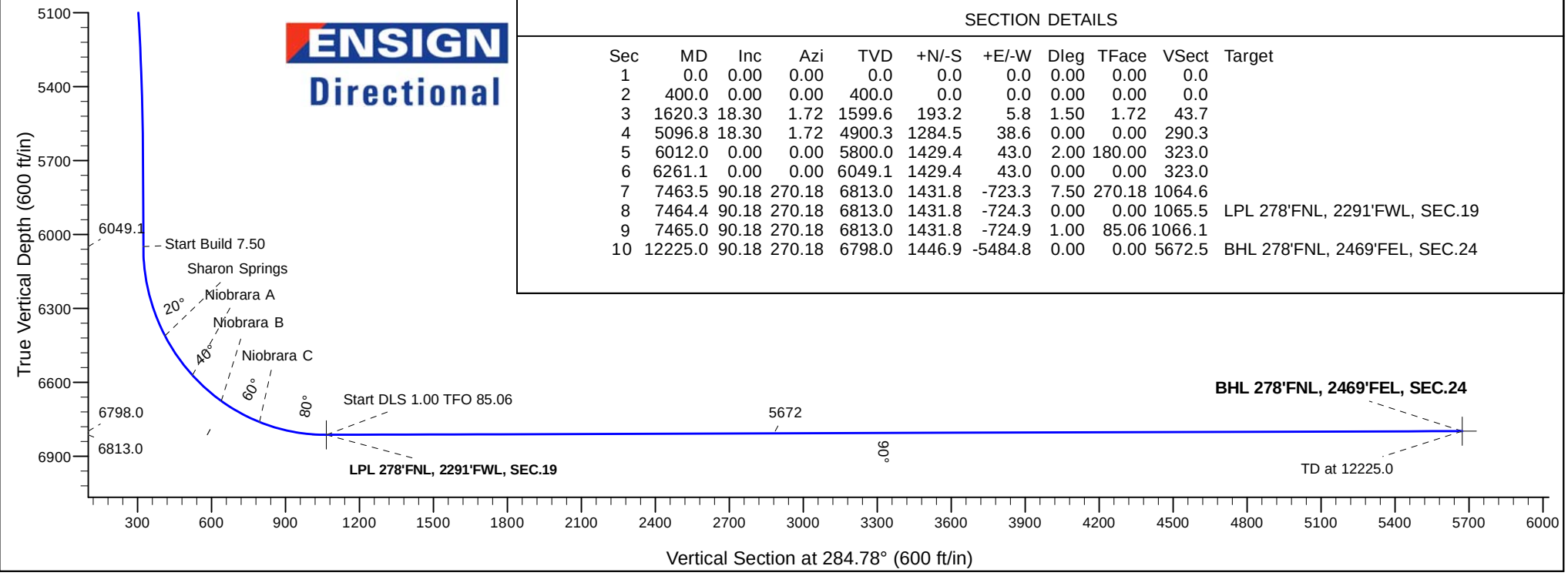
ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
4900.3	5096.8	Start Drop -2.00
6049.1	6261.1	Start Build 7.50
6813.0	7464.4	Start DLS 1.00 TFO 85.06
6813.0	7465.0	Start 4760.0 hold at 7465.0 MD
6798.0	12225.0	TD at 12225.0



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	1620.3	18.30	1.72	1599.6	193.2	5.8	1.50	1.72	43.7	
4	5096.8	18.30	1.72	4900.3	1284.5	38.6	0.00	0.00	290.3	
5	6012.0	0.00	0.00	5800.0	1429.4	43.0	2.00	180.00	323.0	
6	6261.1	0.00	0.00	6049.1	1429.4	43.0	0.00	0.00	323.0	
7	7463.5	90.18	270.18	6813.0	1431.8	-723.3	7.50	270.18	1064.6	
8	7464.4	90.18	270.18	6813.0	1431.8	-724.3	0.00	0.00	1065.5	LPL 278'FNL, 2291'FWL, SEC.19
9	7465.0	90.18	270.18	6813.0	1431.8	-724.9	1.00	85.06	1066.1	
10	12225.0	90.18	270.18	6798.0	1446.9	-5484.8	0.00	0.00	5672.5	BHL 278'FNL, 2469'FEL, SEC.24



ENSIGN Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.19-T5N-R64W
Josephine 5N64W19N Pad Sec.19-T5N-R64W
Josephine 19M-234

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

Anticollision Report

27 December, 2016

PDC ENERGY
Growing E&P Value

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	**Local Co-ordinate Reference:**	Well Josephine 19M-234
Project:	SEC.19-T5N-R64W	**TVD Reference:**	WELL @ 4650.0ft (Original Well Elev)
Reference Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	**MD Reference:**	WELL @ 4650.0ft (Original Well Elev)
Site Error:	0.0 ft	**North Reference:**	True
Reference Well:	Josephine 19M-234	**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** 12/27/2016

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	12,225.0	Plan #1 (12-20-16) (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name / Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Existing Wells - Sec.24-T5N-R65W						
Klein 2-19 (Exist) - Wellbore #1 - Wellbore #1	7,764.7	6,797.1	309.1	254.1	5.617	CC, ES
Klein 2-19 (Exist) - Wellbore #1 - Wellbore #1	7,800.0	6,796.9	311.1	255.1	5.553	SF
McCauley 1 (Exist) - Wellbore #1 - Wellbore #1	11,778.3	6,782.3	366.1	178.6	1.952	CC
McCauley 1 (Exist) - Wellbore #1 - Wellbore #1	11,800.0	6,782.5	366.8	178.5	1.948	ES, SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	14.6	12.6	7.569	CC
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	12,225.0	12,168.1	211.4	-164.0	0.563	Level 1, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	200.0	199.0	14.6	13.8	17.706	CC
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	12,225.0	12,351.6	247.4	-94.5	0.724	Level 1, ES, SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	76.6	74.6	39.775	CC, ES
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	900.0	897.6	109.2	104.4	23.081	SF
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	29.1	27.2	15.143	CC, ES
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	12,225.0	12,033.8	485.4	117.2	1.318	Level 3, SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	47.4	45.5	24.650	CC, ES
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	12,225.0	12,078.6	707.1	331.9	1.884	SF
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	91.1	89.2	47.343	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	996.5	138.1	132.8	26.096	SF
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	62.0	60.1	32.210	CC, ES
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	800.0	798.3	82.9	78.7	19.881	SF
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	134.8	132.9	70.050	CC, ES
Josephine 19O-204 - Wellbore #1 - Plan #1 (12-20-16)	900.0	879.7	187.2	182.6	40.757	SF
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	105.7	103.8	54.913	CC, ES
Josephine 19O-214 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	996.5	152.7	147.4	28.850	SF
Josephine 19O-314 - Wellbore #1 - Plan #1 (12-20-16)	400.0	399.0	120.3	118.3	62.480	CC, ES
Josephine 19O-314 - Wellbore #1 - Plan #1 (12-20-16)	1,000.0	996.5	167.2	161.9	31.603	SF
Klein (Existing) Sec.19-T5N-R64W						
Keensburg 2 (P&A) - Wellbore #1 - Wellbore #1	10,416.0	6,782.7	380.8	88.4	1.303	Level 3, CC, ES, SF
Seth 1 (Exist.) - Wellbore #1 - Wellbore #1	4,623.7	4,432.2	247.2	205.8	5.977	CC, ES
Seth 1 (Exist.) - Wellbore #1 - Wellbore #1	4,700.0	4,503.9	248.5	206.5	5.920	SF
McCauley B19-31D Pad Sec.24-T5N-R65W						
Klein USX B19-04 (Exist.) - Wellbore #1 - Wellbore #1	8,976.8	6,789.0	368.1	274.8	3.946	CC
Klein USX B19-04 (Exist.) - Wellbore #1 - Wellbore #1	9,000.0	6,788.7	368.8	274.7	3.922	ES, SF