

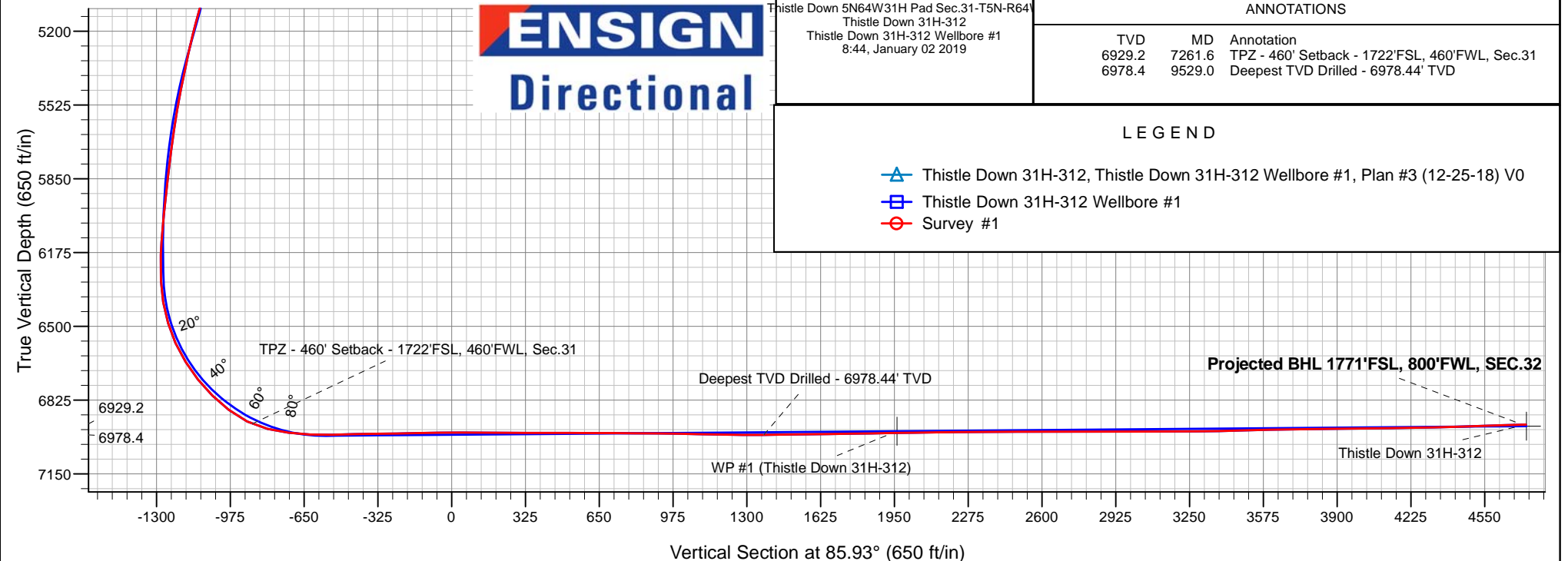
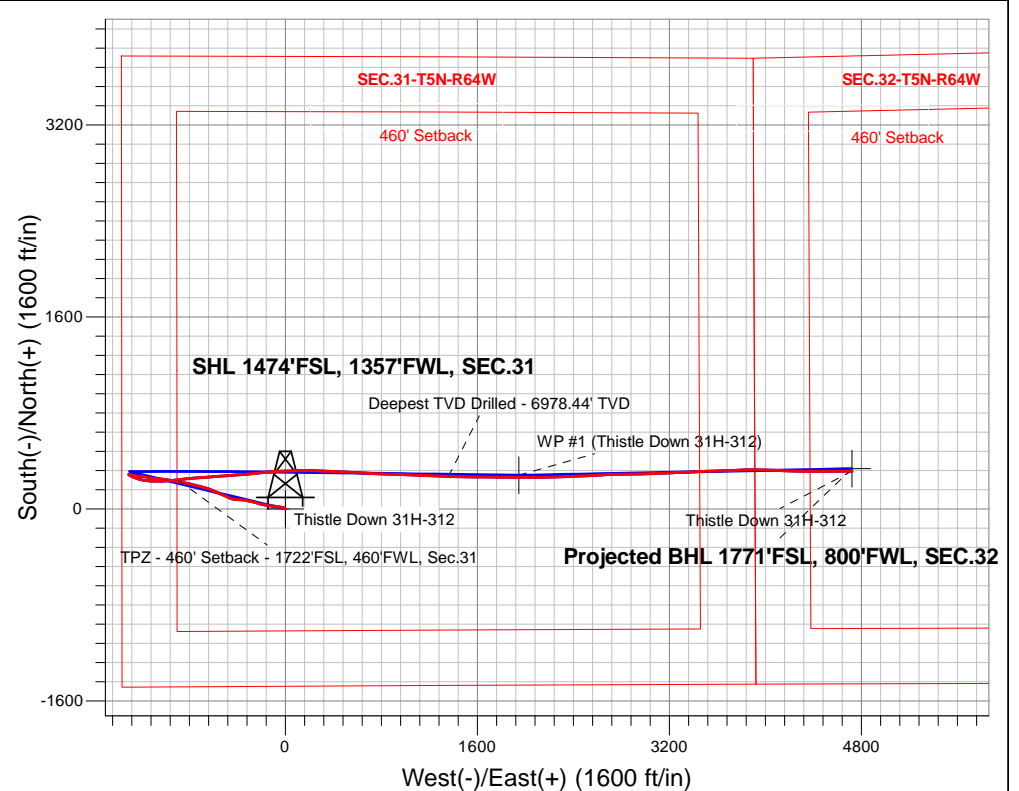
# PDC Energy Inc. DJ Basin

Well Name: **Thistle Down 31H-312**

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 1372530.013251619.41 40.352480 -104.597170  
Original Well Elev WELL @ 4827.0ft (Original Well Elev)

## FINAL SURVEY

**Projected Bottom Hole Location**  
**12,893'MD 6933'TVD 315'N & 4721'E of SHL**  
**91.71 degree Incl @ 89.56 degree AZM**





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

**SEC.31-T5N-R64W**

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

**Thistle Down 31H-312**

**Thistle Down 31H-312 Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**02 January, 2019**

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-312
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down 31H-312	<b>North Reference:</b>	True
<b>Wellbore:</b>	Thistle Down 31H-312 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Thistle Down 31H-312 Wellbore #1	<b>Database:</b>	US_EDM

<b>Project</b>	SEC.31-T5N-R64W, Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site		Thistle Down 5N64W31H Pad Sec.31-T5N-R64W			
Site Position:		Northing:	1,372,559.16 usft	Latitude:	40.352560
From:	Lat/Long	Easting:	3,251,619.12 usft	Longitude:	-104.597170
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.58 °

Well	Thistle Down 31H-312					
Well Position	+N/-S	0.0 ft	Northing:	1,372,530.01 usft	Latitude:	40.352480
	+E/-W	0.0 ft	Easting:	3,251,619.41 usft	Longitude:	-104.597170
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,804.0 ft

<b>Wellbore</b>	Thistle Down 31H-312 Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	12/25/2018	8.17	66.83	52,180

Design	Thistle Down 31H-312 Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	85.93	

<b>Survey Program</b>	<b>Date</b>	1/2/2019			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
152.0	12,893.0	Survey #1 (Thistle Down 31H-312 Wellbor	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.00	34.40	1.0	0.0	0.0	0.0	0.00	0.00	0.00	
<b>SHL 1474'FSL, 1357'FWL, SEC.31</b>										
152.0	0.20	34.40	152.0	0.2	0.1	0.2	0.13	0.13	0.00	
346.0	0.30	318.90	346.0	0.9	0.0	0.1	0.16	0.05	-38.92	
440.0	0.20	52.70	440.0	1.2	0.0	0.1	0.40	-0.11	99.79	
536.0	0.10	12.10	536.0	1.3	0.1	0.2	0.15	-0.10	-42.29	
631.0	1.40	310.30	631.0	2.2	-0.7	-0.6	1.43	1.37	-65.05	
727.0	3.90	304.90	726.9	4.8	-4.3	-4.0	2.61	2.60	-5.63	
822.0	6.90	292.20	821.4	8.8	-12.2	-11.6	3.38	3.16	-13.37	

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-312
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down 31H-312	<b>North Reference:</b>	True
<b>Wellbore:</b>	Thistle Down 31H-312 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Thistle Down 31H-312 Wellbore #1	<b>Database:</b>	US_EDM

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
918.0	10.40	281.30	916.3	12.7	-26.1	-25.1	4.01	3.65	-11.35	
1,013.0	13.10	277.60	1,009.3	15.8	-45.2	-43.9	2.95	2.84	-3.89	
1,109.0	13.90	278.00	1,102.7	18.8	-67.4	-65.9	0.84	0.83	0.42	
1,204.0	13.90	276.70	1,194.9	21.8	-90.0	-88.2	0.33	0.00	-1.37	
1,299.0	13.90	276.70	1,287.1	24.4	-112.7	-110.7	0.00	0.00	0.00	
1,395.0	15.70	279.30	1,379.9	27.9	-136.9	-134.6	2.00	1.88	2.71	
1,490.0	15.90	279.50	1,471.4	32.1	-162.5	-159.8	0.22	0.21	0.21	
1,585.0	17.00	283.10	1,562.5	37.4	-188.8	-185.7	1.58	1.16	3.79	
1,681.0	16.00	285.40	1,654.5	44.1	-215.3	-211.6	1.24	-1.04	2.40	
1,776.0	16.10	285.00	1,745.8	51.0	-240.6	-236.4	0.16	0.11	-0.42	
1,872.0	16.00	284.50	1,838.1	57.7	-266.3	-261.5	0.18	-0.10	-0.52	
1,967.0	14.00	283.50	1,929.8	63.7	-290.1	-284.9	2.12	-2.11	-1.05	
2,062.0	12.70	281.20	2,022.3	68.4	-311.5	-305.9	1.48	-1.37	-2.42	
2,157.0	11.30	279.30	2,115.2	71.9	-331.0	-325.0	1.53	-1.47	-2.00	
2,255.0	11.30	278.00	2,211.3	74.8	-350.0	-343.8	0.26	0.00	-1.33	
2,347.0	10.40	276.00	2,301.6	76.9	-367.1	-360.8	1.06	-0.98	-2.17	
2,470.0	10.60	271.90	2,422.6	78.5	-389.5	-382.9	0.63	0.16	-3.33	
2,563.0	9.86	269.64	2,514.1	78.7	-406.0	-399.4	0.91	-0.80	-2.43	
2,658.0	11.01	276.72	2,607.5	79.7	-423.1	-416.4	1.81	1.21	7.45	
2,753.0	13.03	285.84	2,700.5	83.7	-442.5	-435.4	2.91	2.13	9.60	
2,848.0	15.21	291.97	2,792.6	91.3	-464.3	-456.7	2.78	2.29	6.45	
2,943.0	17.07	294.60	2,883.8	101.8	-488.6	-480.1	2.10	1.96	2.77	
3,038.0	17.22	296.16	2,974.6	113.8	-513.9	-504.5	0.51	0.16	1.64	
3,133.0	16.73	294.50	3,065.5	125.6	-538.9	-528.7	0.73	-0.52	-1.75	
3,228.0	18.26	292.59	3,156.1	137.0	-565.1	-554.0	1.72	1.61	-2.01	
3,324.0	18.76	292.35	3,247.1	148.7	-593.3	-581.2	0.53	0.52	-0.25	
3,419.0	16.83	291.37	3,337.6	159.5	-620.2	-607.3	2.06	-2.03	-1.03	
3,514.0	15.63	290.99	3,428.8	169.1	-645.0	-631.4	1.27	-1.26	-0.40	
3,609.0	16.62	286.14	3,520.0	177.4	-670.0	-655.7	1.76	1.04	-5.11	
3,705.0	15.37	284.05	3,612.3	184.4	-695.5	-680.7	1.43	-1.30	-2.18	
3,801.0	16.64	282.52	3,704.6	190.4	-721.3	-705.9	1.39	1.32	-1.59	
3,896.0	18.11	283.92	3,795.3	196.9	-748.9	-733.0	1.61	1.55	1.47	
3,992.0	18.07	283.79	3,886.5	204.1	-777.8	-761.4	0.06	-0.04	-0.14	
4,087.0	18.13	283.34	3,976.8	211.0	-806.5	-789.5	0.16	0.06	-0.47	
4,183.0	17.75	282.33	4,068.1	217.6	-835.3	-817.8	0.51	-0.40	-1.05	
4,279.0	16.44	281.60	4,159.9	223.4	-862.9	-844.9	1.38	-1.36	-0.76	
4,374.0	15.77	280.01	4,251.2	228.4	-888.8	-870.4	0.84	-0.71	-1.67	
4,469.0	15.07	277.96	4,342.8	232.3	-913.8	-895.0	0.93	-0.74	-2.16	
4,565.0	15.52	277.25	4,435.4	235.7	-938.9	-919.8	0.51	0.47	-0.74	
4,660.0	15.88	278.96	4,526.8	239.3	-964.3	-944.9	0.62	0.38	1.80	
4,755.0	16.71	279.03	4,618.0	243.5	-990.6	-970.9	0.87	0.87	0.07	
4,851.0	17.96	276.90	4,709.6	247.4	-1,019.0	-998.9	1.46	1.30	-2.22	

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-312
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down 31H-312	<b>North Reference:</b>	True
<b>Wellbore:</b>	Thistle Down 31H-312 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Thistle Down 31H-312 Wellbore #1	<b>Database:</b>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,946.0	17.27	275.60	4,800.2	250.5	-1,047.5	-1,027.1	0.84	-0.73	-1.37
5,042.0	15.98	273.07	4,892.2	252.6	-1,074.9	-1,054.3	1.54	-1.34	-2.64
5,137.0	15.41	273.65	4,983.6	254.1	-1,100.6	-1,079.8	0.62	-0.60	0.61
5,233.0	15.39	284.13	5,076.2	258.1	-1,125.7	-1,104.5	2.90	-0.02	10.92
5,328.0	14.97	282.34	5,167.9	263.8	-1,149.9	-1,128.3	0.66	-0.44	-1.88
5,423.0	13.64	279.57	5,259.9	268.2	-1,172.9	-1,150.9	1.57	-1.40	-2.92
5,519.0	12.52	278.03	5,353.4	271.6	-1,194.4	-1,172.1	1.22	-1.17	-1.60
5,614.0	10.90	274.14	5,446.5	273.7	-1,213.5	-1,191.1	1.90	-1.71	-4.09
5,710.0	9.62	269.87	5,540.9	274.3	-1,230.6	-1,208.1	1.55	-1.33	-4.45
5,805.0	8.79	270.14	5,634.7	274.3	-1,245.8	-1,223.2	0.87	-0.87	0.28
5,900.0	7.88	285.54	5,728.7	276.1	-1,259.3	-1,236.6	2.53	-0.96	16.21
5,996.0	6.98	284.95	5,823.9	279.3	-1,271.3	-1,248.3	0.94	-0.94	-0.61
6,091.0	6.22	284.53	5,918.3	282.1	-1,281.9	-1,258.6	0.80	-0.80	-0.44
6,186.0	5.82	283.62	6,012.8	284.5	-1,291.5	-1,268.1	0.43	-0.42	-0.96
6,282.0	4.89	281.86	6,108.3	286.5	-1,300.3	-1,276.7	0.98	-0.97	-1.83
6,377.0	0.99	250.25	6,203.2	287.1	-1,305.0	-1,281.4	4.29	-4.11	-33.27
6,473.0	3.66	137.22	6,299.1	284.6	-1,303.7	-1,280.2	4.32	2.78	-117.74
6,568.0	11.19	117.85	6,393.3	278.0	-1,293.5	-1,270.5	8.24	7.93	-20.39
6,664.0	18.20	114.50	6,486.1	267.4	-1,271.6	-1,249.4	7.35	7.30	-3.49
6,759.0	26.60	108.13	6,573.8	254.6	-1,237.8	-1,216.6	9.19	8.84	-6.71
6,855.0	32.66	103.33	6,657.3	242.0	-1,192.1	-1,172.0	6.77	6.31	-5.00
6,950.0	39.20	92.99	6,734.2	234.5	-1,137.1	-1,117.6	9.37	6.88	-10.88
7,046.0	45.54	92.11	6,805.1	231.6	-1,072.5	-1,053.4	6.63	6.60	-0.92
7,141.0	51.91	86.46	6,867.8	232.7	-1,001.2	-982.2	8.05	6.71	-5.95
7,237.0	63.58	82.68	6,918.9	240.5	-920.5	-901.2	12.60	12.16	-3.94
7,261.6	66.97	83.04	6,929.2	243.3	-898.4	-878.9	13.83	13.77	1.48
TPZ - 460' Setback - 1722'FSL, 460'FWL, Sec.31									
7,333.0	76.80	84.01	6,951.4	250.9	-831.0	-811.1	13.83	13.77	1.35
7,427.0	82.25	85.06	6,968.5	259.7	-739.0	-718.8	5.90	5.80	1.12
7,523.0	87.77	86.60	6,976.8	266.7	-643.7	-623.2	5.97	5.75	1.60
7,595.1	90.77	86.39	6,977.7	271.1	-571.8	-551.1	4.17	4.16	-0.29
LPL 1792'FSL, 784'FWL, SEC.31									
7,619.0	91.76	86.32	6,977.2	272.6	-547.9	-527.2	4.17	4.16	-0.29
7,714.0	91.15	85.89	6,974.8	279.0	-453.2	-432.2	0.79	-0.64	-0.45
7,809.0	90.57	84.44	6,973.4	287.0	-358.5	-337.3	1.64	-0.61	-1.53
7,905.0	90.96	83.88	6,972.1	296.8	-263.0	-241.3	0.71	0.41	-0.58
8,000.0	90.99	84.93	6,970.5	306.1	-168.5	-146.4	1.11	0.03	1.11
8,096.0	91.41	86.49	6,968.5	313.3	-72.8	-50.4	1.68	0.44	1.63
8,192.0	89.68	88.66	6,967.6	317.3	23.1	45.6	2.89	-1.80	2.26
8,287.0	89.22	88.85	6,968.5	319.4	118.1	140.4	0.52	-0.48	0.20
8,383.0	89.84	90.86	6,969.3	319.6	214.1	236.2	2.19	0.65	2.09
8,478.0	89.99	93.17	6,969.4	316.3	309.0	330.7	2.44	0.16	2.43
8,574.0	89.83	92.73	6,969.6	311.3	404.9	426.0	0.49	-0.17	-0.46

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-312
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down 31H-312	<b>North Reference:</b>	True
<b>Wellbore:</b>	Thistle Down 31H-312 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Thistle Down 31H-312 Wellbore #1	<b>Database:</b>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,669.0	89.90	92.77	6,969.8	306.8	499.8	520.3	0.08	0.07	0.04
8,765.0	89.73	92.79	6,970.1	302.1	595.7	615.6	0.18	-0.18	0.02
8,861.0	89.83	92.62	6,970.5	297.6	691.6	710.9	0.21	0.10	-0.18
8,956.0	89.55	92.49	6,971.0	293.4	786.5	805.3	0.32	-0.29	-0.14
9,052.0	89.29	91.88	6,971.9	289.7	882.4	900.7	0.69	-0.27	-0.64
9,147.0	89.08	91.96	6,973.3	286.5	977.3	995.2	0.24	-0.22	0.08
9,242.0	88.78	92.13	6,975.1	283.1	1,072.3	1,089.6	0.36	-0.32	0.18
9,338.0	89.09	92.64	6,976.8	279.1	1,168.2	1,185.0	0.62	0.32	0.53
9,433.0	89.01	92.20	6,978.4	275.1	1,263.1	1,279.4	0.47	-0.08	-0.46
9,529.0	90.97	91.77	6,978.4	271.8	1,359.0	1,374.8	2.09	2.04	-0.45
Deepest TVD Drilled - 6978.44' TVD									
9,624.0	90.78	91.24	6,977.0	269.3	1,453.9	1,469.4	0.59	-0.20	-0.56
9,720.0	90.63	90.45	6,975.8	267.9	1,549.9	1,565.0	0.84	-0.16	-0.82
9,816.0	90.91	90.59	6,974.5	267.0	1,645.9	1,660.7	0.33	0.29	0.15
9,911.0	90.94	91.36	6,973.0	265.4	1,740.9	1,755.3	0.81	0.03	0.81
10,006.0	90.84	90.51	6,971.5	263.9	1,835.9	1,850.0	0.90	-0.11	-0.89
10,101.0	90.94	89.89	6,970.0	263.5	1,930.9	1,944.7	0.66	0.11	-0.65
10,116.1	90.94	89.86	6,969.8	263.6	1,946.0	1,959.8	0.17	-0.02	-0.17
WP #1 (Thistle Down 31H-312)									
10,196.0	90.92	89.73	6,968.5	263.8	2,025.8	2,039.4	0.17	-0.02	-0.17
10,293.0	91.01	89.50	6,966.9	264.5	2,122.8	2,136.2	0.25	0.09	-0.24
10,388.0	90.36	88.47	6,965.7	266.2	2,217.8	2,231.1	1.28	-0.68	-1.08
10,484.0	90.42	87.67	6,965.1	269.4	2,313.7	2,327.0	0.84	0.06	-0.83
10,580.0	90.37	88.07	6,964.4	273.0	2,409.7	2,423.0	0.42	-0.05	0.42
10,675.0	90.01	87.14	6,964.1	276.9	2,504.6	2,517.9	1.05	-0.38	-0.98
10,771.0	89.95	86.27	6,964.1	282.5	2,600.4	2,613.9	0.91	-0.06	-0.91
10,866.0	89.78	87.41	6,964.3	287.7	2,695.3	2,708.9	1.21	-0.18	1.20
10,961.0	90.29	90.12	6,964.3	289.7	2,790.3	2,803.8	2.90	0.54	2.85
11,057.0	90.34	88.91	6,963.8	290.6	2,886.2	2,899.6	1.26	0.05	-1.26
11,153.0	90.22	88.32	6,963.3	292.9	2,982.2	2,995.5	0.63	-0.13	-0.61
11,248.0	90.21	88.15	6,962.9	295.8	3,077.2	3,090.4	0.18	-0.01	-0.18
11,344.0	89.87	87.41	6,962.9	299.5	3,173.1	3,186.3	0.85	-0.35	-0.77
11,440.0	90.39	87.28	6,962.7	304.0	3,269.0	3,282.3	0.56	0.54	-0.14
11,535.0	91.33	87.97	6,961.2	307.9	3,363.9	3,377.3	1.23	0.99	0.73
11,631.0	91.40	87.10	6,958.9	312.0	3,459.8	3,473.2	0.91	0.07	-0.91
11,726.0	91.85	87.93	6,956.2	316.1	3,554.7	3,568.1	0.99	0.47	0.87
11,822.0	90.81	89.29	6,954.0	318.5	3,650.6	3,664.0	1.78	-1.08	1.42
11,917.0	90.54	87.22	6,952.9	321.4	3,745.5	3,758.9	2.20	-0.28	-2.18
12,013.0	90.54	87.32	6,952.0	325.9	3,841.4	3,854.9	0.10	0.00	0.10
12,109.0	91.04	91.90	6,950.7	326.6	3,937.4	3,950.6	4.80	0.52	4.77
12,205.0	90.55	91.69	6,949.3	323.6	4,033.3	4,046.1	0.56	-0.51	-0.22
12,301.0	90.97	91.93	6,948.1	320.6	4,129.3	4,141.6	0.50	0.44	0.25
12,396.0	91.07	91.98	6,946.4	317.3	4,224.2	4,236.1	0.12	0.11	0.05

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Thistle Down 31H-312
<b>Project:</b>	SEC.31-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down 5N64W31H Pad Sec.31-T5N-R64W	<b>MD Reference:</b>	WELL @ 4827.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down 31H-312	<b>North Reference:</b>	True
<b>Wellbore:</b>	Thistle Down 31H-312 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Thistle Down 31H-312 Wellbore #1	<b>Database:</b>	US_EDM

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,492.0	90.76	91.41	6,944.8	314.5	4,320.2	4,331.6	0.68	-0.32	-0.59
12,588.0	91.81	90.01	6,942.7	313.3	4,416.1	4,427.2	1.82	1.09	-1.46
12,683.0	92.07	89.62	6,939.5	313.6	4,511.1	4,521.9	0.49	0.27	-0.41
12,779.0	91.91	89.68	6,936.1	314.2	4,607.0	4,617.7	0.18	-0.17	0.06
12,836.0	91.71	89.56	6,934.3	314.6	4,664.0	4,674.5	0.41	-0.35	-0.21
12,893.0	91.71	89.56	6,932.6	315.0	4,720.9	4,731.4	0.00	0.00	0.00
Projected BHL 1771'FSL, 800'FWL, SEC.32									

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 1474'FSL, 1357'FW - survey hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,372,530.02	3,251,619.41	40.352480	-104.597170
Projected BHL 1771'FSL - survey misses target center by 21.9ft at 12893.0ft MD (6932.6 TVD, 315.0 N, 4720.9 E) - Point	0.00	0.00	6,940.0	335.6	4,721.4	1,372,913.67	3,256,336.96	40.353400	-104.580230
WP #1 (Thistle Down 31) - survey misses target center by 19.9ft at 10116.1ft MD (6969.8 TVD, 263.6 N, 1946.0 E) - Point	0.00	0.00	6,962.0	281.9	1,945.8	1,372,831.70	3,253,562.16	40.353254	-104.590189

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
7,261.6	6,929.2	243.3	-898.4	TPZ - 460' Setback - 1722'FSL, 460'FWL, Sec.31
9,529.0	6,978.4	271.8	1,359.0	Deepest TVD Drilled - 6978.44' TVD

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------