

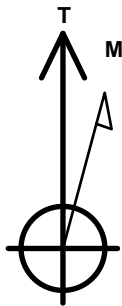
# PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11W-314**

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 1397109.31 3240103.69 40.420262 -104.637629  
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 381'FNL, 688'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 2168'FNL, 2380'FEL, SEC.9	6812.0	-1971.0	-8316.0	Point
LPL 2352'FNL, 508'FWL, SEC.11	6857.0	-1971.0	-180.2	Point



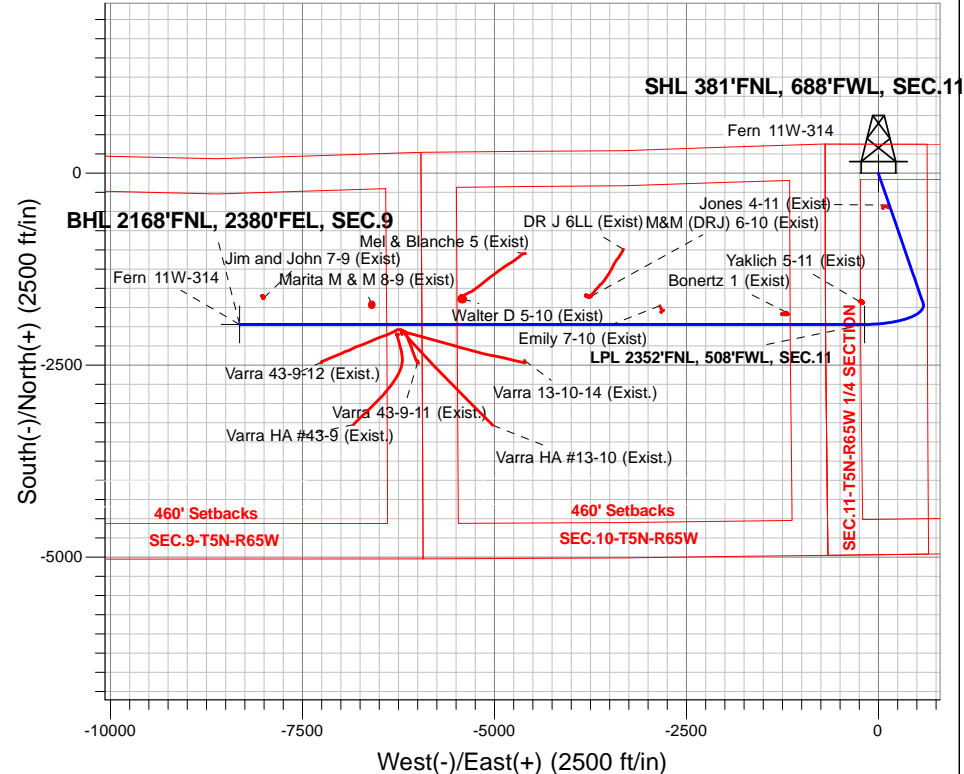
Azimuths to True North  
 Magnetic North: 8.10°

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

Fern 5N65W11EJ Pad Sec.11-T5N-R65W  
 Fern 11W-314  
 Plan #1 (8-05-16)  
 12:46, August 10 2016

## ANNOTATIONS

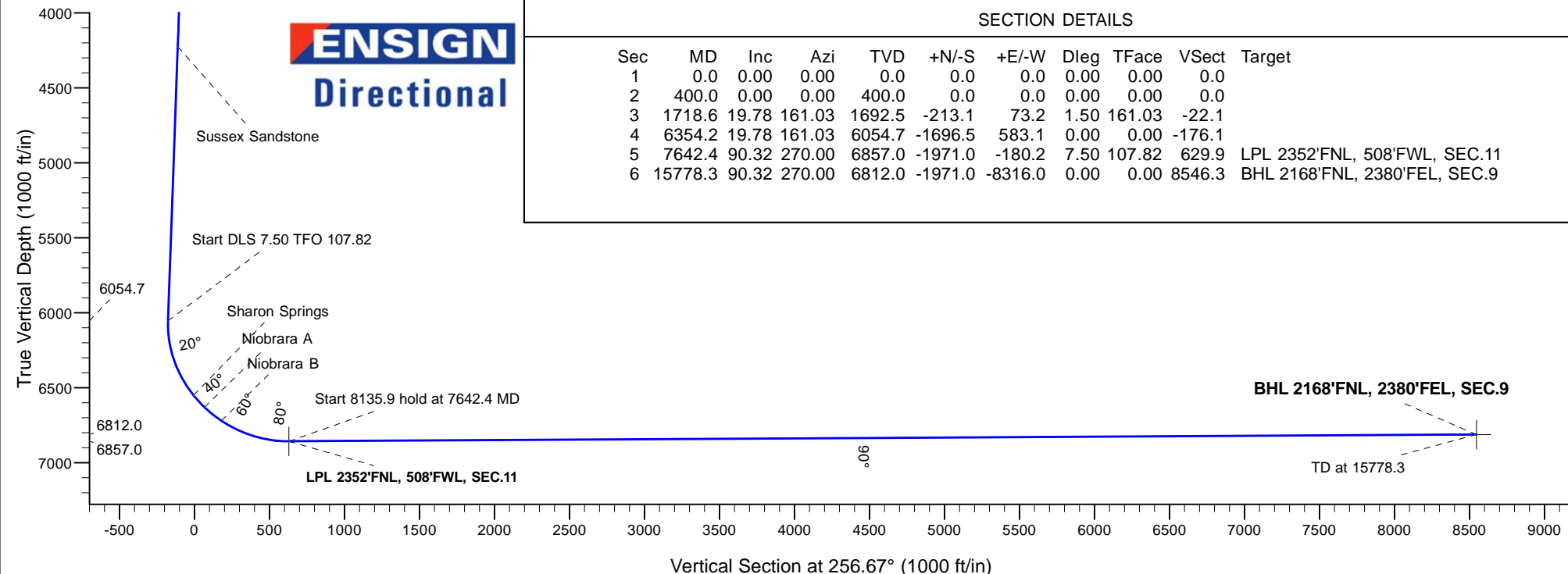
TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
1692.5	1718.6	Start 4635.6 hold at 1718.6 MD
6054.7	6354.2	Start DLS 7.50 TFO 107.82
6857.0	7642.4	Start 8135.9 hold at 7642.4 MD
6812.0	15778.3	TD at 15778.3



**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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	1718.6	19.78	161.03	1692.5	-213.1	73.2	1.50	161.03	-22.1	
4	6354.2	19.78	161.03	6054.7	-1696.5	583.1	0.00	0.00	-176.1	
5	7642.4	90.32	270.00	6857.0	-1971.0	-180.2	7.50	107.82	629.9	LPL 2352'FNL, 508'FWL, SEC.11
6	15778.3	90.32	270.00	6812.0	-1971.0	-8316.0	0.00	0.00	8546.3	BHL 2168'FNL, 2380'FEL, SEC.9





# **PETROLEUM DEVELOPMENT CORP DJ Basin**

**SEC.11-T5N-R65W**

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

**Fern 11W-314**

**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 11W-314
<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 11W-314	<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	15,778.3	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
<b>Offset Well - Wellbore - Design</b>						
Existing Wells Sec.4-T5N-R65W						
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,466.4	6,815.2	342.8	41.1	1.136	Level 2, CC, ES, SF
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	14,058.7	6,806.5	261.8	-143.6	0.646	Level 1, CC, ES, SF
Existing Wells Sec.9, 10, & 11						
Bonertz 1 (Exist) - Wellbore #1 - Wellbore #1	8,659.2	6,827.4	152.9	77.5	2.029	CC, ES, SF
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,784.9	6,858.5	972.4	823.9	6.549	CC
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,800.0	6,858.3	972.5	823.5	6.527	ES
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	11,000.0	6,856.2	995.9	840.2	6.396	SF
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,300.5	6,809.5	227.1	101.4	1.807	CC, ES, SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	2,343.9	2,254.2	93.1	75.1	5.163	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	2,400.0	2,306.7	95.2	76.7	5.145	SF
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,203.6	6,817.3	365.1	206.8	2.306	CC, ES, SF
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	12,068.0	6,919.1	922.4	726.1	4.697	CC
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	12,100.0	6,917.8	923.0	725.5	4.675	ES
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	12,200.0	6,913.7	931.8	731.0	4.640	SF
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,870.5	6,809.1	331.0	116.4	1.542	CC, ES
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,900.0	6,808.8	332.3	116.7	1.541	SF
Yaklich 5-11 (Exist) - Wellbore #1 - Wellbore #1	7,703.1	6,831.7	297.6	249.4	6.173	CC, ES, SF

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Fern 11W-314
<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 11W-314	<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
<b>Offset Well - Wellbore - Design</b>						
Fern 5N65W11EJ Pad Sec.11-T5N-R65W						
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	119.9	117.9	62.189	CC, ES
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,096.4	181.3	175.7	31.895	SF
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	90.0	88.1	46.688	CC, ES
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	997.5	135.2	130.1	26.308	SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	104.9	103.0	54.439	CC, ES
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	997.5	150.1	144.9	29.188	SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	44.8	42.9	23.249	CC, ES
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,778.3	15,534.8	762.3	171.0	1.289	Level 3, SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	74.7	72.8	38.750	CC, ES
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	5,500.0	5,446.0	983.1	939.9	22.763	SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	14.9	13.0	7.749	CC
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,778.3	15,621.8	359.8	-219.7	0.621	Level 1, ES, SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	59.7	57.8	30.999	CC, ES
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	6,200.0	6,185.0	889.2	840.9	18.405	SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	29.9	27.9	15.500	CC
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,778.3	15,649.3	557.0	-38.0	0.936	Level 1, ES, SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	15.3	14.5	18.529	CC
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	15,778.3	15,777.0	261.7	-310.1	0.458	Level 1, ES, SF
Varra 43-9-11 Pad Sec.9-T5N-R65W						
Varra 13-10-14 (Exist.) - Wellbore #1 - Wellbore #1	12,063.3	7,095.6	484.5	273.9	2.300	CC, ES
Varra 13-10-14 (Exist.) - Wellbore #1 - Wellbore #1	12,100.0	7,095.6	485.9	274.0	2.293	SF
Varra 43-9-11 (Exist.) - Wellbore #1 - Wellbore #1	13,459.5	6,849.6	478.6	243.1	2.032	CC, ES
Varra 43-9-11 (Exist.) - Wellbore #1 - Wellbore #1	13,500.0	6,849.0	480.3	243.4	2.027	SF
Varra 43-9-12 (Exist.) - Wellbore #1 - Wellbore #1	14,711.4	6,936.6	492.1	201.6	1.694	CC, ES, SF
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,100.0	6,593.2	694.1	513.3	3.838	SF
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,300.0	6,501.8	664.0	493.7	3.899	ES
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,334.6	6,488.2	663.3	494.7	3.935	CC
Varra HA #43-9 (Exist.) - Wellbore #1 - Wellbore #1	13,707.3	6,535.0	736.5	522.4	3.439	CC, ES
Varra HA #43-9 (Exist.) - Wellbore #1 - Wellbore #1	13,900.0	6,573.0	760.0	534.7	3.374	SF

<b>Offset Design</b>												
Existing Wells Sec.4-T5N-R65W - Jim and John 7-9 (Exist.) - Wellbore #1 - Wellbore #1												
Survey Program: 100-												
Reference												
Offset												
Semi Major Axis												
Distance												
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
14,600.0	6,818.5	6,826.2	6,824.9	258.2	14.9	91.54	-1,628.2	-8,004.0	931.7	659.6	272.09	3.424
14,700.0	6,818.0	6,824.9	6,823.7	261.6	14.9	91.33	-1,628.2	-8,004.0	839.5	564.0	275.52	3.047
14,800.0	6,817.4	6,823.7	6,822.4	265.0	14.9	91.12	-1,628.2	-8,004.0	749.3	470.4	278.95	2.686
14,900.0	6,816.9	6,822.4	6,821.1	268.4	14.9	90.90	-1,628.2	-8,004.0	662.0	379.6	282.37	2.344
15,000.0	6,816.3	6,821.1	6,819.9	271.8	14.9	90.69	-1,628.2	-8,004.0	578.8	293.0	285.79	2.025
15,100.0	6,815.8	6,819.8	6,818.6	275.2	14.9	90.48	-1,628.2	-8,004.1	501.7	212.5	289.20	1.735
15,200.0	6,815.2	6,818.6	6,817.3	278.6	14.9	90.27	-1,628.2	-8,004.1	434.1	141.5	292.62	1.483 Level 3
15,300.0	6,814.6	6,817.3	6,816.0	282.1	14.9	90.05	-1,628.2	-8,004.1	381.0	85.0	296.03	1.287 Level 3
15,400.0	6,814.1	6,816.0	6,814.8	285.5	14.9	89.84	-1,628.2	-8,004.1	349.1	49.7	299.44	1.166 Level 2
15,466.4	6,813.7	6,815.2	6,813.9	287.7	14.9	89.70	-1,628.2	-8,004.1	342.8	41.1	301.70	1.136 Level 2, CC, ES, SF
15,500.0	6,813.5	6,814.7	6,813.5	288.9	14.9	89.63	-1,628.2	-8,004.1	344.4	41.6	302.84	1.137 Level 2
15,600.0	6,813.0	6,813.5	6,812.2	292.3	14.9	89.42	-1,628.2	-8,004.1	367.9	61.6	306.24	1.201 Level 2
15,700.0	6,812.4	6,812.2	6,811.0	295.7	14.9	89.20	-1,628.2	-8,004.1	414.8	105.1	309.64	1.340 Level 3

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation