

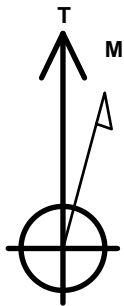
# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11V-304**

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 1397169.06 3240103.66 40.420426 -104.637627  
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 321'FNL, 688'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 1118'FNL, 2380'FEL, SEC.9	6802.0	-980.4	-8322.8	Point
LPL 1301'FNL, 509'FWL, SEC.11	6852.0	-980.4	-178.6	Point



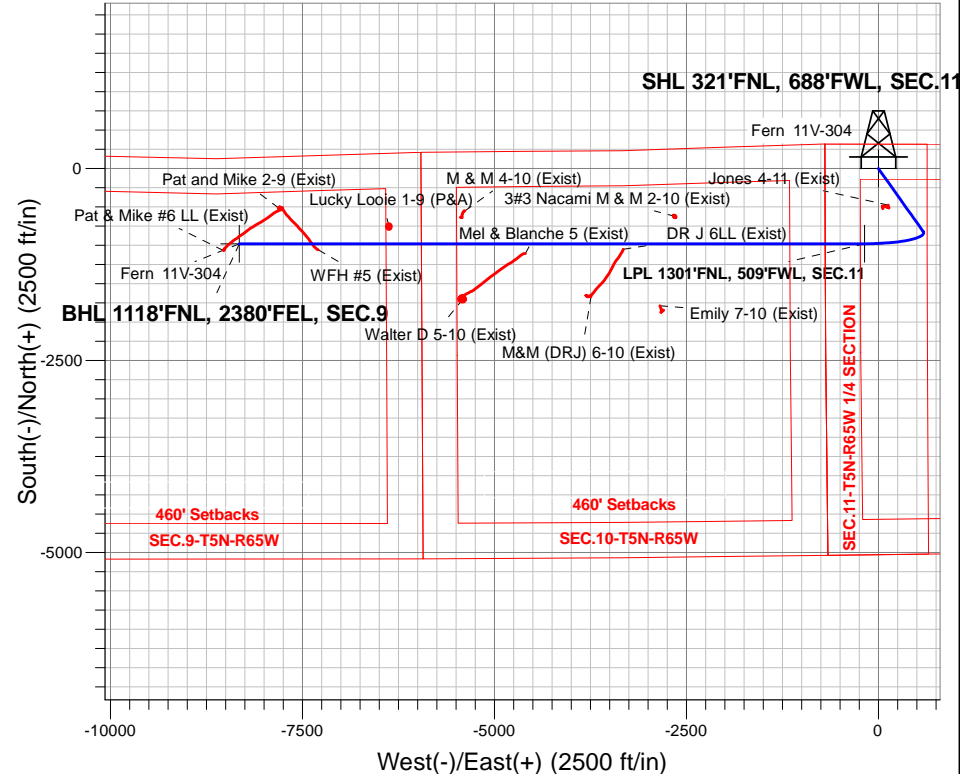
Azimuths to True North  
 Magnetic North: 8.10°

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

Fern 5N65W11EJ Pad Sec.11-T5N-R65W  
 Fern 11V-304  
 Plan #1 (8-05-16)  
 13:47, August 10 2016

## ANNOTATIONS

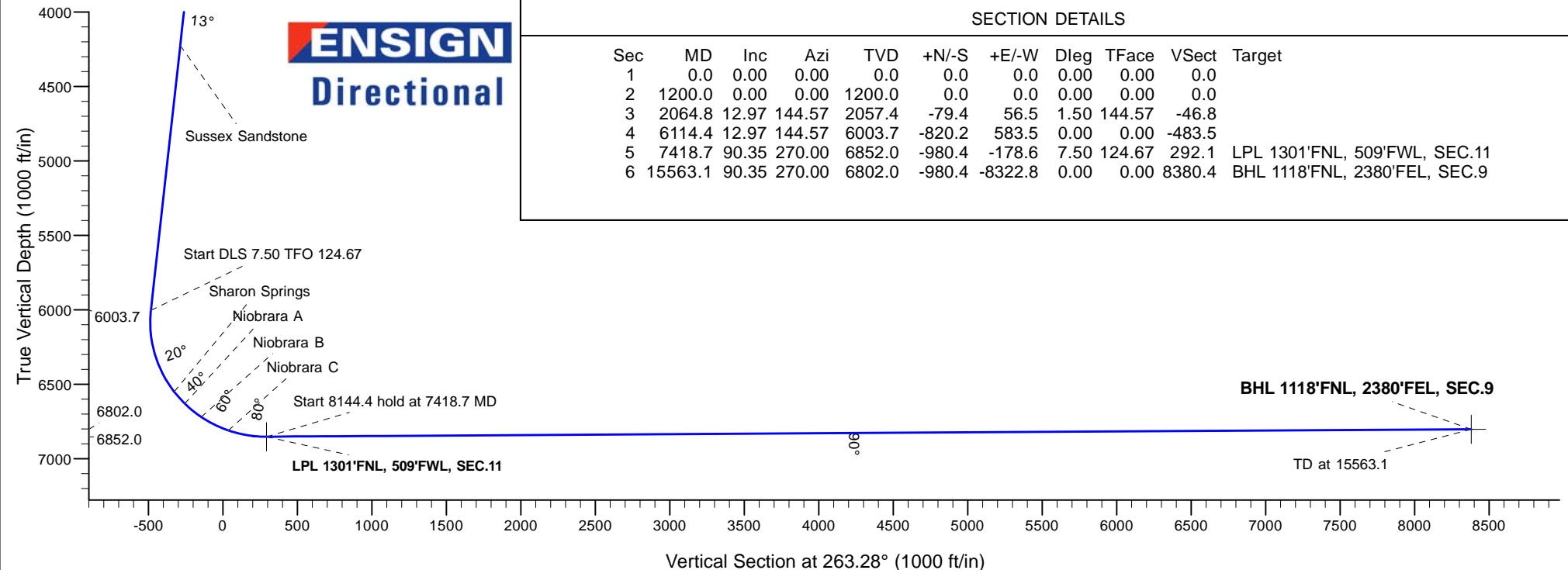
TVD	MD	Annotation
1200.0	1200.0	KOP - Start Build 1.50
2057.4	2064.8	Start 4049.6 hold at 2064.8 MD
6003.7	6114.4	Start DLS 7.50 TFO 124.67
6852.0	7418.7	Start 8144.4 hold at 7418.7 MD
6802.0	15563.1	TD at 15563.1



**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	1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
3	2064.8	12.97	144.57	2057.4	-79.4	56.5	1.50	144.57	-46.8	
4	6114.4	12.97	144.57	6003.7	-820.2	583.5	0.00	0.00	-483.5	
5	7418.7	90.35	270.00	6852.0	-980.4	-178.6	7.50	124.67	292.1	LPL 1301'FNL, 509'FWL, SEC.11
6	15563.1	90.35	270.00	6802.0	-980.4	-8322.8	0.00	0.00	8380.4	BHL 1118'FNL, 2380'FEL, SEC.9





# **PETROLEUM DEVELOPMENT CORP DJ Basin**

**SEC.11-T5N-R65W**

**Fern 5N65W11EJ Pad Sec.11-T5N-R65W**

**Fern 11V-304**

**Wellbore #1**

**Plan #1 (8-05-16)**

## **Anticollision Report**

**10 August, 2016**



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Fern 11V-304
<b>Project:</b>	SEC.11-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4642.0ft (Original Well Elev)
<b>Reference Site:</b>	Fern 5N65W11EJ Pad Sec.11-T5N-R65W	<b>MD Reference:</b>	WELL @ 4642.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Fern 11V-304	<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 (8-05-16)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1 (8-05-16)		
<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 1,000.0 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>	8/10/2016		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	15,563.1	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						
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,563.1	6,877.1	207.4	-113.9	0.646	Level 1, CC, ES, SF
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	15,049.4	6,794.4	466.5	169.9	1.573	CC, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,538.0	6,847.8	78.2	-204.5	0.277	Level 1, CC, ES, SF
Existing Wells Sec.9, 10, & 11						
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,882.0	6,816.5	356.5	237.7	3.000	CC
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,900.0	6,816.3	357.0	237.5	2.989	ES, SF
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,563.1	6,873.5	77.9	-70.4	0.525	Level 1, CC, ES, SF
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,079.8	6,862.9	821.9	696.4	6.546	CC
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,100.0	6,863.3	822.2	695.9	6.513	ES
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,300.0	6,866.5	850.9	718.0	6.400	SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	3,730.5	3,661.7	229.4	205.2	9.476	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	4,000.0	3,924.8	236.5	210.9	9.220	SF
Lucky Looie 1-9 (P&A) - Wellbore #1 - Wellbore #1	13,614.1	6,791.0	230.4	-166.9	0.580	Level 1, CC, ES, SF
M & M 4-10 (Exist) - Wellbore #1 - Wellbore #1	12,626.0	6,803.5	427.9	214.0	2.000	CC, ES, SF
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	10,982.1	6,812.2	685.2	527.2	4.336	CC
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,000.0	6,812.0	685.4	526.8	4.320	ES
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,100.0	6,810.7	695.3	533.2	4.290	SF
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	11,846.7	6,911.6	127.9	-68.3	0.652	Level 1, CC, ES, SF
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,648.9	6,805.6	719.3	504.9	3.354	CC, ES
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,700.0	6,805.1	721.2	504.9	3.335	SF

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Fern 11V-304
<b>Project:</b>	SEC.11-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4642.0ft (Original Well Elev)
<b>Reference Site:</b>	Fern 5N65W11EJ Pad Sec.11-T5N-R65W	<b>MD Reference:</b>	WELL @ 4642.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Fern 11V-304	<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 (8-05-16)	<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						
Fern 5N65W11EJ Pad Sec.11-T5N-R65W						
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	60.1	54.9	11.491	CC
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,199.7	60.6	54.3	9.633	ES
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,300.0	1,299.2	62.7	55.9	9.229	SF
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	30.2	23.9	4.775	CC, ES
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,500.0	653.2	57.3	1.096	Level 2, SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	45.2	38.8	7.134	CC, ES
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,572.3	867.0	272.2	1.458	Level 3, SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	14.9	9.7	2.855	CC
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,539.7	300.5	-280.9	0.517	Level 1, ES, SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	14.9	8.6	2.359	CC
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,443.6	442.7	-145.8	0.752	Level 1, ES, SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	44.8	41.8	14.795	CC, ES
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,624.4	703.0	109.9	1.185	Level 2, SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	29.9	25.7	7.233	CC
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,563.1	15,652.7	493.4	-101.8	0.829	Level 1, ES, SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	75.1	74.2	90.859	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	5,500.0	5,352.9	984.1	942.1	23.430	SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	59.7	57.8	30.999	CC, ES
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	6,250.0	6,140.5	889.5	840.8	18.249	SF

Offset Design													Offset Site Error:		0.0 ft
Survey Program: 577- Existing Wells Sec.4-T5N-R65W - Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
14,800.0	6,806.7	6,869.9	6,778.0	271.8	26.0	-82.38	-1,061.0	-8,513.8	957.5	664.3	293.26	3.265			
14,900.0	6,806.1	6,870.7	6,778.8	275.3	26.0	-82.88	-1,061.0	-8,513.8	857.9	561.0	296.95	2.889			
15,000.0	6,805.5	6,871.4	6,779.5	278.7	26.0	-83.42	-1,061.0	-8,513.8	758.4	457.8	300.64	2.523			
15,100.0	6,804.8	6,872.2	6,780.4	282.1	26.0	-84.00	-1,061.1	-8,513.8	659.1	354.8	304.33	2.166			
15,200.0	6,804.2	6,873.1	6,781.2	285.5	26.0	-84.63	-1,061.1	-8,513.8	560.0	252.0	308.03	1.818			
15,300.0	6,803.6	6,874.1	6,782.2	289.0	26.0	-85.31	-1,061.1	-8,513.8	461.3	149.5	311.71	1.480	Level 3		
15,400.0	6,803.0	6,875.2	6,783.3	292.4	26.0	-86.05	-1,061.1	-8,513.8	363.2	47.9	315.38	1.152	Level 2		
15,500.0	6,802.4	6,876.3	6,784.4	295.8	26.0	-86.86	-1,061.1	-8,513.9	266.7	-52.4	319.02	0.836	Level 1		
15,563.1	6,802.0	6,877.1	6,785.2	298.0	26.0	-87.41	-1,061.1	-8,513.9	207.4	-113.9	321.30	0.646	Level 1, CC, ES, SF		