

PDC Energy Inc. DJ Basin

Well Name: **Thistle Down 31G-332**

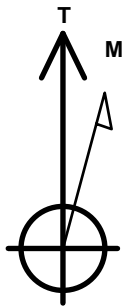
Surface Location: Thistle Down 5N64W31H Pad Sec.31-T5N-R64W
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 4805.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1372559.14	3251619.11	40.352560	-104.597170	

Original Well Elev WELL @ 4828.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1504'FSL, 1357'FWL, SEC.31	1.0	0.0	0.0	Point
BHL 2332'FSL, 800'FWL, SEC.32	6926.0	849.3	4718.5	Point
LPL 2332'FSL, 738'FWL, SEC.31	6966.0	823.4	-620.4	Point



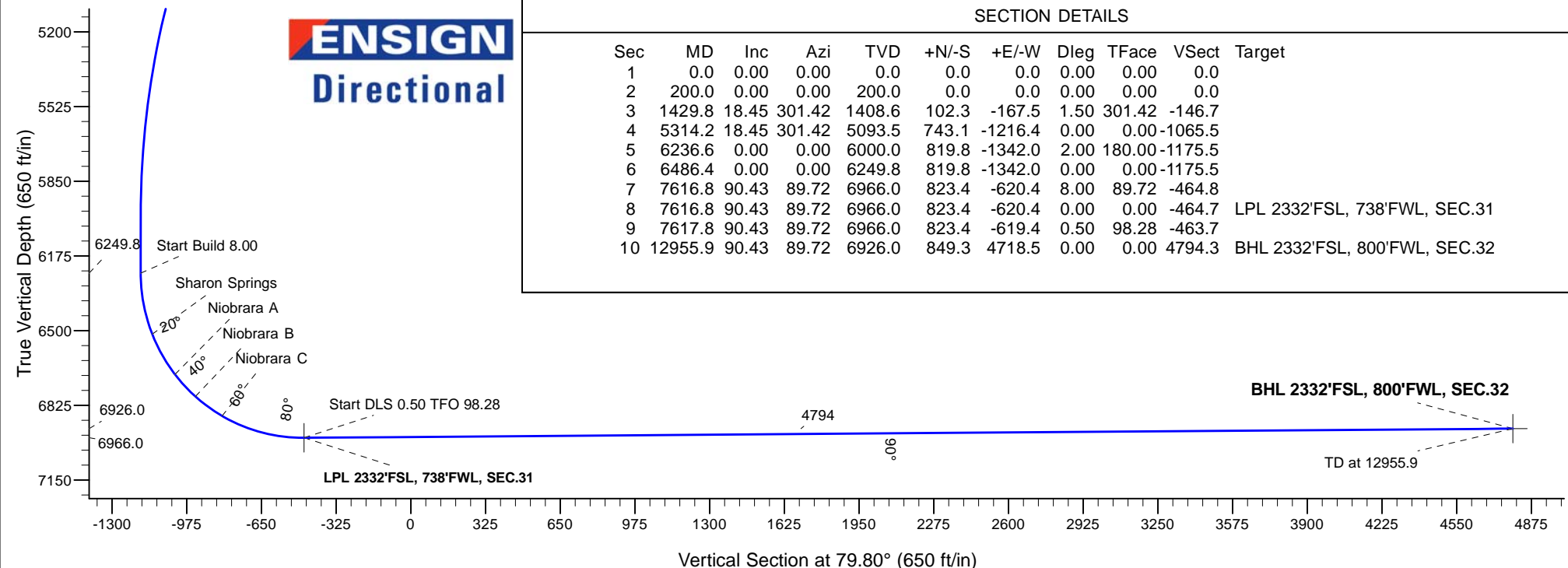
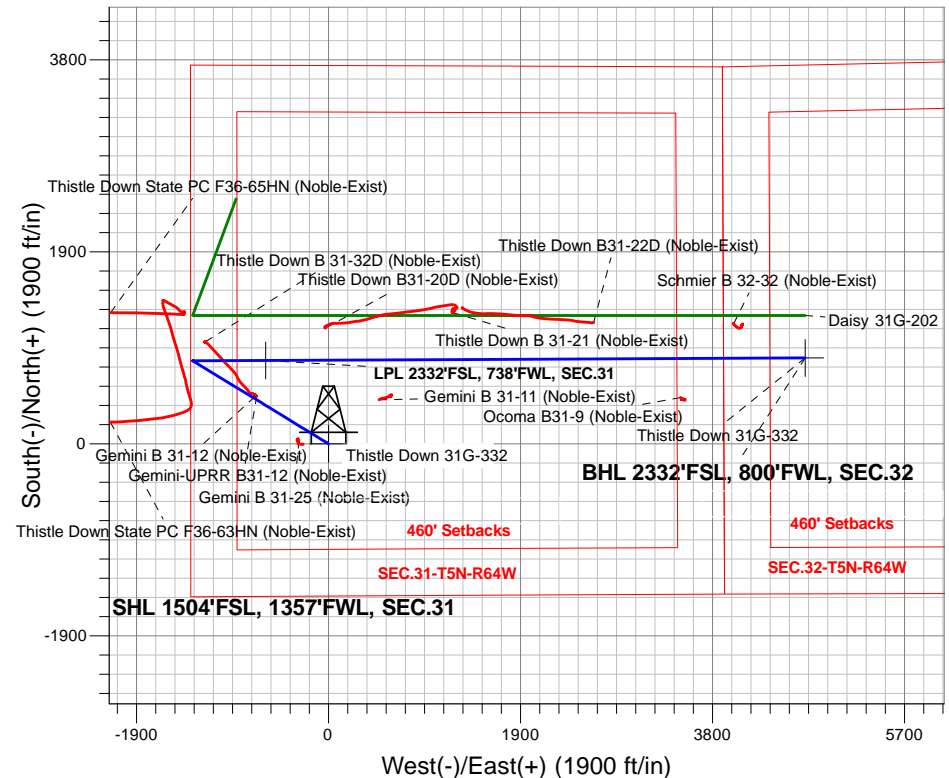
Azimuths to True North
Magnetic North: 8.00°

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 31G-332
Plan #1 (2-28-17)
10:50, March 07 2017

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
5093.5	5314.2	Start Drop -2.00
6249.8	6486.4	Start Build 8.00
6966.0	7616.8	Start DLS 0.50 TFO 98.28
6966.0	7617.8	Start 5338.1 hold at 7617.8 MD
6926.0	12955.9	TD at 12955.9





PDC Energy Inc. DJ Basin

SEC.31-T5N-R64W

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

Thistle Down 31G-332

Wellbore #1

Plan #1 (2-28-17)

Anticollision Report

07 March, 2017

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Thistle Down 31G-332
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-332	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 (2-28-17)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (2-28-17)		
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	3/7/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	12,955.9	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						
Daisy 5N64W31F Pad Sec.31-T5N-R64W						
Daisy 31G-202 - Wellbore #1 - Plan #1 (2-28-17)	12,955.9	12,762.2	426.3	33.3	1.085	Level 2, CC, ES, SF
Existing Wells Sec.31-T5N-R64W (GRID)						
Gemini B 31-11 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,744.9	6,940.0	389.6	312.2	5.034	CC, ES
Gemini B 31-11 (Noble-Exist) - Wellbore #1 - Wellbore #1	8,800.0	6,938.3	393.4	314.5	4.986	SF
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #1	1,513.8	1,455.3	142.8	131.7	12.883	CC, ES
Gemini B 31-25 (Noble-Exist) - Wellbore #1 - Wellbore #1	1,700.0	1,632.5	153.7	140.9	11.958	SF
Ocoma B31-9 (Noble-Exist) - Wellbore #1 - Wellbore #1	11,720.3	6,898.7	387.5	216.2	2.261	CC, ES, SF
Thistle Down B 31-21 (Noble-Exist) - Wellbore #1 - Wellb	9,470.3	6,917.8	464.4	366.7	4.753	CC, ES
Thistle Down B 31-21 (Noble-Exist) - Wellbore #1 - Wellb	9,500.0	6,918.0	465.4	366.7	4.719	SF
Existing Wells Sec.32-T5N-R64W (GRID)						
Schmier B 32-32 (Noble-Exist) - Wellbore #1 - Wellbore #1	12,245.9	6,875.6	343.8	152.5	1.798	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	14.6	13.7	17.627	CC
Thistle Down 31G-232 - Wellbore #1 - Plan #1 (2-28-17)	12,955.9	12,860.6	274.9	-108.2	0.718	Level 1, ES, SF
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	43.7	42.9	53.087	CC, ES
Thistle Down 31H-202 - Wellbore #1 - Plan #1 (2-28-17)	5,400.0	5,369.9	757.2	690.1	11.280	SF
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	76.5	75.7	92.914	CC, ES
Thistle Down 31H-232 - Wellbore #1 - Plan #1 (2-28-17)	3,700.0	3,621.5	777.3	737.0	19.277	SF
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	58.3	57.5	70.788	CC, ES
Thistle Down 31H-302 - Wellbore #1 - Plan #1 (2-28-17)	4,400.0	4,353.7	786.3	736.4	15.741	SF
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	200.0	199.0	29.1	28.3	35.387	CC, ES
Thistle Down 31H-312 - Wellbore #1 - Plan #1 (2-28-17)	12,955.9	12,913.0	542.7	146.3	1.369	Level 3, SF
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	91.1	90.2	110.986	CC, ES
Thistle Down 31H-332 - Wellbore #1 - Plan #1 (2-28-17)	3,200.0	3,090.3	770.0	736.8	23.211	SF
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	105.6	104.8	128.751	CC, ES
Thistle Down 31I-212 - Wellbore #1 - Plan #1 (2-28-17)	2,800.0	2,653.5	773.4	745.3	27.532	SF
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	200.0	198.0	120.2	119.4	146.506	CC, ES
Thistle Down 31I-302 - Wellbore #1 - Plan #1 (2-28-17)	2,500.0	2,325.4	774.2	750.1	32.060	SF
Thistle Down B31-22D Pad Sec.31-T5N-R64W						
Thistle Down B31-20D (Noble-Exist) - Wellbore #1 - Well	8,207.3	7,118.1	320.1	238.3	3.912	CC, ES, SF
Thistle Down B31-22D (Noble-Exist) - Wellbore #1 - Well	10,861.3	7,098.1	360.7	198.4	2.223	CC, ES
Thistle Down B31-22D (Noble-Exist) - Wellbore #1 - Well	10,900.0	7,098.2	362.8	199.2	2.218	SF

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

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Reference Well:	Thistle Down 31G-332	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 (2-28-17)	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	5,341.3	5,142.4	240.4	183.8	4.248	CC, ES
Thistle Down State PC F36-63HN (Noble-Exist) - Wellbo	5,400.0	5,196.1	241.9	184.3	4.197	SF
Thistle Down State PC F36-65HN (Noble-Exist) - Wellbo	6,427.5	6,167.1	467.1	420.2	9.971	CC
Thistle Down State PC F36-65HN (Noble-Exist) - Wellbo	6,500.0	6,228.6	467.9	418.8	9.514	ES, SF
Thistle Down Wells (Noble) Sec.31-T5N-R64W						
Gemini B 31-12 (Noble-Exist) - Wellbore #1 - Wellbore #	3,566.0	3,391.9	30.2	-130.7	0.188	Level 1, CC, ES, SF
Thistle Down B 31-32D (Noble-Exist) - Thistle Down B 31	6,850.0	6,639.7	188.1	130.0	3.234	SF
Thistle Down B 31-32D (Noble-Exist) - Thistle Down B 31	6,900.0	6,682.8	185.5	129.4	3.304	ES
Thistle Down B 31-32D (Noble-Exist) - Thistle Down B 31	6,911.8	6,692.7	185.4	129.8	3.334	CC

Offset Design													Offset Site Error:		0.0 ft
Survey Program: 0-MWD													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance								
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
5,000.0	4,795.4	5,048.6	4,925.0	34.9	28.3	51.76	1,435.9	-1,281.5	776.2	728.4	47.81	16.236			
5,100.0	4,890.3	5,139.3	5,013.0	35.7	28.9	52.76	1,415.5	-1,289.1	735.8	686.8	48.93	15.036			
5,200.0	4,985.1	5,229.9	5,101.0	36.5	29.4	53.87	1,395.2	-1,296.7	695.5	645.5	50.07	13.890			
5,300.0	5,080.0	5,320.6	5,189.0	37.3	30.0	55.12	1,374.8	-1,304.3	655.6	604.3	51.23	12.796			
5,314.2	5,093.5	5,333.5	5,201.5	37.4	30.1	55.31	1,371.9	-1,305.4	649.9	598.5	51.40	12.644			
5,400.0	5,175.3	5,411.6	5,277.4	38.0	30.6	55.82	1,354.3	-1,311.9	616.5	564.1	52.41	11.764			
5,500.0	5,271.5	5,495.2	5,358.6	38.6	31.0	56.25	1,335.9	-1,318.8	580.0	526.6	53.38	10.865			
5,600.0	5,368.6	5,575.0	5,436.6	39.1	31.4	56.64	1,320.1	-1,324.6	547.6	493.4	54.21	10.100			
5,700.0	5,466.6	5,656.7	5,516.9	39.5	31.6	57.05	1,306.2	-1,329.8	519.6	464.7	54.97	9.453			
5,800.0	5,565.1	5,740.0	5,599.2	39.9	31.9	57.44	1,294.1	-1,334.3	496.2	440.6	55.65	8.916			
5,900.0	5,664.2	5,824.6	5,683.2	40.2	32.1	57.80	1,284.2	-1,338.0	477.4	421.1	56.25	8.486			
6,000.0	5,763.7	5,910.4	5,768.6	40.4	32.4	58.08	1,276.5	-1,340.9	463.1	406.4	56.77	8.158			
6,100.0	5,863.5	6,000.0	5,858.0	40.6	32.5	58.27	1,271.0	-1,342.9	453.6	396.4	57.21	7.929			
6,200.0	5,963.4	6,084.0	5,941.9	40.8	32.6	58.32	1,268.3	-1,343.9	448.7	391.1	57.54	7.797			
6,236.6	6,000.0	6,115.9	5,973.8	40.8	32.7	-0.27	1,267.8	-1,344.1	448.0	389.4	58.64	7.640			
6,276.7	6,040.1	6,152.2	6,010.1	40.8	32.7	-0.27	1,267.7	-1,344.1	447.9	389.2	58.75	7.624			
6,300.0	6,063.4	6,175.5	6,033.4	40.9	32.8	-0.27	1,267.7	-1,344.1	447.9	389.1	58.81	7.616			
6,400.0	6,163.4	6,275.5	6,133.4	41.0	32.9	-0.27	1,267.7	-1,344.1	447.9	388.8	59.07	7.583			
6,468.6	6,232.1	6,344.2	6,202.1	41.0	32.9	-0.04	1,267.7	-1,342.3	447.9	388.7	59.20	7.566			
6,486.4	6,249.8	6,361.9	6,219.7	41.1	33.0	0.15	1,267.7	-1,340.8	447.9	388.7	59.20	7.566			
6,500.0	6,263.4	6,375.4	6,233.1	41.1	33.0	-89.40	1,267.7	-1,339.4	447.9	389.5	58.40	7.670			
6,550.0	6,313.3	6,424.8	6,282.0	41.1	33.0	-88.79	1,267.7	-1,332.0	447.9	389.5	58.47	7.661			
6,600.0	6,362.9	6,473.9	6,329.9	41.1	33.0	-88.19	1,267.7	-1,321.4	448.0	389.5	58.48	7.662			
6,650.0	6,412.0	6,522.7	6,376.7	41.0	33.0	-87.60	1,267.7	-1,307.6	448.1	389.7	58.41	7.672			
6,700.0	6,460.3	6,571.2	6,422.2	40.9	32.9	-87.03	1,267.7	-1,290.7	448.3	390.0	58.29	7.690			
6,750.0	6,507.5	6,619.5	6,466.2	40.8	32.9	-86.46	1,267.7	-1,271.0	448.4	390.3	58.13	7.714			
6,800.0	6,553.5	6,667.4	6,508.5	40.6	32.8	-85.92	1,267.7	-1,248.5	448.6	390.7	57.93	7.744			
6,850.0	6,598.0	6,715.1	6,549.0	40.5	32.8	-85.40	1,267.7	-1,223.3	448.8	391.1	57.71	7.776			
6,900.0	6,640.8	6,762.5	6,587.5	40.3	32.7	-84.90	1,267.7	-1,195.6	449.0	391.5	57.49	7.810			
6,950.0	6,681.7	6,809.7	6,623.9	40.1	32.6	-84.43	1,267.7	-1,165.6	449.2	391.9	57.28	7.842			
7,000.0	6,720.5	6,856.7	6,658.2	39.9	32.6	-83.98	1,267.7	-1,133.5	449.4	392.3	57.10	7.871			
7,050.0	6,757.0	6,903.5	6,690.1	39.7	32.5	-83.56	1,267.7	-1,099.3	449.6	392.6	56.96	7.892			

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