

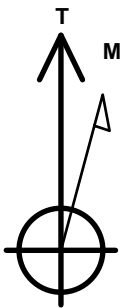
# PDC Energy Inc. DJ Basin

Well Name: **Thistle Down 31H-232**

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 1372482.66 3251619.89 40.352350 -104.597170  
 Original Well Elev WELL @ 4827.0ft (Original Well Elev)

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1429'FSL, 1357'FWL, SEC.31	1.0	0.0	0.0	Point
BHL 1008'FSL, 800'FWL, SEC.32	6856.0	-400.3	4724.4	Point
LPL 1008'FSL, 735'FWL, SEC.31	6896.0	-422.6	-620.4	Point



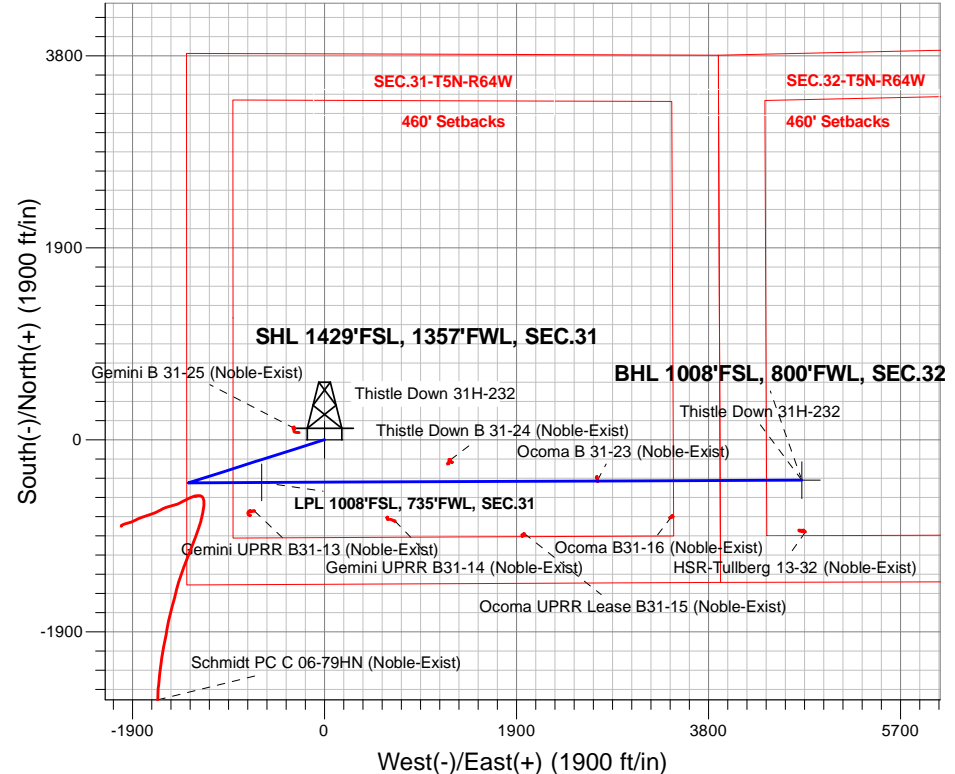
Azimuths to True North  
 Magnetic North: 8.00°

Magnetic Field  
 Strength: 52520.5snT  
 Dip Angle: 66.84°  
 Date: 3/7/2017  
 Model: IGRF2010

Thistle Down 5N64W31H Pad Sec.31-T5N-R64W  
 Thistle Down 31H-232  
 Plan #1 (2-28-17)  
 14:27, March 07 2017

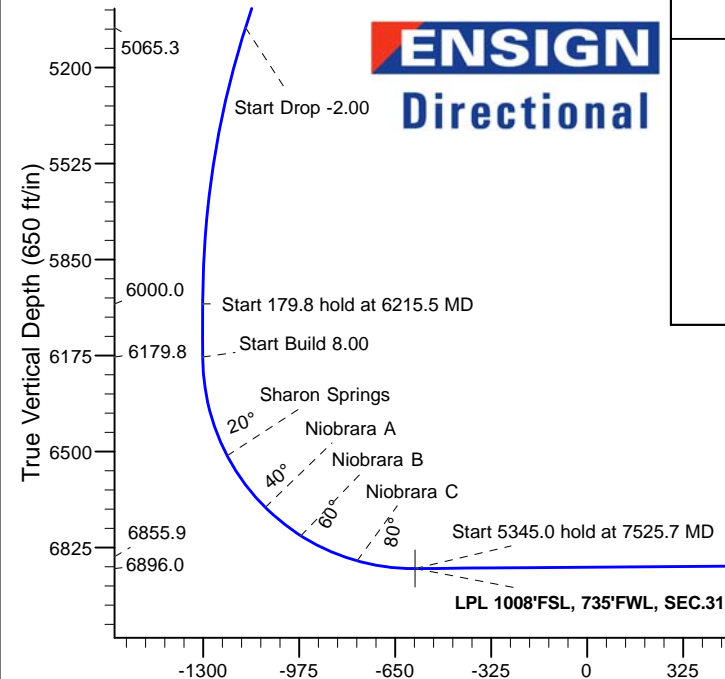
## ANNOTATIONS

TVD	MD	Annotation
800.0	800.0	KOP - Start Build 1.50
5065.3	5263.3	Start Drop -2.00
6000.0	6215.5	Start 179.8 hold at 6215.5 MD
6179.8	6395.3	Start Build 8.00
6896.0	7525.7	Start 5345.0 hold at 7525.7 MD
6855.9	12870.6	TD at 12870.6



## 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	2069.5	19.04	252.40	2046.3	-63.2	-199.3	1.50	252.40	-193.2	
4	5263.3	19.04	252.40	5065.3	-378.2	-1192.6	0.00	0.00	-1156.4	
5	6215.5	0.00	0.00	6000.0	-425.6	-1342.0	2.00	180.00	-1301.3	
6	6395.3	0.00	0.00	6179.8	-425.6	-1342.0	0.00	0.00	-1301.3	
7	7525.7	90.43	89.76	6896.0	-422.6	-620.4	8.00	89.76	-582.5	
8	7525.7	90.43	89.76	6896.0	-422.6	-620.4	0.00	0.00	-582.5	LPL 1008'FSL, 735'FWL, SEC.31
9	12870.6	90.43	89.76	6855.9	-400.2	4724.4	0.00	0.00	4741.3	BHL 1008'FSL, 800'FWL, SEC.32



Vertical Section at 94.84° (650 ft/in)

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

**SEC.31-T5N-R64W**

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

**Thistle Down 31H-232**

**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-232
<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-232	<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	12,870.6	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
Offset Well - Wellbore - Design						
Existing Wells Sec.31-T5N-R64W (GRID)						
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	2,166.8	2,107.3	150.9	136.3	10.322	CC, ES
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #	7,900.0	6,864.9	534.0	475.5	9.125	SF
Gemini UPRR B31-13 (Noble-Exist) - Wellbore #1 - Well	7,450.5	6,855.6	283.1	231.2	5.459	CC, ES, SF
Gemini UPRR B31-14 (Noble-Exist) - Wellbore #1 - Well	8,842.0	6,867.7	388.5	304.7	4.637	CC, ES
Gemini UPRR B31-14 (Noble-Exist) - Wellbore #1 - Well	8,900.0	6,867.3	392.8	307.3	4.595	SF
Ocoma B 31-23 (Noble-Exist) - Wellbore #1 - Wellbore #	10,844.5	6,859.2	5.0	-140.0	0.035	Level 1, CC, ES, SF
Ocoma B31-16 (Noble-Exist) - Wellbore #1 - Wellbore #1	11,575.9	6,828.3	357.8	188.1	2.108	CC, ES
Ocoma B31-16 (Noble-Exist) - Wellbore #1 - Wellbore #1	11,600.0	6,828.4	358.6	188.1	2.103	SF
Ocoma UPRR Lease B31-15 (Noble-Exist) - Wellbore #1	10,118.5	6,846.4	516.7	395.3	4.257	CC, ES
Ocoma UPRR Lease B31-15 (Noble-Exist) - Wellbore #1	10,200.0	6,846.6	523.1	399.1	4.218	SF
Thistle Down B 31-24 (Noble-Exist) - Wellbore #1 - Wellb	9,389.9	6,868.7	216.2	118.2	2.205	CC
Thistle Down B 31-24 (Noble-Exist) - Wellbore #1 - Wellb	9,400.0	6,868.7	216.5	118.1	2.200	ES, SF
Existing Wells Sec.32-T5N-R64W (GRID)						
HSR-Tullberg 13-32 (Noble-Exist) - Wellbore #1 - Wellbo	12,870.6	6,781.2	507.0	294.1	2.381	CC, ES, SF
Existing Wells Sec.36-T5N-R65W						
Schmidt PC C.06-79HN (Noble-Exist) - Wellbore #1 - We	6,749.4	6,539.7	129.3	74.6	2.361	CC, ES, SF

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-232
<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-232	<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
Thistle Down 5N64W31H Pad Sec.31-T5N-R64W						
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	366.3	367.3	61.9	60.2	35.497	CC
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	500.0	500.3	62.5	60.0	25.288	ES
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	4,500.0	4,399.9	779.5	727.0	14.847	SF
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	166.3	167.3	76.5	75.8	118.896	CC
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	200.0	201.0	76.5	75.7	92.306	ES
Thistle Down 31G-332 - Wellbore #1 - Plan #1 (2-28-17)	3,800.0	3,673.2	797.1	755.6	19.190	SF
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	800.0	800.0	32.8	28.7	7.939	CC
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	900.0	900.0	33.2	28.6	7.155	ES
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	12,870.6	12,847.1	510.0	113.1	1.285	Level 3, SF
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	800.0	800.0	18.2	14.1	4.410	CC
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	12,870.6	12,918.7	253.9	-129.1	0.663	Level 1, ES, SF
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	600.0	600.0	47.4	44.3	15.637	CC
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	700.0	699.7	47.7	44.1	13.367	ES
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	12,870.6	12,913.6	786.4	391.3	1.990	SF
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	600.0	599.0	14.6	11.5	4.816	CC
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	12,870.6	12,955.5	274.6	-104.7	0.724	Level 1, ES, SF
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	400.0	399.0	29.1	27.2	15.145	CC, ES
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	12,870.6	12,931.4	557.5	161.7	1.409	Level 3, SF
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	43.7	42.9	53.102	CC, ES
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	5,400.0	5,299.5	763.0	695.9	11.364	SF

<b>Offset Design</b> Existing Wells Sec.31-T5N-R64W (GRID) - Gemini B 31-25 (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		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
0.0	0.0	0.0	0.0	0.0	0.0	-74.57	69.2	-250.8	262.1				
100.0	100.0	68.0	68.0	0.1	0.1	-74.58	69.2	-251.0	260.3	260.1	0.25	1,048.042	
200.0	200.0	168.0	168.0	0.4	0.4	-74.60	69.3	-251.4	260.8	260.0	0.80	327.963	
300.0	300.0	267.8	267.8	0.7	0.7	-74.63	69.2	-251.8	261.2	259.8	1.39	187.473	
400.0	400.0	367.6	367.6	1.0	1.0	-74.63	69.3	-252.3	261.7	259.7	1.98	131.869	
500.0	500.0	467.1	467.1	1.2	1.3	-74.59	69.7	-252.8	262.3	259.7	2.56	102.299	
600.0	600.0	566.4	566.4	1.5	1.6	-74.49	70.3	-253.5	263.1	260.0	3.14	83.733	
700.0	700.0	665.4	665.4	1.8	1.9	-74.42	71.0	-254.5	264.3	260.6	3.73	70.846	
800.0	800.0	765.1	765.1	2.1	2.3	-74.40	71.5	-255.9	265.8	261.4	4.33	61.401	
900.0	900.0	864.8	864.8	2.3	2.6	33.33	71.8	-257.4	266.2	261.2	4.90	54.269	
1,000.0	999.9	964.4	964.4	2.6	2.9	33.78	72.1	-259.0	264.5	259.1	5.46	48.409	
1,100.0	1,099.7	1,064.2	1,064.1	2.8	3.2	34.55	72.3	-260.8	260.9	254.8	6.03	43.239	
1,200.0	1,199.3	1,163.8	1,163.7	3.1	3.6	35.67	72.5	-262.6	255.1	248.5	6.61	38.600	
1,300.0	1,298.6	1,263.3	1,263.2	3.4	3.9	37.21	72.5	-264.4	247.4	240.2	7.20	34.368	
1,400.0	1,397.5	1,363.0	1,362.8	3.7	4.2	39.29	72.7	-266.2	237.8	230.0	7.81	30.444	
1,500.0	1,496.1	1,462.4	1,462.3	4.1	4.5	41.99	72.7	-267.7	226.3	217.8	8.45	26.773	
1,600.0	1,594.2	1,561.1	1,560.9	4.6	4.8	45.45	72.6	-269.0	213.2	204.1	9.13	23.341	
1,700.0	1,691.7	1,659.2	1,659.0	5.0	5.1	49.91	72.4	-270.1	199.1	189.2	9.88	20.154	
1,800.0	1,788.6	1,756.5	1,756.4	5.6	5.4	55.59	72.1	-271.2	184.6	173.9	10.71	17.240	
1,900.0	1,884.9	1,853.2	1,853.0	6.2	5.7	62.77	71.7	-272.3	170.9	159.2	11.66	14.662	
2,000.0	1,980.4	1,948.8	1,948.6	6.9	6.0	71.77	71.4	-273.3	159.4	146.7	12.73	12.521	
2,069.5	2,046.3	2,014.7	2,014.6	7.4	6.2	79.05	71.3	-274.1	153.9	140.4	13.53	11.375	

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