

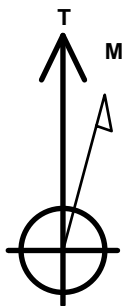
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Fern 11U-204**

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 1397229.17 3240103.63 40.420591 -104.637625
 Original Well Elev WELL @ 4642.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 261'FNL, 689'FWL, SEC.11	1.0	0.0	0.0	Point
BHL 53'FNL, 2380'FEL, SEC.9	6732.0	24.7	-8329.4	Point
LPL 236'FNL & 511'FWL, SEC.11	6777.0	24.7	-177.2	Point



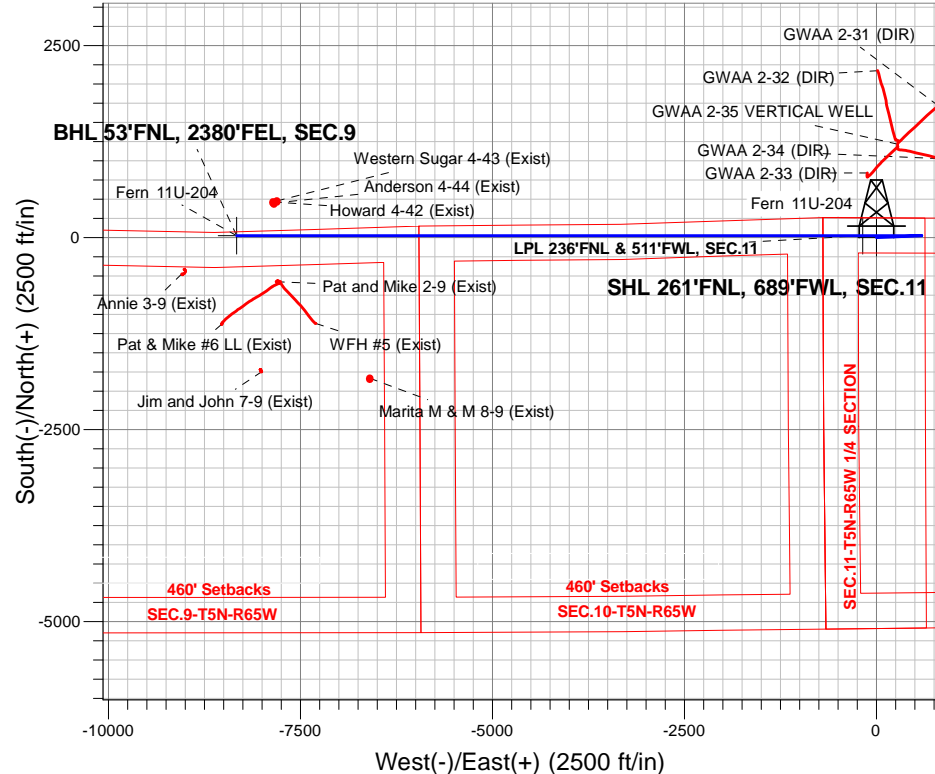
Azimuths to True North
 Magnetic North: 8.10°

Magnetic Field
 Strength: 52615.2snT
 Dip Angle: 66.91°
 Date: 8/5/2016
 Model: IGRF2010

Fern 5N65W11EJ Pad Sec.11-T5N-R65W
 Fern 11U-204
 Plan #1 (8-05-16)
 14:36, August 11 2016

ANNOTATIONS

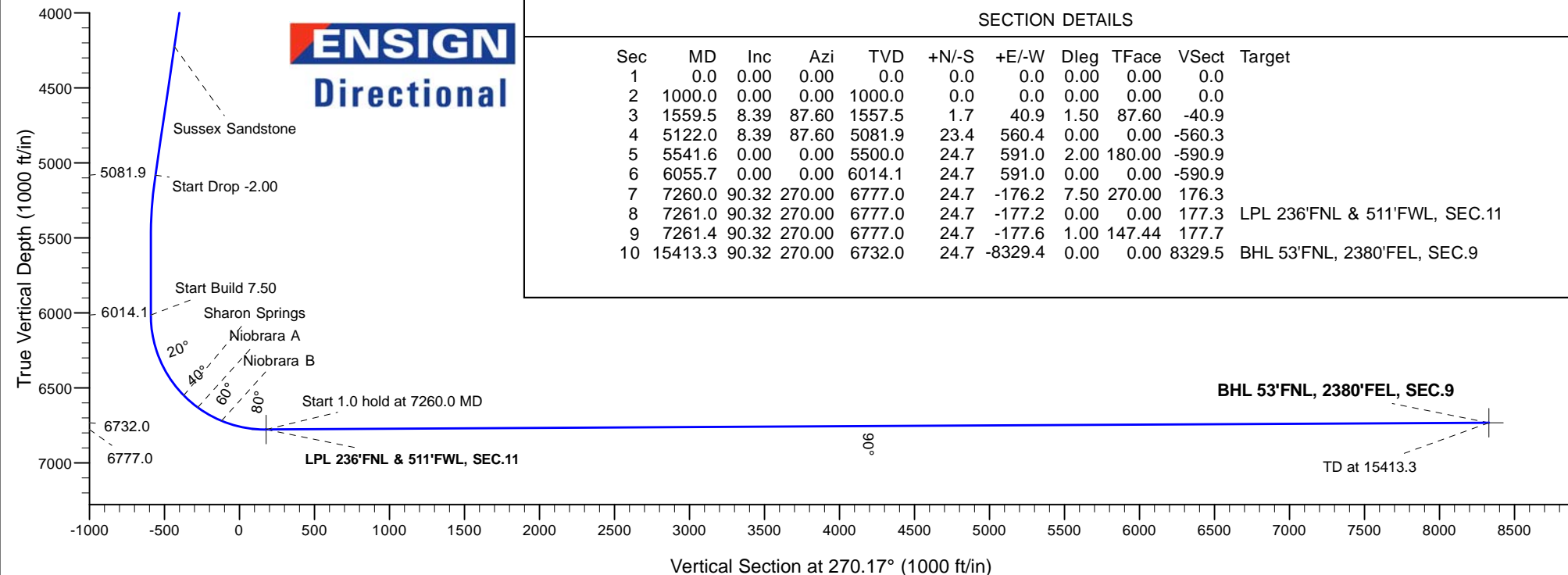
TVD	MD	Annotation
1000.0	1000.0	KOP - Start Build 1.50
5081.9	5122.0	Start Drop -2.00
6014.1	6055.7	Start Build 7.50
6777.0	7260.0	Start 1.0 hold at 7260.0 MD
6777.0	7261.4	Start 8151.9 hold at 7261.4 MD
6732.0	15413.3	TD at 15413.3



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	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1559.5	8.39	87.60	1557.5	1.7	40.9	1.50	87.60	-40.9	
4	5122.0	8.39	87.60	5081.9	23.4	560.4	0.00	0.00	-560.3	
5	5541.6	0.00	0.00	5500.0	24.7	591.0	2.00	180.00	-590.9	
6	6055.7	0.00	0.00	6014.1	24.7	591.0	0.00	0.00	-590.9	
7	7260.0	90.32	270.00	6777.0	24.7	-176.2	7.50	270.00	176.3	
8	7261.0	90.32	270.00	6777.0	24.7	-177.2	0.00	0.00	177.3	LPL 236'FNL & 511'FWL, SEC.11
9	7261.4	90.32	270.00	6777.0	24.7	-177.6	1.00	147.44	177.7	
10	15413.3	90.32	270.00	6732.0	24.7	-8329.4	0.00	0.00	8329.5	BHL 53'FNL, 2380'FEL, SEC.9





PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.11-T5N-R65W

Fern 5N65W11EJ Pad Sec.11-T5N-R65W

Fern 11U-204

Wellbore #1

Plan #1 (8-05-16)

Anticollision Report

11 August, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11U-204
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 11U-204	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 2,000.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	8/11/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	15,413.3	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
Offset Well - Wellbore - Design						
Existing Wells Sec.4-T5N-R65W						
Anderson 4-44 (Exist) - Wellbore #1 - Wellbore #1	14,928.4	6,716.7	424.3	-21.9	0.951	Level 1, CC, ES, SF
Annie 3-9 (Exist) - Wellbore #1 - Wellbore #1	15,413.8	6,719.4	869.0	555.9	2.776	CC, ES, SF
Howard 4-42 (Exist) - Wellbore #1 - Wellbore #1	14,940.7	6,719.6	440.3	-6.3	0.986	Level 1, CC, ES, SF
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,089.5	6,746.3	1,773.2	1,471.4	5.875	CC
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,200.0	6,744.9	1,776.6	1,471.0	5.813	ES
Jim and John 7-9 (Exist) - Wellbore #1 - Wellbore #1	15,413.3	6,742.2	1,802.5	1,489.6	5.760	SF
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	13,681.4	6,726.6	1,853.8	1,450.2	4.593	CC
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	13,700.0	6,726.5	1,853.9	1,449.7	4.586	ES
Marita M & M 8-9 (Exist) - Wellbore #1 - Wellbore #1	14,000.0	6,724.8	1,881.0	1,466.5	4.538	SF
Pat & Mike #6 LL (Exist) - Wellbore #1 - Wellbore #1	15,413.8	6,795.0	1,160.1	838.4	3.606	CC, ES, SF
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	14,893.8	6,717.7	598.3	301.7	2.017	CC
Pat and Mike 2-9 (Exist) - Wellbore #1 - Wellbore #1	14,900.0	6,717.7	598.3	301.5	2.016	ES, SF
Western Sugar 4-43 (Exist) - Wellbore #1 - Wellbore #1	14,891.4	6,711.9	453.8	9.0	1.020	Level 2, CC
Western Sugar 4-43 (Exist) - Wellbore #1 - Wellbore #1	14,900.0	6,711.8	453.8	8.8	1.020	Level 2, ES, SF
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,383.0	6,771.9	1,143.1	860.4	4.043	CC
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,400.0	6,771.6	1,143.3	859.9	4.035	ES
WFH #5 (Exist) - Wellbore #1 - Wellbore #1	14,500.0	6,769.7	1,149.1	862.4	4.007	SF

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Fern 11U-204
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 11U-204	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-334 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	29.9	24.6	5.711	CC
Fern 11U-334 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,503.6	418.0	-170.8	0.710	Level 1, ES, SF
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	14.9	9.7	2.855	CC
Fern 11U-434 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,576.9	245.0	-253.9	0.491	Level 1, ES, SF
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	75.1	69.8	14.346	CC, ES
Fern 11V-204 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,539.7	1,357.5	761.5	2.278	SF
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	45.2	39.9	8.635	CC
Fern 11V-214 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,445.8	628.1	31.7	1.053	Level 2, ES, SF
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	600.0	600.0	104.9	101.9	34.644	CC, ES
Fern 11V-234 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,624.4	1,764.8	1,169.0	2.962	SF
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	1,000.0	1,000.0	60.1	54.9	11.491	CC
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	1,200.0	1,199.9	60.6	54.3	9.631	ES
Fern 11V-304 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,563.1	1,067.6	472.8	1.795	SF
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	800.0	800.0	90.0	85.9	21.788	CC, ES
Fern 11V-334 - Wellbore #1 - Plan #1 (8-05-16)	15,413.8	15,652.7	1,560.6	965.6	2.623	SF
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	200.0	200.0	135.2	134.3	163.635	CC, ES
Fern 11W-214 - Wellbore #1 - Plan #1 (8-05-16)	6,055.7	5,652.1	1,941.7	1,883.0	33.040	SF
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	400.0	400.0	119.9	117.9	62.189	CC, ES
Fern 11W-314 - Wellbore #1 - Plan #1 (8-05-16)	6,055.7	5,727.8	1,731.8	1,676.5	31.346	SF
GWAA 2-32 PAD SEC.2-T5N-R65W						
GWAA 2-31 (DIR) - GWAA 2-31 - GWAA 2-31	744.0	745.0	1,266.7	1,263.6	403.773	CC, ES
GWAA 2-31 (DIR) - GWAA 2-31 - GWAA 2-31	4,100.0	3,557.9	1,994.7	1,966.1	69.866	SF
GWAA 2-32 (DIR) - GWAA 2-32 - GWAA 2-32	981.4	982.7	1,295.5	1,290.9	284.006	CC
GWAA 2-32 (DIR) - GWAA 2-32 - GWAA 2-32	1,000.0	997.1	1,295.5	1,290.9	278.751	ES
GWAA 2-32 (DIR) - GWAA 2-32 - GWAA 2-32	4,500.0	3,977.0	1,975.2	1,948.0	72.581	SF
GWAA 2-33 (DIR) - GWAA 2-33 - GWAA 2-33	7,201.3	6,779.2	795.3	750.2	17.638	CC, ES
GWAA 2-33 (DIR) - GWAA 2-33 - GWAA 2-33	7,600.0	6,774.2	887.5	832.9	16.260	SF
GWAA 2-34 (DIR) - Wellbore #1 - Wellbore #1	3,796.2	3,770.9	1,126.1	1,096.4	37.920	CC
GWAA 2-34 (DIR) - Wellbore #1 - Wellbore #1	5,400.0	5,450.8	1,131.7	1,088.0	25.865	ES
GWAA 2-34 (DIR) - Wellbore #1 - Wellbore #1	6,100.0	6,184.6	1,146.5	1,100.2	24.798	SF
GWAA 2-35 VERTICAL WELL - GWAA 2-35 - GWAA 2-3	6,774.8	6,632.6	1,192.1	1,009.0	6.511	CC
GWAA 2-35 VERTICAL WELL - GWAA 2-35 - GWAA 2-3	6,800.0	6,647.1	1,192.3	1,008.7	6.496	ES
GWAA 2-35 VERTICAL WELL - GWAA 2-35 - GWAA 2-3	6,950.0	6,718.7	1,201.8	1,015.5	6.452	SF

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 7548- Existing Wells Sec.4-T5N-R65W - Anderson 4-44 (Exist) - Wellbore #1 - Wellbore #1												Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
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	
13,000.0	6,745.3	6,727.3	6,727.3	215.4	164.8	91.44	449.0	-7,844.5	1,974.5	1,594.4	380.11	5.195	
13,100.0	6,744.8	6,726.8	6,726.8	218.8	164.8	91.36	449.0	-7,844.5	1,877.0	1,493.5	383.53	4.894	
13,200.0	6,744.2	6,726.2	6,726.2	222.3	164.8	91.29	449.0	-7,844.5	1,779.7	1,392.8	386.96	4.599	
13,300.0	6,743.7	6,725.7	6,725.7	225.7	164.8	91.21	449.0	-7,844.5	1,682.8	1,292.4	390.38	4.311	
13,400.0	6,743.1	6,725.1	6,725.1	229.1	164.8	91.14	449.0	-7,844.5	1,586.2	1,192.4	393.80	4.028	
13,500.0	6,742.6	6,724.6	6,724.6	232.6	164.8	91.06	449.0	-7,844.5	1,490.1	1,092.9	397.23	3.751	
13,600.0	6,742.0	6,724.0	6,724.0	236.0	164.7	90.99	449.0	-7,844.5	1,394.5	993.9	400.65	3.481	
13,700.0	6,741.5	6,723.5	6,723.5	239.4	164.7	90.92	449.0	-7,844.5	1,299.6	895.5	404.08	3.216	
13,800.0	6,740.9	6,722.9	6,722.9	242.8	164.7	90.84	449.0	-7,844.5	1,205.5	798.0	407.50	2.958	
13,900.0	6,740.4	6,722.4	6,722.4	246.3	164.7	90.77	449.0	-7,844.5	1,112.5	701.6	410.92	2.707	

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