

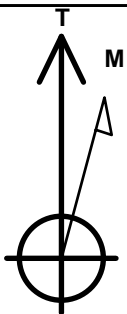
PDC Energy Inc. DJ Basin

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 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	1.0	0.0	0.0	Point
BHL 500'FNL & 60'FEL, Sec.12	6918.0	11601.5	1879.5	Point
LPL 300'FSL & 60'FEL, Sec.13	6918.0	1853.0	1846.8	Point



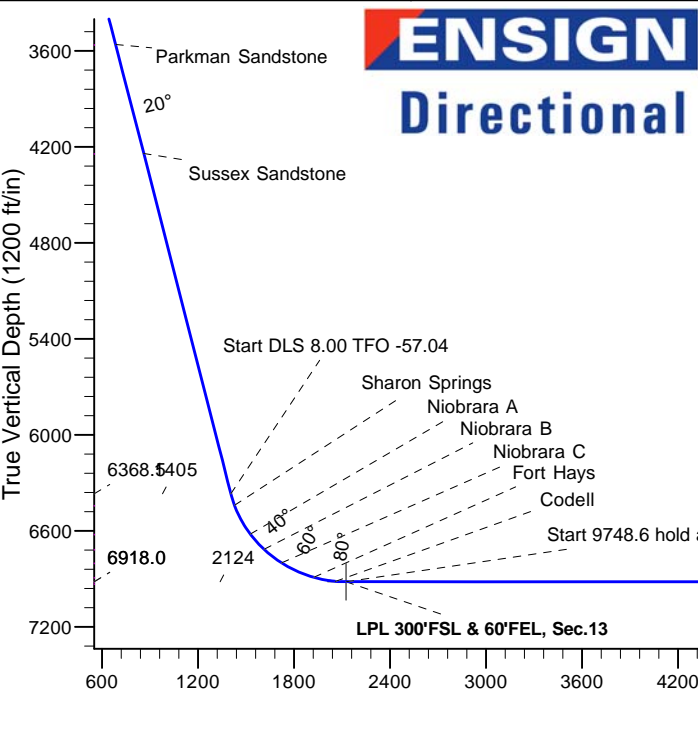
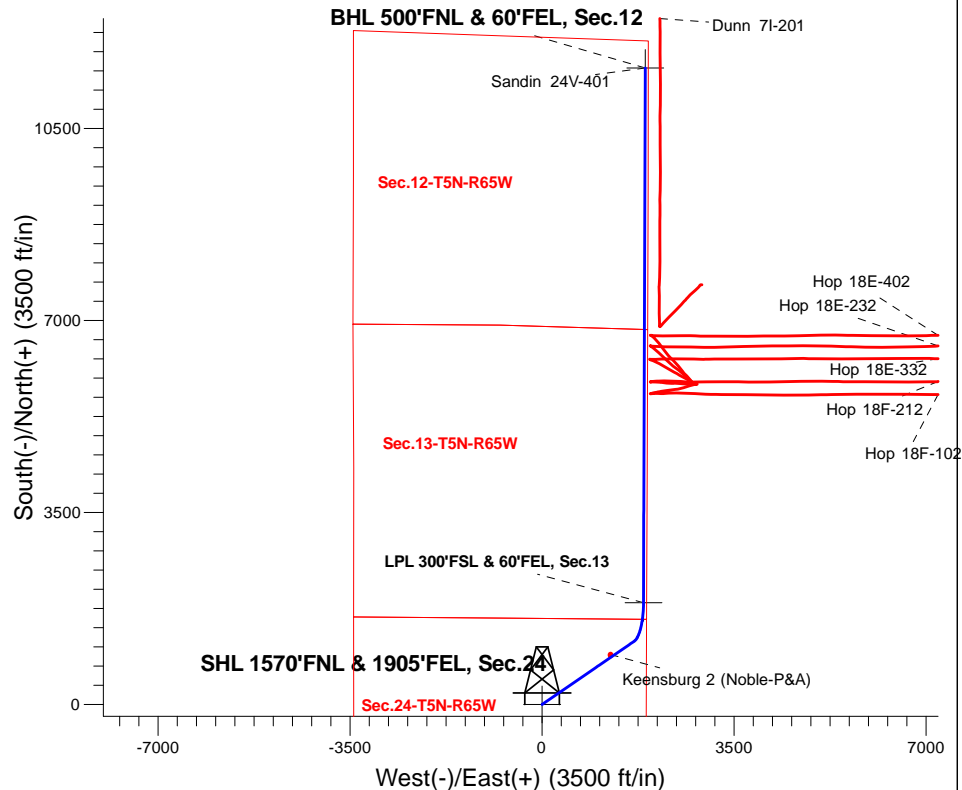
Azimuths to True North
 Magnetic North: 8.03°

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 #2 (6-2-17)
 16:47, June 07 2017

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
1528.6	1557.0	Start 5162.2 hold at 1557.0 MD
6368.5	6719.2	Start DLS 8.00 TFO -57.04
6918.0	7701.6	Start 9748.6 hold at 7701.6 MD
6918.0	17450.1	TD at 17450.1



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	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	1557.0	20.36	55.52	1528.6	135.0	196.6	1.50	55.52	164.7	
4	6719.2	20.36	55.52	6368.5	1151.5	1676.8	0.00	0.00	1404.9	
5	7701.6	90.00	0.19	6918.0	1853.0	1846.8	8.00	-57.04	2124.5	LPL 300'FSL & 60'FEL, Sec.13
6	17450.1	90.00	0.19	6918.0	11601.5	1879.5	0.00	0.00	11752.8	BHL 500'FNL & 60'FEL, Sec.12

BHL 500'FNL & 60'FEL, Sec.12

TD at 17450.1

Vertical Section at 9.20° (1200 ft/in)



Directional

PDC Energy Inc. DJ Basin

SEC.24-T5N-R65W

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

Sandin 24V-401

Wellbore #1

Plan #2 (6-2-17)

Anticollision Summary Report

07 June, 2017



Company:	PDC Energy Inc. 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 #2 (6-2-17)	Offset TVD Reference:	Offset Datum

Reference	Plan #2 (6-2-17)		
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 1,000.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	6/7/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	17,450.1	Plan #2 (6-2-17) (Wellbore #1)	MWD	MWD - Standard

Site Name Offset Well - Wellbore - Design	Reference Measured	Offset Measured	Distance		Separation Factor	Warning
	Depth (ft)	Depth (ft)	Between Centres (ft)	Between Ellipses (ft)		
Dunn 5N64W7 Pad Sec.7-T5N-R64W						
Dunn 7I-201 - Wellbore #1 - Wellbore #1	13,472.7	7,319.2	301.5	123.4	1.693	CC
Dunn 7I-201 - Wellbore #1 - Wellbore #1	17,450.1	11,302.5	320.6	4.4	1.014	Level 2, ES, SF
Existing Wells Sec.24-T5N-R65W						
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	5,304.5	5,014.1	45.9	-116.5	0.283	Level 1, CC, ES, SF
Hop 5N64W18A Pad Sec.18-T5N-R64W						
Hop 18E-232 - Wellbore #1 - Wellbore #1	12,368.4	6,726.0	482.8	356.7	3.829	CC, ES
Hop 18E-232 - Wellbore #1 - Wellbore #1	12,400.0	6,725.9	483.9	357.3	3.822	SF
Hop 18E-332 - Wellbore #1 - Wellbore #1	12,146.6	6,758.8	467.5	336.1	3.560	CC, ES
Hop 18E-332 - Wellbore #1 - Wellbore #1	12,200.0	6,759.4	470.5	338.1	3.554	SF
Hop 18E-402 - Wellbore #1 - Wellbore #1	12,569.1	6,760.8	466.3	331.3	3.454	CC, ES
Hop 18E-402 - Wellbore #1 - Wellbore #1	12,600.0	6,760.8	467.3	331.8	3.448	SF
Hop 18F-102 - Wellbore #1 - Wellbore #1	11,516.8	6,792.0	399.3	277.5	3.277	CC, ES, SF
Hop 18F-212 - Wellbore #1 - Wellbore #1	11,747.3	6,696.0	497.1	382.4	4.331	CC, ES
Hop 18F-212 - Wellbore #1 - Wellbore #1	11,800.0	6,696.0	499.9	384.3	4.322	SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	7,161.6	10,742.3	107.4	-20.4	0.840	Level 1, CC, ES, SF
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	7,000.0	10,738.0	267.2	119.3	1.806	SF
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	7,043.3	10,727.6	262.6	118.3	1.820	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	7,372.3	10,811.5	65.4	-28.8	0.695	Level 1, CC, ES, SF
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)						Out of range
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	6,892.5	10,628.1	446.0	284.5	2.761	CC, ES, SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	6,800.0	10,712.5	692.3	525.3	4.146	SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	6,883.6	10,689.5	682.8	520.6	4.210	CC, ES
Josephine 19N-334 - Wellbore #1 - Plan #3 (3-09-17)						Out of range
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	6,800.0	10,773.5	964.3	796.6	5.750	SF
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	6,872.0	10,753.8	958.2	794.8	5.865	CC, ES

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

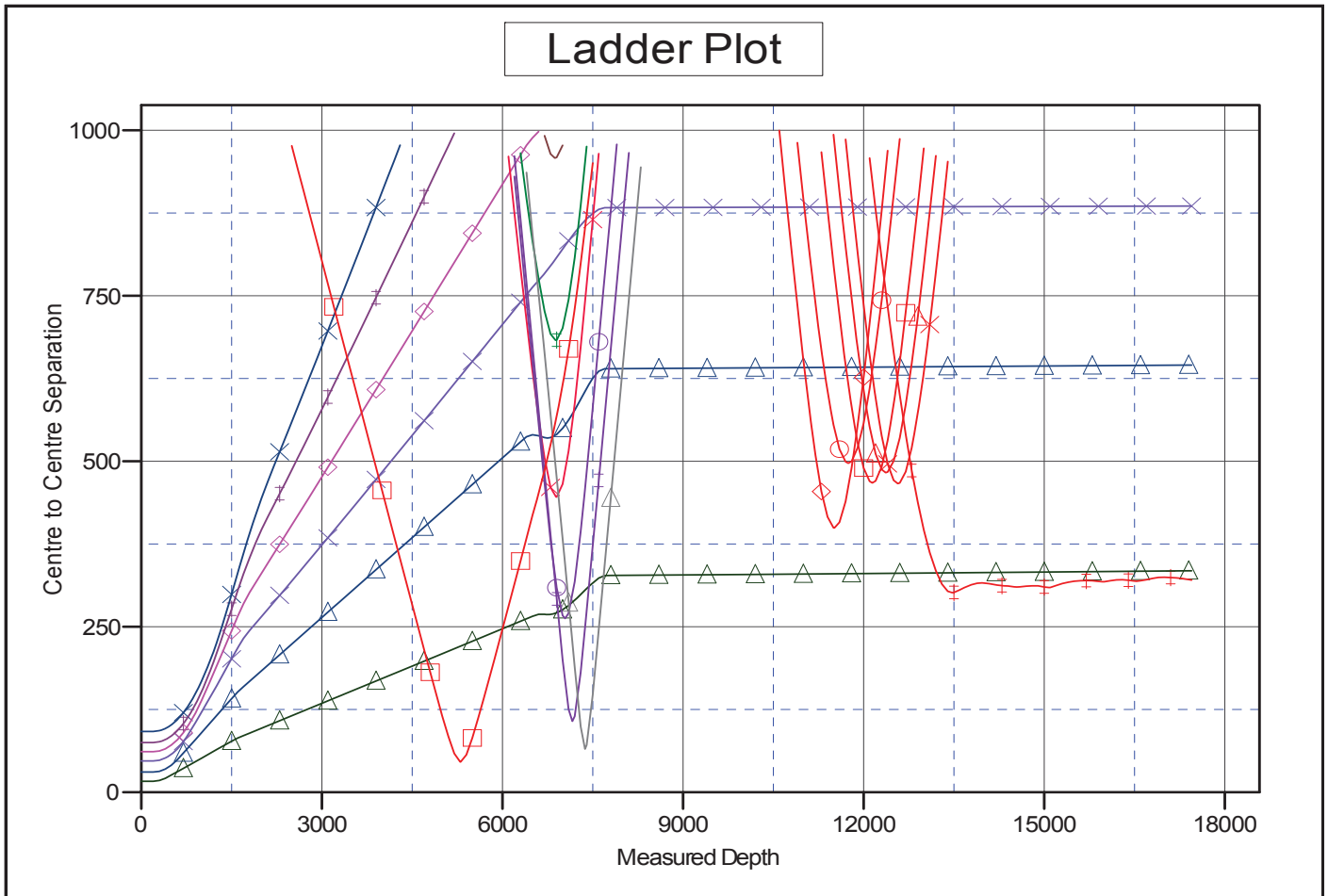
Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Sandin 24V-401
Project:	SEC.24-T5N-R65W	TVD Reference:	WELL @ 4657.0ft (RKB - 23')
Reference Site:	Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W	MD Reference:	WELL @ 4657.0ft (RKB - 23')
Site Error:	0.0 ft	North Reference:	True
Reference 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 #2 (6-2-17)	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (ft)	Measured Depth (ft)	Between Centres (ft)	Between Ellipses (ft)		
Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W						
Sandin 24C-201 - Wellbore #1 - Spider	200.0	200.0	61.3	60.5	74.195	CC, ES
Sandin 24C-201 - Wellbore #1 - Spider	6,600.0	6,639.3	998.0	937.8	16.583	SF
Sandin 24C-221 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	30.6	29.8	37.097	CC, ES
Sandin 24C-221 - Wellbore #1 - Plan #2 (6-2-17)	17,450.1	17,377.1	645.4	124.9	1.240	Level 2, SF
Sandin 24C-241 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	91.9	91.1	111.292	CC, ES
Sandin 24C-241 - Wellbore #1 - Plan #2 (6-2-17)	4,300.0	4,236.0	977.5	943.8	28.947	SF
Sandin 24C-301 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	75.2	74.4	91.057	CC, ES
Sandin 24C-301 - Wellbore #1 - Plan #2 (6-2-17)	5,200.0	5,156.5	995.6	948.6	21.203	SF
Sandin 24C-321 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	47.4	46.5	57.332	CC, ES
Sandin 24C-321 - Wellbore #1 - Plan #2 (6-2-17)	17,450.1	17,290.8	885.7	348.7	1.649	SF
Sandin 24V-341 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	16.7	15.9	20.235	CC
Sandin 24V-341 - Wellbore #1 - Plan #2 (6-2-17)	17,450.1	17,386.9	334.7	-178.5	0.652	Level 1, ES, SF

Company:	PDC Energy Inc. 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 #2 (6-2-17)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4657.0ft (RKB - 23')
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000

Coordinates are relative to: Sandin 24V-401
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.58°



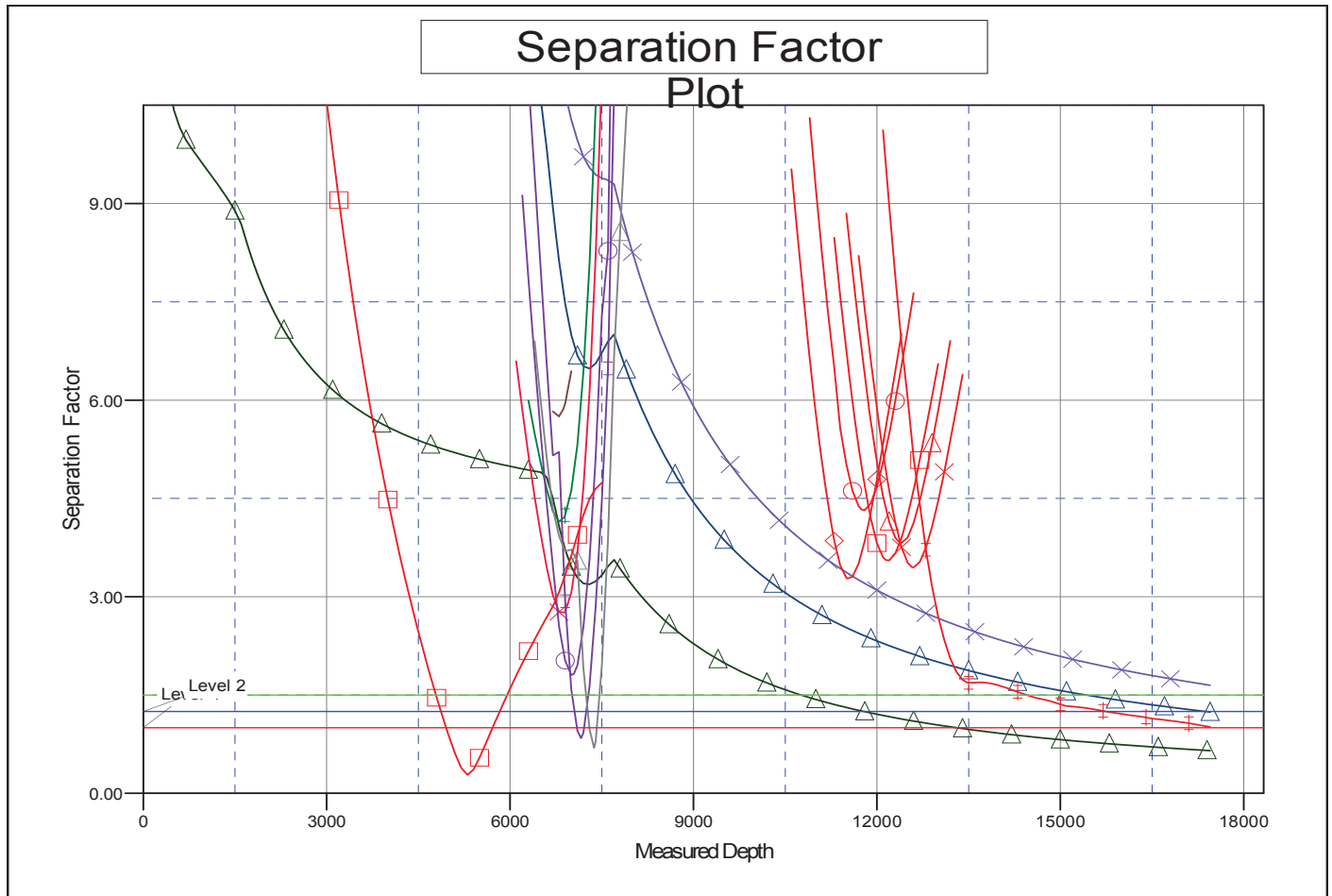
LEGEND

- | | | |
|---|--|--|
| din 24C-321, Wellbore #1, Plan #2 (6-2-17) V0 | Josephine 19N-314, Wellbore #1, Plan #3 (3-09-17) V0 | Hop 18F-102, Wellbore #1, Wellbore #1 V0 |
| din 24V-341, Wellbore #1, Plan #2 (6-2-17) V0 | Josephine 19N-214, Wellbore #1, Plan #3 (3-09-17) V0 | Hop 18E-332, Wellbore #1, Wellbore #1 V0 |
| din 24C-301, Wellbore #1, Plan #2 (6-2-17) V0 | Josephine 19M-234, Wellbore #1, Plan #3 (3-09-17) V0 | Hop 18E-402, Wellbore #1, Wellbore #1 V0 |
| din 24C-201, Wellbore #1, Spider V0 | Josephine 19M-334, Wellbore #1, Plan #3 (3-09-17) V0 | Hop 18E-232, Wellbore #1, Wellbore #1 V0 |
| din 24C-241, Wellbore #1, Plan #2 (6-2-17) V0 | Josephine 19N-404, Wellbore #1, Plan #3 (3-09-17) V0 | Keensburg 2 (Noble-P&A), Wellbore #1, Wellbore #1 V0 |
| din 24C-221, Wellbore #1, Plan #2 (6-2-17) V0 | Josephine 19M-404, Wellbore #1, Plan #3 (3-09-17) V0 | |
| n 71-201, Wellbore #1, Wellbore #1 V0 | Hop 18F-212, Wellbore #1, Wellbore #1 V0 | |

Company:	PDC Energy Inc. 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 #2 (6-2-17)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4657.0ft (RKB - 23')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Sandin 24V-401
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.58°



LEGEND

dir 24C-321, Wellbore #1, Plan #2 (6-2-17) V0	Josephine 19N-314, Wellbore #1, Plan #3 (3-09-17) V0	Hop 18F-102, Wellbore #1, Wellbore #1 V0
dir 24V-341, Wellbore #1, Plan #2 (6-2-17) V0	Josephine 19N-214, Wellbore #1, Plan #3 (3-09-17) V0	Hop 18E-332, Wellbore #1, Wellbore #1 V0
dir 24C-301, Wellbore #1, Plan #2 (6-2-17) V0	Josephine 19M-234, Wellbore #1, Plan #3 (3-09-17) V0	Hop 18E-402, Wellbore #1, Wellbore #1 V0
dir 24C-201, Wellbore #1, Spider V0	Josephine 19M-334, Wellbore #1, Plan #3 (3-09-17) V0	Hop 18E-232, Wellbore #1, Wellbore #1 V0
dir 24C-241, Wellbore #1, Plan #2 (6-2-17) V0	Josephine 19N-404, Wellbore #1, Plan #3 (3-09-17) V0	Keensburg 2 (Noble-P&A), Wellbore #1, Wellbore #1 V0
dir 24C-221, Wellbore #1, Plan #2 (6-2-17) V0	Josephine 19M-404, Wellbore #1, Plan #3 (3-09-17) V0	
n 71-201, Wellbore #1, Wellbore #1 V0	Hop 18F-212, Wellbore #1, Wellbore #1 V0	