

PETROLEUM DEVELOPMENT CORP DJ Basin

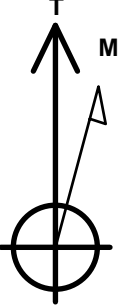
Well Name: Sandin 24V-341

Surface Location: Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4634.0
+N/-S +E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1385286.98 3248252.47 40.387590 -104.608790
RKB - 23' WELL @ 4657.0ft (RKB - 23')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1570'FNL & 1920'FEL, Sec.24	101.0	0.0	0.0	Point
BHL 50'FNL & 378'FEL, Sec.12	6812.0	12062.5	1578.7	Point
LPL 200'FSL & 378'FEL, Sec.13	6837.0	1753.0	1546.0	Point

Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W
Sandin 24V-341
Plan #1 (12-20-16)
16:16, December 27 2016



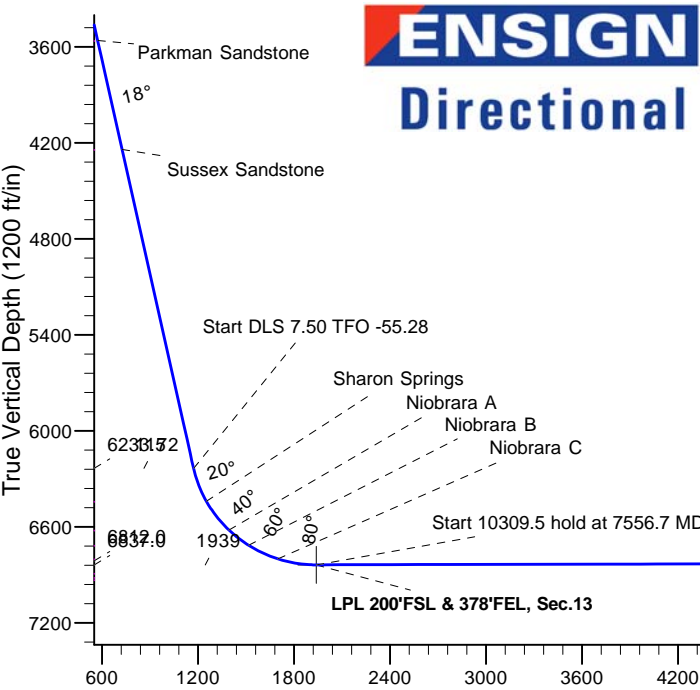
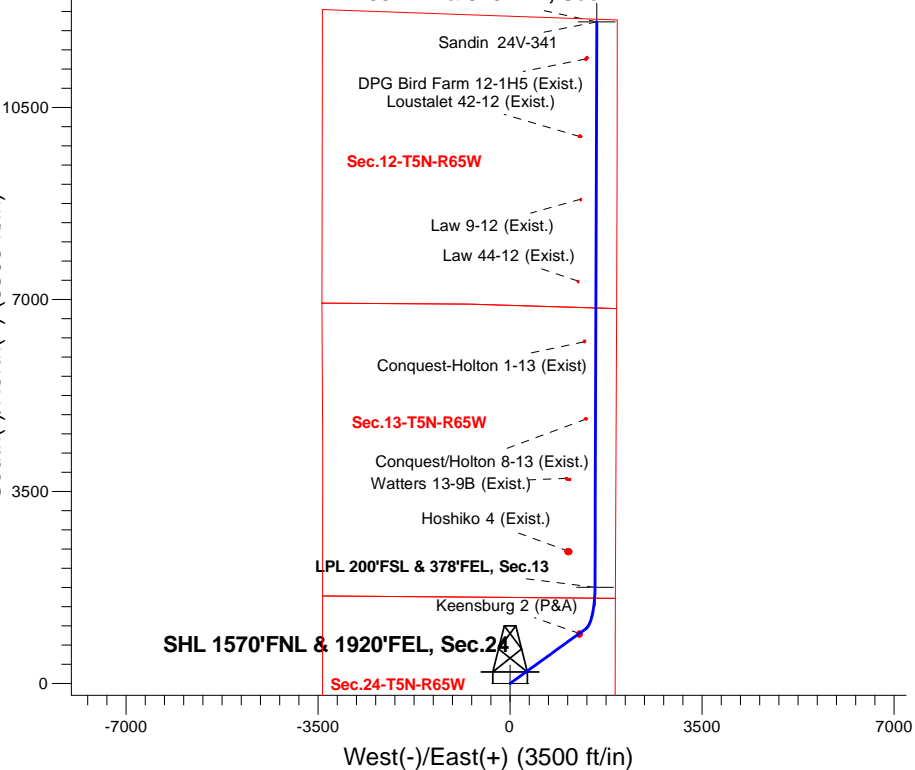
Azimuths to True North
Magnetic North: 8.03°

Magnetic Field
Strength: 52561.3snT
Dip Angle: 66.87°
Date: 12/20/2016
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
1586.6	1606.5	Start 4888.8 hold at 1606.5 MD
6233.5	6495.4	Start DLS 7.50 TFO -55.28
6837.0	7556.7	Start 10309.5 hold at 7556.7 MD
6812.0	17866.2	TD at 17866.2

South(-)/North(+) (3500 ft/in)



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	1606.5	18.10	54.13	1586.6	110.7	153.1	1.50	54.13	129.7	
4	6495.4	18.10	54.13	6233.5	1000.7	1383.7	0.00	0.00	1171.8	
5	7556.7	90.14	0.18	6837.0	1753.0	1546.0	7.50	-55.28	1938.8	LPL 200'FSL & 378'FEL, Sec.13
6	17866.2	90.14	0.18	6812.0	12062.5	1578.7	0.00	0.00	12165.3	BHL 50'FNL & 378'FEL, Sec.12

BHL 50'FNL & 378'FEL, Sec.12

Vertical Section at 7.46° (1200 ft/in)



PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.24-T5N-R65W

Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W

Sandin 24V-341

Wellbore #1

Plan #1 (12-20-16)

Anticollision Report

27 December, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Sandin 24V-341
Project:	SEC.24-T5N-R65W	TVD Reference:	WELL @ 4657.0ft (RKB - 23')
Reference Site:	Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W	MD Reference:	WELL @ 4657.0ft (RKB - 23')
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Sandin 24V-341	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 (12-20-16)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (12-20-16)		
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	12/27/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	17,866.2	Plan #1 (12-20-16) (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.17 & 18-T5N-R64W						
Conquest-Holton 1-13 (Exist.) - Wellbore #1 - Wellbore #1	12,028.2	6,793.2	213.5	52.7	1.328	Level 3, CC, ES, SF
Existing Wells - Sec.7-T5N-R64W						
Law 44-12 (Exist.) - Wellbore #1 - Wellbore #1	13,139.6	6,791.5	324.7	-12.6	0.963	Level 1, CC, ES, SF
Law 9-12 (Exist.) - Wellbore #1 - Wellbore #1	14,631.3	6,766.8	280.2	-91.2	0.754	Level 1, CC, ES, SF
Loustalet 42-12 (Exist.) - Wellbore #1 - Wellbore #1	15,775.6	6,764.5	301.8	54.8	1.222	Level 2, CC, ES, SF
Existing Wells (GRID) - Sec.7-T5N-R64W						
DPG Bird Farm 12-1H5 (Exist.) - Wellbore #1 - Wellbore	17,185.3	6,759.1	196.4	-83.9	0.701	Level 1, CC, ES, SF
Existing Wells Sec.24-T5N-R65W						
Conquest/Holton 8-13 (Exist.) - Wellbore #1 - Wellbore #	10,621.7	6,800.3	169.3	40.1	1.311	Level 3, CC, ES, SF
Hoshiko 4 (Exist.) - Wellbore #1 - Wellbore #1	8,205.7	6,810.3	474.8	400.8	6.417	CC, ES
Hoshiko 4 (Exist.) - Wellbore #1 - Wellbore #1	8,300.0	6,809.9	484.0	408.1	6.371	SF
Watters 13-9B (Exist.) - Wellbore #1 - Wellbore #1	9,539.2	6,812.3	530.4	423.2	4.947	CC, ES
Watters 13-9B (Exist.) - Wellbore #1 - Wellbore #1	9,600.0	6,812.0	533.9	425.3	4.917	SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	7,125.7	10,165.0	103.0	6.6	1.069	Level 2, CC, ES, SF
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	6,984.9	10,133.7	230.1	114.8	1.997	CC, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	7,345.5	10,268.3	100.0	34.1	1.518	CC, ES, SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	6,500.0	10,026.6	1,064.9	908.9	6.827	SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	6,600.0	10,001.5	1,049.0	896.6	6.883	ES
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	6,623.2	9,995.8	1,048.4	897.2	6.934	CC
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	6,800.0	10,036.6	371.6	235.0	2.721	ES, SF
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	6,808.4	10,034.7	371.4	235.6	2.734	CC
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	6,700.0	10,106.9	618.2	473.6	4.274	SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	6,775.7	10,089.7	610.1	471.2	4.393	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #1 (12-20-16)						Out of range
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	6,600.0	10,183.3	906.4	755.8	6.020	SF
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	6,700.0	10,159.6	883.6	738.8	6.100	ES
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	6,747.6	10,148.9	881.0	739.7	6.238	CC
Klein (Existing) Sec.19-T5N-R64W						
Keensburg 2 (P&A) - Wellbore #1 - Wellbore #1	6,009.7	5,743.9	1.5	-177.2	0.008	Level 1, CC, ES, SF

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Sandin 24V-341
Project:	SEC.24-T5N-R65W	TVD Reference:	WELL @ 4657.0ft (RKB - 23')
Reference Site:	Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W	MD Reference:	WELL @ 4657.0ft (RKB - 23')
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Sandin 24V-341	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 (12-20-16)	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
Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W						
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	400.0	400.0	44.6	42.6	23.126	CC, ES
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	17,866.2	17,787.5	826.9	274.8	1.498	Level 3, SF
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	400.0	400.0	13.9	12.0	7.227	CC
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	17,866.2	17,857.0	311.5	-236.9	0.568	Level 1, ES, SF
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	400.0	400.0	75.2	73.3	39.025	CC, ES
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	900.0	898.6	103.5	98.8	22.002	SF
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	400.0	400.0	58.5	56.6	30.352	CC, ES
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	17,866.2	17,721.7	1,097.2	533.4	1.946	SF
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	400.0	400.0	30.6	28.7	15.899	CC
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	17,866.2	17,769.4	562.5	-0.6	0.999	Level 1, ES, SF
Sandin 24N-221 - Wellbore #1 - Plan #1 (12-21-16)	400.0	400.0	103.1	101.1	53.478	CC, ES
Sandin 24N-221 - Wellbore #1 - Plan #1 (12-21-16)	1,100.0	1,091.4	165.6	159.6	27.899	SF
Sandin 24N-241 - Wellbore #1 - Plan #1 (12-21-16)	200.0	200.0	133.7	132.9	161.880	CC, ES
Sandin 24N-241 - Wellbore #1 - Plan #1 (12-21-16)	1,000.0	964.9	232.9	227.4	42.578	SF
Sandin 24N-301 - Wellbore #1 - Plan #1 (12-21-16)	400.0	400.0	119.8	117.9	62.150	CC, ES
Sandin 24N-301 - Wellbore #1 - Plan #1 (12-21-16)	1,000.0	982.9	183.8	178.4	34.132	SF
Sandin 24N-321 - Wellbore #1 - Plan #1 (12-21-16)	400.0	400.0	89.1	87.2	46.251	CC, ES
Sandin 24N-321 - Wellbore #1 - Plan #1 (12-21-16)	5,200.0	5,069.8	1,177.1	1,128.0	23.977	SF
Sandin 24V-401 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	16.7	15.9	20.235	CC
Sandin 24V-401 - Wellbore #1 - Plan #1 (12-20-16)	17,866.2	17,919.0	334.8	-198.7	0.628	Level 1, ES, SF

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Existing Wells - Sec.17 & 18-T5N-R64W - Conquest-Holton 1-13 (Exist) - Wellbore #1 - Wellbore #1														
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,900.0	6,828.9	6,793.6	6,793.4	123.7	15.6	-90.33	6,225.2	1,346.7	1,148.3	1,013.5	134.81	8.517		
11,000.0	6,828.7	6,793.6	6,793.4	125.9	15.6	-90.32	6,225.2	1,346.7	1,050.2	913.1	137.11	7.660		
11,100.0	6,828.4	6,793.6	6,793.3	128.1	15.6	-90.31	6,225.2	1,346.7	952.5	813.1	139.40	6.833		
11,200.0	6,828.2	6,793.5	6,793.3	130.3	15.6	-90.30	6,225.2	1,346.7	855.3	713.6	141.70	6.036		
11,300.0	6,827.9	6,793.5	6,793.3	132.6	15.6	-90.30	6,225.2	1,346.7	758.9	614.9	144.00	5.270		
11,400.0	6,827.7	6,793.5	6,793.2	134.8	15.6	-90.29	6,225.2	1,346.7	663.5	517.2	146.30	4.535		
11,500.0	6,827.4	6,793.4	6,793.2	137.0	15.6	-90.28	6,225.2	1,346.7	569.8	421.2	148.60	3.834		
11,600.0	6,827.2	6,793.4	6,793.2	139.2	15.6	-90.27	6,225.2	1,346.7	478.5	327.6	150.91	3.171		
11,700.0	6,827.0	6,793.4	6,793.1	141.5	15.6	-90.26	6,225.2	1,346.7	391.6	238.4	153.21	2.556		
11,800.0	6,826.7	6,793.3	6,793.1	143.7	15.6	-90.25	6,225.2	1,346.7	312.6	157.0	155.52	2.010		
11,900.0	6,826.5	6,793.3	6,793.1	146.0	15.6	-90.24	6,225.2	1,346.7	249.1	91.3	157.83	1.578		
12,000.0	6,826.2	6,793.3	6,793.0	148.2	15.6	-90.23	6,225.2	1,346.7	215.4	55.3	160.14	1.345	Level 3	
12,028.2	6,826.2	6,793.2	6,793.0	148.9	15.6	-90.23	6,225.2	1,346.7	213.5	52.7	160.79	1.328	Level 3, CC, ES, SF	
12,100.0	6,826.0	6,793.2	6,793.0	150.5	15.6	-90.22	6,225.2	1,346.7	225.3	62.8	162.45	1.387	Level 3	
12,200.0	6,825.7	6,793.2	6,793.0	152.7	15.6	-90.22	6,225.2	1,346.7	274.0	109.3	164.76	1.663		
12,300.0	6,825.5	6,793.2	6,792.9	155.0	15.6	-90.21	6,225.2	1,346.7	345.6	178.5	167.07	2.069		
12,400.0	6,825.3	6,793.1	6,792.9	157.3	15.6	-90.20	6,225.2	1,346.7	428.7	259.3	169.39	2.531		
12,500.0	6,825.0	6,793.1	6,792.9	159.5	15.6	-90.19	6,225.2	1,346.7	517.8	346.1	171.70	3.016		
12,600.0	6,824.8	6,793.1	6,792.8	161.8	15.6	-90.18	6,225.2	1,346.7	610.3	436.3	174.02	3.507		
12,700.0	6,824.5	6,793.0	6,792.8	164.1	15.6	-90.17	6,225.2	1,346.7	704.9	528.5	176.34	3.997		
12,800.0	6,824.3	6,793.0	6,792.8	166.3	15.6	-90.16	6,225.2	1,346.7	800.8	622.1	178.66	4.482		

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