

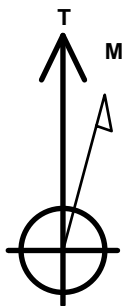
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11W-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 1397094.01 3240103.83 40.420220 -104.637629
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 396'FNL, 687'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 2417'FNL, 2380'FEL, SEC.9	6732.0	-2204.9	-8314.6	Point
LPL 2601'FNL, 506'FWL, SEC.11	6787.0	-2204.9	-181.1	Point



Azimuths to True North
 Magnetic North: 8.10°

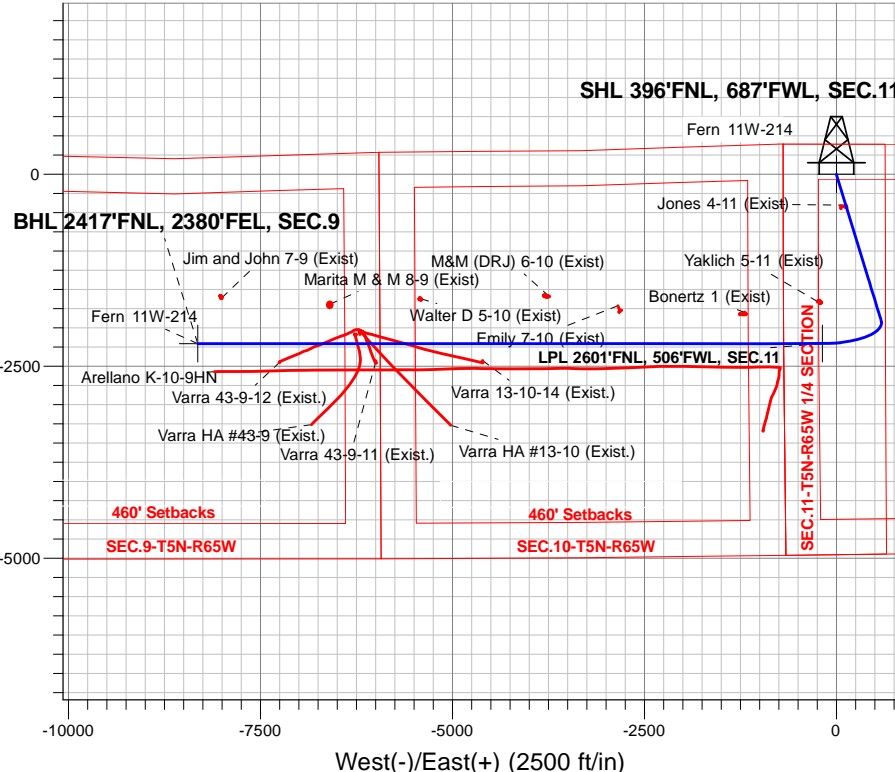
Magnetic Field
 Strength: 52613.5snT
 Dip Angle: 66.91°
 Date: 8/10/2016
 Model: IGRF2010

Fern 5N65W11EJ Pad Sec.11-T5N-R65W
 Fern 11W-214
 Plan #1 (8-05-16)
 13:33, August 10 2016

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
1596.7	1629.9	Start 4726.6 hold at 1629.9 MD
5996.0	6356.5	Start DLS 7.50 TFO 105.77
6787.0	7643.3	Start 8133.7 hold at 7643.3 MD
6732.0	15777.0	TD at 15777.0

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



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

ENSIGN
 Directional

SECTION DETAILS

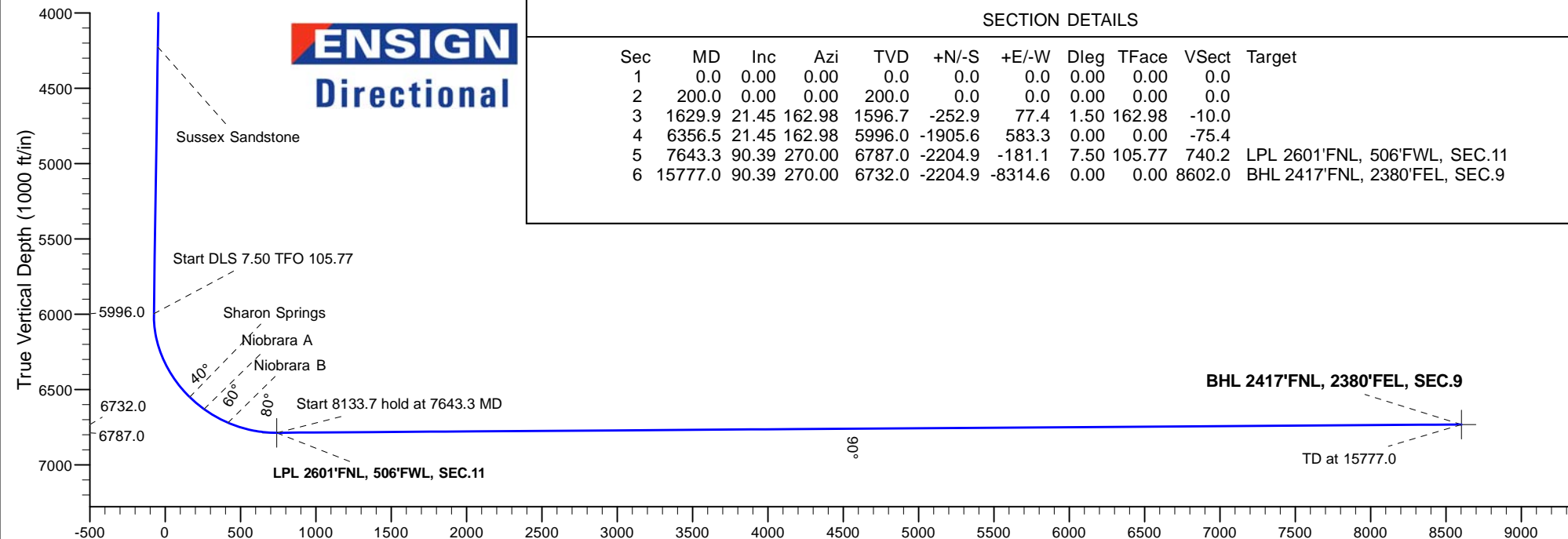
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	1629.9	21.45	162.98	1596.7	-252.9	77.4	1.50	162.98	-10.0	
4	6356.5	21.45	162.98	5996.0	-1905.6	583.3	0.00	0.00	-75.4	
5	7643.3	90.39	270.00	6787.0	-2204.9	-181.1	7.50	105.77	740.2	LPL 2601'FNL, 506'FWL, SEC.11
6	15777.0	90.39	270.00	6732.0	-2204.9	-8314.6	0.00	0.00	8602.0	BHL 2417'FNL, 2380'FEL, SEC.9

BHL 2417'FNL, 2380'FEL, SEC.9

TD at 15777.0

LPL 2601'FNL, 506'FWL, SEC.11

Vertical Section at 255.15° (1000 ft/in)





PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.11-T5N-R65W

Fern 5N65W11EJ Pad Sec.11-T5N-R65W

Fern 11W-214

Wellbore #1

Plan #1 (8-05-16)

Anticollision Report

10 August, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11W-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 11W-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 #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	15,777.0	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						
Arellano 10-L Pad Sec.10-T5N-R65W						
Arellano K-10-9HN - Wellbore #1 - Wellbore #1	8,474.2	6,919.0	305.7	233.6	4.240	CC
Arellano K-10-9HN - Wellbore #1 - Wellbore #1	15,600.0	14,037.0	382.9	-134.9	0.739	Level 1, ES, SF
Existing Wells Sec.4-T5N-R65W						
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,467.1	6,734.2	591.5	289.9	1.961	CC
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,500.0	6,733.8	592.4	289.7	1.957	ES, SF
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	14,058.7	6,728.6	511.0	107.5	1.266	Level 3, CC, ES
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	14,100.0	6,728.3	512.6	107.7	1.266	Level 3, SF
Existing Wells Sec.9, 10, & 11						
Bonertz 1 (Exist) - Wellbore #1 - Wellbore #1	8,659.1	6,754.0	401.5	325.9	5.312	CC, ES
Bonertz 1 (Exist) - Wellbore #1 - Wellbore #1	8,700.0	6,753.7	403.5	326.7	5.254	SF
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,298.6	6,722.1	471.7	346.2	3.758	CC
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,300.0	6,722.1	471.7	346.1	3.757	ES
Emily 7-10 (Exist) - Wellbore #1 - Wellbore #1	10,400.0	6,723.7	482.4	353.5	3.742	SF
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	2,084.5	1,992.9	73.5	56.7	4.379	CC, ES
Jones 4-11 (Exist) - Wellbore #1 - Wellbore #1	2,100.0	2,007.2	73.8	56.8	4.351	SF
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,204.2	6,742.4	614.2	455.9	3.881	CC, ES
M&M (DRJ) 6-10 (Exist) - Wellbore #1 - Wellbore #1	11,300.0	6,741.1	621.6	460.1	3.849	SF
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,870.8	6,731.6	579.9	365.4	2.704	CC
Walter D 5-10 (Exist) - Wellbore #1 - Wellbore #1	12,900.0	6,731.3	580.6	365.1	2.695	ES, SF
Yaklich 5-11 (Exist) - Wellbore #1 - Wellbore #1	7,701.8	6,768.1	547.5	498.7	11.211	CC, ES
Yaklich 5-11 (Exist) - Wellbore #1 - Wellbore #1	7,800.0	6,769.5	556.3	505.4	10.940	SF

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11W-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 11W-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 #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
Fern 5N65W11EJ Pad Sec.11-T5N-R65W						
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	135.2	134.3	163.635	CC, ES
Fern 11U-204 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,092.2	237.9	232.0	40.544	SF
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	105.3	104.5	127.467	CC, ES
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	994.2	186.6	181.3	35.226	SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	120.2	119.4	145.553	CC, ES
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,100.0	1,091.7	223.1	217.3	37.976	SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	60.1	59.3	72.776	CC, ES
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	6,100.0	6,104.6	839.8	790.0	16.884	SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	90.0	89.2	108.944	CC, ES
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	4,600.0	4,560.3	994.7	960.0	28.619	SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	30.2	29.4	36.609	CC
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,777.0	15,621.0	600.0	5.1	1.009	Level 2, ES, SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	75.1	74.2	90.859	CC, ES
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	5,500.0	5,475.6	994.8	952.3	23.415	SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	45.2	44.4	54.696	CC, ES
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,777.0	15,648.4	810.2	217.1	1.366	Level 3, SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	15.3	14.5	18.529	CC
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	15,777.0	15,777.4	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	12,063.1	7,010.5	237.5	26.8	1.127	Level 2, CC, ES, SF
Varra 43-9-11 (Exist.) - Wellbore #1 - Wellbore #1	13,460.3	6,771.1	230.0	-5.4	0.977	Level 1, CC, ES, SF
Varra 43-9-12 (Exist.) - Wellbore #1 - Wellbore #1	14,711.9	6,856.8	242.8	-47.6	0.836	Level 1, CC, ES, SF
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,100.0	6,707.7	462.3	282.6	2.573	SF
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,200.0	6,649.0	445.9	278.6	2.664	ES
Varra HA #13-10 (Exist.) - Wellbore #1 - Wellbore #1	13,262.3	6,612.3	443.0	284.3	2.792	CC
Varra HA #43-9 (Exist.) - Wellbore #1 - Wellbore #1	13,720.7	6,585.4	483.9	271.8	2.282	CC
Varra HA #43-9 (Exist.) - Wellbore #1 - Wellbore #1	13,800.0	6,602.6	490.0	271.7	2.245	ES, SF

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 131- Arellano 10-L Pad Sec.10-T5N-R65W - Arellano K-10-9HN - Wellbore #1 - Wellbore #1													Offset Well Error:	0.0 ft
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
7,350.0	6,736.9	6,493.0	6,420.5	54.1	24.5	-18.07	-2,512.0	-778.4	992.8	957.4	35.46	27.996		
7,400.0	6,752.7	6,528.3	6,454.0	54.1	24.5	-22.38	-2,511.2	-789.5	953.0	918.2	34.81	27.374		
7,450.0	6,765.5	6,541.7	6,466.6	54.1	24.6	-26.78	-2,510.9	-794.1	912.9	877.8	35.10	26.006		
7,500.0	6,775.4	6,554.6	6,478.6	54.1	24.6	-31.69	-2,510.8	-798.7	872.0	835.5	36.50	23.891		
7,550.0	6,782.3	6,568.0	6,509.5	54.1	24.6	-38.52	-2,510.4	-811.5	831.0	791.5	39.49	21.043		
7,600.0	6,786.1	6,588.0	6,509.5	54.2	24.6	-43.86	-2,510.4	-811.5	788.7	746.5	42.21	18.686		
7,643.3	6,787.0	6,588.0	6,509.5	54.2	24.6	-48.56	-2,510.4	-811.5	752.2	707.5	44.71	16.826		
7,700.0	6,786.6	6,588.0	6,509.5	54.2	24.6	-48.56	-2,510.4	-811.5	705.3	659.7	45.54	15.485		
7,800.0	6,785.9	6,622.7	6,540.9	54.3	24.6	-52.05	-2,510.3	-826.2	624.6	576.1	48.50	12.880		
7,900.0	6,785.3	6,649.2	6,564.5	54.6	24.6	-54.91	-2,510.3	-838.4	548.6	497.2	51.36	10.682		
8,000.0	6,784.6	6,683.0	6,593.8	55.0	24.6	-58.79	-2,510.4	-855.1	478.7	424.0	54.71	8.749		
8,100.0	6,783.9	6,716.3	6,621.9	55.6	24.7	-62.83	-2,510.6	-873.0	417.0	358.8	58.21	7.163		
8,200.0	6,783.2	6,760.0	6,657.4	56.4	24.7	-68.36	-2,510.5	-898.5	366.3	304.2	62.13	5.897		
8,300.0	6,782.6	6,809.9	6,695.6	57.6	24.7	-74.83	-2,510.3	-930.5	329.9	263.8	66.08	4.992		
8,400.0	6,781.9	6,874.0	6,740.0	59.1	24.8	-82.88	-2,510.1	-976.7	310.0	240.3	69.77	4.444		
8,474.2	6,781.4	6,919.0	6,768.0	60.4	24.8	-88.15	-2,510.4	-1,012.0	305.7	233.6	72.10	4.240	CC	

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