

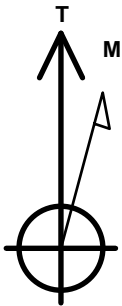
# PDC Energy Inc. DJ Basin

Well Name: **Thistle Down 31H-202**

Surface Location: Thistle Down 5N64W31H Pad Sec.31-T5N-R64W  
 North American Datum 1983 , US State Plane 1983 Colorado Northern Zone  
 Ground Elevation: 4804.0  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.0 0.0 1372515.44 3251619.56 40.352440 -104.597170  
 Original Well Elev WELL @ 4827.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1459'FSL, 1357'FWL, SEC.31	1.0	0.0	0.0	Point
BHL 1516'FSL, 800'FWL, SEC.32	6856.0	77.0	4721.5	Point
LPL 1516'FSL, 735'FWL, SEC.31	6896.0	51.0	-620.4	Point



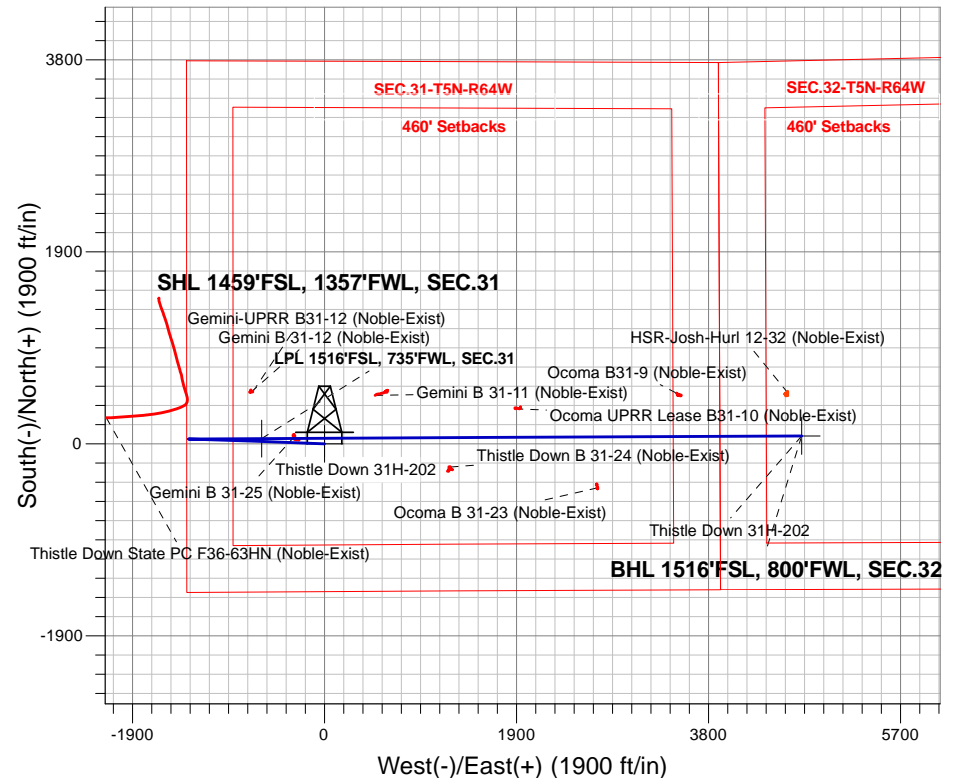
Azimuths to True North  
 Magnetic North: 8.00°

Magnetic Field  
 Strength: 52520.6snT  
 Dip Angle: 66.84°  
 Date: 3/7/2017  
 Model: IGRF2010

Thistle Down 5N64W31H Pad Sec.31-T5N-R64W  
 Thistle Down 31H-202  
 Plan #1 (2-28-17)  
 13:42, March 07 2017

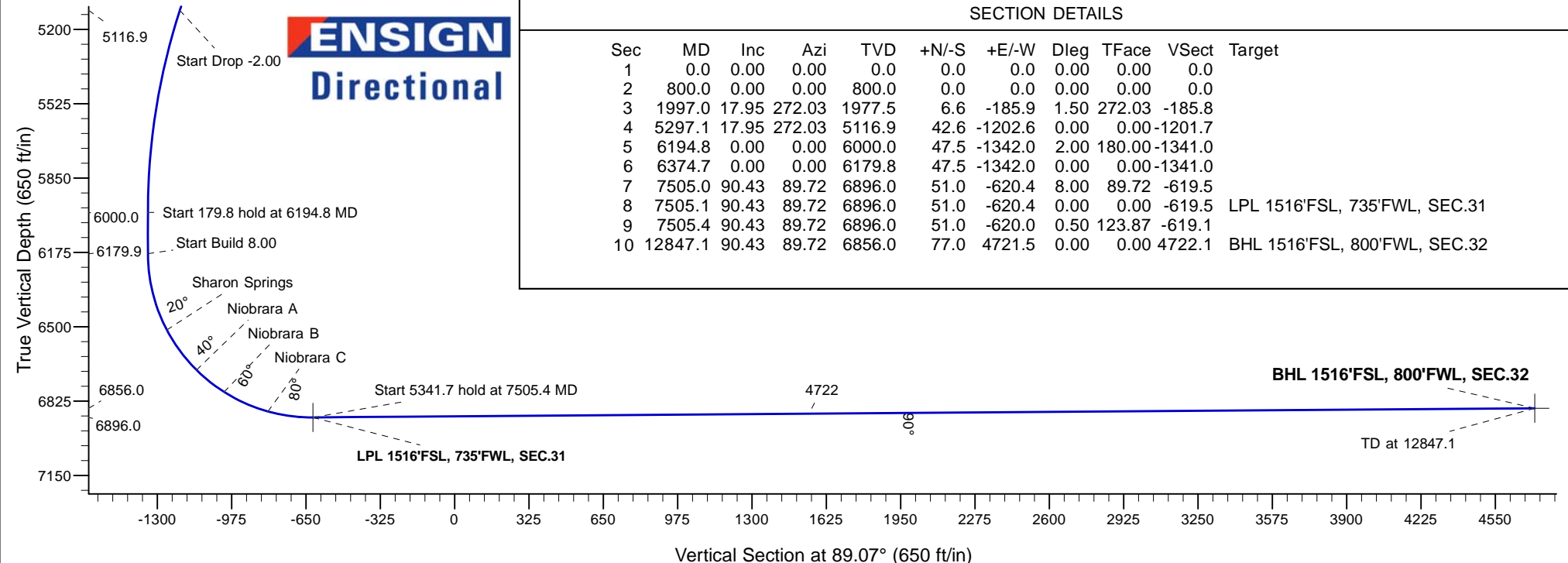
## ANNOTATIONS

TVD	MD	Annotation
800.0	800.0	KOP - Start Build 1.50
5116.9	5297.1	Start Drop -2.00
6000.0	6194.8	Start 179.8 hold at 6194.8 MD
6179.9	6374.7	Start Build 8.00
6896.0	7505.4	Start 5341.7 hold at 7505.4 MD
6856.0	12847.1	TD at 12847.1



## 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	800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.0	
3	1997.0	17.95	272.03	1977.5	6.6	-185.9	1.50	272.03	-185.8	
4	5297.1	17.95	272.03	5116.9	42.6	-1202.6	0.00	0.00	-1201.7	
5	6194.8	0.00	0.00	6000.0	47.5	-1342.0	2.00	180.00	-1341.0	
6	6374.7	0.00	0.00	6179.8	47.5	-1342.0	0.00	0.00	-1341.0	
7	7505.0	90.43	89.72	6896.0	51.0	-620.4	8.00	89.72	-619.5	
8	7505.1	90.43	89.72	6896.0	51.0	-620.4	0.00	0.00	-619.5	LPL 1516'FSL, 735'FWL, SEC.31
9	7505.4	90.43	89.72	6896.0	51.0	-620.0	0.50	123.87	-619.1	
10	12847.1	90.43	89.72	6856.0	77.0	4721.5	0.00	0.00	4722.1	BHL 1516'FSL, 800'FWL, SEC.32





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

**SEC.31-T5N-R64W**

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

**Thistle Down 31H-202**

**Wellbore #1**

**Plan #1 (2-28-17)**

## **Anticollision Report**

**07 March, 2017**



<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-202
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Reference Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thistle Down 31H-202	<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 #1 (2-28-17)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1 (2-28-17)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	Stations	<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 800.0 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> 3/7/2017			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,847.1	Plan #1 (2-28-17) (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.31-T5N-R64W (GRID)						
Gemini B 31-11 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,638.3	6,885.5	427.6	350.1	5.517	CC, ES
Gemini B 31-11 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,700.0	6,883.5	432.0	352.7	5.451	SF
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	7,825.8	6,864.3	24.9	-32.8	0.432	Level 1, CC, ES, SF
Ocoma B 31-23 (Noble-Exist) - Wellbore #1 - Wellbore #	10,821.5	6,860.1	503.6	358.4	3.468	CC, ES
Ocoma B 31-23 (Noble-Exist) - Wellbore #1 - Wellbore #	10,900.0	6,859.9	509.7	361.9	3.448	SF
Ocoma B31-9 (Noble-Exist) - Wellbore #1 - Wellbore #1	11,613.0	6,827.2	428.3	256.7	2.496	CC, ES, SF
Ocoma UPRR Lease B31-10 (Noble-Exist) - Wellbore #1	10,013.3	6,866.1	284.8	165.6	2.389	CC, ES, SF
Thistle Down B 31-24 (Noble-Exist) - Wellbore #1 - Wellb	9,367.0	6,867.3	291.4	193.1	2.965	CC, ES
Thistle Down B 31-24 (Noble-Exist) - Wellbore #1 - Wellb	9,400.0	6,867.3	293.3	193.9	2.953	SF
Existing Wells Sec.32-T5N-R64W (GRID)						
HSR-Josh-Hurl 12-32 (Noble-Exist) - Wellbore #1 - Wellb	12,705.7	6,811.9	430.7	222.0	2.064	CC, ES, SF
Thistle Down 5N64W31H Pad Sec.31-T5N-R64W						
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	366.3	367.3	29.1	27.4	16.705	CC
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	400.0	401.0	29.1	27.2	15.101	ES
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	12,847.1	12,860.6	550.2	153.4	1.387	Level 3, SF
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	166.3	167.3	43.7	43.1	67.933	CC
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	200.0	201.0	43.7	42.9	52.739	ES
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	5,400.0	5,312.5	753.4	686.7	11.289	SF
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	800.0	800.0	32.8	28.7	7.939	CC
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	900.0	899.7	33.2	28.6	7.156	ES
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	12,847.1	12,869.9	510.0	113.1	1.285	Level 3, SF
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	800.0	800.0	14.6	10.4	3.528	CC
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	12,847.1	12,918.7	275.0	-110.4	0.714	Level 1, ES, SF
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	600.0	600.0	14.6	11.5	4.811	CC
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	12,847.1	12,913.0	282.1	-102.8	0.733	Level 1, ES, SF
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	600.0	599.0	47.4	44.3	15.651	CC, ES
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	12,847.1	12,955.5	776.6	382.4	1.970	SF
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	400.0	399.0	61.9	60.0	32.181	CC, ES
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	4,500.0	4,388.4	790.2	738.1	15.181	SF
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	76.5	75.7	92.929	CC, ES
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	3,700.0	3,560.7	784.7	745.4	20.001	SF

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-202
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Reference Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site Error:</b>	0.0 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thistle Down 31H-202	<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 #1 (2-28-17)	<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
Offset Well - Wellbore - Design						
Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W						
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	6,500.0	6,418.6	331.9	278.3	6.197	SF
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	6,542.8	6,453.5	330.6	277.4	6.211	CC, ES
Thistle Down Wells (Noble) Sec.31-T5N-R64W						
Gemini B 31-12 (Noble-Exist) - Wellbore #1 - Wellbore #	7,394.0	6,847.3	459.2	281.8	2.588	CC, ES, SF

Offset Design Existing Wells Sec.31-T5N-R64W (GRID) - Gemini B 31-11 (Noble-Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
8,000.0	6,892.3	6,905.5	6,902.2	45.3	16.0	-93.71	483.7	510.3	768.0	706.9	61.15	12.559		
8,100.0	6,891.5	6,902.3	6,899.1	47.6	16.0	-93.29	483.7	510.4	687.3	623.9	63.42	10.837		
8,200.0	6,890.8	6,900.0	6,896.8	50.0	16.0	-92.98	483.8	510.5	612.2	546.4	65.81	9.302		
8,300.0	6,890.0	6,896.1	6,892.9	52.5	16.0	-92.46	483.8	510.6	545.1	476.8	68.33	7.978		
8,400.0	6,889.3	6,893.0	6,889.8	55.1	15.9	-92.05	483.9	510.6	489.5	418.5	70.94	6.899		
8,500.0	6,888.6	6,889.9	6,886.7	57.7	15.9	-91.63	483.9	510.7	449.4	375.7	73.64	6.102		
8,600.0	6,887.8	6,886.7	6,883.5	60.5	15.9	-91.21	484.0	510.8	429.3	352.9	76.41	5.618		
8,638.3	6,887.5	6,885.5	6,882.3	61.6	15.9	-91.04	484.0	510.8	427.6	350.1	77.50	5.517	CC, ES	
8,700.0	6,887.1	6,883.5	6,880.3	63.3	15.9	-90.78	484.1	510.9	432.0	352.7	79.25	5.451	SF	
8,800.0	6,886.3	6,880.3	6,877.1	66.2	15.9	-90.34	484.1	511.0	457.1	374.9	82.14	5.565		
8,900.0	6,885.6	6,877.0	6,873.8	69.2	15.9	-89.90	484.2	511.0	501.2	416.1	85.07	5.891		
9,000.0	6,884.8	6,873.7	6,870.4	72.2	15.9	-89.45	484.2	511.1	559.9	471.8	88.05	6.359		
9,100.0	6,884.1	6,870.3	6,867.1	75.2	15.9	-89.00	484.3	511.2	629.1	538.0	91.06	6.908		
9,200.0	6,883.3	6,866.9	6,863.6	78.2	15.9	-88.55	484.4	511.3	705.6	611.5	94.10	7.499		
9,300.0	6,882.6	6,863.4	6,860.2	81.3	15.9	-88.08	484.4	511.4	787.5	690.3	97.16	8.105		