

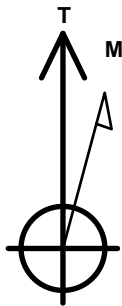
# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11U-434**

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 1397214.23 3240103.78 40.420550 -104.637625  
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 276'FNL, 689'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 254'FNL, 2380'FEL, SEC.9	6872.0	-161.4	-8328.4	Point
LPL 437'FNL, 511'FWL, SEC.11	6922.0	-161.4	-177.6	Point



Azimuths to True North  
 Magnetic North: 8.10°

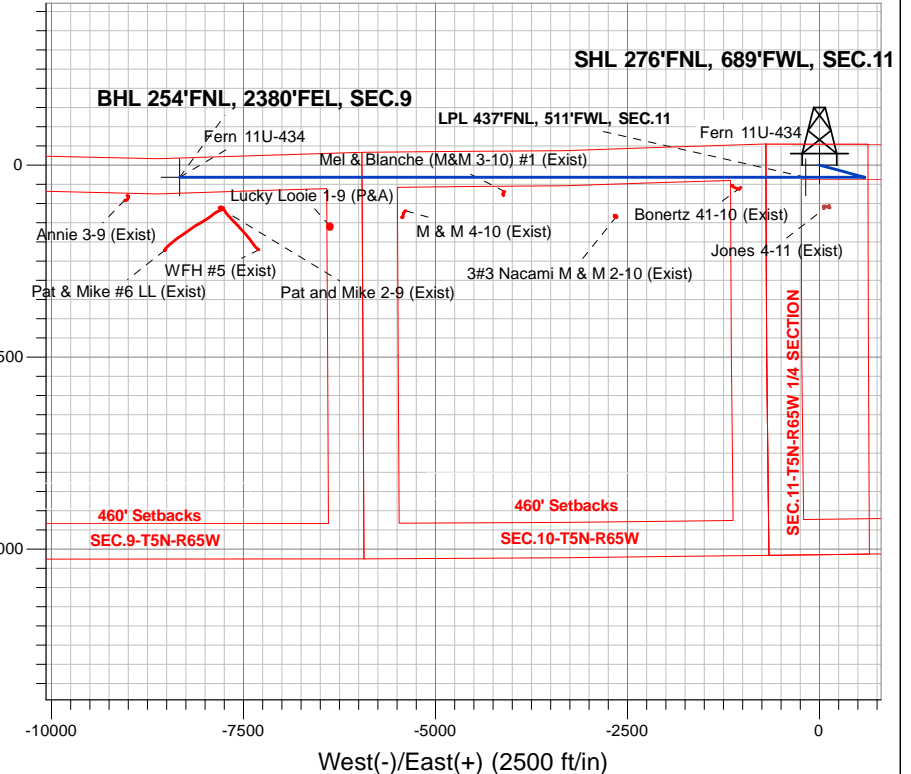
Magnetic Field  
 Strength: 52613.7snT  
 Dip Angle: 66.91°  
 Date: 8/10/2016  
 Model: IGRF2010

Fern 5N65W11EJ Pad Sec.11-T5N-R65W  
 Fern 11U-434  
 Plan #1 (8-05-16)  
 8:06, August 10 2016

## ANNOTATIONS

TVD	MD	Annotation
2500.0	2500.0	KOP - Start Build 1.50
5381.2	5437.5	Start Drop -2.00
6159.1	6220.3	Start Build 7.50
6923.0	7424.9	Start 1.0 hold at 7424.9 MD
6922.0	7426.2	Start 8150.6 hold at 7426.2 MD
6872.0	15576.9	TD at 15576.9

South(-)/North(+) (2500 ft/in)

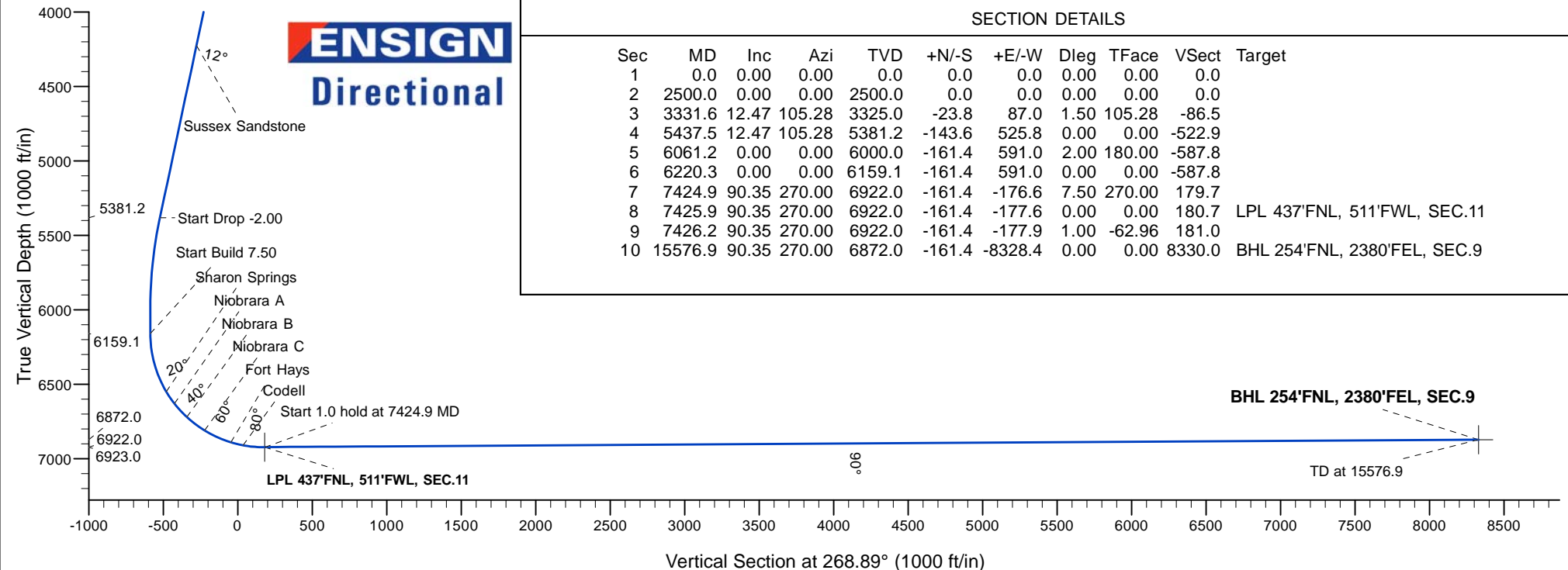


West(-)/East(+) (2500 ft/in)

**ENSIGN**  
 Directional

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	2500.0	0.00	0.00	2500.0	0.0	0.0	0.00	0.00	0.0	
3	3331.6	12.47	105.28	3325.0	-23.8	87.0	1.50	105.28	-86.5	
4	5437.5	12.47	105.28	5381.2	-143.6	525.8	0.00	0.00	-522.9	
5	6061.2	0.00	0.00	6000.0	-161.4	591.0	2.00	180.00	-587.8	
6	6220.3	0.00	0.00	6159.1	-161.4	591.0	0.00	0.00	-587.8	
7	7424.9	90.35	270.00	6922.0	-161.4	-176.6	7.50	270.00	179.7	
8	7425.9	90.35	270.00	6922.0	-161.4	-177.6	0.00	0.00	180.7	LPL 437'FNL, 511'FWL, SEC.11
9	7426.2	90.35	270.00	6922.0	-161.4	-177.9	1.00	-62.96	181.0	
10	15576.9	90.35	270.00	6872.0	-161.4	-8328.4	0.00	0.00	8330.0	BHL 254'FNL, 2380'FEL, SEC.9





# **PETROLEUM DEVELOPMENT CORP DJ Basin**

**SEC.11-T5N-R65W**

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

**Fern 11U-434**

**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 11U-434
<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 11U-434	<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	15,576.9	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						
Annie 3-9 (Exist) - Wellbore #1 - Wellbore #1	15,576.9	6,853.0	771.7	457.8	2.458	CC, ES, SF
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,576.9	6,928.1	964.3	641.7	2.989	CC, ES, SF
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	15,058.0	6,859.2	398.0	100.4	1.337	Level 3, CC, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,546.4	6,915.9	942.6	658.8	3.322	CC
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,600.0	6,915.2	944.1	658.5	3.306	ES
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,700.0	6,914.0	955.0	666.0	3.304	SF
Existing Wells Sec.9, 10, & 11						
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,890.6	6,876.6	508.4	388.6	4.245	CC
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,900.0	6,876.5	508.5	388.4	4.235	ES
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	10,000.0	6,875.6	520.0	396.6	4.213	SF
Bonertz 41-10 (Exist) - Wellbore #1 - Wellbore #1	8,279.3	6,896.4	140.4	71.5	2.038	CC, ES, SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	7,117.1	6,855.2	369.3	330.3	9.469	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	7,150.0	6,867.7	370.6	331.3	9.419	SF
Lucky Looie 1-9 (P&A) - Wellbore #1 - Wellbore #1	13,622.9	6,861.0	633.8	233.8	1.585	CC, ES, SF
M & M 4-10 (Exist) - Wellbore #1 - Wellbore #1	12,634.4	6,874.6	436.1	221.1	2.028	CC, ES, SF
Mel & Blanche (M&M 3-10) #1 (Exist) - Wellbore #1 - We	11,346.7	6,878.0	186.0	16.8	1.100	Level 2, CC, ES, SF

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Fern 11U-434
<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 11U-434	<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	14.9	9.7	2.855	CC
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	15,576.9	15,411.5	245.0	-253.9	0.491	Level 1, ES, SF
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	1,600.0	1,600.0	14.9	6.4	1.750	CC
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	15,576.9	15,503.6	222.3	-346.8	0.391	Level 1, ES, SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	60.1	54.9	11.491	CC, ES
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,197.1	64.7	58.4	10.367	SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	1,400.0	1,400.0	30.2	22.8	4.068	CC
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	15,576.9	15,445.8	449.4	-120.4	0.789	Level 1, ES, SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	90.0	87.0	29.712	CC, ES
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,086.8	120.0	114.3	21.200	SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	45.2	38.8	7.134	CC, ES
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	15,576.9	15,563.1	867.0	272.0	1.457	Level 3, SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	75.0	70.9	18.171	CC, ES
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,094.2	85.6	79.9	15.163	SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	120.2	119.4	145.553	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	1,400.0	1,330.8	295.8	286.9	33.213	SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	104.9	103.0	54.439	CC, ES
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,169.2	183.1	176.5	27.782	SF

Offset Design													Existing Wells Sec.4-T5N-R65W - Annie 3-9 (Exist) - Wellbore #1 - Wellbore #1		Offset Site Error:		0.0 ft	
Survey Program: 100-															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						
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)							
15,400.0	6,873.1	6,852.1	6,850.8	292.8	15.1	-89.84	-461.6	-9,039.3	937.2	629.3	307.86	3.044						
15,500.0	6,872.5	6,852.6	6,851.3	296.3	15.1	-89.93	-461.6	-9,039.3	843.0	531.7	311.29	2.708						
15,576.9	6,872.0	6,853.0	6,851.6	298.9	15.1	-90.00	-461.6	-9,039.3	771.7	457.8	313.93	2.458	CC, ES, SF					