

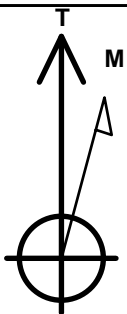
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Sandin 24V-401**

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 1385287.15 3248269.19 40.387590 -104.608730
 RKB - 23' WELL @ 4657.0ft (RKB - 23')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1570'FNL & 1905'FEL, Sec.24	101.0	0.0	0.0	Point
BHL 50'FNL & 60'FEL, Sec.12	6918.0	12051.5	1879.5	Point
LPL 300'FSL & 60'FEL, Sec.13	6918.0	1853.0	1846.8	Point



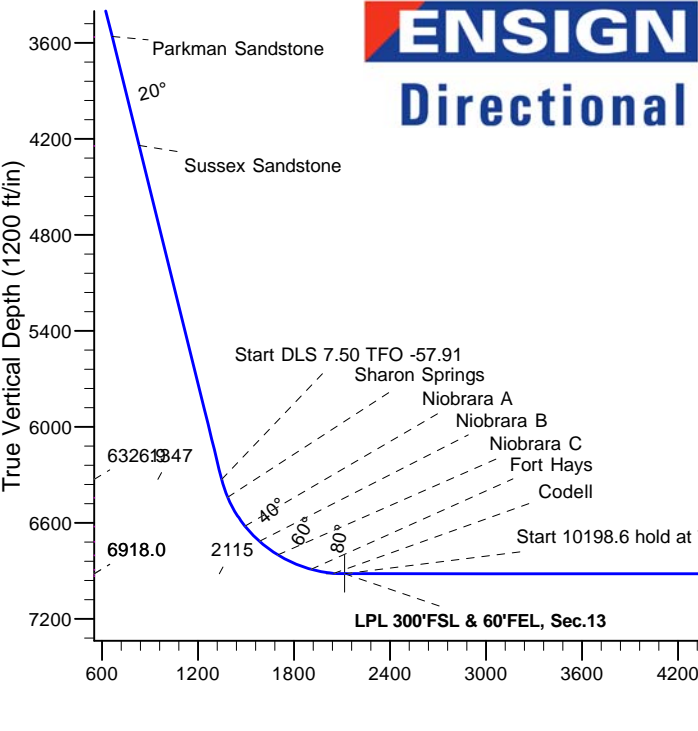
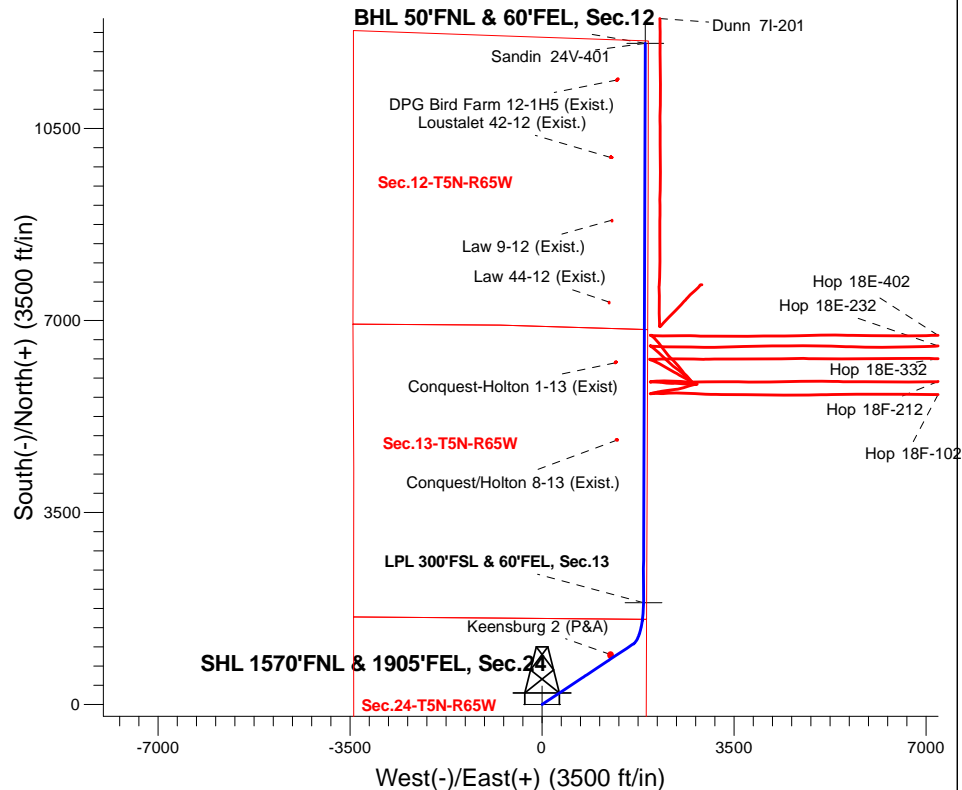
Azimuths to True North
 Magnetic North: 8.03°

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

Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W
 Sandin 24V-401
 Plan #1 (12-20-16)
 15:54, December 27 2016

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
1514.4	1541.8	Start 5125.5 hold at 1541.8 MD
6326.9	6667.3	Start DLS 7.50 TFO -57.91
6918.0	7720.4	Start 10198.6 hold at 7720.4 MD
6918.0	17919.0	TD at 17919.0



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	1541.8	20.13	56.45	1514.4	128.9	194.4	1.50	56.45	157.3	
4	6667.3	20.13	56.45	6326.9	1103.7	1664.3	0.00	0.00	1347.0	
5	7720.4	90.00	0.18	6918.0	1853.0	1846.8	7.50	-57.91	2115.4	LPL 300'FSL & 60'FEL, Sec.13
6	17919.0	90.00	0.18	6918.0	12051.5	1879.5	0.00	0.00	2197.2	BHL 50'FNL & 60'FEL, Sec.12

BHL 50'FNL & 60'FEL, Sec.12

Vertical Section at 8.86° (1200 ft/in)



Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.24-T5N-R65W

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

Sandin 24V-401

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-401
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-401	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	17,919.0	Plan #1 (12-20-16) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance		Separation Factor	Warning
			Between Centres (ft)	Between Ellipses (ft)		
Offset Well - Wellbore - Design						
Dunn 5N64W7 Pad Sec.7-T5N-R64W						
Dunn 7I-201 - Wellbore #1 - Wellbore #1	13,491.4	7,319.0	302.3	124.1	1.696	CC
Dunn 7I-201 - Wellbore #1 - Wellbore #1	17,919.0	11,749.3	317.7	-16.9	0.949	Level 1, ES, SF
Existing Wells - Sec.17 & 18-T5N-R64W						
Conquest-Holton 1-13 (Exist) - Wellbore #1 - Wellbore #1	12,091.1	6,886.4	530.5	369.7	3.299	CC
Conquest-Holton 1-13 (Exist) - Wellbore #1 - Wellbore #1	12,100.0	6,886.4	530.6	369.5	3.295	ES, SF
Existing Wells - Sec.7-T5N-R64W						
Law 44-12 (Exist.) - Wellbore #1 - Wellbore #1	13,202.3	6,886.0	642.1	302.6	1.891	CC, ES, SF
Law 9-12 (Exist.) - Wellbore #1 - Wellbore #1	14,694.0	6,865.0	597.6	224.0	1.599	CC
Law 9-12 (Exist.) - Wellbore #1 - Wellbore #1	14,700.0	6,865.0	597.7	223.9	1.599	ES, SF
Loustalet 42-12 (Exist.) - Wellbore #1 - Wellbore #1	15,837.3	6,866.3	618.9	372.0	2.507	CC, ES
Loustalet 42-12 (Exist.) - Wellbore #1 - Wellbore #1	15,900.0	6,865.7	622.1	373.7	2.505	SF
Existing Wells (GRID) - Sec.7-T5N-R64W						
DPG Bird Farm 12-1H5 (Exist.) - Wellbore #1 - Wellbore	17,248.4	6,862.3	514.1	233.9	1.835	CC, ES, SF
Existing Wells Sec.24-T5N-R65W						
Conquest/Holton 8-13 (Exist.) - Wellbore #1 - Wellbore #	10,685.0	6,888.0	486.8	357.5	3.763	CC
Conquest/Holton 8-13 (Exist.) - Wellbore #1 - Wellbore #	10,700.0	6,888.1	487.1	357.4	3.755	ES, SF
Hop 5N64W18A Pad Sec.18-T5N-R64W						
Hop 18E-232 - Wellbore #1 - Wellbore #1	12,387.2	6,725.7	483.3	357.1	3.829	CC
Hop 18E-232 - Wellbore #1 - Wellbore #1	12,400.0	6,725.7	483.4	357.0	3.824	ES, SF
Hop 18E-332 - Wellbore #1 - Wellbore #1	12,165.4	6,758.4	467.9	336.5	3.561	CC, ES
Hop 18E-332 - Wellbore #1 - Wellbore #1	12,200.0	6,758.8	469.2	337.1	3.552	SF
Hop 18E-402 - Wellbore #1 - Wellbore #1	12,587.9	6,760.5	466.8	331.7	3.455	CC
Hop 18E-402 - Wellbore #1 - Wellbore #1	12,600.0	6,760.5	466.9	331.6	3.451	ES, SF
Hop 18F-102 - Wellbore #1 - Wellbore #1	11,535.6	6,792.0	399.7	277.8	3.277	CC, ES, SF
Hop 18F-212 - Wellbore #1 - Wellbore #1	11,766.1	6,696.0	497.6	382.6	4.330	CC, ES
Hop 18F-212 - Wellbore #1 - Wellbore #1	11,800.0	6,696.0	498.7	383.2	4.318	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-401
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-401	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
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #1 (12-20-16)	7,173.2	9,872.3	96.3	-13.7	0.876	Level 1, CC, ES, SF
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	7,000.0	9,856.3	251.4	122.6	1.952	SF
Josephine 19M-334 - Wellbore #1 - Plan #1 (12-20-16)	7,048.1	9,845.2	245.5	120.6	1.965	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #1 (12-20-16)	7,397.8	9,963.2	56.8	-22.8	0.714	Level 1, CC, ES, SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	6,700.0	9,721.0	1,119.5	967.3	7.356	SF
Josephine 19N-204 - Wellbore #1 - Plan #1 (12-20-16)	6,740.4	9,709.4	1,117.7	967.0	7.413	CC, ES
Josephine 19N-214 - Wellbore #1 - Plan #1 (12-20-16)	6,889.0	9,750.5	414.7	274.0	2.946	CC, ES, SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	6,800.0	9,822.2	664.0	517.9	4.545	SF
Josephine 19N-314 - Wellbore #1 - Plan #1 (12-20-16)	6,871.4	9,802.9	657.2	515.1	4.627	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)	6,700.0	9,902.9	958.3	808.3	6.389	SF
Josephine 19N-404 - Wellbore #1 - Plan #1 (12-20-16)	6,854.7	9,860.4	931.4	788.3	6.510	CC, ES
Klein (Existing) Sec.19-T5N-R64W						
Keensburg 2 (P&A) - Wellbore #1 - Wellbore #1	5,342.5	5,055.0	70.9	-92.6	0.434	Level 1, CC, ES, SF
Sandin Farms 5N65W24N Pad Sec.24-T5N-R35W						
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	61.3	60.5	74.195	CC, ES
Sandin 24C-201 - Wellbore #1 - Plan #1 (12-20-16)	17,919.0	17,776.4	1,159.8	612.6	2.120	SF
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	30.6	29.8	37.097	CC, ES
Sandin 24C-221 - Wellbore #1 - Plan #1 (12-20-16)	17,919.0	17,846.9	645.4	104.4	1.193	Level 2, SF
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	200.0	200.0	91.9	91.1	111.292	CC, ES
Sandin 24C-241 - Wellbore #1 - Plan #1 (12-21-16)	5,200.0	5,107.3	1,191.9	1,149.4	28.014	SF
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	75.2	74.4	91.057	CC, ES
Sandin 24C-301 - Wellbore #1 - Plan #1 (12-20-16)	6,200.0	6,135.2	1,189.9	1,132.1	20.607	SF
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	47.4	46.5	57.332	CC, ES
Sandin 24C-321 - Wellbore #1 - Plan #1 (12-20-16)	17,919.0	17,759.3	885.7	327.7	1.587	SF
Sandin 24V-341 - Wellbore #1 - Plan #1 (12-20-16)	200.0	200.0	16.7	15.9	20.235	CC
Sandin 24V-341 - Wellbore #1 - Plan #1 (12-20-16)	17,919.0	17,856.1	334.7	-198.7	0.628	Level 1, ES, SF

Offset Design													Dunn 5N64W7 Pad Sec.7-T5N-R64W - Dunn 71-201 - Wellbore #1 - Wellbore #1		Offset Site Error:	0.0 ft
Survey Program: 154-MWD															Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						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				
11,900.0	6,918.0	6,502.0	6,329.5	146.1	28.1	25.22	6,968.9	2,136.1	1,135.2	1,047.1	88.07	12.890				
12,000.0	6,918.0	6,532.0	6,354.8	148.3	28.0	26.20	6,984.9	2,135.9	1,053.3	962.1	91.14	11.557				
12,100.0	6,918.0	6,560.9	6,378.8	150.5	27.8	27.20	7,001.0	2,135.8	973.2	878.9	94.29	10.321				
12,200.0	6,918.0	6,598.0	6,409.0	152.8	27.7	28.56	7,022.7	2,135.6	895.3	797.1	98.19	9.119				
12,300.0	6,918.0	6,626.1	6,431.3	155.0	27.5	29.67	7,039.7	2,135.5	819.8	718.1	101.64	8.065				
12,400.0	6,918.0	6,662.8	6,459.7	157.2	27.3	31.20	7,062.9	2,135.6	747.1	641.1	105.99	7.049				
12,500.0	6,918.0	6,694.0	6,483.3	159.4	27.1	32.61	7,083.4	2,135.9	677.8	567.7	110.12	6.155				
12,600.0	6,918.0	6,744.6	6,520.0	161.7	26.8	35.04	7,118.1	2,136.4	612.4	496.1	116.31	5.265				
12,700.0	6,918.0	6,789.0	6,550.7	163.9	26.6	37.32	7,150.2	2,136.9	551.8	429.5	122.24	4.514				
12,800.0	6,918.0	6,844.8	6,587.1	166.2	26.2	40.35	7,192.5	2,137.4	496.4	366.8	129.59	3.831				
12,900.0	6,918.0	6,902.6	6,622.2	168.4	25.9	43.63	7,238.5	2,137.4	446.9	309.6	137.33	3.254				
13,000.0	6,918.0	6,964.3	6,656.0	170.7	25.6	47.13	7,290.0	2,136.8	404.2	258.8	145.32	2.781				
13,100.0	6,918.0	7,032.4	6,688.6	172.9	25.2	50.85	7,349.8	2,135.2	368.6	215.1	153.45	2.402				
13,200.0	6,918.0	7,106.0	6,718.3	175.2	24.9	54.59	7,417.0	2,132.9	340.0	178.7	161.32	2.108				

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