

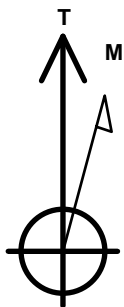
PDC Energy Inc. DJ Basin

Well Name: **Thistle Down 31G-402**

Surface Location: Thistle Down 5N64W31H Pad Sec.31-T5N-R64W
 North American Datum 1983 , US State Plane 1983 Colorado Northern Zone
 Ground Elevation: 4805.0
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1372573.72 3251618.97 40.352600 -104.597170
 Original Well Elev WELL @ 4828.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1519'FSL, 1357'FWL, SEC.31	1.0	0.0	0.0	Point
BHL 2532'FSL, 800'FWL, SEC.32	7026.0	1035.1	4718.5	Point
LPL 2532'FSL, 905'FWL, SEC.31	7076.0	1009.1	-451.7	Point



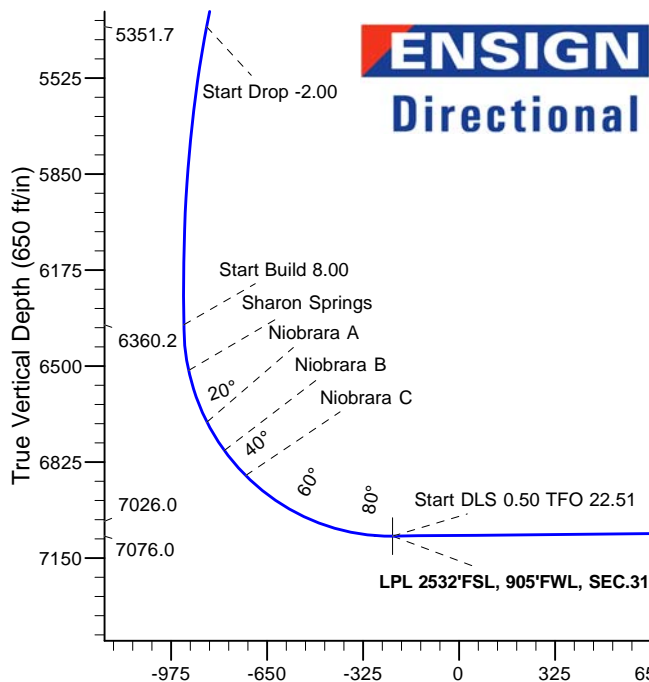
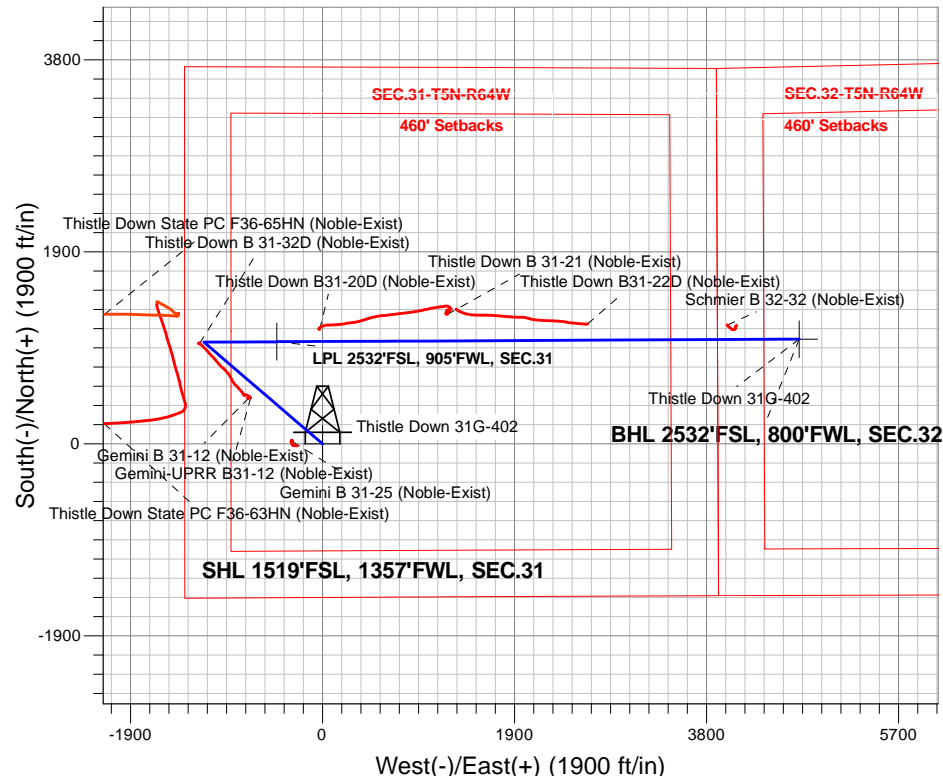
Azimuths to True North
 Magnetic North: 7.95°

Magnetic Field
 Strength: 52485.7snT
 Dip Angle: 66.83°
 Date: 7/6/2017
 Model: IGRF2010

Thistle Down 5N64W31H Pad Sec.31-T5N-R64W
 Thistle Down 31G-402
 Plan #1 (6-30-17)
 8:57, July 06 2017

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
5351.8	5557.7	Start Drop -2.00
6360.2	6579.1	Start Build 8.00
7076.0	7710.5	Start DLS 0.50 TFO 22.51
7076.0	7711.4	Start 5169.6 hold at 7711.4 MD
7026.0	12881.0	TD at 12881.0



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	1348.2	17.22	310.57	1331.0	111.4	-130.1	1.50	310.57	-103.2	
4	5557.7	17.22	310.57	5351.8	922.0	-1076.9	0.00	0.00	-854.4	
5	6418.9	0.00	0.00	6200.0	1005.5	-1174.5	2.00	180.00	-931.8	
6	6579.1	0.00	0.00	6360.2	1005.5	-1174.5	0.00	0.00	-931.8	
7	7710.4	90.55	89.71	7076.0	1009.1	-451.8	8.00	89.71	-225.1	
8	7710.5	90.55	89.71	7076.0	1009.1	-451.7	0.00	0.00	-225.0	LPL 2532'FSL, 905'FWL, SEC.31
9	7711.4	90.55	89.71	7076.0	1009.2	-450.8	0.50	22.51	-224.1	
10	12881.0	90.55	89.71	7026.0	1035.1	4718.5	0.00	0.00	4830.7	BHL 2532'FSL, 800'FWL, SEC.32

BHL 2532'FSL, 800'FWL, SEC.32

TD at 12881.0

Vertical Section at 77.63° (650 ft/in)



PDC Energy Inc. DJ Basin

SEC.31-T5N-R64W

Thistle Down 5N64W31H Pad Sec.31-T5N-R64W

Thistle Down 31G-402

Wellbore #1

Plan #1 (6-30-17)

Anticollision Summary Report

06 July, 2017



Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Thistle Down 31G-402
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4828.0ft (Original Well Elev)
Reference Site:	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4828.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Thistle Down 31G-402	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 (6-30-17)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (6-30-17)		
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 800.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 7/6/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	12,881.0	Plan #1 (6-30-17) (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
Offset Well - Wellbore - Design						
Existing Wells Sec.31-T5N-R64W (GRID)						
Gemini B 31-12 (Noble-Exist) - Wellbore #1 - Wellbore #	3,683.5	3,520.1	118.8	85.8	3.596	CC
Gemini B 31-12 (Noble-Exist) - Wellbore #1 - Wellbore #	3,700.0	3,535.9	118.9	85.7	3.585	ES, SF
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	1,389.6	1,336.6	186.9	177.2	19.219	CC
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	1,400.0	1,346.6	186.9	177.1	19.008	ES
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	1,700.0	1,634.1	206.8	194.2	16.400	SF
Thistle Down B 31-21 (Noble-Exist) - Wellbore #1 - Wellb	9,395.7	7,023.4	264.0	172.2	2.876	CC
Thistle Down B 31-21 (Noble-Exist) - Wellbore #1 - Wellb	9,400.0	7,023.5	264.0	172.1	2.872	ES, SF
Existing Wells Sec.32-T5N-R64W (GRID)						
Schmier B 32-32 (Noble-Exist) - Wellbore #1 - Wellbore #	12,171.1	6,977.0	143.4	-42.0	0.773	Level 1, CC, ES, SF
Thistle Down 5N64W31H Pad Sec.31-T5N-R64W						
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	200.0	200.0	29.1	28.3	35.284	CC, ES
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	12,881.0	12,860.6	496.3	129.2	1.352	Level 3, SF
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	200.0	200.0	14.6	13.8	17.657	CC
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	12,881.0	12,955.9	223.9	-126.4	0.639	Level 1, ES, SF
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	58.3	57.5	70.803	CC, ES
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	4,700.0	4,650.5	789.2	734.4	14.395	SF
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	91.1	90.3	110.630	CC, ES
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	3,400.0	3,301.8	786.3	752.3	23.115	SF
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	72.9	72.0	88.504	CC, ES
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	3,900.0	3,834.6	781.4	740.8	19.245	SF
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	43.7	42.9	53.102	CC, ES
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	12,881.0	12,913.0	749.7	362.9	1.938	SF
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	105.6	104.8	128.761	CC, ES
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	3,000.0	2,871.9	784.2	755.6	27.435	SF
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	120.2	119.4	146.526	CC, ES
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	2,600.0	2,439.4	767.4	743.7	32.382	SF
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	134.8	134.0	164.282	CC, ES
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	2,400.0	2,206.8	795.9	774.6	37.331	SF
Thistle Down B31-22D Pad Sec.31-T5N-R64W						
Thistle Down B31-20D (Noble-Exist) - Wellbore #1 - Well	8,132.4	7,227.4	120.1	44.0	1.577	CC, ES, SF
Thistle Down B31-22D (Noble-Exist) - Wellbore #1 - Well	10,786.5	7,203.5	161.1	4.6	1.029	Level 2, CC, ES, SF

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Reference Well:	Thistle Down 31G-402	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 (6-30-17)	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
Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W						
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	5,236.6	5,047.7	484.2	430.1	8.948	CC
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	5,300.0	5,106.0	485.0	429.9	8.800	ES
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	5,500.0	5,288.2	497.1	439.6	8.646	SF
Thistle Down State PC F36-65HN (Noble-Exist) - Wellbo	6,403.2	6,158.5	364.5	328.3	10.069	CC
Thistle Down State PC F36-65HN (Noble-Exist) - Wellbo	6,418.9	6,170.1	364.6	308.9	6.536	ES, SF
Thistle Down Wells (Noble) Sec.31-T5N-R64W						
Thistle Down B 31-32D (Noble-Exist) - Thistle Down B 31	6,583.9	6,407.4	50.1	-6.2	0.890	Level 1, CC, ES, SF