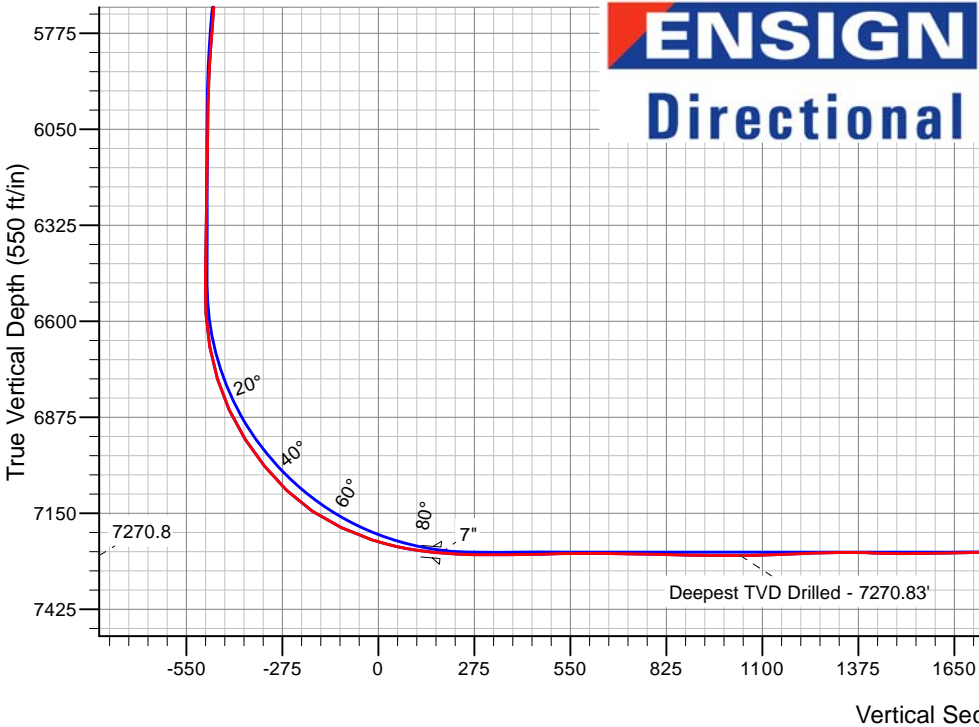
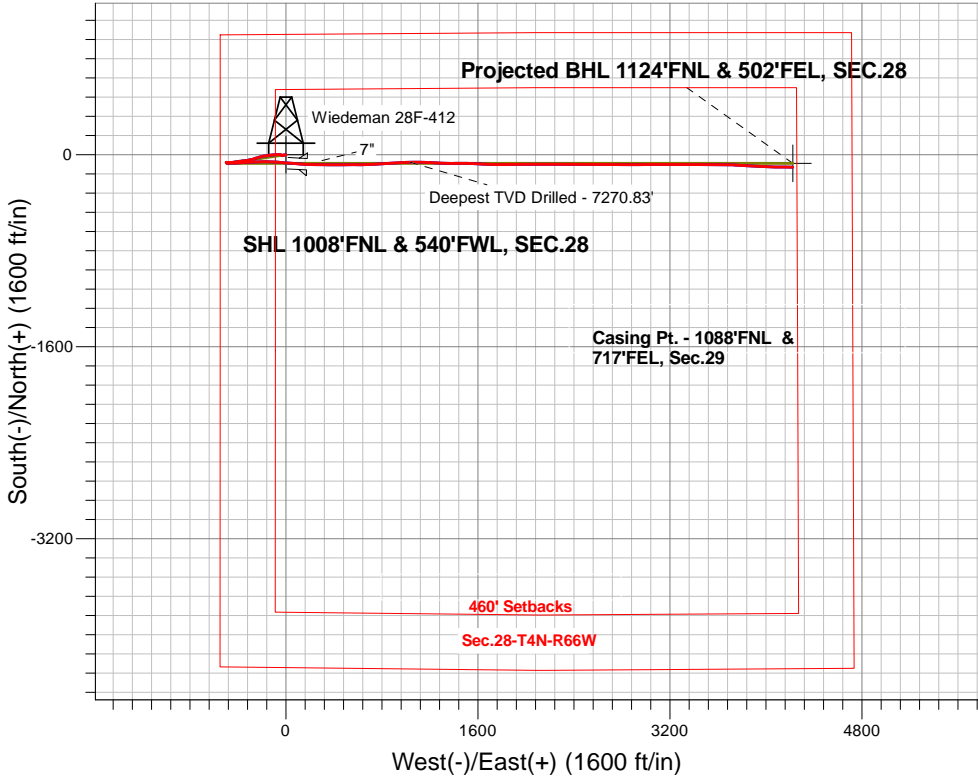


PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Wiedeman 28F-412**
Surface Location: Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W
North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
Ground Elevation: 4762.0
+N/-S+E/-W Northing Easting Latitude Longitude Slot
0.0 0.01348221.12 3198077.94 40.287090 -104.789970
Ensign Rig #134 RKB - 13'WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')

FINAL SURVEY

Projected Bottom Hole Location
11714'MD 7256TVD 103'S & 4222'E of SHL
91.5 degree Incl @ 90.20 degree AZM



Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W Wiedeman 28F-412 Wellbore #1 12:03, October 13 2015	ANNOTATIONS		
	TVD	MD	Annotation
	7270.8	8526.0	Deepest TVD Drilled - 7270.83'
LEGEND			
✕ Wiedeman 28F-412, Wellbore #1, Plan #1 (8-20-15) V0			
□ Wellbore #1			
○ Survey #1			

BHL 1124'FNL & 502'FEL, SEC.28



PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.28-T4N-R66W

Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W

Wiedeman 28F-412

Wellbore #1

Survey: Survey #1

Standard Survey Report

13 October, 2015

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Wiedeman 28F-412
Project:	SEC.28-T4N-R66W	TVD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Site:	Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W	MD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Well:	Wiedeman 28F-412	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	US_EDM

Project	SEC.28-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 4N66W28F - East Pad Sec.28-T4N-R66W			
Site Position:		Northing:	1,348,308.56 usft	Latitude:	40.287330
From:	Lat/Long	Easting:	3,198,077.24 usft	Longitude:	-104.789970
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.46 °

Well	Wiedeman 28F-412					
Well Position	+N/-S	0.0 ft	Northing:	1,348,221.12 usft	Latitude:	40.287090
	+E/-W	0.0 ft	Easting:	3,198,077.94 usft	Longitude:	-104.789970
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,762.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/21/2015	8.29	66.81	52,621

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	90.97	

Survey Program	Date	10/13/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
74.0	11,714.0	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	
1.0	0.01	234.70	1.0	0.0	0.0	0.0	0.54	0.54	0.00	
SHL 1008'FNL & 540'FWL, SEC.28										
74.0	0.40	234.70	74.0	-0.1	-0.2	-0.2	0.54	0.54	0.00	
167.0	0.40	259.00	167.0	-0.4	-0.8	-0.8	0.18	0.00	26.13	
260.0	0.70	238.90	260.0	-0.8	-1.6	-1.6	0.38	0.32	-21.61	
352.0	0.90	254.00	352.0	-1.2	-2.8	-2.8	0.31	0.22	16.41	
444.0	0.90	249.30	444.0	-1.7	-4.1	-4.1	0.08	0.00	-5.11	
537.0	0.90	261.90	537.0	-2.1	-5.6	-5.5	0.21	0.00	13.55	
629.0	1.10	263.50	628.9	-2.3	-7.1	-7.1	0.22	0.22	1.74	

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Wiedeman 28F-412
Project:	SEC.28-T4N-R66W	TVD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Site:	Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W	MD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Well:	Wiedeman 28F-412	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)	
722.0	1.50	257.90	721.9	-2.6	-9.2	-9.2	0.45	0.43	-6.02	
814.0	1.80	262.60	813.9	-3.1	-11.8	-11.8	0.36	0.33	5.11	
906.0	1.60	269.10	905.8	-3.3	-14.5	-14.5	0.30	-0.22	7.07	
1,015.0	1.50	258.30	1,014.8	-3.6	-17.5	-17.4	0.28	-0.09	-9.91	
1,107.0	1.50	257.40	1,106.8	-4.1	-19.8	-19.8	0.03	0.00	-0.98	
1,199.0	1.80	259.30	1,198.7	-4.6	-22.4	-22.3	0.33	0.33	2.07	
1,292.0	1.40	273.40	1,291.7	-4.8	-25.0	-24.9	0.60	-0.43	15.16	
1,384.0	0.80	253.90	1,383.7	-4.9	-26.7	-26.6	0.76	-0.65	-21.20	
1,476.0	0.40	267.20	1,475.7	-5.1	-27.7	-27.6	0.46	-0.43	14.46	
1,569.0	0.90	244.20	1,568.7	-5.5	-28.6	-28.5	0.60	0.54	-24.73	
1,661.0	0.70	231.00	1,660.7	-6.1	-29.7	-29.6	0.29	-0.22	-14.35	
1,754.0	0.30	188.60	1,753.7	-6.7	-30.2	-30.1	0.56	-0.43	-45.59	
1,846.0	0.20	217.50	1,845.7	-7.1	-30.3	-30.2	0.17	-0.11	31.41	
1,942.0	0.20	53.60	1,941.7	-7.1	-30.3	-30.2	0.41	0.00	-170.73	
2,037.0	0.30	343.70	2,036.7	-6.8	-30.2	-30.1	0.31	0.11	-73.58	
2,132.0	0.40	283.40	2,131.7	-6.5	-30.6	-30.5	0.38	0.11	-63.47	
2,227.0	2.30	301.80	2,226.6	-5.4	-32.6	-32.5	2.03	2.00	19.37	
2,323.0	1.80	298.70	2,322.6	-3.6	-35.5	-35.5	0.53	-0.52	-3.23	
2,418.0	3.20	294.60	2,417.5	-1.8	-39.3	-39.2	1.48	1.47	-4.32	
2,513.0	3.80	291.10	2,512.3	0.4	-44.6	-44.6	0.67	0.63	-3.68	
2,609.0	5.40	272.70	2,608.0	1.8	-52.1	-52.1	2.25	1.67	-19.17	
2,704.0	5.50	270.90	2,702.6	2.0	-61.1	-61.1	0.21	0.11	-1.89	
2,799.0	7.20	264.90	2,797.0	1.6	-71.6	-71.6	1.92	1.79	-6.32	
2,895.0	6.40	262.30	2,892.3	0.3	-82.9	-82.9	0.89	-0.83	-2.71	
2,990.0	8.30	267.40	2,986.5	-0.7	-95.0	-95.0	2.11	2.00	5.37	
3,085.0	7.70	265.30	3,080.6	-1.5	-108.2	-108.1	0.70	-0.63	-2.21	
3,180.0	7.00	262.10	3,174.8	-2.8	-120.3	-120.2	0.85	-0.74	-3.37	
3,275.0	8.10	264.90	3,269.0	-4.2	-132.7	-132.6	1.22	1.16	2.95	
3,371.0	6.40	261.20	3,364.2	-5.6	-144.7	-144.6	1.84	-1.77	-3.85	
3,466.0	7.30	258.40	3,458.5	-7.7	-155.8	-155.7	1.01	0.95	-2.95	
3,561.0	8.40	264.20	3,552.6	-9.6	-168.6	-168.5	1.43	1.16	6.11	
3,656.0	6.90	260.90	3,646.8	-11.2	-181.2	-181.0	1.64	-1.58	-3.47	
3,752.0	8.90	257.70	3,741.9	-13.7	-194.1	-193.9	2.13	2.08	-3.33	
3,847.0	8.90	256.50	3,835.7	-17.0	-208.5	-208.1	0.20	0.00	-1.26	
3,942.0	8.50	254.70	3,929.6	-20.5	-222.4	-222.0	0.51	-0.42	-1.89	
4,037.0	7.90	249.80	4,023.7	-24.6	-235.3	-234.8	0.97	-0.63	-5.16	
4,132.0	9.10	254.20	4,117.6	-28.9	-248.6	-248.1	1.44	1.26	4.63	
4,228.0	8.40	250.20	4,212.5	-33.4	-262.5	-261.9	0.97	-0.73	-4.17	
4,322.0	10.00	256.70	4,305.3	-37.6	-276.9	-276.3	2.03	1.70	6.91	
4,418.0	9.10	257.00	4,400.0	-41.2	-292.4	-291.7	0.94	-0.94	0.31	
4,513.0	8.40	257.20	4,493.9	-44.4	-306.5	-305.7	0.74	-0.74	0.21	
4,608.0	7.80	257.00	4,587.9	-47.4	-319.6	-318.7	0.63	-0.63	-0.21	

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Wiedeman 28F-412
Project:	SEC.28-T4N-R66W	TVD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Site:	Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W	MD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Well:	Wiedeman 28F-412	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)
4,703.0	9.10	263.00	4,681.9	-49.8	-333.3	-332.4	1.65	1.37	6.32
4,799.0	8.20	265.10	4,776.8	-51.3	-347.7	-346.8	0.99	-0.94	2.19
4,894.0	7.70	264.60	4,870.9	-52.5	-360.8	-359.8	0.53	-0.53	-0.53
4,989.0	6.90	264.90	4,965.1	-53.6	-372.8	-371.8	0.84	-0.84	0.32
5,085.0	7.80	266.20	5,060.3	-54.5	-385.0	-384.1	0.95	0.94	1.35
5,180.0	8.70	257.70	5,154.3	-56.5	-398.5	-397.5	1.59	0.95	-8.95
5,275.0	9.90	261.90	5,248.1	-59.2	-413.6	-412.5	1.45	1.26	4.42
5,370.0	8.40	261.20	5,341.9	-61.4	-428.5	-427.4	1.58	-1.58	-0.74
5,466.0	8.40	261.40	5,436.8	-63.5	-442.4	-441.3	0.03	0.00	0.21
5,561.0	7.00	259.30	5,531.0	-65.6	-454.9	-453.8	1.50	-1.47	-2.21
5,656.0	6.20	259.80	5,625.4	-67.6	-465.7	-464.5	0.84	-0.84	0.53
5,751.0	4.60	261.20	5,719.9	-69.1	-474.5	-473.3	1.69	-1.68	1.47
5,847.0	3.90	264.80	5,815.7	-70.0	-481.5	-480.3	0.78	-0.73	3.75
5,942.0	2.70	259.00	5,910.5	-70.7	-487.0	-485.7	1.31	-1.26	-6.11
6,037.0	1.10	324.70	6,005.5	-70.4	-489.7	-488.4	2.59	-1.68	69.16
6,133.0	1.40	327.20	6,101.4	-68.6	-490.9	-489.6	0.32	0.31	2.60
6,228.0	1.40	315.40	6,196.4	-66.8	-492.3	-491.1	0.30	0.00	-12.42
6,323.0	1.20	318.00	6,291.4	-65.3	-493.8	-492.6	0.22	-0.21	2.74
6,419.0	1.10	304.50	6,387.4	-64.0	-495.2	-494.1	0.30	-0.10	-14.06
6,514.0	1.20	304.10	6,482.3	-62.9	-496.8	-495.7	0.11	0.11	-0.42
6,609.0	3.30	97.20	6,577.3	-62.7	-494.9	-493.8	4.64	2.21	161.16
6,705.0	10.10	104.10	6,672.6	-65.1	-484.0	-482.8	7.12	7.08	7.19
6,800.0	16.90	96.70	6,764.9	-68.8	-462.2	-460.9	7.37	7.16	-7.79
6,895.0	24.60	87.90	6,853.7	-69.6	-428.6	-427.4	8.72	8.11	-9.26
6,991.0	32.70	87.70	6,937.9	-67.9	-382.7	-381.5	8.44	8.44	-0.21
7,086.0	38.80	83.30	7,015.0	-63.4	-327.4	-326.3	6.96	6.42	-4.63
7,181.0	46.40	88.40	7,084.9	-58.9	-263.3	-262.3	8.78	8.00	5.37
7,275.0	55.90	90.90	7,143.8	-58.6	-190.2	-189.2	10.32	10.11	2.66
7,370.0	64.90	92.30	7,190.6	-60.9	-107.8	-106.7	9.56	9.47	1.47
7,465.0	71.70	94.40	7,225.8	-66.1	-19.7	-18.6	7.45	7.16	2.21
7,560.0	79.10	94.20	7,249.7	-73.0	71.9	73.1	7.79	7.79	-0.21
7,621.0	83.20	94.10	7,259.1	-77.4	132.0	133.3	6.72	6.72	-0.16
7,666.2	85.08	93.03	7,263.7	-80.2	176.9	178.2	4.79	4.16	-2.37
7"									
7,765.0	89.20	90.70	7,268.6	-83.4	275.5	276.9	4.79	4.17	-2.36
7,860.0	90.50	90.00	7,268.9	-83.9	370.5	371.8	1.55	1.37	-0.74
7,956.0	91.30	89.50	7,267.3	-83.5	466.5	467.8	0.98	0.83	-0.52
8,051.0	91.50	90.00	7,265.0	-83.1	561.4	562.8	0.57	0.21	0.53
8,146.0	88.50	88.40	7,265.0	-81.8	656.4	657.7	3.58	-3.16	-1.68
8,241.0	89.20	87.20	7,266.9	-78.1	751.3	752.5	1.46	0.74	-1.26
8,336.0	88.50	86.00	7,268.8	-72.5	846.1	847.2	1.46	-0.74	-1.26
8,431.0	89.60	86.00	7,270.4	-65.9	940.9	941.9	1.16	1.16	0.00
8,526.0	89.90	89.00	7,270.8	-61.7	1,035.8	1,036.7	3.17	0.32	3.16

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Wiedeman 28F-412
Project:	SEC.28-T4N-R66W	TVD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Site:	Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W	MD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Well:	Wiedeman 28F-412	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)
Deepest TVD Drilled - 7270.83'									
8,621.0	92.20	92.00	7,269.1	-62.6	1,130.7	1,131.6	3.98	2.42	3.16
8,717.0	92.50	93.00	7,265.2	-66.7	1,226.6	1,227.5	1.09	0.31	1.04
8,812.0	90.70	92.00	7,262.5	-70.9	1,321.4	1,322.5	2.17	-1.89	-1.05
8,907.0	87.90	88.60	7,263.7	-71.4	1,416.4	1,417.4	4.64	-2.95	-3.58
9,002.0	89.80	91.80	7,265.6	-71.7	1,511.4	1,512.4	3.92	2.00	3.37
9,097.0	91.50	93.50	7,264.5	-76.1	1,606.3	1,607.3	2.53	1.79	1.79
9,192.0	91.50	91.30	7,262.0	-80.1	1,701.1	1,702.2	2.32	0.00	-2.32
9,288.0	90.50	90.90	7,260.3	-81.9	1,797.1	1,798.2	1.12	-1.04	-0.42
9,383.0	90.50	88.60	7,259.5	-81.5	1,892.1	1,893.2	2.42	0.00	-2.42
9,478.0	90.10	89.50	7,259.0	-79.9	1,987.1	1,988.1	1.04	-0.42	0.95
9,573.0	90.20	90.20	7,258.8	-79.7	2,082.1	2,083.1	0.74	0.11	0.74
9,668.0	90.00	90.00	7,258.6	-79.9	2,177.1	2,178.1	0.30	-0.21	-0.21
9,763.0	89.50	89.50	7,259.0	-79.4	2,272.1	2,273.1	0.74	-0.53	-0.53
9,858.0	90.20	90.90	7,259.3	-79.8	2,367.1	2,368.1	1.65	0.74	1.47
9,954.0	89.50	90.00	7,259.5	-80.5	2,463.1	2,464.1	1.19	-0.73	-0.94
10,049.0	89.90	90.20	7,260.0	-80.7	2,558.1	2,559.1	0.47	0.42	0.21
10,144.0	90.10	90.20	7,260.0	-81.0	2,653.1	2,654.1	0.21	0.21	0.00
10,239.0	90.40	90.40	7,259.6	-81.5	2,748.1	2,749.0	0.38	0.32	0.21
10,334.0	90.90	90.60	7,258.5	-82.4	2,843.1	2,844.0	0.57	0.53	0.21
10,429.0	90.00	89.10	7,257.8	-82.1	2,938.0	2,939.0	1.84	-0.95	-1.58
10,525.0	90.50	89.70	7,257.3	-81.1	3,034.0	3,035.0	0.81	0.52	0.63
10,620.0	90.40	89.50	7,256.6	-80.4	3,129.0	3,129.9	0.24	-0.11	-0.21
10,715.0	91.40	90.90	7,255.1	-80.8	3,224.0	3,224.9	1.81	1.05	1.47
10,810.0	91.80	90.00	7,252.5	-81.5	3,319.0	3,319.9	1.04	0.42	-0.95
10,905.0	89.30	90.90	7,251.5	-82.3	3,414.0	3,414.9	2.80	-2.63	0.95
11,000.0	90.30	89.10	7,251.9	-82.3	3,509.0	3,509.8	2.17	1.05	-1.89
11,096.0	89.50	90.70	7,252.0	-82.1	3,604.9	3,605.8	1.86	-0.83	1.67
11,191.0	89.40	91.30	7,253.0	-83.7	3,699.9	3,700.8	0.64	-0.11	0.63
11,286.0	90.40	94.20	7,253.1	-88.3	3,794.8	3,795.8	3.23	1.05	3.05
11,381.0	88.30	92.70	7,254.2	-94.0	3,889.6	3,890.7	2.72	-2.21	-1.58
11,476.0	88.60	92.30	7,256.8	-98.2	3,984.5	3,985.6	0.53	0.32	-0.42
11,571.0	89.80	91.40	7,258.1	-101.2	4,079.4	4,080.6	1.58	1.26	-0.95
11,657.0	91.50	90.20	7,257.1	-102.4	4,165.4	4,166.6	2.42	1.98	-1.40
11,714.0	91.50	90.20	7,255.6	-102.6	4,222.4	4,223.5	0.00	0.00	0.00
BHL 1093°FNL & 500°FEL, SEC.28									

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Wiedeman 28F-412
Project:	SEC.28-T4N-R66W	TVD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Site:	Wiedeman 4N66W28F - East Pad Sec.28-T4N-R66W	MD Reference:	WELL @ 4775.0ft (Ensign Rig #134 RKB - 13')
Well:	Wiedeman 28F-412	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 1008'FNL & 540'FM - survey hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,348,221.13	3,198,077.94	40.287090	-104.789970
BHL 1093'FNL & 500'FE - survey misses target center by 31.7ft at 11714.0ft MD (7255.6 TVD, -102.6 N, 4222.4 E) - Point	0.00	0.00	7,260.0	-71.3	4,223.9	1,348,183.65	3,202,302.06	40.286893	-104.774830

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,666.2	7,263.7	7"	7	8-3/4	

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
8,526.0	7,270.8	-61.7	1,035.8	Deepest TVD Drilled - 7270.83'	

Checked By: _____	Approved By: _____	Date: _____
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