PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11U-334**

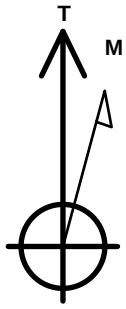
Surface Location: Fern 5N65W11EJ Pad Sec.11-T5N-R65W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4619.0

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude	Slot
0.0	0.0	1397199.29	3240103.65	40.420509	-104.637626	

Original Well Elev WELL @ 4642.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 291'FNL, 689'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 580'FNL, 2380'FEL, SEC.9	6802.0	-472.6	-8326.3	Point
LPL 764'FNL, 510'FWL, SEC.11	6852.0	-472.6	-178.6	Point



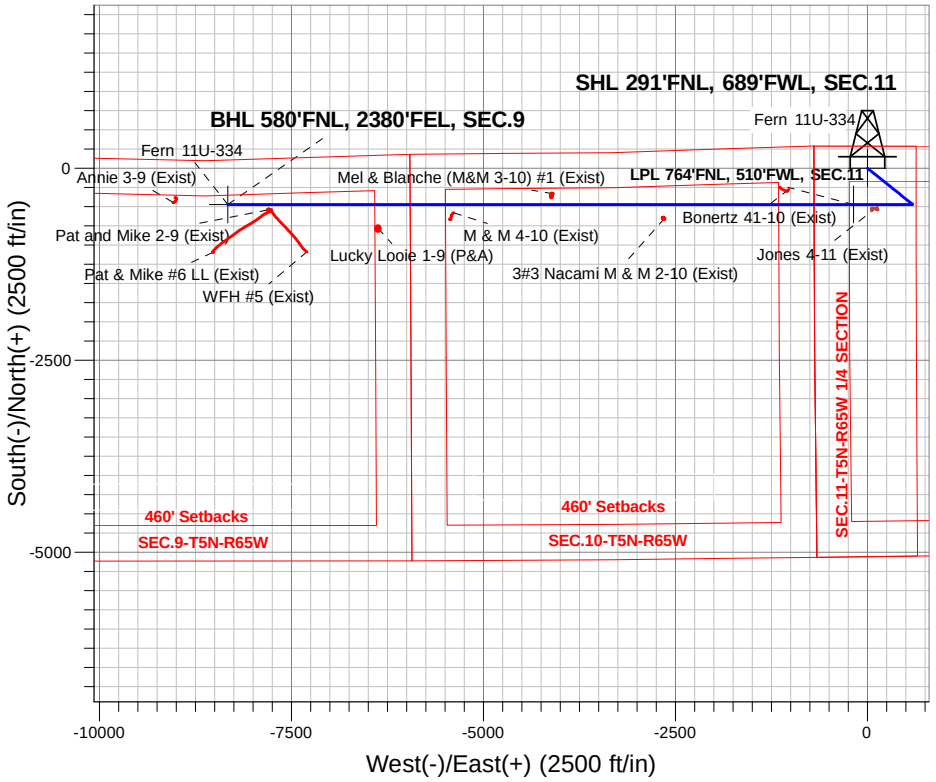
Azimuths to True North
Magnetic North: 8.10°

Magnetic Field
Strength: 52613.7snT
Dip Angle: 66.91°
Date: 8/10/2016
Model: IGRF2010

Fern 5N65W11EJ Pad Sec.11-T5N-R65W
Fern 11U-334
Plan #2 (1-11-17)
16:54, January 11 2017

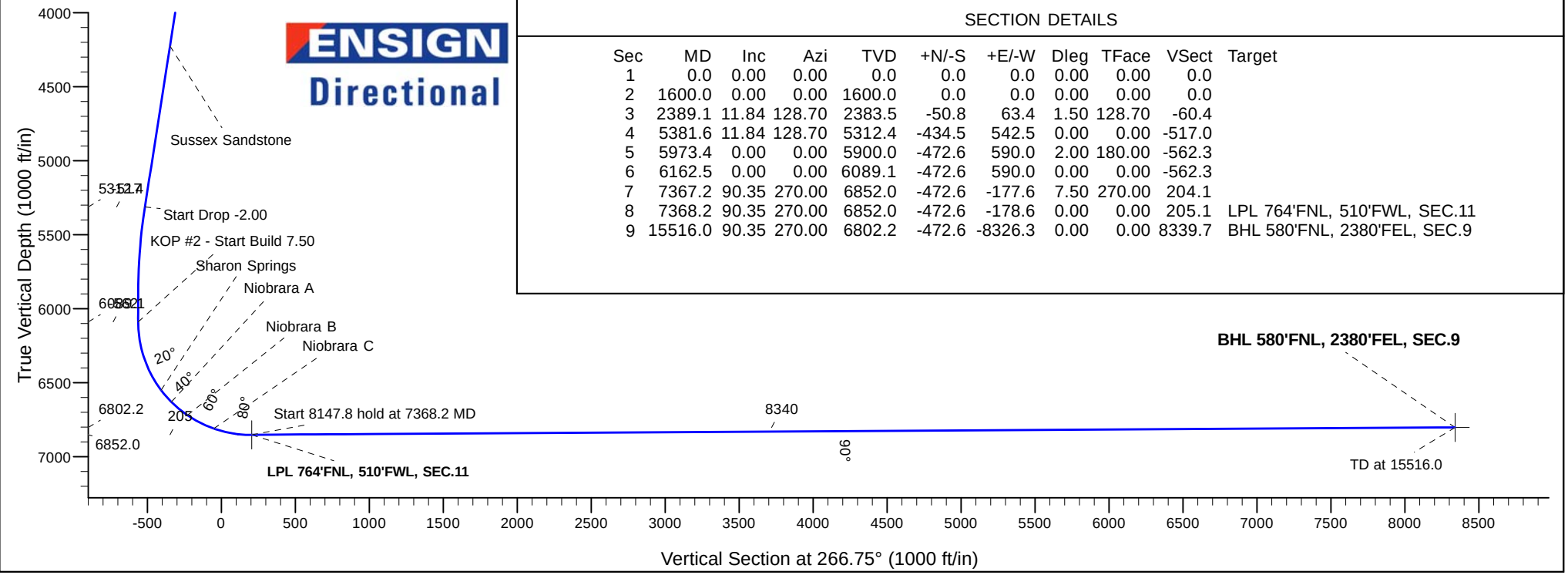
ANNOTATIONS

TVD	MD	Annotation
1600.0	1600.0	KOP - Start Build 1.50
5312.4	5381.6	Start Drop -2.00
6089.1	6162.5	KOP #2 - Start Build 7.50
6852.0	7368.2	Start 8147.8 hold at 7368.2 MD
6802.2	15516.0	TD at 15516.0



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	1600.0	0.00	0.00	1600.0	0.0	0.0	0.00	0.00	0.0	
3	2389.1	11.84	128.70	2383.5	-50.8	63.4	1.50	128.70	-60.4	
4	5381.6	11.84	128.70	5312.4	-434.5	542.5	0.00	0.00	-517.0	
5	5973.4	0.00	0.00	5900.0	-472.6	590.0	2.00	180.00	-562.3	
6	6162.5	0.00	0.00	6089.1	-472.6	590.0	0.00	0.00	-562.3	
7	7367.2	90.35	270.00	6852.0	-472.6	-177.6	7.50	270.00	204.1	
8	7368.2	90.35	270.00	6852.0	-472.6	-178.6	0.00	0.00	205.1	LPL 764'FNL, 510'FWL, SEC.11
9	15516.0	90.35	270.00	6802.2	-472.6	-8326.3	0.00	0.00	8339.7	BHL 580'FNL, 2380'FEL, SEC.9



ENSIGN Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.11-T5N-R65W
Fern 5N65W11EJ Pad Sec.11-T5N-R65W
Fern 11U-334

Wellbore #1
Plan #2 (1-11-17)

Anticollision Report

11 January, 2017

PDC ENERGY
Growing E&P Value

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	**Local Co-ordinate Reference:**	Well Fern 11U-334
Project:	SEC.11-T5N-R65W	**TVD Reference:**	WELL @ 4642.0ft (Original Well Elev)
Reference Site:	Fern 5N65W11EJ Pad Sec.11-T5N-R65W	**MD Reference:**	WELL @ 4642.0ft (Original Well Elev)
Site Error:	0.0 ft	**North Reference:**	True
Reference Well:	Fern 11U-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 #2 (1-11-17)	**Offset TVD Reference:**	Offset Datum

Reference Plan #2 (1-11-17)

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,200.0 ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.45 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 1/11/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	15,516.0	Plan #2 (1-11-17) (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.4-T5N-R65W						
Annie 3-9 (Exist) - Wellbore #1 - Wellbore #1	15,516.0	6,783.8	712.7	399.5	2.275	CC, ES, SF
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,516.0	6,871.6	646.6	324.6	2.008	CC, ES, SF
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	14,999.1	6,791.4	71.5	-225.5	0.241	Level 1, CC
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	15,000.0	6,791.4	71.5	-225.5	0.241	Level 1, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,487.8	6,846.1	616.2	333.1	2.177	CC
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,500.0	6,845.9	616.4	332.8	2.174	ES, SF
Existing Wells Sec.9, 10, & 11						
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,831.8	6,810.4	181.5	62.4	1.524	CC, ES, SF
Bonertz 41-10 (Exist) - Wellbore #1 - Wellbore #1	8,222.9	6,812.9	182.6	114.3	2.676	CC, ES, SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	7,050.4	6,767.6	46.6	8.3	1.216	Level 2, CC, ES, SF
Lucky Looie 1-9 (P&A) - Wellbore #1 - Wellbore #1	13,563.9	6,791.2	307.7	-90.1	0.774	Level 1, CC, ES, SF
M & M 4-10 (Exist) - Wellbore #1 - Wellbore #1	12,575.7	6,804.3	110.1	-104.3	0.514	Level 1, CC, ES, SF
Mel & Blanche (M&M 3-10) #1 (Exist) - Wellbore #1 - We	11,288.9	6,808.7	140.2	-28.4	0.832	Level 1, CC, ES, SF
Fern 5N65W11EJ Pad Sec.11-T5N-R65W						
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	29.9	24.6	5.711	CC
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	15,516.0	15,410.1	531.9	-59.7	0.899	Level 1, ES, SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,600.0	1,600.0	14.9	6.4	1.751	CC
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	15,516.0	15,575.4	333.5	-251.5	0.570	Level 1, ES, SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	45.2	39.9	8.635	CC, ES
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,516.0	15,539.7	833.2	238.9	1.402	Level 3, SF
Fern 11V-214 - Wellbore #1 - Plan #2 (1-11-17)	1,400.0	1,400.0	15.3	7.9	2.058	CC
Fern 11V-214 - Wellbore #1 - Plan #2 (1-11-17)	15,516.0	15,457.0	303.3	-278.3	0.521	Level 1, ES, SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	75.0	72.0	24.778	CC, ES
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	6,000.0	5,876.1	946.4	892.3	17.506	SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	30.2	23.9	4.774	CC
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	15,516.0	15,563.1	538.1	-58.1	0.903	Level 1, ES, SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	60.1	56.0	14.553	CC, ES
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,516.0	15,652.7	1,031.4	435.5	1.731	SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	105.3	104.5	127.462	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	5,200.0	4,988.1	1,197.1	1,157.4	30.207	SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	90.0	88.1	46.686	CC, ES
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	5,500.0	5,334.4	1,069.3	1,027.1	25.309	SF