

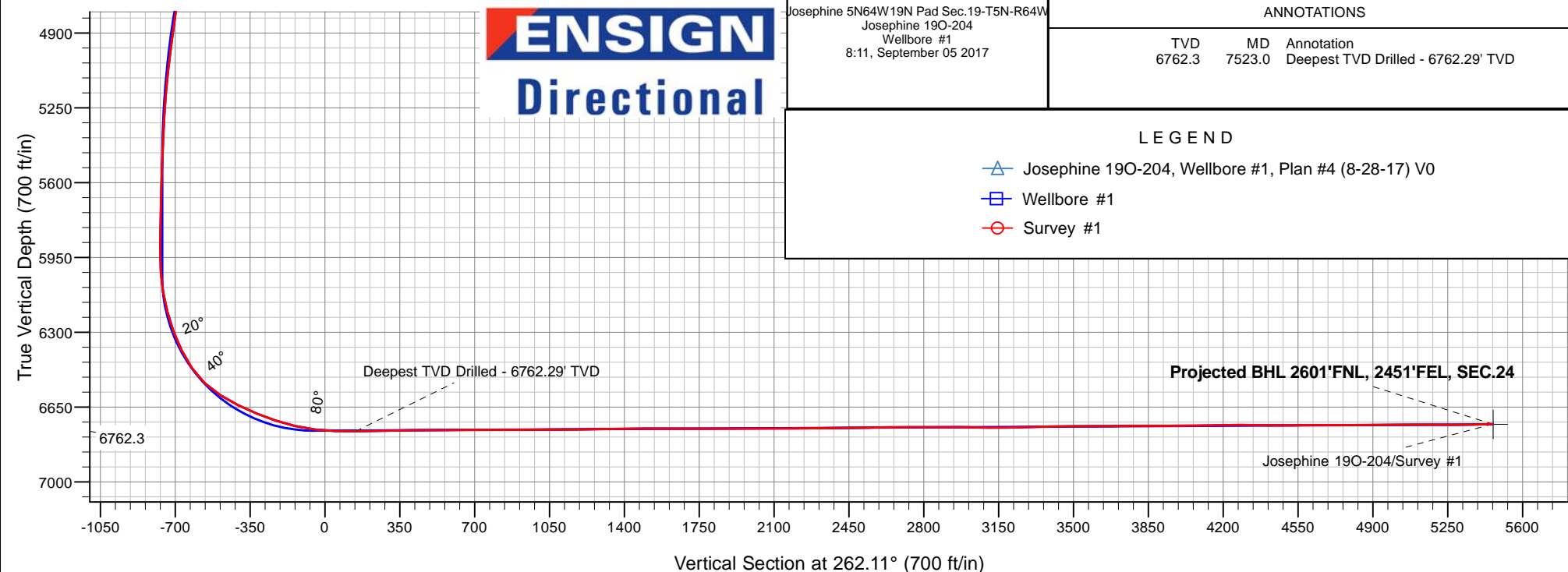
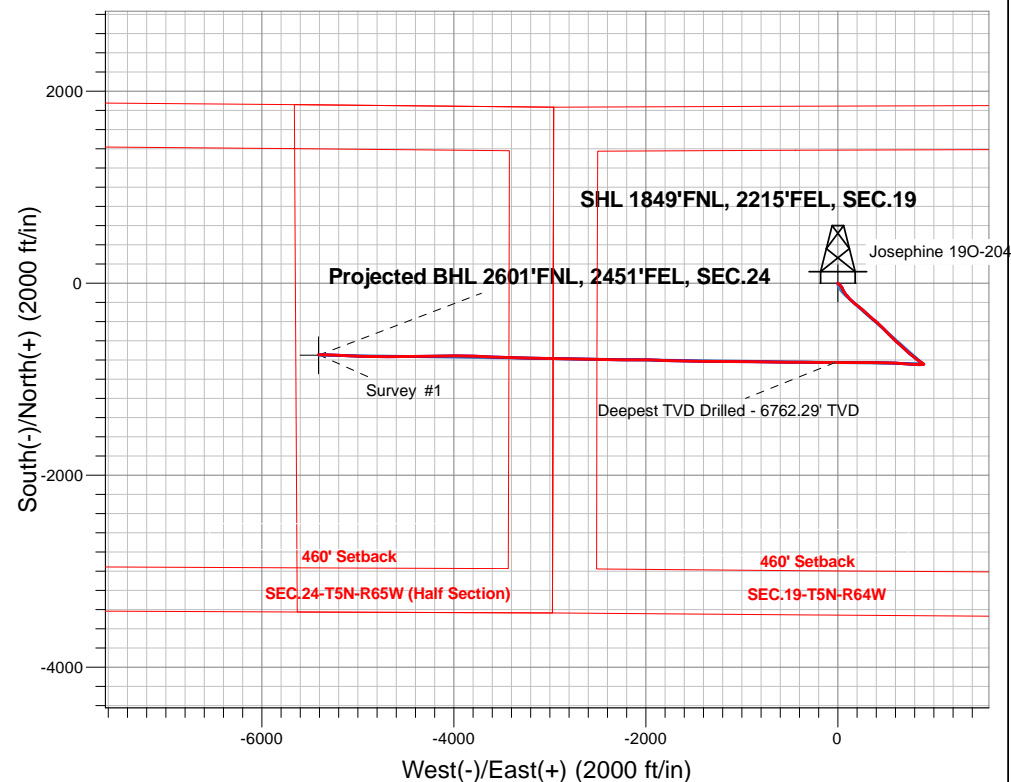
PDC Energy Inc. DJ Basin

Well Name: **Josephine 190-204**

Surface Location: Josephine 5N64W19N Pad Sec.19-T5N-R64W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4626.0
+N/-S+E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1385052.353253132.74 40.386810 -104.591280
Original Well Elev WELL @ 4649.0ft (Original Well Elev)

FINAL SURVEY

Projected Bottom Hole Location
12,904'MD 6729'TVD 743'S & 5409'W of SHL
91.4 degree Incl @ 272.0 degree AZM





PDC Energy Inc. DJ Basin

SEC.19-T5N-R64W

Josephine 5N64W19N Pad Sec.19-T5N-R64W

Josephine 19O-204

Wellbore #1

Survey: Survey #1

Standard Survey Report

05 September, 2017

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Josephine 19O-204
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4649.0ft (Original Well Elev)
Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Well:	Josephine 19O-204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Project	SEC.19-T5N-R64W		
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		Josephine 5N64W19N Pad Sec.19-T5N-R64W						
Site Position:		Northing:	1,385,202.34	usft	Latitude:	40.387220		
From:	Lat/Long	Easting:	3,253,192.49	usft	Longitude:	-104.591060		
Position Uncertainty:	0.0	ft	Slot Radius:	13-3/16	"	Grid Convergence:	0.59	°

Well	Josephine 19O-204					
Well Position	+N/-S	0.0 ft	Northing:	1,385,052.35 usft	Latitude:	40.386810
	+E/-W	0.0 ft	Easting:	3,253,132.74 usft	Longitude:	-104.591280
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,626.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/28/2017	7.93	66.85	52,490

Design	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	262.11	

Survey Program	Date	9/5/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
155.0	12,904.0	Survey #1 (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	
155.0	0.50	137.80	155.0	-0.5	0.5	-0.4	0.32	0.32	0.00	
251.0	0.30	116.00	251.0	-0.9	1.0	-0.8	0.26	-0.21	-22.71	
346.0	0.30	138.90	346.0	-1.2	1.3	-1.2	0.13	0.00	24.11	
442.0	0.40	78.40	442.0	-1.3	1.8	-1.6	0.38	0.10	-63.02	
538.0	2.10	137.80	538.0	-2.6	3.4	-3.0	2.01	1.77	61.88	
633.0	3.40	128.60	632.9	-5.6	6.7	-5.9	1.44	1.37	-9.68	
729.0	5.20	128.90	728.6	-10.1	12.3	-10.8	1.88	1.88	0.31	
825.0	6.40	137.80	824.1	-16.8	19.3	-16.8	1.56	1.25	9.27	
920.0	7.70	138.40	918.4	-25.5	27.1	-23.3	1.37	1.37	0.63	

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Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Well:	Josephine 19O-204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	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)
1,016.0	8.50	144.30	1,013.4	-36.1	35.5	-30.2	1.20	0.83	6.15
1,112.0	8.90	152.10	1,108.3	-48.4	43.1	-36.1	1.30	0.42	8.13
1,208.0	9.10	152.10	1,203.1	-61.7	50.1	-41.2	0.21	0.21	0.00
1,303.0	9.20	154.70	1,296.9	-75.2	56.9	-46.0	0.45	0.11	2.74
1,399.0	9.70	151.40	1,391.6	-89.2	64.1	-51.2	0.77	0.52	-3.44
1,494.0	9.80	146.30	1,485.3	-103.0	72.4	-57.6	0.91	0.11	-5.37
1,609.0	10.50	139.10	1,598.5	-119.0	84.7	-67.5	1.26	0.61	-6.26
1,687.0	9.80	137.80	1,675.2	-129.3	93.8	-75.1	0.94	-0.90	-1.67
1,783.0	12.40	140.80	1,769.4	-143.4	105.8	-85.1	2.77	2.71	3.13
1,879.0	14.90	138.20	1,862.7	-160.6	120.5	-97.3	2.68	2.60	-2.71
1,975.0	16.20	132.90	1,955.2	-178.9	138.6	-112.7	2.00	1.35	-5.52
2,071.0	18.10	129.00	2,046.9	-197.4	160.0	-131.4	2.31	1.98	-4.06
2,166.0	18.40	131.00	2,137.2	-216.5	182.8	-151.3	0.73	0.32	2.11
2,262.0	17.80	127.60	2,228.4	-235.4	205.8	-171.5	1.27	-0.63	-3.54
2,357.0	17.90	131.00	2,318.8	-253.8	228.3	-191.3	1.10	0.11	3.58
2,453.0	18.90	131.70	2,409.9	-273.9	251.1	-211.1	1.07	1.04	0.73
2,549.0	18.30	130.10	2,500.9	-293.9	274.2	-231.3	0.82	-0.63	-1.67
2,644.0	18.00	128.70	2,591.2	-312.7	297.1	-251.3	0.56	-0.32	-1.47
2,740.0	19.10	133.40	2,682.2	-332.8	320.1	-271.3	1.93	1.15	4.90
2,835.0	18.30	132.00	2,772.2	-353.4	342.5	-290.7	0.97	-0.84	-1.47
2,931.0	17.80	130.10	2,863.5	-373.0	364.9	-310.2	0.80	-0.52	-1.98
3,027.0	17.60	128.70	2,954.9	-391.5	387.4	-330.0	0.49	-0.21	-1.46
3,123.0	17.90	131.90	3,046.4	-410.4	409.7	-349.5	1.06	0.31	3.33
3,219.0	16.80	131.20	3,138.0	-429.4	431.2	-368.1	1.17	-1.15	-0.73
3,314.0	17.10	137.00	3,228.9	-448.7	451.0	-385.1	1.81	0.32	6.11
3,410.0	17.90	137.50	3,320.4	-469.9	470.6	-401.6	0.85	0.83	0.52
3,506.0	16.40	136.30	3,412.1	-490.5	489.9	-417.9	1.61	-1.56	-1.25
3,601.0	16.80	135.20	3,503.2	-510.0	508.9	-434.0	0.54	0.42	-1.16
3,697.0	18.70	135.00	3,594.6	-530.7	529.5	-451.6	1.98	1.98	-0.21
3,793.0	19.00	134.10	3,685.5	-552.5	551.6	-470.6	0.44	0.31	-0.94
3,889.0	19.30	133.30	3,776.2	-574.2	574.4	-490.1	0.42	0.31	-0.83
3,984.0	19.10	133.40	3,865.9	-595.7	597.1	-509.7	0.21	-0.21	0.11
4,080.0	17.50	133.40	3,957.0	-616.4	619.0	-528.5	1.67	-1.67	0.00
4,176.0	19.40	132.60	4,048.1	-637.1	641.3	-547.7	2.00	1.98	-0.83
4,272.0	17.90	132.40	4,139.0	-657.8	663.9	-567.3	1.56	-1.56	-0.21
4,368.0	18.70	132.70	4,230.2	-678.2	686.1	-586.5	0.84	0.83	0.31
4,464.0	17.10	132.20	4,321.5	-698.1	707.9	-605.3	1.67	-1.67	-0.52
4,559.0	18.50	130.60	4,412.0	-717.3	729.7	-624.2	1.56	1.47	-1.68
4,654.0	17.00	130.40	4,502.4	-736.1	751.7	-643.5	1.58	-1.58	-0.21
4,749.0	15.40	129.20	4,593.7	-753.1	772.0	-661.3	1.72	-1.68	-1.26
4,845.0	14.50	127.60	4,686.4	-768.5	791.4	-678.4	1.03	-0.94	-1.67
4,941.0	12.80	128.00	4,779.7	-782.4	809.3	-694.2	1.77	-1.77	0.42
5,037.0	10.50	126.10	4,873.7	-794.1	824.8	-707.9	2.43	-2.40	-1.98
5,132.0	10.30	126.90	4,967.2	-804.3	838.6	-720.2	0.26	-0.21	0.84

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Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Well:	Josephine 19O-204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	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)
5,228.0	9.60	127.60	5,061.7	-814.3	851.8	-731.9	0.74	-0.73	0.73
5,324.0	7.40	129.60	5,156.7	-823.1	862.9	-741.7	2.31	-2.29	2.08
5,419.0	4.90	120.40	5,251.1	-829.1	871.1	-749.0	2.82	-2.63	-9.68
5,515.0	3.20	114.60	5,346.9	-832.3	877.1	-754.5	1.82	-1.77	-6.04
5,610.0	2.70	116.60	5,441.7	-834.4	881.5	-758.5	0.54	-0.53	2.11
5,706.0	2.70	122.40	5,537.6	-836.6	885.4	-762.1	0.28	0.00	6.04
5,801.0	2.30	122.20	5,632.5	-838.8	888.9	-765.3	0.42	-0.42	-0.21
5,897.0	1.30	128.70	5,728.5	-840.5	891.4	-767.5	1.06	-1.04	6.77
5,992.0	1.30	125.00	5,823.5	-841.8	893.1	-769.1	0.09	0.00	-3.89
6,088.0	1.10	136.30	5,919.4	-843.1	894.6	-770.4	0.32	-0.21	11.77
6,184.0	3.30	261.20	6,015.4	-844.2	892.5	-768.2	4.20	2.29	130.10
6,280.0	10.00	259.60	6,110.7	-846.1	881.6	-757.1	6.98	6.98	-1.67
6,375.0	14.40	269.80	6,203.5	-847.7	861.7	-737.1	5.14	4.63	10.74
6,471.0	20.20	270.00	6,295.2	-847.7	833.1	-708.8	6.04	6.04	0.21
6,568.0	26.80	273.40	6,384.1	-846.4	794.5	-670.8	6.94	6.80	3.51
6,663.0	35.30	276.20	6,465.4	-842.2	745.8	-623.0	9.07	8.95	2.95
6,758.0	46.70	274.40	6,537.0	-836.5	683.8	-562.4	12.06	12.00	-1.89
6,853.0	58.70	272.10	6,594.4	-832.4	608.5	-488.4	12.78	12.63	-2.42
6,949.0	64.00	271.60	6,640.4	-829.7	524.3	-405.4	5.54	5.52	-0.52
7,045.0	67.70	271.30	6,679.7	-827.5	436.8	-319.0	3.86	3.85	-0.31
7,141.0	72.00	270.20	6,712.8	-826.3	346.7	-229.9	4.61	4.48	-1.15
7,236.0	77.40	269.80	6,737.8	-826.3	255.1	-139.2	5.70	5.68	-0.42
7,332.0	82.70	270.20	6,754.4	-826.3	160.5	-45.6	5.54	5.52	0.42
7,427.0	88.50	269.80	6,761.7	-826.3	65.9	48.2	6.12	6.11	-0.42
7,523.0	90.80	271.10	6,762.3	-825.5	-30.1	143.2	2.75	2.40	1.35
Deepest TVD Drilled - 6762.29' TVD									
7,649.0	91.20	270.40	6,760.1	-823.9	-156.1	267.8	0.64	0.32	-0.56
7,744.0	90.30	270.90	6,758.8	-822.8	-251.1	361.7	1.08	-0.95	0.53
7,840.0	90.50	270.50	6,758.2	-821.6	-347.1	456.6	0.47	0.21	-0.42
7,936.0	90.70	270.00	6,757.2	-821.2	-443.1	551.6	0.56	0.21	-0.52
8,030.0	90.90	270.70	6,755.9	-820.7	-537.1	644.7	0.77	0.21	0.74
8,126.0	89.90	271.10	6,755.2	-819.1	-633.0	739.5	1.12	-1.04	0.42
8,222.0	90.00	270.50	6,755.3	-817.8	-729.0	834.4	0.63	0.10	-0.63
8,317.0	90.00	270.20	6,755.3	-817.2	-824.0	928.4	0.32	0.00	-0.32
8,413.0	89.90	269.70	6,755.4	-817.3	-920.0	1,023.5	0.53	-0.10	-0.52
8,508.0	90.70	271.30	6,754.9	-816.5	-1,015.0	1,117.5	1.88	0.84	1.68
8,604.0	90.90	270.50	6,753.5	-815.0	-1,111.0	1,212.4	0.86	0.21	-0.83
8,699.0	90.80	270.00	6,752.1	-814.6	-1,206.0	1,306.4	0.54	-0.11	-0.53
8,794.0	90.60	270.90	6,751.0	-813.8	-1,301.0	1,400.4	0.97	-0.21	0.95
8,890.0	90.80	270.40	6,749.8	-812.7	-1,397.0	1,495.3	0.56	0.21	-0.52
8,986.0	89.70	271.40	6,749.4	-811.2	-1,492.9	1,590.2	1.55	-1.15	1.04
9,081.0	89.70	270.50	6,749.9	-809.6	-1,587.9	1,684.1	0.95	0.00	-0.95
9,177.0	89.80	272.50	6,750.3	-807.1	-1,683.9	1,778.8	2.09	0.10	2.08

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Design:	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)
9,273.0	89.90	271.90	6,750.5	-803.4	-1,779.8	1,873.3	0.63	0.10	-0.63
9,368.0	90.00	271.60	6,750.6	-800.5	-1,874.8	1,966.9	0.33	0.11	-0.32
9,464.0	90.40	271.30	6,750.3	-798.1	-1,970.7	2,061.7	0.52	0.42	-0.31
9,560.0	90.30	270.20	6,749.7	-796.9	-2,066.7	2,156.6	1.15	-0.10	-1.15
9,656.0	90.70	270.00	6,748.9	-796.7	-2,162.7	2,251.6	0.47	0.42	-0.21
9,752.0	91.20	269.70	6,747.3	-796.9	-2,258.7	2,346.7	0.61	0.52	-0.31
9,846.0	90.20	271.10	6,746.1	-796.3	-2,352.7	2,439.8	1.83	-1.06	1.49
9,942.0	90.70	270.70	6,745.4	-794.8	-2,448.7	2,534.6	0.67	0.52	-0.42
10,039.0	90.80	270.50	6,744.1	-793.8	-2,545.7	2,630.5	0.23	0.10	-0.21
10,134.0	90.00	272.30	6,743.4	-791.4	-2,640.6	2,724.3	2.07	-0.84	1.89
10,230.0	90.10	272.10	6,743.3	-787.8	-2,736.6	2,818.8	0.23	0.10	-0.21
10,326.0	90.00	271.90	6,743.3	-784.4	-2,832.5	2,913.4	0.23	-0.10	-0.21
10,421.0	88.80	270.00	6,744.3	-782.8	-2,927.5	3,007.2	2.37	-1.26	-2.00
10,517.0	89.40	270.70	6,745.8	-782.2	-3,023.5	3,102.2	0.96	0.63	0.73
10,612.0	91.30	270.70	6,745.2	-781.1	-3,118.5	3,196.2	2.00	2.00	0.00
10,707.0	91.90	270.20	6,742.5	-780.3	-3,213.4	3,290.1	0.82	0.63	-0.53
10,803.0	90.50	271.10	6,740.5	-779.2	-3,309.4	3,385.0	1.73	-1.46	0.94
10,899.0	90.70	272.70	6,739.5	-776.1	-3,405.3	3,479.6	1.68	0.21	1.67
10,994.0	90.00	273.20	6,738.9	-771.2	-3,500.2	3,572.9	0.91	-0.74	0.53
11,090.0	90.70	273.70	6,738.3	-765.4	-3,596.0	3,667.1	0.90	0.73	0.52
11,184.0	90.60	271.80	6,737.3	-760.9	-3,689.9	3,759.4	2.02	-0.11	-2.02
11,280.0	89.50	270.90	6,737.2	-758.6	-3,785.9	3,854.2	1.48	-1.15	-0.94
11,376.0	90.40	271.30	6,737.3	-756.8	-3,881.8	3,949.0	1.03	0.94	0.42
11,472.0	90.30	269.30	6,736.7	-756.3	-3,977.8	4,044.0	2.09	-0.10	-2.08
11,567.0	91.50	269.10	6,735.2	-757.6	-4,072.8	4,138.3	1.28	1.26	-0.21
11,662.0	90.50	270.20	6,733.5	-758.2	-4,167.8	4,232.4	1.56	-1.05	1.16
11,757.0	89.30	268.60	6,733.7	-759.2	-4,262.8	4,326.7	2.11	-1.26	-1.68
11,853.0	90.00	268.30	6,734.3	-761.8	-4,358.7	4,422.1	0.79	0.73	-0.31
11,948.0	90.10	269.80	6,734.2	-763.4	-4,453.7	4,516.4	1.58	0.11	1.58
12,044.0	90.50	269.50	6,733.7	-763.9	-4,549.7	4,611.5	0.52	0.42	-0.31
12,140.0	89.60	270.20	6,733.6	-764.2	-4,645.7	4,706.7	1.19	-0.94	0.73
12,236.0	90.20	269.30	6,733.8	-764.6	-4,741.7	4,801.8	1.13	0.63	-0.94
12,331.0	90.70	271.80	6,733.0	-763.7	-4,836.7	4,895.8	2.68	0.53	2.63
12,427.0	90.00	272.50	6,732.5	-760.1	-4,932.6	4,990.3	1.03	-0.73	0.73
12,523.0	90.90	271.80	6,731.7	-756.5	-5,028.6	5,084.8	1.19	0.94	-0.73
12,619.0	89.20	272.50	6,731.6	-752.9	-5,124.5	5,179.3	1.92	-1.77	0.73
12,714.0	90.10	272.10	6,732.2	-749.1	-5,219.4	5,272.8	1.04	0.95	-0.42
12,810.0	91.10	271.90	6,731.2	-745.7	-5,315.4	5,367.4	1.06	1.04	-0.21
12,904.0	91.40	272.00	6,729.1	-742.5	-5,409.3	5,460.0	0.34	0.32	0.11

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Josephine 19O-204
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4649.0ft (Original Well Elev)
Site:	Josephine 5N64W19N Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4649.0ft (Original Well Elev)
Well:	Josephine 19O-204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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 1849'FNL, 2215'FE - survey hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,385,052.35	3,253,132.74	40.386810	-104.591280
BHL 2608'FNL, 2452'FE - survey misses target center by 7.6ft at 12904.0ft MD (6729.1 TVD, -742.5 N, -5409.3 E) - Point	0.00	0.00	6,730.0	-750.0	-5,410.1	1,384,246.97	3,247,730.84	40.384750	-104.610700

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
+N/-S (ft)	+E/-W (ft)			
7,523.0	6,762.3	-825.5	-30.1	Deepest TVD Drilled - 6762.29' TVD

Checked By: _____	Approved By: _____	Date: _____
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