

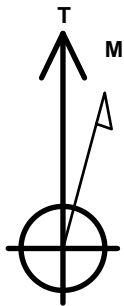
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11V-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 Latitude Longitude Slot
 0.0 0.0 1397139.19 3240103.67 40.420344 -104.637628
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 351'FNL, 688'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 1611'FNL, 2380'FEL, SEC.9	6812.0	-1443.8	-8319.7	Point
LPL 1795'FNL, 510'FWL, SEC.11	6857.0	-1443.8	-178.2	Point



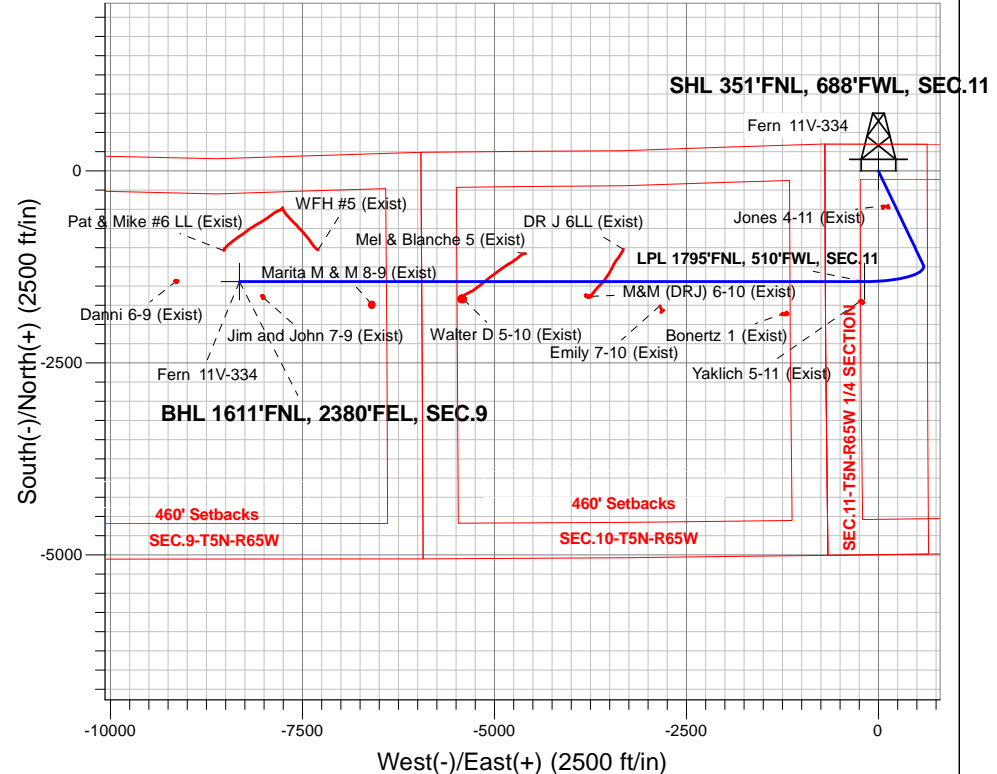
Azimuths to True North
 Magnetic North: 8.10°

Magnetic Field
 Strength: 52613.6snT
 Dip Angle: 66.91°
 Date: 8/10/2016
 Model: IGRF2010

Fern 5N65W11EJ Pad Sec.11-T5N-R65W
 Fern 11V-334
 Plan #1 (8-05-16)
 11:06, August 10 2016

ANNOTATIONS

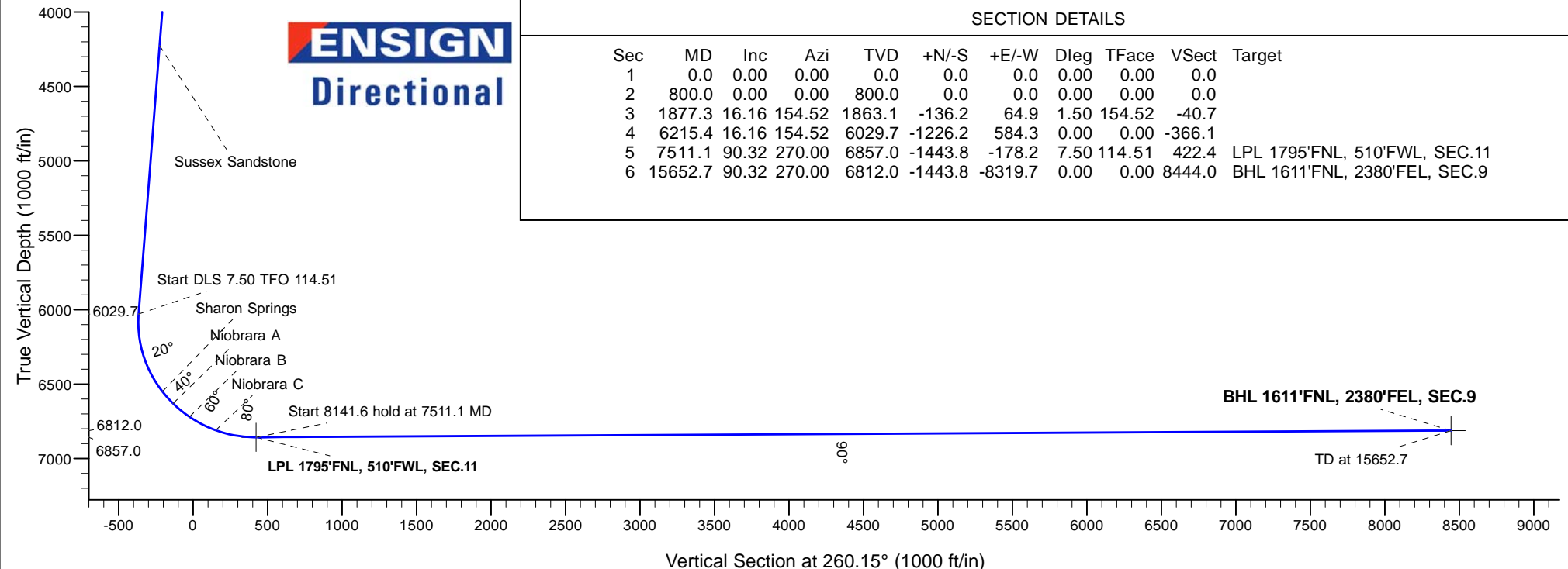
TVD	MD	Annotation
800.0	800.0	KOP - Start Build 1.50
1863.1	1877.3	Start 4338.1 hold at 1877.3 MD
6029.7	6215.4	Start DLS 7.50 TFO 114.51
6857.0	7511.1	Start 8141.6 hold at 7511.1 MD
6812.0	15652.7	TD at 15652.7



ENSIGN
 Directional

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	800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.0	
3	1877.3	16.16	154.52	1863.1	-136.2	64.9	1.50	154.52	-40.7	
4	6215.4	16.16	154.52	6029.7	-1226.2	584.3	0.00	0.00	-366.1	
5	7511.1	90.32	270.00	6857.0	-1443.8	-178.2	7.50	114.51	422.4	LPL 1795'FNL, 510'FWL, SEC.11
6	15652.7	90.32	270.00	6812.0	-1443.8	-8319.7	0.00	0.00	8444.0	BHL 1611'FNL, 2380'FEL, SEC.9





PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.11-T5N-R65W

Fern 5N65W11EJ Pad Sec.11-T5N-R65W

Fern 11V-334

Wellbore #1

Plan #1 (8-05-16)

Anticollision Report

10 August, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11V-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 11V-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 (8-05-16)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (8-05-16)		
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 1,000.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	8/10/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	15,652.7	Plan #1 (8-05-16) (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
Offset Well - Wellbore - Design						
Existing Wells Sec.4-T5N-R65W						
Danni 6-9 (Exist) - Wellbore #1 - Wellbore #1	15,652.7	6,784.8	810.6	550.5	3.117	CC, ES, SF
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,337.4	6,818.1	214.3	-87.4	0.710	Level 1, CC, ES, SF
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	13,929.7	6,806.5	295.3	-110.1	0.728	Level 1, CC, ES, SF
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,652.7	6,892.0	455.9	134.5	1.419	Level 3, CC, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,630.5	6,858.9	415.1	132.4	1.468	Level 3, CC, ES, SF
Existing Wells Sec.9, 10, & 11						
Bonertz 1 (Exist) - Wellbore #1 - Wellbore #1	8,530.2	6,832.2	404.2	329.6	5.417	CC, ES
Bonertz 1 (Exist) - Wellbore #1 - Wellbore #1	8,600.0	6,831.9	410.1	333.4	5.341	SF
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,655.8	6,870.2	415.4	267.1	2.801	CC, ES
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,700.0	6,869.8	417.8	268.0	2.789	SF
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,172.1	6,841.4	329.1	203.5	2.621	CC, ES
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,200.0	6,841.8	330.3	203.8	2.611	SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	2,931.3	2,849.4	152.9	132.0	7.334	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	3,000.0	2,915.6	154.0	132.6	7.184	SF
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,074.7	6,818.4	191.9	33.8	1.214	Level 2, CC, ES, SF
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	11,939.0	6,919.2	365.4	169.1	1.862	CC, ES, SF
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,741.5	6,811.6	226.0	11.5	1.054	Level 2, CC, ES, SF
Yaklich 5-11 (Exist) - Wellbore #1 - Wellbore #1	7,574.1	6,827.7	259.5	212.9	5.568	CC, ES
Yaklich 5-11 (Exist) - Wellbore #1 - Wellbore #1	7,600.0	6,828.0	260.8	213.7	5.533	SF

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11V-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 11V-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 (8-05-16)	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						
Fern 5N65W11EJ Pad Sec.11-T5N-R65W						
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	90.0	85.9	21.788	CC, ES
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,199.3	109.1	103.0	17.790	SF
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	60.1	56.0	14.554	CC, ES
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,099.7	70.9	65.2	12.532	SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	75.0	70.9	18.171	CC, ES
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,099.7	85.8	80.1	15.166	SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	14.9	10.8	3.616	CC
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,538.2	216.4	-338.0	0.390	Level 1, ES, SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	44.8	40.7	10.850	CC, ES
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,440.6	933.9	340.6	1.574	SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	14.9	11.9	4.933	CC
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,624.4	221.2	-339.3	0.395	Level 1, ES, SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	29.9	25.7	7.233	CC
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,560.1	493.4	-101.7	0.829	Level 1, ES, SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	45.2	44.4	54.696	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,777.0	810.2	216.9	1.366	Level 3, SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	29.9	27.9	15.500	CC
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	15,652.7	15,778.3	557.0	-38.1	0.936	Level 1, ES, SF

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 100- Existing Wells Sec.4-T5N-R65W - Danni 6-9 (Exist) - Wellbore #1 - Wellbore #1													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
15,500.0	6,812.8	6,783.5	6,783.0	292.9	14.5	50.70	-1,433.4	-9,130.0	963.3	721.6	241.69	3.986		
15,600.0	6,812.3	6,784.3	6,783.8	296.3	14.5	53.73	-1,433.4	-9,130.1	863.3	609.7	253.61	3.404		
15,652.7	6,812.0	6,784.8	6,784.3	298.1	14.5	55.43	-1,433.4	-9,130.1	810.6	550.5	260.03	3.117	CC, ES, SF	