

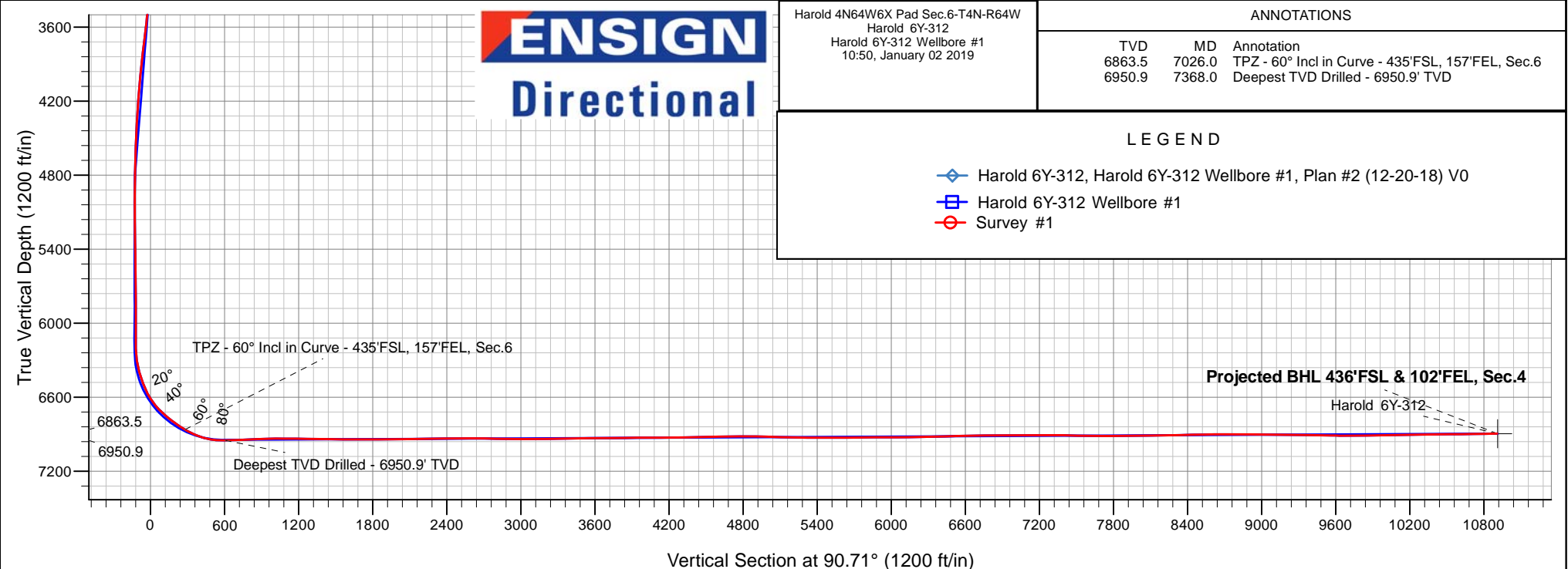
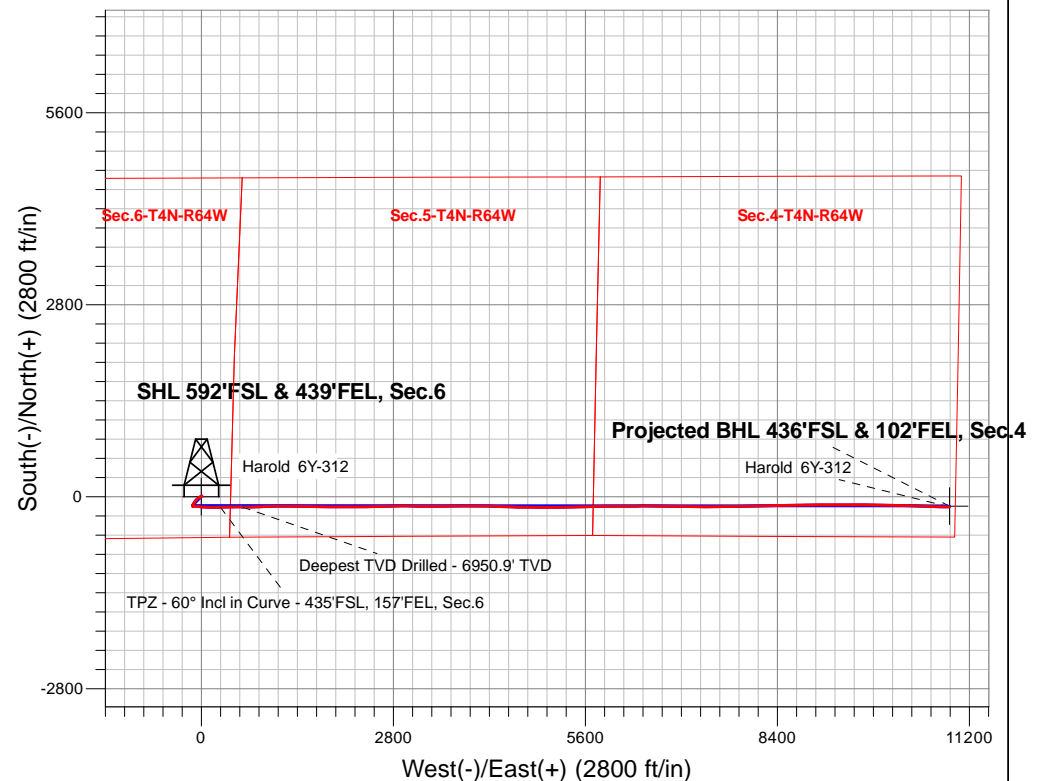
PDC Energy Inc. DJ Basin

Well Name: **Harold 6Y-312**

Surface Location: Harold 4N64W6X Pad Sec.6-T4N-R64W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4788.0
+N/-S+E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1366450.863254937.56 40.335700 -104.585490
RKB - 23' WELL @ 4811.0ft (RKB - 23')

FINAL SURVEY

Projected Bottom Hole Location
17,675'MD 6896'TVD 150'S & 10907'E of SHL
91.12 degree Incl @ 90.79 degree AZM





PDC Energy Inc. DJ Basin

SEC.6-T4N-R64W

Harold 4N64W6X Pad Sec.6-T4N-R64W

Harold 6Y-312

Harold 6Y-312 Wellbore #1

Survey: Survey #1

Standard Survey Report

02 January, 2019

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Harold 6Y-312
Project:	SEC.6-T4N-R64W	TVD Reference:	WELL @ 4811.0ft (RKB - 23')
Site:	Harold 4N64W6X Pad Sec.6-T4N-R64W	MD Reference:	WELL @ 4811.0ft (RKB - 23')
Well:	Harold 6Y-312	North Reference:	True
Wellbore:	Harold 6Y-312 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Harold 6Y-312 Wellbore #1	Database:	US_EDM

Project	SEC.6-T4N-R64W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Harold 4N64W6X Pad Sec.6-T4N-R64W				
Site Position:		Northing:	1,366,494.58 usft	Latitude:	40.335820
From:	Lat/Long	Easting:	3,254,937.11 usft	Longitude:	-104.585490
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.59 °

Well	Harold 6Y-312					
Well Position	+N/-S	0.0 ft	Northing:	1,366,450.86 usft	Latitude:	40.335700
	+E/-W	0.0 ft	Easting:	3,254,937.56 usft	Longitude:	-104.585490
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,788.0 ft

Wellbore	Harold 6Y-312 Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/20/2018	8.18	66.83	52,188

Design	Harold 6Y-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	90.71	

Survey Program	Date	1/2/2019			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
158.0	17,675.0	Survey #1 (Harold 6Y-312 Wellbore #1)	MWD	MWD - Standard	

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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.00	282.92	1.0	0.0	0.0	0.0	0.33	0.33	0.00	
SHL 592'FSL & 439'FEL, Sec.6										
158.0	0.52	282.92	158.0	0.2	-0.7	-0.7	0.33	0.33	0.00	
253.0	0.39	271.11	253.0	0.3	-1.4	-1.4	0.17	-0.14	-12.43	
348.0	0.62	288.54	348.0	0.4	-2.3	-2.3	0.29	0.24	18.35	
444.0	0.65	291.58	444.0	0.8	-3.3	-3.3	0.05	0.03	3.17	
540.0	0.41	296.34	540.0	1.2	-4.1	-4.1	0.25	-0.25	4.96	
635.0	0.44	313.74	635.0	1.6	-4.6	-4.7	0.14	0.03	18.32	
731.0	0.61	303.35	731.0	2.1	-5.3	-5.4	0.20	0.18	-10.82	
826.0	0.58	303.75	826.0	2.6	-6.1	-6.2	0.03	-0.03	0.42	

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Site:	Harold 4N64W6X Pad Sec.6-T4N-R64W	MD Reference:	WELL @ 4811.0ft (RKB - 23')
Well:	Harold 6Y-312	North Reference:	True
Wellbore:	Harold 6Y-312 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Harold 6Y-312 Wellbore #1	Database:	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)
922.0	0.77	298.01	922.0	3.2	-7.1	-7.2	0.21	0.20	-5.98
1,017.0	0.81	299.44	1,017.0	3.8	-8.3	-8.3	0.05	0.04	1.51
1,113.0	0.63	281.48	1,112.9	4.3	-9.4	-9.4	0.30	-0.19	-18.71
1,208.0	0.61	105.73	1,207.9	4.2	-9.4	-9.5	1.30	-0.02	-185.00
1,303.0	0.80	99.74	1,302.9	4.0	-8.3	-8.3	0.21	0.20	-6.31
1,399.0	0.52	105.81	1,398.9	3.8	-7.2	-7.2	0.30	-0.29	6.32
1,495.0	0.55	114.82	1,494.9	3.4	-6.3	-6.4	0.09	0.03	9.39
1,595.0	0.38	116.54	1,594.9	3.1	-5.6	-5.7	0.17	-0.17	1.72
1,778.0	0.46	46.45	1,777.9	3.3	-4.5	-4.6	0.27	0.04	-38.30
1,873.0	0.50	72.53	1,872.9	3.7	-3.9	-3.9	0.23	0.04	27.45
1,969.0	0.78	81.33	1,968.9	3.9	-2.8	-2.9	0.31	0.29	9.17
2,064.0	0.68	76.71	2,063.9	4.2	-1.6	-1.7	0.12	-0.11	-4.86
2,159.0	0.75	54.86	2,158.9	4.7	-0.6	-0.6	0.29	0.07	-23.00
2,255.0	1.43	55.94	2,254.9	5.7	0.9	0.9	0.71	0.71	1.13
2,376.0	1.56	53.03	2,375.8	7.5	3.5	3.4	0.12	0.11	-2.40
2,471.0	1.57	58.01	2,470.8	9.0	5.6	5.5	0.14	0.01	5.24
2,566.0	1.55	258.90	2,565.8	9.4	5.5	5.4	3.23	-0.02	-167.48
2,662.0	1.30	258.27	2,661.8	9.0	3.1	3.0	0.26	-0.26	-0.66
2,758.0	1.40	253.02	2,757.7	8.4	0.9	0.8	0.17	0.10	-5.47
2,853.0	1.28	248.24	2,852.7	7.7	-1.1	-1.2	0.17	-0.13	-5.03
2,949.0	1.26	242.15	2,948.7	6.8	-3.1	-3.2	0.14	-0.02	-6.34
3,044.0	1.42	222.97	3,043.7	5.4	-4.8	-4.9	0.50	0.17	-20.19
3,140.0	1.58	217.82	3,139.6	3.5	-6.4	-6.5	0.22	0.17	-5.36
3,235.0	3.89	232.16	3,234.5	0.5	-9.8	-9.8	2.52	2.43	15.09
3,331.0	3.88	233.97	3,330.3	-3.4	-15.0	-14.9	0.13	-0.01	1.89
3,426.0	5.18	243.19	3,425.0	-7.2	-21.4	-21.3	1.56	1.37	9.71
3,521.0	6.20	240.15	3,519.5	-11.7	-29.7	-29.5	1.12	1.07	-3.20
3,617.0	7.90	236.25	3,614.8	-18.0	-39.7	-39.4	1.84	1.77	-4.06
3,713.0	7.80	235.78	3,709.9	-25.3	-50.5	-50.2	0.12	-0.10	-0.49
3,808.0	9.14	230.12	3,803.9	-33.8	-61.7	-61.2	1.66	1.41	-5.96
3,903.0	9.46	222.89	3,897.6	-44.3	-72.8	-72.2	1.27	0.34	-7.61
3,999.0	9.61	219.96	3,992.3	-56.2	-83.3	-82.6	0.53	0.16	-3.05
4,095.0	7.99	209.61	4,087.2	-68.2	-91.7	-90.9	2.35	-1.69	-10.78
4,190.0	7.79	211.88	4,181.3	-79.4	-98.4	-97.4	0.39	-0.21	2.39
4,285.0	7.52	211.69	4,275.4	-90.1	-105.0	-103.9	0.29	-0.28	-0.20
4,381.0	7.48	213.26	4,370.6	-100.7	-111.8	-110.5	0.22	-0.04	1.64
4,477.0	6.09	203.70	4,465.9	-110.6	-117.2	-115.9	1.86	-1.45	-9.96
4,572.0	5.12	206.16	4,560.5	-119.0	-121.1	-119.6	1.05	-1.02	2.59
4,668.0	3.42	204.57	4,656.2	-125.5	-124.2	-122.6	1.77	-1.77	-1.66
4,763.0	1.66	234.72	4,751.1	-128.8	-126.5	-124.9	2.27	-1.85	31.74
4,858.0	1.62	233.42	4,846.1	-130.4	-128.7	-127.1	0.06	-0.04	-1.37
4,954.0	0.90	165.19	4,942.0	-132.0	-129.6	-128.0	1.60	-0.75	-71.07
5,050.0	0.86	152.37	5,038.0	-133.3	-129.1	-127.4	0.21	-0.04	-13.35

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Well:	Harold 6Y-312	North Reference:	True
Wellbore:	Harold 6Y-312 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Harold 6Y-312 Wellbore #1	Database:	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)
5,146.0	0.95	158.22	5,134.0	-134.7	-128.5	-126.8	0.13	0.09	6.09
5,264.0	0.81	152.62	5,252.0	-136.4	-127.7	-126.0	0.14	-0.12	-4.75
5,359.0	0.53	89.03	5,347.0	-137.0	-127.0	-125.3	0.78	-0.29	-66.94
5,455.0	0.60	85.87	5,443.0	-136.9	-126.0	-124.3	0.08	0.07	-3.29
5,550.0	0.83	102.73	5,538.0	-137.0	-124.9	-123.1	0.33	0.24	17.75
5,645.0	0.95	72.10	5,633.0	-136.9	-123.4	-121.7	0.51	0.13	-32.24
5,741.0	1.02	66.67	5,729.0	-136.4	-121.9	-120.2	0.12	0.07	-5.66
5,837.0	0.55	76.75	5,825.0	-135.9	-120.7	-119.0	0.51	-0.49	10.50
5,932.0	0.22	324.99	5,920.0	-135.7	-120.3	-118.6	0.70	-0.35	-117.64
6,028.0	0.14	348.74	6,016.0	-135.4	-120.5	-118.8	0.11	-0.08	24.74
6,123.0	0.28	36.96	6,111.0	-135.1	-120.3	-118.6	0.23	0.15	50.76
6,219.0	0.58	10.70	6,206.9	-134.4	-120.1	-118.4	0.37	0.31	-27.35
6,315.0	8.16	100.98	6,302.6	-135.3	-113.3	-111.6	8.52	7.90	94.04
6,411.0	16.45	96.57	6,396.3	-138.1	-93.1	-91.4	8.68	8.64	-4.59
6,506.0	20.29	95.90	6,486.5	-141.3	-63.3	-61.6	4.05	4.04	-0.71
6,602.0	27.57	92.50	6,574.2	-144.0	-24.5	-22.7	7.72	7.58	-3.54
6,698.0	38.35	94.98	6,654.6	-147.6	27.5	29.3	11.31	11.23	2.58
6,793.0	47.04	94.27	6,724.4	-152.7	91.6	93.5	9.16	9.15	-0.75
6,889.0	52.07	90.68	6,786.6	-155.8	164.6	166.5	5.96	5.24	-3.74
6,985.0	57.23	88.22	6,842.2	-155.0	242.9	244.8	5.77	5.38	-2.56
7,026.0	60.00	87.90	6,863.5	-153.8	277.8	279.7	6.78	6.75	-0.78
TPZ - 60° Incl in Curve - 435'FSL, 157'FEL, Sec.6									
7,081.0	63.71	87.50	6,889.5	-151.9	326.3	328.2	6.78	6.75	-0.73
7,176.0	72.24	88.49	6,925.0	-148.8	414.2	416.0	9.03	8.98	1.04
7,272.0	82.38	90.76	6,946.1	-148.2	507.7	509.5	10.81	10.56	2.36
7,352.0	90.30	91.86	6,951.2	-150.1	587.5	589.3	10.00	9.91	1.38
LPL 459'FSL & 153'FWL, Sec.5									
7,368.0	91.89	92.08	6,950.9	-150.6	603.5	605.3	10.00	9.91	1.37
Deepest TVD Drilled - 6950.9' TVD									
7,464.0	93.24	89.15	6,946.6	-151.7	699.4	701.2	3.36	1.41	-3.05
7,559.0	91.64	87.56	6,942.6	-148.9	794.2	796.0	2.37	-1.68	-1.67
7,654.0	92.00	87.26	6,939.5	-144.6	889.1	890.8	0.49	0.38	-0.32
7,750.0	90.63	88.13	6,937.3	-140.8	985.0	986.7	1.69	-1.43	0.91
7,846.0	91.11	87.85	6,935.9	-137.4	1,080.9	1,082.5	0.58	0.50	-0.29
7,941.0	88.67	90.62	6,936.1	-136.1	1,175.9	1,177.5	3.89	-2.57	2.92
8,037.0	88.95	90.88	6,938.1	-137.4	1,271.9	1,273.5	0.40	0.29	0.27
8,133.0	89.06	91.04	6,939.7	-139.0	1,367.8	1,369.5	0.20	0.11	0.17
8,228.0	89.34	91.19	6,941.1	-140.9	1,462.8	1,464.4	0.33	0.29	0.16
8,324.0	89.37	91.32	6,942.1	-143.0	1,558.8	1,560.4	0.14	0.03	0.14
8,419.0	89.99	90.82	6,942.7	-144.7	1,653.8	1,655.4	0.84	0.65	-0.53
8,515.0	90.24	90.75	6,942.5	-146.0	1,749.7	1,751.4	0.27	0.26	-0.07
8,611.0	90.43	90.59	6,941.9	-147.2	1,845.7	1,847.4	0.26	0.20	-0.17
8,707.0	90.32	90.42	6,941.3	-148.0	1,941.7	1,943.4	0.21	-0.11	-0.18
8,802.0	90.41	90.24	6,940.7	-148.6	2,036.7	2,038.4	0.21	0.09	-0.19

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8,898.0	90.66	90.25	6,939.8	-149.0	2,132.7	2,134.4	0.26	0.26	0.01	
8,993.0	90.90	90.20	6,938.5	-149.3	2,227.7	2,229.4	0.26	0.25	-0.05	
9,089.0	91.51	90.42	6,936.5	-149.9	2,323.7	2,325.4	0.68	0.64	0.23	
9,184.0	90.87	89.02	6,934.5	-149.4	2,418.7	2,420.3	1.62	-0.67	-1.47	
9,280.0	89.50	86.86	6,934.2	-146.0	2,514.6	2,516.2	2.66	-1.43	-2.25	
9,375.0	89.95	87.06	6,934.6	-140.9	2,609.5	2,611.0	0.52	0.47	0.21	
9,471.0	89.25	89.23	6,935.3	-137.8	2,705.4	2,706.9	2.38	-0.73	2.26	
9,566.0	88.88	88.90	6,936.9	-136.3	2,800.4	2,801.9	0.52	-0.39	-0.35	
9,661.0	88.88	89.69	6,938.7	-135.1	2,895.3	2,896.8	0.83	0.00	0.83	
9,757.0	89.92	90.77	6,939.7	-135.5	2,991.3	2,992.8	1.56	1.08	1.13	
9,852.0	90.06	90.54	6,939.7	-136.6	3,086.3	3,087.8	0.28	0.15	-0.24	
9,947.0	90.90	90.62	6,938.9	-137.5	3,181.3	3,182.8	0.89	0.88	0.08	
10,042.0	90.98	90.50	6,937.4	-138.4	3,276.3	3,277.8	0.15	0.08	-0.13	
10,137.0	90.87	89.69	6,935.9	-138.6	3,371.3	3,372.8	0.86	-0.12	-0.85	
10,232.0	91.15	89.54	6,934.2	-138.0	3,466.3	3,467.7	0.33	0.29	-0.16	
10,327.0	90.22	90.06	6,933.0	-137.6	3,561.3	3,562.7	1.12	-0.98	0.55	
10,422.0	90.64	90.32	6,932.3	-138.0	3,656.3	3,657.7	0.52	0.44	0.27	
10,518.0	90.67	89.79	6,931.2	-138.0	3,752.3	3,753.7	0.55	0.03	-0.55	
10,614.0	90.48	89.44	6,930.3	-137.4	3,848.2	3,849.7	0.41	-0.20	-0.36	
10,709.0	90.48	88.65	6,929.5	-135.8	3,943.2	3,944.6	0.83	0.00	-0.83	
10,805.0	90.22	89.93	6,928.9	-134.6	4,039.2	4,040.6	1.36	-0.27	1.33	
10,901.0	90.25	91.65	6,928.5	-136.0	4,135.2	4,136.6	1.79	0.03	1.79	
10,996.0	90.45	91.68	6,927.9	-138.7	4,230.2	4,231.6	0.21	0.21	0.03	
11,092.0	90.95	91.83	6,926.7	-141.7	4,326.1	4,327.5	0.54	0.52	0.16	
11,187.0	91.88	92.13	6,924.4	-144.9	4,421.0	4,422.5	1.03	0.98	0.32	
11,283.0	91.82	91.84	6,921.3	-148.3	4,516.9	4,518.4	0.31	-0.06	-0.30	
11,379.0	90.42	91.13	6,919.4	-150.7	4,612.9	4,614.4	1.64	-1.46	-0.74	
11,475.0	90.14	90.36	6,918.9	-152.0	4,708.9	4,710.4	0.85	-0.29	-0.80	
11,571.0	90.84	90.04	6,918.1	-152.3	4,804.8	4,806.4	0.80	0.73	-0.33	
11,666.0	88.60	90.65	6,918.6	-152.9	4,899.8	4,901.4	2.44	-2.36	0.64	
11,762.0	88.49	90.03	6,921.0	-153.5	4,995.8	4,997.3	0.66	-0.11	-0.65	
11,858.0	88.63	90.11	6,923.4	-153.6	5,091.8	5,093.3	0.17	0.15	0.08	
11,953.0	88.54	89.99	6,925.8	-153.7	5,186.7	5,188.3	0.16	-0.09	-0.13	
12,049.0	88.26	89.20	6,928.5	-153.0	5,282.7	5,284.2	0.87	-0.29	-0.82	
12,144.0	90.17	88.96	6,929.8	-151.5	5,377.7	5,379.2	2.03	2.01	-0.25	
12,240.0	90.22	88.70	6,929.4	-149.5	5,473.7	5,475.1	0.28	0.05	-0.27	
12,336.0	90.14	87.96	6,929.1	-146.7	5,569.6	5,571.0	0.78	-0.08	-0.77	
12,431.0	91.40	88.54	6,927.9	-143.8	5,664.6	5,665.9	1.46	1.33	0.61	
12,527.0	90.62	87.49	6,926.2	-140.5	5,760.5	5,761.8	1.36	-0.81	-1.09	
12,623.0	90.14	90.56	6,925.5	-138.8	5,856.5	5,857.7	3.24	-0.50	3.20	
12,718.0	89.97	90.22	6,925.4	-139.5	5,951.5	5,952.7	0.40	-0.18	-0.36	
12,814.0	90.62	90.26	6,925.0	-139.9	6,047.5	6,048.7	0.68	0.68	0.04	
12,910.0	90.62	89.35	6,923.9	-139.6	6,143.4	6,144.7	0.95	0.00	-0.95	

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Harold 6Y-312
Project:	SEC.6-T4N-R64W	TVD Reference:	WELL @ 4811.0ft (RKB - 23')
Site:	Harold 4N64W6X Pad Sec.6-T4N-R64W	MD Reference:	WELL @ 4811.0ft (RKB - 23')
Well:	Harold 6Y-312	North Reference:	True
Wellbore:	Harold 6Y-312 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Harold 6Y-312 Wellbore #1	Database:	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)
13,006.0	91.04	89.10	6,922.5	-138.3	6,239.4	6,240.7	0.51	0.44	-0.26
13,101.0	91.06	88.37	6,920.8	-136.2	6,334.4	6,335.6	0.77	0.02	-0.77
13,197.0	91.60	89.80	6,918.6	-134.6	6,430.3	6,431.5	1.59	0.56	1.49
13,293.0	92.38	90.12	6,915.2	-134.6	6,526.3	6,527.5	0.88	0.81	0.33
13,389.0	90.78	91.62	6,912.6	-136.0	6,622.2	6,623.4	2.28	-1.67	1.56
13,485.0	90.70	91.28	6,911.3	-138.5	6,718.2	6,719.4	0.36	-0.08	-0.35
13,581.0	89.94	91.13	6,910.8	-140.5	6,814.2	6,815.4	0.81	-0.79	-0.16
13,676.0	90.20	90.93	6,910.7	-142.2	6,909.2	6,910.4	0.35	0.27	-0.21
13,771.0	90.45	90.49	6,910.1	-143.4	7,004.1	7,005.4	0.53	0.26	-0.46
13,867.0	90.81	90.25	6,909.1	-144.0	7,100.1	7,101.4	0.45	0.38	-0.25
13,962.0	90.14	90.88	6,908.3	-144.9	7,195.1	7,196.4	0.97	-0.71	0.66
14,058.0	90.14	90.46	6,908.1	-146.0	7,291.1	7,292.4	0.44	0.00	-0.44
14,154.0	88.57	90.13	6,909.1	-146.5	7,387.1	7,388.4	1.67	-1.64	-0.34
14,250.0	88.43	89.74	6,911.7	-146.4	7,483.1	7,484.3	0.43	-0.15	-0.41
14,346.0	88.99	89.24	6,913.8	-145.6	7,579.1	7,580.3	0.78	0.58	-0.52
14,441.0	89.97	89.01	6,914.7	-144.1	7,674.0	7,675.2	1.06	1.03	-0.24
14,537.0	90.36	88.91	6,914.4	-142.4	7,770.0	7,771.2	0.42	0.41	-0.10
14,633.0	90.34	87.52	6,913.8	-139.4	7,866.0	7,867.1	1.45	-0.02	-1.45
14,728.0	90.34	88.65	6,913.3	-136.2	7,960.9	7,962.0	1.19	0.00	1.19
14,824.0	90.89	89.40	6,912.2	-134.6	8,056.9	8,057.9	0.97	0.57	0.78
14,920.0	90.92	88.62	6,910.7	-132.9	8,152.9	8,153.9	0.81	0.03	-0.81
15,016.0	91.29	88.07	6,908.9	-130.2	8,248.8	8,249.8	0.69	0.39	-0.57
15,111.0	90.92	89.63	6,907.0	-128.2	8,343.8	8,344.7	1.69	-0.39	1.64
15,207.0	91.09	89.07	6,905.3	-127.2	8,439.7	8,440.7	0.61	0.18	-0.58
15,301.0	91.20	88.99	6,903.5	-125.6	8,533.7	8,534.6	0.14	0.12	-0.09
15,377.0	91.15	89.38	6,901.9	-124.5	8,609.7	8,610.6	0.52	-0.07	0.51
15,473.0	89.70	89.68	6,901.2	-123.7	8,705.7	8,706.5	1.54	-1.51	0.31
15,569.0	89.49	90.02	6,901.9	-123.4	8,801.7	8,802.5	0.42	-0.22	0.35
15,664.0	89.81	89.13	6,902.4	-122.7	8,896.7	8,897.5	1.00	0.34	-0.94
15,759.0	89.73	88.68	6,902.8	-120.9	8,991.7	8,992.5	0.48	-0.08	-0.47
15,854.0	89.50	90.00	6,903.5	-119.8	9,086.6	9,087.4	1.41	-0.24	1.39
15,950.0	89.25	91.06	6,904.5	-120.7	9,182.6	9,183.4	1.13	-0.26	1.10
16,045.0	89.25	90.09	6,905.8	-121.7	9,277.6	9,278.4	1.02	0.00	-1.02
16,141.0	89.29	88.91	6,907.0	-120.8	9,373.6	9,374.4	1.23	0.04	-1.23
16,236.0	88.90	88.59	6,908.5	-118.8	9,468.6	9,469.3	0.53	-0.41	-0.34
16,331.0	88.53	88.91	6,910.6	-116.7	9,563.5	9,564.2	0.51	-0.39	0.34
16,427.0	90.01	91.16	6,911.8	-116.8	9,659.5	9,660.2	2.81	1.54	2.34
16,523.0	90.22	90.95	6,911.6	-118.5	9,755.5	9,756.2	0.31	0.22	-0.22
16,618.0	90.68	91.62	6,910.9	-120.6	9,850.5	9,851.2	0.86	0.48	0.71
16,714.0	91.19	90.91	6,909.3	-122.8	9,946.4	9,947.2	0.91	0.53	-0.74
16,809.0	91.26	89.82	6,907.3	-123.4	10,041.4	10,042.2	1.15	0.07	-1.15
16,904.0	90.47	91.57	6,905.9	-124.5	10,136.4	10,137.1	2.02	-0.83	1.84
16,999.0	90.48	92.75	6,905.1	-128.1	10,231.3	10,232.1	1.24	0.01	1.24

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Harold 6Y-312
Project:	SEC.6-T4N-R64W	TVD Reference:	WELL @ 4811.0ft (RKB - 23')
Site:	Harold 4N64W6X Pad Sec.6-T4N-R64W	MD Reference:	WELL @ 4811.0ft (RKB - 23')
Well:	Harold 6Y-312	North Reference:	True
Wellbore:	Harold 6Y-312 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Harold 6Y-312 Wellbore #1	Database:	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)	
17,095.0	91.05	92.81	6,903.8	-132.8	10,327.2	10,328.0	0.60	0.59	0.06	
17,190.0	91.76	92.84	6,901.5	-137.4	10,422.0	10,422.9	0.75	0.75	0.03	
17,285.0	90.01	92.15	6,900.0	-141.6	10,516.9	10,517.9	1.98	-1.84	-0.73	
17,381.0	90.34	91.79	6,899.7	-144.9	10,612.9	10,613.9	0.51	0.34	-0.38	
17,475.0	90.56	91.00	6,899.0	-147.2	10,706.8	10,707.8	0.87	0.23	-0.84	
17,571.0	90.98	90.47	6,897.7	-148.4	10,802.8	10,803.8	0.70	0.44	-0.55	
17,615.0	91.12	90.79	6,896.9	-148.9	10,846.8	10,847.8	0.79	0.32	0.73	
17,675.0	91.12	90.79	6,895.7	-149.7	10,906.8	10,907.8	0.00	0.00	0.00	
Projected BHL 436'FSL & 102'FEL, Sec.4										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
SHL 592'FSL & 439'FEL	0.00	0.00	1.0	0.0	0.0	1,366,450.87	3,254,937.56	40.335700	-104.585490	
- survey hits target center										
- Point										
Projected BHL 436'FSL & 102'FEL, Sec.4	0.00	0.00	6,896.0	-136.0	10,909.0	1,366,427.35	3,265,846.89	40.335320	-104.546360	
- survey misses target center by 13.9ft at 17675.0ft MD (6895.7 TVD, -149.7 N, 10906.8 E)										
- Point										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,026.0	6,863.5	-153.8	277.8	TPZ - 60° Incl in Curve - 435'FSL, 157'FEL, Sec.6	
7,368.0	6,950.9	-150.6	603.5	Deepest TVD Drilled - 6950.9' TVD	

Checked By: _____	Approved By: _____	Date: _____
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