

PDC Energy Inc. DJ Basin

Well Name: **Wiedeman Federal 22G-302**

Surface Location: Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone

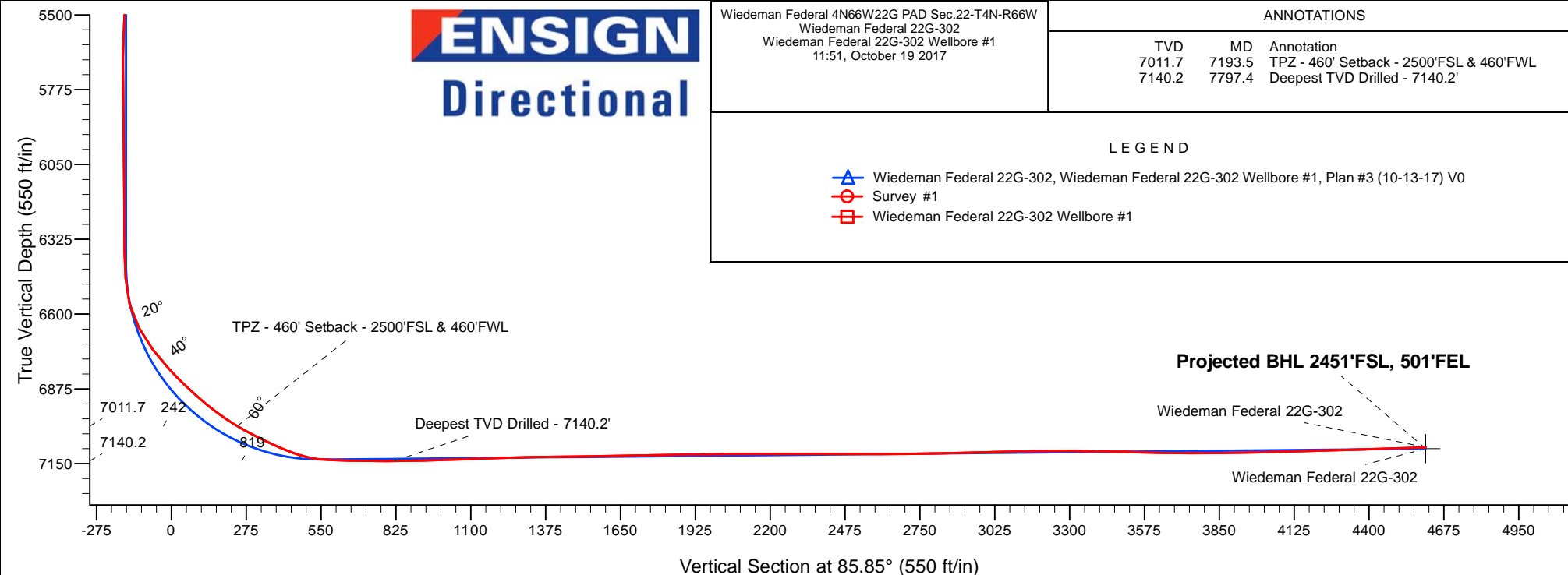
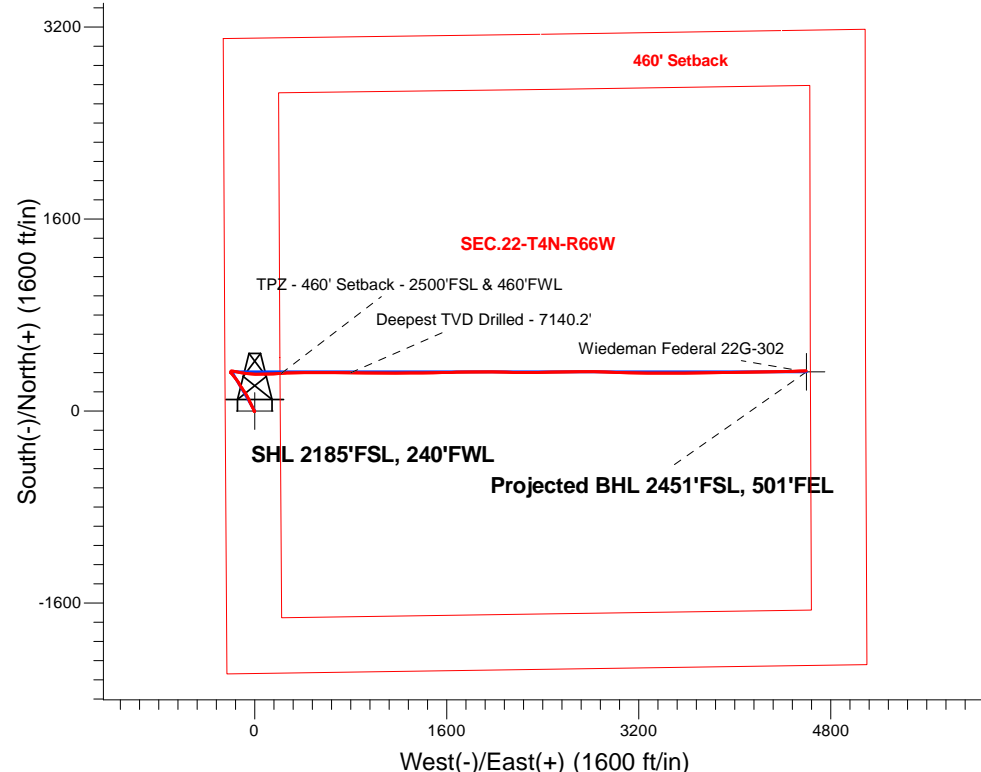
Ground Elevation: 4737.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1351470.85	3202996.81	40.295901	-104.772243	

Ensign Rig #152 - RKB - 23'WELL @ 4760.0ft (Ensign Rig #152 - RKB - 23')

FINAL SURVEY

Projected Bottom Hole Location
11,597'MD 7090'TVD 333'N & 4596'W of SHL
92.0 degree Incl @ 88.2 degree AZM



ENSIGN
Directional

Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W
Wiedeman Federal 22G-302
Wiedeman Federal 22G-302 Wellbore #1
11:51, October 19 2017

ANNOTATIONS

TVD	MD	Annotation
7011.7	7193.5	TPZ - 460' Setback - 2500'FSL & 460'FWL
7140.2	7797.4	Deepest TVD Drilled - 7140.2'

LEGEND

- Wiedeman Federal 22G-302, Wiedeman Federal 22G-302 Wellbore #1, Plan #3 (10-13-17) V0
- Survey #1
- Wiedeman Federal 22G-302 Wellbore #1



PDC Energy Inc. DJ Basin

SEC.22-T4N-R66W

Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W

Wiedeman Federal 22G-302

Wiedeman Federal 22G-302 Wellbore #1

Survey: Survey #1

Standard Survey Report

19 October, 2017

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Wiedeman Federal 22G-302
Project:	SEC.22-T4N-R66W	TVD Reference:	WELL @ 4760.0ft (Ensign Rig #152 - RKB - 23')
Site:	Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W	MD Reference:	WELL @ 4760.0ft (Ensign Rig #152 - RKB - 23')
Well:	Wiedeman Federal 22G-302	North Reference:	True
Wellbore:	Wiedeman Federal 22G-302 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wiedeman Federal 22G-302 Wellbore #1	Database:	US_EDM

Project	SEC.22-T4N-R66W, Weld County, Colorado		
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	Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W				
Site Position:		Northing:	1,351,350.65 usft	Latitude:	40.295571
From:	Lat/Long	Easting:	3,202,996.97 usft	Longitude:	-104.772246
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.47 °

Well	Wiedeman Federal 22G-302					
Well Position	+N/-S	0.0 ft	Northing:	1,351,470.85 usft	Latitude:	40.295901
	+E/-W	0.0 ft	Easting:	3,202,996.82 usft	Longitude:	-104.772243
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,737.0 ft

Wellbore	Wiedeman Federal 22G-302 Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/13/2017	8.01	66.74	52,411

Design	Wiedeman Federal 22G-302 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	85.85	

Survey Program	Date	10/19/2017			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
156.0	11,597.0	Survey #1 (Wiedeman Federal 22G-302 W	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	
156.0	0.50	229.70	156.0	-0.4	-0.5	-0.5	0.32	0.32	0.00	
252.0	0.50	232.50	252.0	-1.0	-1.2	-1.2	0.03	0.00	2.92	
347.0	0.40	231.30	347.0	-1.4	-1.8	-1.9	0.11	-0.11	-1.26	
442.0	0.40	221.10	442.0	-1.9	-2.2	-2.4	0.07	0.00	-10.74	
537.0	0.40	216.80	537.0	-2.4	-2.7	-2.8	0.03	0.00	-4.53	
633.0	0.40	202.10	633.0	-3.0	-3.0	-3.2	0.11	0.00	-15.31	
729.0	0.40	216.30	729.0	-3.6	-3.3	-3.6	0.10	0.00	14.79	
824.0	0.40	219.50	824.0	-4.1	-3.7	-4.0	0.02	0.00	3.37	
920.0	0.50	234.60	920.0	-4.6	-4.3	-4.6	0.16	0.10	15.73	

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Well:	Wiedeman Federal 22G-302	North Reference:	True
Wellbore:	Wiedeman Federal 22G-302 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wiedeman Federal 22G-302 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	1.40	348.30	1,016.0	-3.7	-4.8	-5.1	1.73	0.94	118.44
1,111.0	3.40	343.40	1,110.9	0.2	-5.9	-5.9	2.11	2.11	-5.16
1,206.0	5.30	338.10	1,205.6	6.9	-8.3	-7.8	2.04	2.00	-5.58
1,302.0	5.30	336.90	1,301.2	15.1	-11.7	-10.6	0.12	0.00	-1.25
1,397.0	5.10	334.10	1,395.8	23.0	-15.3	-13.6	0.34	-0.21	-2.95
1,493.0	4.60	334.80	1,491.5	30.3	-18.8	-16.5	0.52	-0.52	0.73
1,588.0	4.40	331.80	1,586.2	36.9	-22.1	-19.4	0.33	-0.21	-3.16
1,690.0	4.20	323.70	1,687.9	43.4	-26.2	-23.0	0.63	-0.20	-7.94
1,786.0	4.70	346.00	1,783.6	50.0	-29.2	-25.5	1.86	0.52	23.23
1,881.0	5.20	337.40	1,878.2	57.8	-31.8	-27.6	0.94	0.53	-9.05
1,976.0	5.00	331.80	1,972.9	65.4	-35.4	-30.6	0.56	-0.21	-5.89
2,071.0	4.70	329.30	2,067.5	72.4	-39.4	-34.0	0.39	-0.32	-2.63
2,167.0	6.30	338.30	2,163.1	80.7	-43.3	-37.4	1.89	1.67	9.38
2,262.0	6.20	336.70	2,257.5	90.2	-47.3	-40.6	0.21	-0.11	-1.68
2,358.0	5.60	334.10	2,353.0	99.2	-51.4	-44.1	0.68	-0.63	-2.71
2,454.0	5.40	334.80	2,448.6	107.5	-55.4	-47.4	0.22	-0.21	0.73
2,549.0	5.20	331.80	2,543.2	115.4	-59.3	-50.8	0.36	-0.21	-3.16
2,645.0	5.20	330.90	2,638.8	123.0	-63.5	-54.4	0.08	0.00	-0.94
2,740.0	5.20	329.90	2,733.4	130.5	-67.7	-58.1	0.10	0.00	-1.05
2,836.0	5.00	327.20	2,829.0	137.8	-72.2	-62.0	0.33	-0.21	-2.81
2,931.0	4.70	330.60	2,923.7	144.6	-76.3	-65.7	0.44	-0.32	3.58
3,027.0	4.50	327.40	3,019.3	151.2	-80.3	-69.1	0.34	-0.21	-3.33
3,122.0	4.10	325.10	3,114.1	157.2	-84.2	-72.6	0.46	-0.42	-2.42
3,217.0	4.00	321.30	3,208.8	162.5	-88.2	-76.3	0.30	-0.11	-4.00
3,313.0	5.60	326.20	3,304.5	169.0	-92.9	-80.5	1.72	1.67	5.10
3,408.0	5.10	327.60	3,399.1	176.5	-97.8	-84.8	0.54	-0.53	1.47
3,504.0	4.80	323.50	3,494.7	183.3	-102.5	-88.9	0.48	-0.31	-4.27
3,600.0	5.50	331.60	3,590.3	190.6	-107.0	-93.0	1.05	0.73	8.44
3,696.0	5.20	327.60	3,685.9	198.3	-111.6	-96.9	0.50	-0.31	-4.17
3,791.0	4.70	323.90	3,780.6	205.1	-116.2	-101.0	0.62	-0.53	-3.89
3,887.0	4.70	323.00	3,876.2	211.4	-120.8	-105.2	0.08	0.00	-0.94
3,983.0	5.40	331.60	3,971.9	218.5	-125.4	-109.2	1.07	0.73	8.96
4,079.0	5.40	332.50	4,067.5	226.5	-129.6	-112.9	0.09	0.00	0.94
4,175.0	4.70	329.70	4,163.1	233.9	-133.7	-116.4	0.77	-0.73	-2.92
4,270.0	4.60	327.40	4,257.8	240.4	-137.7	-119.9	0.22	-0.11	-2.42
4,366.0	5.40	320.70	4,353.4	247.2	-142.6	-124.4	1.03	0.83	-6.98
4,462.0	5.40	322.50	4,449.0	254.3	-148.2	-129.4	0.18	0.00	1.88
4,557.0	5.20	323.20	4,543.6	261.3	-153.5	-134.2	0.22	-0.21	0.74
4,653.0	4.90	323.90	4,639.2	268.1	-158.5	-138.7	0.32	-0.31	0.73
4,748.0	4.60	323.70	4,733.9	274.4	-163.2	-142.9	0.32	-0.32	-0.21
4,844.0	4.60	323.60	4,829.6	280.6	-167.8	-147.0	0.01	0.00	-0.10
4,939.0	4.30	322.80	4,924.3	286.5	-172.2	-151.0	0.32	-0.32	-0.84

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Survey									
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5,035.0	4.30	323.50	5,020.0	292.3	-176.5	-154.9	0.05	0.00	0.73
5,130.0	3.80	320.70	5,114.8	297.6	-180.6	-158.6	0.57	-0.53	-2.95
5,225.0	3.50	318.80	5,209.6	302.2	-184.5	-162.2	0.34	-0.32	-2.00
5,320.0	3.30	319.80	5,304.4	306.5	-188.2	-165.5	0.22	-0.21	1.05
5,416.0	3.10	316.00	5,400.3	310.4	-191.8	-168.8	0.30	-0.21	-3.96
5,511.0	3.20	314.00	5,495.1	314.1	-195.5	-172.2	0.16	0.11	-2.11
5,607.0	3.20	311.60	5,591.0	317.8	-199.4	-175.9	0.14	0.00	-2.50
5,702.0	1.60	354.70	5,685.9	320.8	-201.5	-177.7	2.43	-1.68	45.37
5,798.0	1.30	26.30	5,781.9	323.2	-201.1	-177.2	0.88	-0.31	32.92
5,894.0	1.10	28.20	5,877.8	324.9	-200.2	-176.2	0.21	-0.21	1.98
5,989.0	1.10	38.20	5,972.8	326.5	-199.2	-175.1	0.20	0.00	10.53
6,085.0	1.10	16.60	6,068.8	328.1	-198.4	-174.1	0.43	0.00	-22.50
6,181.0	1.00	24.90	6,164.8	329.7	-197.8	-173.4	0.19	-0.10	8.65
6,293.0	0.80	21.00	6,276.8	331.3	-197.1	-172.6	0.19	-0.18	-3.48
6,389.0	0.60	37.20	6,372.8	332.4	-196.5	-172.0	0.29	-0.21	16.88
6,485.0	3.70	84.70	6,468.7	333.0	-193.1	-168.5	3.46	3.23	49.48
6,580.0	14.40	101.00	6,562.4	331.1	-178.5	-154.0	11.47	11.26	17.16
6,676.0	29.80	102.40	6,651.1	323.6	-143.2	-119.4	16.05	16.04	1.46
6,772.0	37.40	96.80	6,731.0	315.0	-90.9	-67.9	8.54	7.92	-5.83
6,868.0	43.40	95.20	6,804.1	308.6	-29.0	-6.6	6.34	6.25	-1.67
6,963.0	47.00	90.30	6,871.0	305.4	38.2	60.2	5.27	3.79	-5.16
7,059.0	50.20	86.80	6,934.5	307.3	110.2	132.2	4.31	3.33	-3.65
7,154.0	57.00	87.30	6,990.8	311.2	186.5	208.6	7.17	7.16	0.53
7,193.5	59.26	86.83	7,011.7	313.0	220.0	242.1	5.81	5.73	-1.18
TPZ - 460' Setback - 2500'FSL & 460'FWL									
7,250.0	62.50	86.20	7,039.2	316.0	269.3	291.4	5.81	5.73	-1.12
7,346.0	65.00	89.90	7,081.6	318.9	355.3	377.4	4.33	2.60	3.85
7,442.0	71.80	89.60	7,117.0	319.2	444.5	466.4	7.09	7.08	-0.31
7,537.0	86.10	90.10	7,135.1	319.5	537.5	559.2	15.06	15.05	0.53
7,633.0	89.30	90.00	7,139.0	319.4	633.4	654.9	3.33	3.33	-0.10
7,728.0	89.60	91.00	7,139.9	318.6	728.4	749.6	1.10	0.32	1.05
7,797.4	89.89	90.71	7,140.2	317.5	797.8	818.7	0.59	0.42	-0.42
Deepest TVD Drilled - 7140.2'									
7,824.0	90.00	90.60	7,140.2	317.2	824.4	845.2	0.59	0.42	-0.42
7,919.0	92.00	90.60	7,138.6	316.2	919.4	939.8	2.11	2.11	0.00
8,015.0	92.20	90.30	7,135.0	315.5	1,015.3	1,035.5	0.38	0.21	-0.31
8,110.0	92.20	89.70	7,131.4	315.5	1,110.2	1,130.2	0.63	0.00	-0.63
8,205.0	91.20	89.70	7,128.6	316.0	1,205.2	1,224.9	1.05	-1.05	0.00
8,301.0	91.60	89.60	7,126.2	316.6	1,301.2	1,320.7	0.43	0.42	-0.10
8,396.0	90.80	89.70	7,124.2	317.1	1,396.1	1,415.4	0.85	-0.84	0.11
8,491.0	90.70	89.00	7,123.0	318.2	1,491.1	1,510.2	0.74	-0.11	-0.74
8,587.0	90.80	88.30	7,121.7	320.5	1,587.1	1,606.1	0.74	0.10	-0.73
8,682.0	90.70	89.40	7,120.5	322.4	1,682.1	1,701.0	1.16	-0.11	1.16

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8,778.0	91.10	89.20	7,119.0	323.6	1,778.0	1,796.8	0.47	0.42	-0.21	
8,873.0	91.40	88.70	7,116.9	325.3	1,873.0	1,891.6	0.61	0.32	-0.53	
8,968.0	90.70	91.30	7,115.2	325.3	1,968.0	1,986.4	2.83	-0.74	2.74	
9,063.0	90.10	91.20	7,114.5	323.2	2,063.0	2,080.9	0.64	-0.63	-0.11	
9,159.0	89.60	90.50	7,114.8	321.8	2,158.9	2,176.6	0.90	-0.52	-0.73	
9,254.0	90.60	90.30	7,114.6	321.1	2,253.9	2,271.3	1.07	1.05	-0.21	
9,350.0	90.00	89.60	7,114.1	321.2	2,349.9	2,367.0	0.96	-0.63	-0.73	
9,446.0	89.70	89.00	7,114.4	322.4	2,445.9	2,462.8	0.70	-0.31	-0.63	
9,541.0	90.40	89.40	7,114.3	323.7	2,540.9	2,557.7	0.85	0.74	0.42	
9,636.0	90.00	88.70	7,113.9	325.3	2,635.9	2,652.5	0.85	-0.42	-0.74	
9,731.0	90.30	88.70	7,113.7	327.5	2,730.9	2,747.4	0.32	0.32	0.00	
9,827.0	91.50	91.90	7,112.2	327.0	2,826.8	2,843.1	3.56	1.25	3.33	
9,923.0	91.90	91.90	7,109.3	323.8	2,922.8	2,938.5	0.42	0.42	0.00	
10,018.0	91.50	91.50	7,106.5	321.0	3,017.7	3,033.0	0.60	-0.42	-0.42	
10,114.0	90.40	91.50	7,104.9	318.4	3,113.6	3,128.5	1.15	-1.15	0.00	
10,210.0	91.00	91.00	7,103.8	316.4	3,209.6	3,224.1	0.81	0.63	-0.52	
10,305.0	89.10	90.50	7,103.7	315.1	3,304.6	3,318.7	2.07	-2.00	-0.53	
10,401.0	89.20	90.30	7,105.1	314.4	3,400.6	3,414.4	0.23	0.10	-0.21	
10,497.0	88.50	89.70	7,107.0	314.4	3,496.5	3,510.1	0.96	-0.73	-0.63	
10,592.0	88.90	89.40	7,109.2	315.2	3,591.5	3,604.9	0.53	0.42	-0.32	
10,688.0	88.50	89.40	7,111.4	316.2	3,687.5	3,700.7	0.42	-0.42	0.00	
10,784.0	90.60	89.60	7,112.1	317.0	3,783.5	3,796.5	2.20	2.19	0.21	
10,879.0	91.50	88.90	7,110.4	318.3	3,878.4	3,891.3	1.20	0.95	-0.74	
10,974.0	91.40	88.30	7,108.0	320.6	3,973.4	3,986.2	0.64	-0.11	-0.63	
11,070.0	90.90	88.30	7,106.0	323.4	4,069.3	4,082.1	0.52	-0.52	0.00	
11,165.0	91.50	89.70	7,104.0	325.1	4,164.3	4,176.9	1.60	0.63	1.47	
11,261.0	92.10	89.60	7,101.0	325.7	4,260.2	4,272.6	0.63	0.63	-0.10	
11,356.0	91.80	88.90	7,097.8	326.9	4,355.2	4,367.4	0.80	-0.32	-0.74	
11,452.0	91.80	88.50	7,094.8	329.1	4,451.1	4,463.2	0.42	0.00	-0.42	
11,542.0	92.00	88.20	7,091.8	331.7	4,541.0	4,553.1	0.40	0.22	-0.33	
11,597.0	92.00	88.20	7,089.9	333.4	4,596.0	4,608.0	0.00	0.00	0.00	

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 2185'FSL, 240'FWL	0.00	0.00	1.0	0.0	0.0	1,351,470.87	3,202,996.82	40.295901	-104.772243	
- survey hits target center										
- Point										
BHL 2444'FSL, 500'FEL	0.00	0.00	7,095.0	326.5	4,596.5	1,351,835.04	3,207,590.26	40.296796	-104.755765	
- survey misses target center by 8.6ft at 11597.0ft MD (7089.9 TVD, 333.4 N, 4596.0 E)										
- Point										

Company:	PDC Energy Inc. DJ Basin	Local Co-ordinate Reference:	Well Wiedeman Federal 22G-302
Project:	SEC.22-T4N-R66W	TVD Reference:	WELL @ 4760.0ft (Ensign Rig #152 - RKB - 23')
Site:	Wiedeman Federal 4N66W22G PAD Sec.22-T4N-R66W	MD Reference:	WELL @ 4760.0ft (Ensign Rig #152 - RKB - 23')
Well:	Wiedeman Federal 22G-302	North Reference:	True
Wellbore:	Wiedeman Federal 22G-302 Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wiedeman Federal 22G-302 Wellbore #1	Database:	US_EDM

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
7,193.5	7,011.7	313.0	220.0	TPZ - 460' Setback - 2500'FSL & 460'FWL
7,797.4	7,140.2	317.5	797.8	Deepest TVD Drilled - 7140.2'

Checked By: _____	Approved By: _____	Date: _____
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