

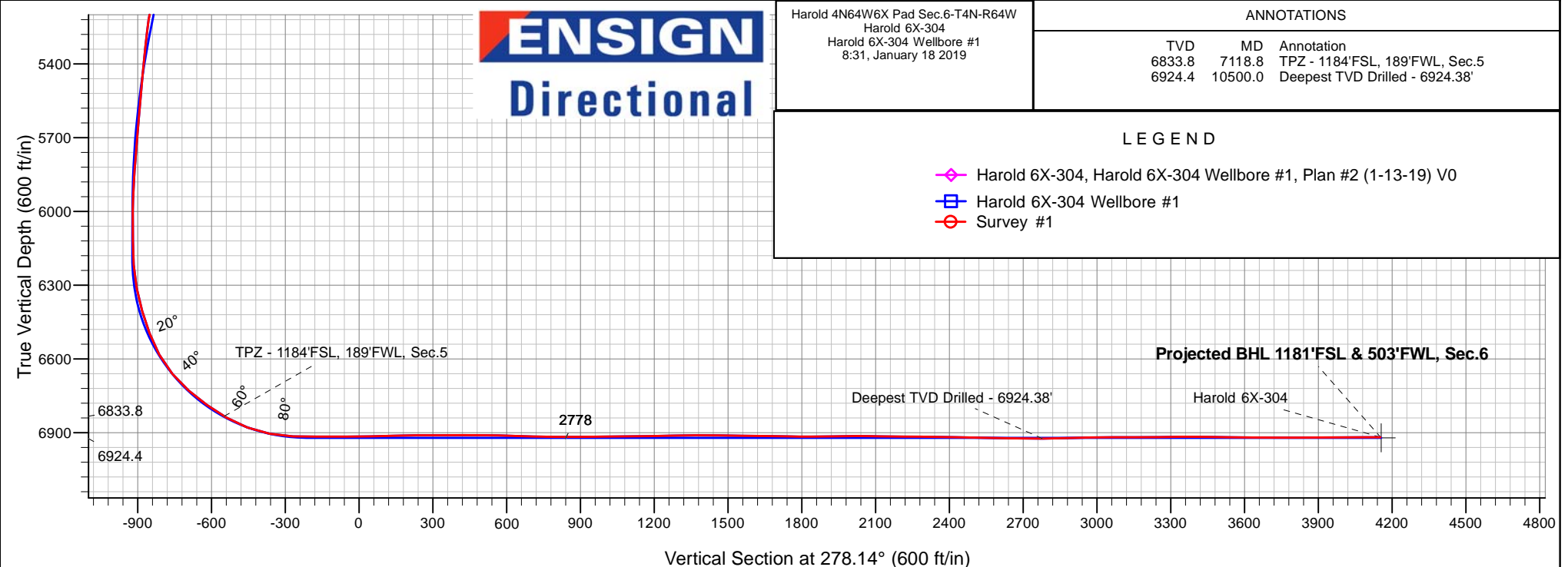
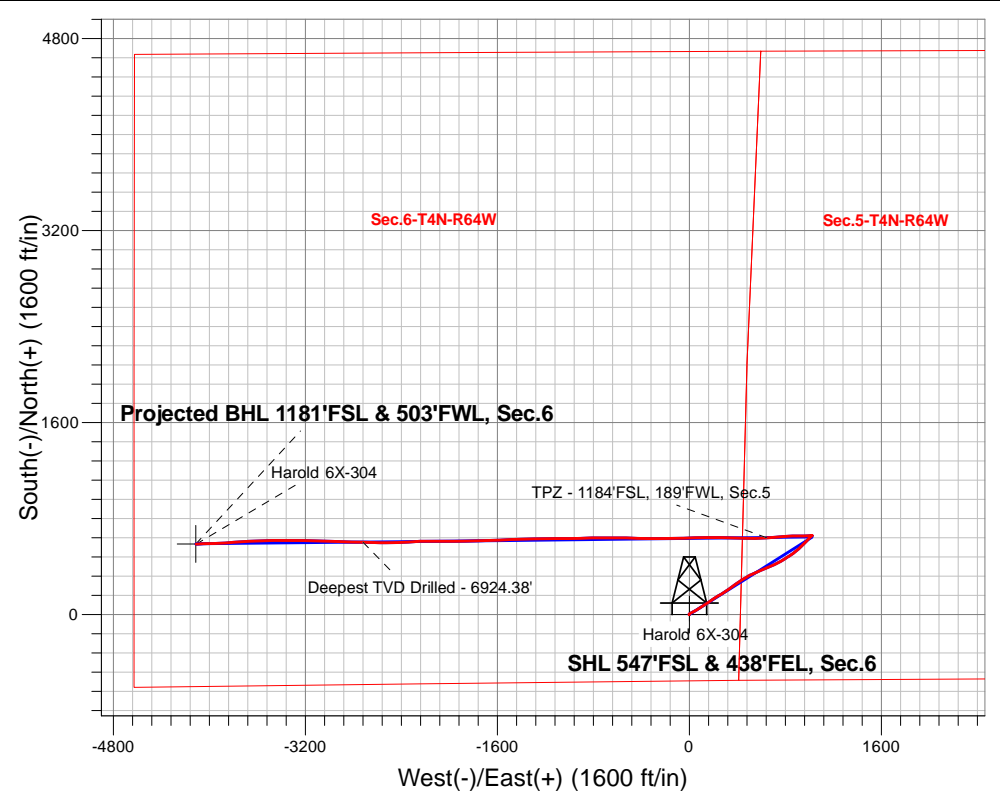
# PDC Energy Inc. DJ Basin

Well Name: **Harold 6X-304**

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 1366407.153254938.01 40.335580 -104.585490  
 RKB - 23' WELL @ 4811.0ft (RKB - 23')

## FINAL SURVEY

**Projected Bottom Hole Location**  
**11,892'MD 6918'TVD 587'N & 4111'W of SHL**  
**90.29 degree Incl @ 268.04 degree AZM**





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

**SEC.6-T4N-R64W**

**Harold 4N64W6X Pad Sec.6-T4N-R64W**

**Harold 6X-304**

**Harold 6X-304 Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**18 January, 2019**

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Harold 6X-304
<b>Project:</b>	SEC.6-T4N-R64W	<b>TVD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Site:</b>	Harold 4N64W6X Pad Sec.6-T4N-R64W	<b>MD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Well:</b>	Harold 6X-304	<b>North Reference:</b>	True
<b>Wellbore:</b>	Harold 6X-304 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Harold 6X-304 Wellbore #1	<b>Database:</b>	US_EDM

<b>Project</b>	SEC.6-T4N-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	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 6X-304					
Well Position	+N/-S	0.0 ft	Northing:	1,366,407.15 usft	Latitude:	40.335580
	+E/-W	0.0 ft	Easting:	3,254,938.02 usft	Longitude:	-104.585490
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,788.0 ft

<b>Wellbore</b>	Harold 6X-304 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	11/13/2018	8.18	66.83	52,199

<b>Design</b>	Harold 6X-304 Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	278.14	

<b>Survey Program</b>	<b>Date</b>	1/18/2019			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
158.0	11,892.0	Survey #1 (Harold 6X-304 Wellbore #1)	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	326.27	1.0	0.0	0.0	0.0	0.36	0.36	0.00	
<b>SHL 547'FSL &amp; 438'FEL, Sec.6</b>										
158.0	0.57	326.27	158.0	0.7	-0.4	0.5	0.36	0.36	0.00	
252.0	0.70	251.95	252.0	0.9	-1.2	1.4	0.82	0.14	-79.06	
348.0	0.70	264.69	348.0	0.6	-2.4	2.4	0.16	0.00	13.27	
444.0	0.59	351.35	444.0	1.1	-3.0	3.2	0.93	-0.11	90.27	
539.0	2.18	41.73	539.0	2.9	-1.9	2.3	1.96	1.67	53.03	
635.0	3.52	50.14	634.8	6.1	1.6	-0.7	1.46	1.40	8.76	
730.0	5.32	60.64	729.5	10.2	7.6	-6.1	2.07	1.89	11.05	
825.0	7.34	63.93	824.0	15.0	16.9	-14.6	2.16	2.13	3.46	

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Harold 6X-304
<b>Project:</b>	SEC.6-T4N-R64W	<b>TVD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Site:</b>	Harold 4N64W6X Pad Sec.6-T4N-R64W	<b>MD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Well:</b>	Harold 6X-304	<b>North Reference:</b>	True
<b>Wellbore:</b>	Harold 6X-304 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Harold 6X-304 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)
921.0	9.19	63.91	919.0	21.1	29.3	-26.0	1.93	1.93	-0.02
1,017.0	10.19	61.46	1,013.6	28.5	43.7	-39.2	1.13	1.04	-2.55
1,112.0	11.62	58.11	1,106.9	37.6	59.2	-53.3	1.65	1.51	-3.53
1,207.0	13.07	56.97	1,199.7	48.5	76.3	-68.7	1.55	1.53	-1.20
1,303.0	14.16	57.48	1,293.0	60.7	95.3	-85.8	1.14	1.14	0.53
1,399.0	13.91	58.64	1,386.1	73.0	115.1	-103.6	0.39	-0.26	1.21
1,495.0	14.72	56.90	1,479.1	85.7	135.1	-121.6	0.96	0.84	-1.81
1,590.0	14.25	56.48	1,571.1	98.7	155.0	-139.5	0.51	-0.49	-0.44
1,685.0	12.15	54.33	1,663.6	111.0	172.9	-155.4	2.27	-2.21	-2.26
1,781.0	12.07	55.92	1,757.5	122.5	189.4	-170.1	0.36	-0.08	1.66
1,876.0	12.45	56.51	1,850.3	133.8	206.2	-185.1	0.42	0.40	0.62
1,972.0	13.18	57.09	1,943.9	145.4	224.0	-201.1	0.77	0.76	0.60
2,068.0	15.21	58.74	2,037.0	157.9	243.9	-219.1	2.16	2.11	1.72
2,163.0	16.67	59.64	2,128.3	171.3	266.3	-239.4	1.56	1.54	0.95
2,258.0	14.58	57.34	2,219.8	184.6	288.2	-259.1	2.29	-2.20	-2.42
2,354.0	13.54	57.90	2,312.9	197.1	307.9	-276.9	1.09	-1.08	0.58
2,450.0	13.15	57.74	2,406.3	208.9	326.6	-293.8	0.41	-0.41	-0.17
2,518.0	14.00	54.86	2,472.4	217.8	339.9	-305.6	1.60	1.25	-4.24
2,637.0	14.00	49.53	2,587.9	235.4	362.6	-325.6	1.08	0.00	-4.48
2,733.0	15.04	51.89	2,680.8	250.6	381.2	-341.9	1.25	1.08	2.46
2,828.0	15.07	55.96	2,772.6	265.1	401.2	-359.6	1.11	0.03	4.28
2,923.0	15.11	59.87	2,864.3	278.3	422.1	-378.5	1.07	0.04	4.12
3,019.0	13.93	59.24	2,957.2	290.4	442.9	-397.3	1.24	-1.23	-0.66
3,114.0	13.73	58.22	3,049.5	302.2	462.3	-414.8	0.33	-0.21	-1.07
3,210.0	12.82	58.64	3,142.9	313.8	481.1	-431.8	0.95	-0.95	0.44
3,306.0	11.88	60.65	3,236.7	324.2	498.8	-447.8	1.08	-0.98	2.09
3,401.0	10.95	62.87	3,329.8	333.1	515.3	-463.0	1.08	-0.98	2.34
3,496.0	12.76	67.97	3,422.8	341.1	533.1	-479.4	2.20	1.91	5.37
3,592.0	13.91	66.66	3,516.2	349.7	553.5	-498.4	1.24	1.20	-1.36
3,688.0	15.07	67.58	3,609.1	359.0	575.6	-519.0	1.23	1.21	0.96
3,783.0	16.01	67.43	3,700.7	368.7	599.1	-540.9	0.99	0.99	-0.16
3,878.0	16.46	67.22	3,791.9	379.0	623.7	-563.7	0.48	0.47	-0.22
3,974.0	16.55	66.66	3,883.9	389.7	648.7	-587.0	0.19	0.09	-0.58
4,070.0	16.57	66.00	3,975.9	400.6	673.8	-610.3	0.20	0.02	-0.69
4,165.0	15.45	65.70	4,067.3	411.4	697.7	-632.4	1.18	-1.18	-0.32
4,260.0	15.25	63.91	4,158.9	422.1	720.5	-653.5	0.54	-0.21	-1.88
4,356.0	14.19	62.14	4,251.7	433.1	742.2	-673.4	1.20	-1.10	-1.84
4,452.0	16.13	59.91	4,344.4	445.3	764.2	-693.4	2.11	2.02	-2.32
4,547.0	14.98	57.95	4,435.9	458.4	786.0	-713.2	1.33	-1.21	-2.06
4,642.0	14.19	55.71	4,527.8	471.5	806.0	-731.1	1.02	-0.83	-2.36
4,738.0	15.96	57.79	4,620.5	485.2	826.9	-749.9	1.93	1.84	2.17
4,833.0	14.97	53.89	4,712.1	499.4	847.9	-768.6	1.51	-1.04	-4.11
4,929.0	14.26	54.21	4,805.0	513.6	867.5	-786.0	0.74	-0.74	0.33

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<b>Site:</b>	Harold 4N64W6X Pad Sec.6-T4N-R64W	<b>MD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Well:</b>	Harold 6X-304	<b>North Reference:</b>	True
<b>Wellbore:</b>	Harold 6X-304 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Harold 6X-304 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)
5,025.0	13.07	53.57	4,898.3	527.0	885.8	-802.3	1.25	-1.24	-0.67
5,120.0	15.18	49.59	4,990.4	541.4	903.9	-818.2	2.44	2.22	-4.19
5,216.0	14.52	48.16	5,083.2	557.6	922.4	-834.2	0.79	-0.69	-1.49
5,312.0	13.27	47.66	5,176.4	573.0	939.6	-849.0	1.31	-1.30	-0.52
5,407.0	12.00	43.91	5,269.1	587.5	954.5	-861.7	1.59	-1.34	-3.95
5,502.0	10.54	41.24	5,362.2	601.1	967.0	-872.2	1.63	-1.54	-2.81
5,598.0	9.69	37.64	5,456.7	614.1	977.8	-881.0	1.10	-0.89	-3.75
5,693.0	9.52	41.07	5,550.4	626.4	987.8	-889.2	0.63	-0.18	3.61
5,789.0	8.65	41.27	5,645.2	637.8	997.8	-897.4	0.91	-0.91	0.21
5,885.0	6.96	51.73	5,740.3	646.8	1,007.1	-905.4	2.29	-1.76	10.90
5,980.0	5.73	49.14	5,834.7	653.5	1,015.2	-912.5	1.33	-1.29	-2.73
6,076.0	2.71	84.73	5,930.5	656.8	1,021.1	-917.8	4.02	-3.15	37.07
6,172.0	0.38	297.86	6,026.4	657.2	1,023.1	-919.7	3.16	-2.43	-152.99
6,267.0	0.61	322.81	6,121.4	657.7	1,022.5	-919.1	0.33	0.24	26.26
6,363.0	3.27	261.25	6,217.4	657.7	1,019.5	-916.1	3.15	2.77	-64.13
6,458.0	11.38	270.20	6,311.5	657.4	1,007.4	-904.2	8.60	8.54	9.42
6,554.0	15.80	266.03	6,404.8	656.5	984.9	-882.0	4.71	4.60	-4.34
6,650.0	21.28	266.17	6,495.8	654.4	954.5	-852.2	5.71	5.71	0.15
6,746.0	28.72	270.59	6,582.7	653.5	914.0	-812.2	7.99	7.75	4.60
6,841.0	40.04	270.21	6,661.0	653.8	860.4	-759.2	11.92	11.92	-0.40
6,937.0	49.87	265.45	6,728.9	651.0	792.7	-692.6	10.82	10.24	-4.96
7,033.0	54.79	264.97	6,787.5	644.7	717.0	-618.6	5.14	5.13	-0.50
7,118.8	60.00	266.28	6,833.8	639.2	645.0	-548.0	6.21	6.07	1.53
TPZ - 1184'FSL, 189'FWL, Sec.5									
7,129.0	60.62	266.43	6,838.8	638.6	636.2	-539.3	6.21	6.08	1.44
7,225.0	69.75	268.86	6,879.1	635.1	549.2	-453.7	9.78	9.51	2.53
7,321.0	79.03	271.84	6,904.9	635.7	456.9	-362.2	10.12	9.67	3.10
7,416.0	88.50	271.97	6,915.2	638.9	362.6	-268.5	9.97	9.97	0.14
7,471.9	89.29	271.26	6,916.3	640.4	306.7	-212.9	1.90	1.42	-1.27
LPL 1182'FSL & 149'FEL, Sec.6									
7,512.0	89.86	270.75	6,916.6	641.1	266.6	-173.2	1.90	1.42	-1.27
7,636.0	90.55	269.40	6,916.1	641.3	142.6	-50.4	1.22	0.56	-1.09
7,732.0	90.97	268.27	6,914.8	639.4	46.7	44.3	1.26	0.44	-1.18
7,827.0	91.94	268.07	6,912.4	636.3	-48.3	137.9	1.04	1.02	-0.21
7,923.0	89.89	269.61	6,910.9	634.4	-144.2	232.6	2.67	-2.14	1.60
8,019.0	90.27	268.98	6,910.8	633.2	-240.2	327.5	0.77	0.40	-0.66
8,115.0	90.03	271.34	6,910.5	633.5	-336.2	422.5	2.47	-0.25	2.46
8,210.0	89.56	271.34	6,910.9	635.7	-431.2	516.8	0.49	-0.49	0.00
8,306.0	88.08	270.72	6,912.8	637.4	-527.1	612.1	1.67	-1.54	-0.65
8,401.0	88.67	270.31	6,915.5	638.3	-622.1	706.2	0.76	0.62	-0.43
8,497.0	89.29	270.10	6,917.2	638.6	-718.1	801.3	0.68	0.65	-0.22
8,593.0	90.22	268.91	6,917.6	637.8	-814.1	896.2	1.57	0.97	-1.24
8,688.0	91.22	268.50	6,916.4	635.6	-909.0	989.9	1.14	1.05	-0.43
8,784.0	90.06	269.42	6,915.4	633.9	-1,005.0	1,084.6	1.54	-1.21	0.96

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<b>Well:</b>	Harold 6X-304	<b>North Reference:</b>	True
<b>Wellbore:</b>	Harold 6X-304 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Harold 6X-304 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)
8,879.0	91.02	269.52	6,914.5	633.0	-1,100.0	1,178.6	1.02	1.01	0.11
8,975.0	91.68	269.04	6,912.2	631.8	-1,196.0	1,273.4	0.85	0.69	-0.50
9,071.0	89.64	269.53	6,911.1	630.6	-1,292.0	1,368.2	2.19	-2.13	0.51
9,166.0	89.57	268.77	6,911.8	629.2	-1,386.9	1,462.1	0.80	-0.07	-0.80
9,262.0	89.38	267.53	6,912.6	626.1	-1,482.9	1,556.6	1.31	-0.20	-1.29
9,357.0	89.40	266.52	6,913.7	621.2	-1,577.8	1,649.8	1.06	0.02	-1.06
9,452.0	88.56	268.30	6,915.3	616.9	-1,672.6	1,743.1	2.07	-0.88	1.87
9,548.0	90.05	268.76	6,916.5	614.4	-1,768.6	1,837.8	1.62	1.55	0.48
9,643.0	91.39	268.28	6,915.3	612.0	-1,863.6	1,931.4	1.50	1.41	-0.51
9,738.0	90.06	269.71	6,914.1	610.3	-1,958.5	2,025.2	2.06	-1.40	1.51
9,834.0	88.67	270.29	6,915.2	610.3	-2,054.5	2,120.2	1.57	-1.45	0.60
9,928.0	89.61	270.74	6,916.6	611.1	-2,148.5	2,213.4	1.11	1.00	0.48
10,024.0	89.25	268.35	6,917.5	610.4	-2,244.5	2,308.3	2.52	-0.38	-2.49
10,119.0	89.11	265.49	6,918.9	605.3	-2,339.3	2,401.5	3.01	-0.15	-3.01
10,213.0	89.71	267.40	6,919.9	599.5	-2,433.1	2,493.5	2.13	0.64	2.03
10,309.0	87.88	270.81	6,921.9	598.0	-2,529.1	2,588.3	4.03	-1.91	3.55
10,404.0	89.26	271.84	6,924.3	600.1	-2,624.0	2,682.6	1.81	1.45	1.08
10,500.0	90.61	271.72	6,924.4	603.1	-2,720.0	2,778.0	1.41	1.41	-0.13
<b>Deepest TVD Drilled - 6924.38'</b>									
10,596.0	91.76	270.79	6,922.4	605.2	-2,815.9	2,873.3	1.54	1.20	-0.97
10,691.0	91.06	272.13	6,920.1	607.7	-2,910.9	2,967.6	1.59	-0.74	1.41
10,787.0	90.31	271.80	6,918.9	610.9	-3,006.8	3,063.0	0.85	-0.78	-0.34
10,882.0	90.02	271.16	6,918.6	613.4	-3,101.8	3,157.4	0.74	-0.31	-0.67
10,978.0	90.55	270.80	6,918.2	615.0	-3,197.8	3,252.6	0.67	0.55	-0.38
11,073.0	90.66	270.67	6,917.2	616.3	-3,292.8	3,346.8	0.18	0.12	-0.14
11,169.0	89.17	270.40	6,917.3	617.2	-3,388.7	3,442.0	1.58	-1.55	-0.28
11,265.0	89.11	269.85	6,918.7	617.4	-3,484.7	3,537.0	0.58	-0.06	-0.57
11,361.0	89.38	267.86	6,920.0	615.4	-3,580.7	3,631.8	2.09	0.28	-2.07
11,457.0	90.00	265.74	6,920.5	610.1	-3,676.5	3,725.9	2.30	0.65	-2.21
11,553.0	90.35	265.05	6,920.2	602.4	-3,772.2	3,819.5	0.81	0.36	-0.72
11,648.0	90.23	267.12	6,919.7	595.9	-3,867.0	3,912.4	2.18	-0.13	2.18
11,744.0	90.35	268.42	6,919.3	592.2	-3,962.9	4,006.8	1.36	0.13	1.35
11,832.0	90.29	268.04	6,918.8	589.4	-4,050.9	4,093.5	0.44	-0.07	-0.43
11,892.0	90.29	268.04	6,918.5	587.4	-4,110.8	4,152.6	0.00	0.00	0.00
<b>Projected BHL 1181'FSL &amp; 503'FWL, Sec.6</b>									

<b>Company:</b>	PDC Energy Inc. DJ Basin	<b>Local Co-ordinate Reference:</b>	Well Harold 6X-304
<b>Project:</b>	SEC.6-T4N-R64W	<b>TVD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Site:</b>	Harold 4N64W6X Pad Sec.6-T4N-R64W	<b>MD Reference:</b>	WELL @ 4811.0ft (RKB - 23')
<b>Well:</b>	Harold 6X-304	<b>North Reference:</b>	True
<b>Wellbore:</b>	Harold 6X-304 Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Harold 6X-304 Wellbore #1	<b>Database:</b>	US_EDM

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 547'FSL & 438'FEL - survey hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,366,407.16	3,254,938.02	40.335580	-104.585490
Projected BHL 1181'FSL - survey misses target center by 4.1ft at 11892.0ft MD (6918.5 TVD, 587.4 N, -4110.8 E) - Point	0.00	0.00	6,921.0	588.4	-4,113.9	1,366,953.05	3,250,818.41	40.337194	-104.600247

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
7,118.8	6,833.8	639.2	645.0	TPZ - 1184'FSL, 189'FWL, Sec.5
10,500.0	6,924.4	603.1	-2,720.0	Deepest TVD Drilled - 6924.38'

Checked By: _____	Approved By: _____	Date: _____
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