

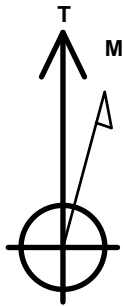
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11V-214**

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 1397183.99 3240103.79 40.420467 -104.637626
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 306'FNL, 689'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 875'FNL, 2380'FEL, SEC.9	6732.0	-752.4	-8324.4	Point
LPL 1058'FNL, 510'FWL, SEC.11	6777.0	-752.4	-179.2	Point



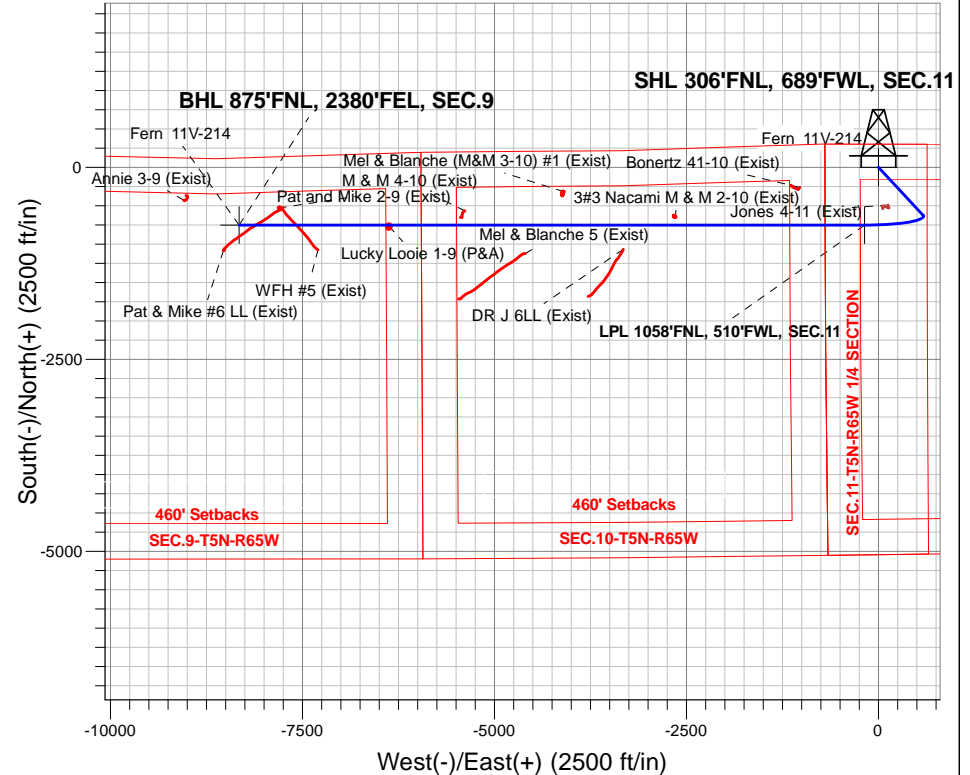
Azimuths to True North
 Magnetic North: 8.10°

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

Fern 5N65W11EJ Pad Sec.11-T5N-R65W
 Fern 11V-214
 Plan #2 (1-11-17)
 17:03, January 11 2017

ANNOTATIONS

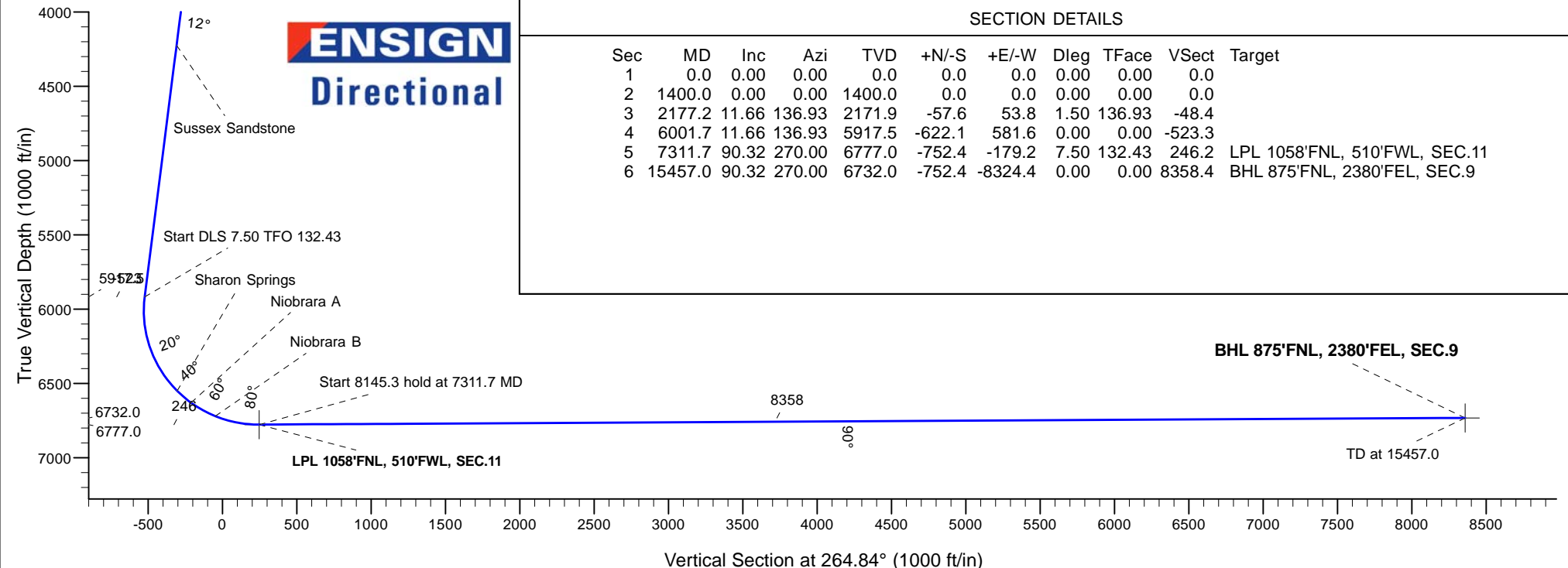
TVD	MD	Annotation
1400.0	1400.0	KOP - Start Build 1.50
2171.9	2177.2	Start 3824.5 hold at 2177.2 MD
5917.5	6001.7	Start DLS 7.50 TFO 132.43
6777.0	7311.7	Start 8145.3 hold at 7311.7 MD
6732.0	15457.0	TD at 15457.0



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	1400.0	0.00	0.00	1400.0	0.0	0.0	0.00	0.00	0.0	
3	2177.2	11.66	136.93	2171.9	-57.6	53.8	1.50	136.93	-48.4	
4	6001.7	11.66	136.93	5917.5	-622.1	581.6	0.00	0.00	-523.3	
5	7311.7	90.32	270.00	6777.0	-752.4	-179.2	7.50	132.43	246.2	LPL 1058'FNL, 510'FWL, SEC.11
6	15457.0	90.32	270.00	6732.0	-752.4	-8324.4	0.00	0.00	8358.4	BHL 875'FNL, 2380'FEL, SEC.9





PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.11-T5N-R65W

Fern 5N65W11EJ Pad Sec.11-T5N-R65W

Fern 11V-214

Wellbore #1

Plan #2 (1-11-17)

Anticollision Report

11 January, 2017



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11V-214
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-214	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	15,457.0	Plan #2 (1-11-17) (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	15,457.0	6,710.0	781.8	469.2	2.501	CC, ES, SF
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,457.0	6,812.0	374.5	53.1	1.165	Level 2, CC, ES, SF
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	14,942.2	6,722.6	224.0	-72.5	0.755	Level 1, CC, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,431.3	6,775.9	320.9	38.3	1.136	Level 2, CC, ES, SF
Existing Wells Sec.9, 10, & 11						
3#3 Nacami M & M 2-10 (Exist) - Wellbore #1 - Wellbore	9,774.9	6,740.2	114.4	-4.2	0.965	Level 1, CC, ES, SF
Bonertz 41-10 (Exist) - Wellbore #1 - Wellbore #1	8,168.4	6,730.3	474.5	406.7	6.991	CC, ES
Bonertz 41-10 (Exist) - Wellbore #1 - Wellbore #1	8,300.0	6,726.1	492.4	420.5	6.846	SF
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,456.1	6,805.9	322.3	174.3	2.177	CC, ES
DR J 6LL (Exist) - Wellbore #1 - Wellbore #1	10,500.0	6,805.4	325.3	175.8	2.176	SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	6,968.1	6,668.6	234.1	196.4	6.202	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	7,000.0	6,681.9	235.8	197.5	6.154	SF
Lucky Looie 1-9 (P&A) - Wellbore #1 - Wellbore #1	13,508.0	6,719.8	12.7	-383.0	0.032	Level 1, CC, ES, SF
M & M 4-10 (Exist) - Wellbore #1 - Wellbore #1	12,519.0	6,732.0	184.9	-28.9	0.865	Level 1, CC, ES, SF
Mel & Blanche (M&M 3-10) #1 (Exist) - Wellbore #1 - We	11,233.1	6,736.5	435.4	267.4	2.591	CC, ES
Mel & Blanche (M&M 3-10) #1 (Exist) - Wellbore #1 - We	11,300.0	6,734.9	440.5	270.2	2.586	SF
Mel & Blanche 5 (Exist) - Wellbore #1 - Wellbore #1	11,741.9	6,839.8	370.9	174.8	1.891	CC, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11V-214
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-214	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

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	45.2	39.9	8.635	CC
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,199.7	45.7	39.4	7.268	ES
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,408.6	822.3	226.4	1.380	Level 3, SF
Fern 11U-334 - Wellbore #1 - Plan #2 (1-11-17)	1,400.0	1,400.0	15.3	7.9	2.058	CC
Fern 11U-334 - Wellbore #1 - Plan #2 (1-11-17)	15,457.0	15,514.6	303.3	-278.3	0.522	Level 1, ES, SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,400.0	1,400.0	30.2	22.8	4.068	CC, ES
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,574.0	636.7	53.4	1.092	Level 2, SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	29.9	24.6	5.711	CC
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,539.7	535.2	-60.4	0.899	Level 1, ES, SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	59.7	56.7	19.728	CC, ES
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,624.4	942.5	347.1	1.583	SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,200.0	14.9	8.6	2.359	CC
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,563.1	252.9	-320.4	0.441	Level 1, ES, SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	44.8	40.7	10.850	CC, ES
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,457.0	15,652.7	740.6	148.8	1.251	Level 3, SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	90.0	89.2	108.944	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	5,700.0	5,508.0	1,196.9	1,153.4	27.541	SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	74.7	72.8	38.750	CC, ES
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	6,200.0	6,050.9	1,079.3	1,031.4	22.532	SF

Offset Design													Offset Site Error:	0.0 ft
Existing Wells Sec.4-T5N-R65W - Annie 3-9 (Exist) - Wellbore #1 - Wellbore #1													Offset Well Error:	0.0 ft
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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
15,100.0	6,734.0	6,710.1	6,708.7	285.7	14.8	89.40	-433.3	-9,038.1	1,117.3	816.9	300.41	3.719		
15,200.0	6,733.4	6,710.0	6,708.7	289.2	14.8	89.40	-433.3	-9,038.1	1,021.8	718.0	303.84	3.363		
15,300.0	6,732.9	6,710.0	6,708.7	292.6	14.8	89.39	-433.3	-9,038.1	927.4	620.1	307.27	3.018		
15,400.0	6,732.3	6,710.0	6,708.7	296.0	14.8	89.39	-433.3	-9,038.1	834.2	523.5	310.71	2.685		
15,457.0	6,732.0	6,710.0	6,708.6	298.0	14.8	89.39	-433.3	-9,038.1	781.8	469.2	312.66	2.501	CC, ES, SF	