

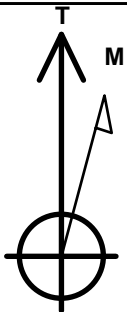
# PDC Energy Inc. DJ Basin

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	1.0	0.0	0.0	Point
BHL 500'FNL & 378'FEL, Sec.12	6812.0	11612.5	1578.7	Point
LPL 200'FSL & 378'FEL, Sec.13	6837.0	1753.0	1546.0	Point



Azimuths to True North  
 Magnetic North: 8.03°

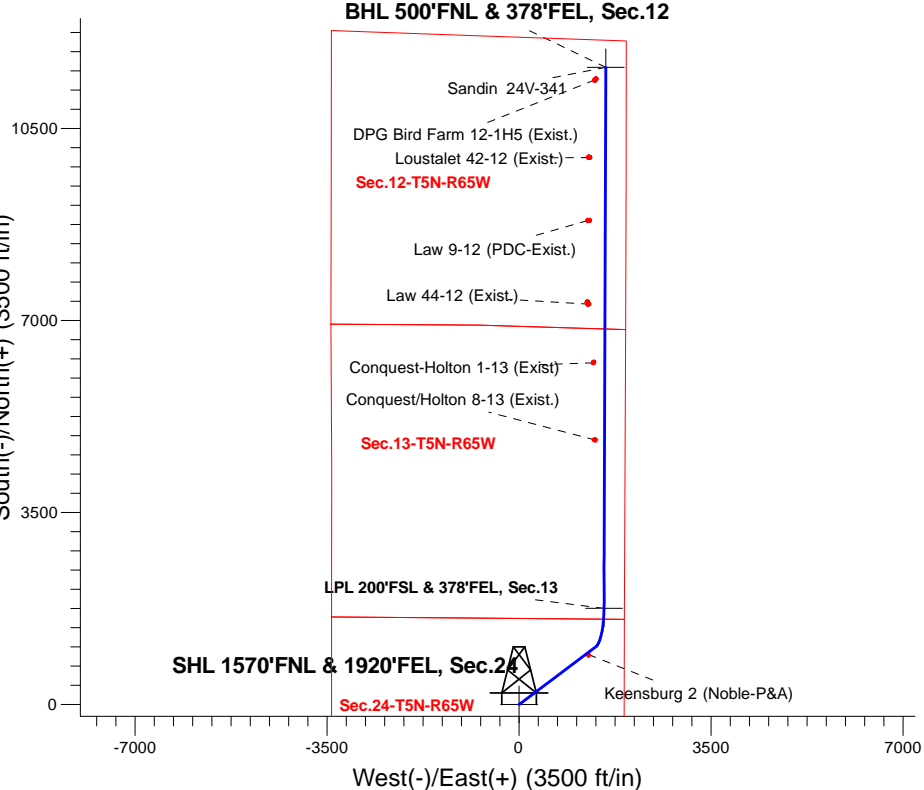
Magnetic Field  
 Strength: 52561.3snT  
 Dip Angle: 66.87°  
 Date: 12/20/2016  
 Model: IGRF2010

Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W  
 Sandin 24V-341  
 Plan #2 (6-2-17)  
 16:43, June 07 2017

## ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
1603.0	1623.8	Start 4923.9 hold at 1623.8 MD
6276.3	6547.7	Start DLS 8.00 TFO -54.27
6837.0	7537.5	Start 9859.6 hold at 7537.5 MD
6812.0	17397.1	TD at 17397.1

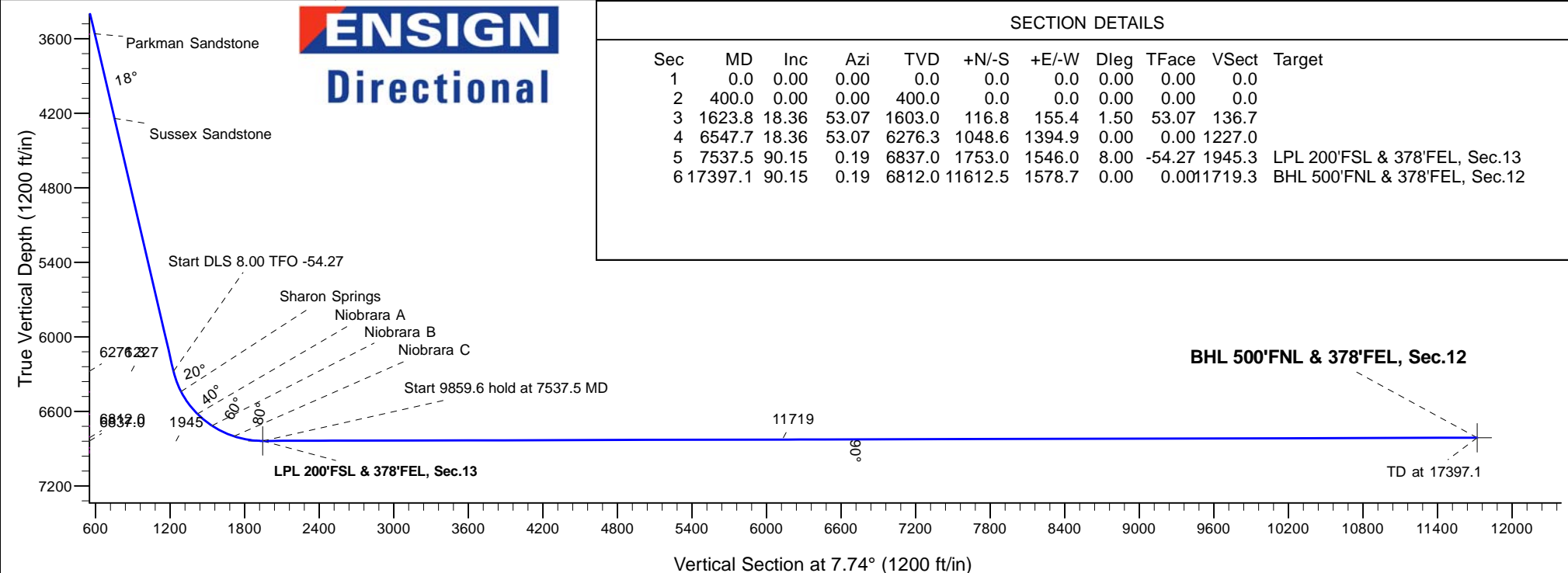
South(-)/North(+) (3500 ft/in)



## 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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	1623.8	18.36	53.07	1603.0	116.8	155.4	1.50	53.07	136.7	
4	6547.7	18.36	53.07	6276.3	1048.6	1394.9	0.00	0.00	1227.0	
5	7537.5	90.15	0.19	6837.0	1753.0	1546.0	8.00	-54.27	1945.3	LPL 200'FSL & 378'FEL, Sec.13
6	17397.1	90.15	0.19	6812.0	11612.5	1578.7	0.00	0.00	1719.3	BHL 500'FNL & 378'FEL, Sec.12

**ENSIGN**  
 Directional





## **PDC Energy Inc. DJ Basin**

**SEC.24-T5N-R65W**

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

**Sandin 24V-341**

**Wellbore #1**

**Plan #2 (6-2-17)**

## **Anticollision Summary Report**

**07 June, 2017**



<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Sandin 24V-341
<b>Project:</b>	SEC.24-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4657.0ft (RKB - 23')
<b>Reference Site:</b>	Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W	<b>MD Reference:</b>	WELL @ 4657.0ft (RKB - 23')
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sandin 24V-341	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #2 (6-2-17)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #2 (6-2-17)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.0ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,000.0 ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.45 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b> 6/7/2017			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	17,397.1	Plan #2 (6-2-17) (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
<b>Offset Well - Wellbore - Design</b>						
Existing Wells Sec.12-T5N-R65W						
DPG Bird Farm 12-1H5 (Exist.) - Wellbore #1 - Wellbore	17,166.1	6,758.1	197.8	-82.4	0.706	Level 1, CC, ES, SF
Law 44-12 (Exist.) - Wellbore #1 - Wellbore #1	13,083.3	6,799.1	294.8	108.7	1.584	CC, ES
Law 44-12 (Exist.) - Wellbore #1 - Wellbore #1	13,100.0	6,798.9	295.2	108.8	1.583	SF
Law 9-12 (PDC-Exist.) - Wellbore #1 - Wellbore #1	14,605.4	6,765.3	315.0	92.2	1.414	Level 3, CC, ES, SF
Loustalet 42-12 (Exist.) - Wellbore #1 - Wellbore #1	15,756.4	6,763.6	303.0	56.1	1.227	Level 2, CC, ES, SF
Existing Wells Sec.13-T5N-R65W						
Conquest/Holton 8-13 (Exist.) - Wellbore #1 - Wellbore #	10,602.4	6,800.0	169.8	40.6	1.314	Level 3, CC, ES, SF
Conquest-Holton 1-13 (Exist.) - Wellbore #1 - Wellbore #1	12,009.0	6,792.8	214.2	53.4	1.332	Level 3, CC, ES, SF
Existing Wells Sec.24-T5N-R65W						
Keensburg 2 (Noble-P&A) - Wellbore #1 - Wellbore #1	5,947.2	5,678.4	30.2	-149.1	0.169	Level 1, CC, ES, SF
Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	7,100.0	11,036.0	110.7	-3.0	0.974	Level 1, ES, SF
Josephine 19M-234 - Wellbore #1 - Plan #3 (3-09-17)	7,111.8	11,034.3	110.0	-2.1	0.981	Level 1, CC
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	6,900.0	11,030.6	257.5	115.7	1.815	SF
Josephine 19M-334 - Wellbore #1 - Plan #3 (3-09-17)	6,976.3	11,016.0	242.5	109.1	1.818	CC, ES
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	7,300.0	11,116.9	106.6	25.9	1.321	Level 3, ES, SF
Josephine 19M-404 - Wellbore #1 - Plan #3 (3-09-17)	7,320.5	11,115.4	104.4	26.8	1.345	Level 3, CC
Josephine 19N-204 - Wellbore #1 - Plan #3 (3-09-17)						Out of range
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	6,800.0	10,914.2	397.0	240.1	2.530	ES, SF
Josephine 19N-214 - Wellbore #1 - Plan #3 (3-09-17)	6,806.9	10,912.7	397.0	240.7	2.540	CC, SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	6,700.0	10,996.6	642.0	476.5	3.880	SF
Josephine 19N-314 - Wellbore #1 - Plan #3 (3-09-17)	6,783.5	10,977.2	632.1	473.3	3.982	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)	6,600.0	11,081.6	935.6	763.8	5.446	SF
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	6,700.0	11,057.4	909.3	743.0	5.468	ES
Josephine 19N-404 - Wellbore #1 - Plan #3 (3-09-17)	6,760.9	11,043.3	904.8	743.5	5.610	CC

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Sandin 24V-341
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<b>Reference Site:</b>	Sandin Farms 5N65W24N Pad Sec.24-T5N-R65W	<b>MD Reference:</b>	WELL @ 4657.0ft (RKB - 23')
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sandin 24V-341	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #2 (6-2-17)	<b>Offset TVD Reference:</b>	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 - Spider	400.0	400.0	44.6	42.6	23.126	CC, ES
Sandin 24C-201 - Wellbore #1 - Spider	17,397.1	17,318.1	826.9	295.6	1.556	SF
Sandin 24C-221 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	13.9	12.0	7.227	CC
Sandin 24C-221 - Wellbore #1 - Plan #2 (6-2-17)	17,397.1	17,387.2	311.5	-216.2	0.590	Level 1, ES, SF
Sandin 24C-241 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	75.2	73.3	39.025	CC, ES
Sandin 24C-241 - Wellbore #1 - Plan #2 (6-2-17)	900.0	898.6	103.2	98.5	21.940	SF
Sandin 24C-301 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	58.5	56.6	30.352	CC, ES
Sandin 24C-301 - Wellbore #1 - Plan #2 (6-2-17)	6,500.0	6,457.8	992.8	930.0	15.823	SF
Sandin 24C-321 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	30.6	28.7	15.899	CC
Sandin 24C-321 - Wellbore #1 - Plan #2 (6-2-17)	17,397.1	17,301.0	562.5	20.5	1.038	Level 2, ES, SF
Sandin 24N-221 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	103.1	101.1	53.478	CC, ES
Sandin 24N-221 - Wellbore #1 - Plan #2 (6-2-17)	1,100.0	1,091.8	164.4	158.5	27.676	SF
Sandin 24N-241 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	133.7	132.9	161.880	CC, ES
Sandin 24N-241 - Wellbore #1 - Plan #2 (6-2-17)	1,000.0	965.8	231.2	225.7	42.143	SF
Sandin 24N-301 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	119.8	117.9	62.150	CC, ES
Sandin 24N-301 - Wellbore #1 - Plan #2 (6-2-17)	1,100.0	1,078.1	204.8	198.8	33.752	SF
Sandin 24N-321 - Wellbore #1 - Plan #2 (6-2-17)	400.0	400.0	89.1	87.2	46.251	CC, ES
Sandin 24N-321 - Wellbore #1 - Plan #2 (6-2-17)	4,500.0	4,395.3	992.5	950.6	23.659	SF
Sandin 24V-401 - Wellbore #1 - Plan #2 (6-2-17)	200.0	200.0	16.7	15.9	20.235	CC
Sandin 24V-401 - Wellbore #1 - Plan #2 (6-2-17)	17,397.1	17,450.1	334.8	-178.5	0.652	Level 1, ES, SF

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<b>Reference Well:</b>	Sandin 24V-341	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #2 (6-2-17)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 4657.0ft (RKB - 23')

Offset Depths are relative to Offset Datum

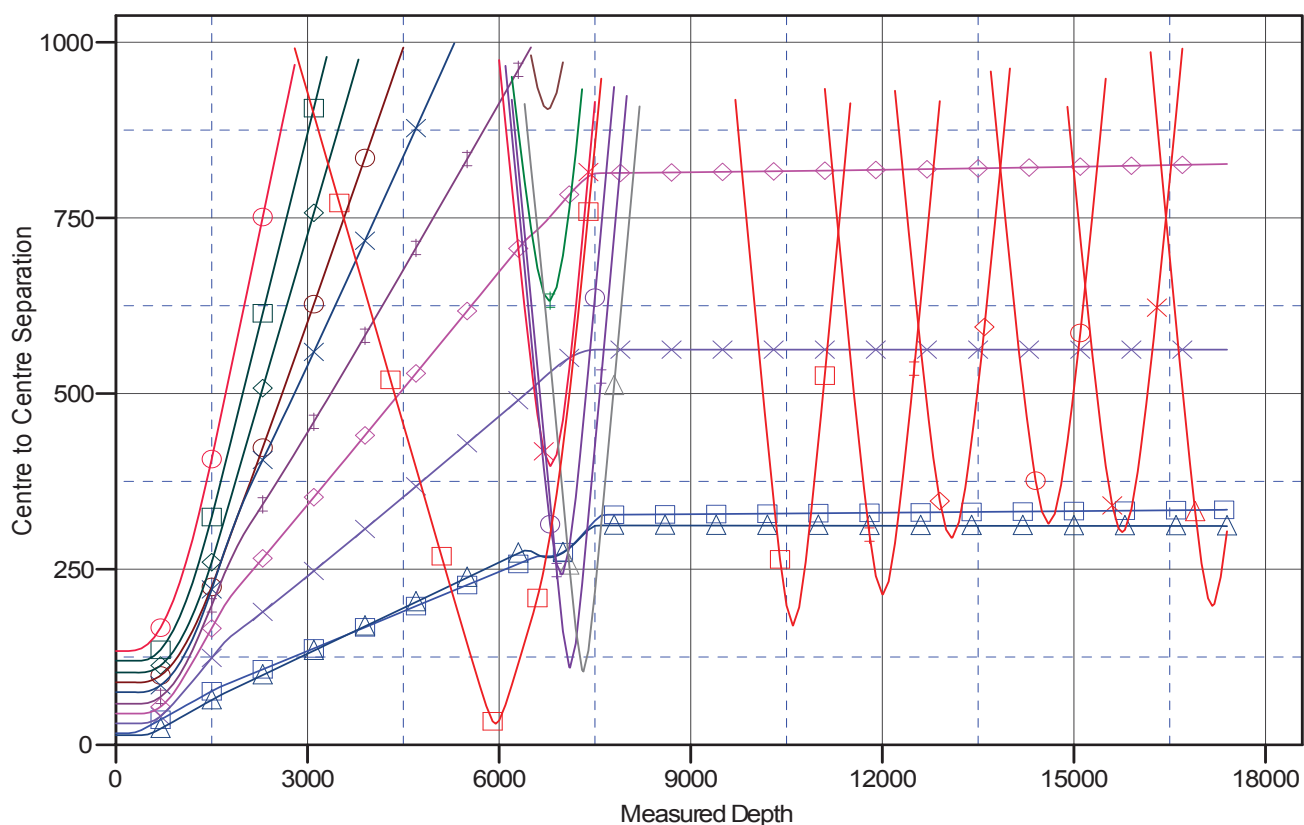
Central Meridian is -105.500000

Coordinates are relative to: Sandin 24V-341

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.58°

## Ladder Plot



## LEGEND

-241, Wellbore #1, Plan #2 (6-2-17) V0	✕ Sandin 24C-241, Wellbore #1, Plan #2 (6-2-17) V0	▲ DPG Bird Farm 12-1H5 (Exist), Wellbore #
-221, Wellbore #1, Plan #2 (6-2-17) V0	▲ Sandin 24C-221, Wellbore #1, Plan #2 (6-2-17) V0	✕ Loustalet 42-12 (Exist), Wellbore #1, Wellb
-401, Wellbore #1, Plan #2 (6-2-17) V0	✕ Josephine 19N-314, Wellbore #1, Plan #3 (3-09-17) V0	○ Law 9-12 (PDC-Exist), Wellbore #1, Wellb
-321, Wellbore #1, Plan #2 (6-2-17) V0	✕ Josephine 19N-214, Wellbore #1, Plan #3 (3-09-17) V0	◆ Law 44-12 (Exist), Wellbore #1, Wellbore #
-301, Wellbore #1, Plan #2 (6-2-17) V0	✕ Josephine 19M-234, Wellbore #1, Plan #3 (3-09-17) V0	✕ Conquest-Holton 1-13 (Exist), Wellbore #1,
-321, Wellbore #1, Plan #2 (6-2-17) V0	○ Josephine 19M-334, Wellbore #1, Plan #3 (3-09-17) V0	✕ Conquest-Holton 8-13 (Exist), Wellbore #1,
-301, 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, W
-201, Wellbore #1, Spider V0	▲ Josephine 19M-404, Wellbore #1, Plan #3 (3-09-17) V0	

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

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<b>Well Error:</b>	0.0 ft	<b>Output errors are at</b>	2.45 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	US_EDM
<b>Reference Design:</b>	Plan #2 (6-2-17)	<b>Offset TVD Reference:</b>	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-341

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.58°

