



**Company:** PDC ENERGY  
**Lease / Well:** HAHN 14-27 05123-20348  
**County/Parish:** WELD 123  
**State:** COLORADO  
**Date:** 2/2/2017  
**Rig:** NA  
**Surveyor:** JOHNNY RIDDLE  
**Job Number:** 3543-05-123-20348  
**Instrument Number:** 3123 **Type:** MEMORY  
**Proposed Direction:** 0 **GL Elev:** 4823  
**Magnetic Declination** 9.79 EAST TO TRUE NORTH  
**Calulation Method:** MINIMUM OF CURVATURE  
**Log Measured From:** GL

#### TIE-IN Coordinates

Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Coordinates	
				(+N/-S)	(+E/-W)
0	0.00	0.00	0.00	0.00	0.00

#### Directional Survey Report

Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Vertical Section	Coordinates (+N/-S)	Coordinates (+E/-W)	Dog-Leg / 100 ft.	Closure Distance	Closure Direction
100	4.50	48.11	99.90	2.62	2.62	2.92	4.50	3.92	48.11°
200	10.84	45.62	198.95	11.83	11.83	12.57	6.35	17.26	46.75°
300	17.03	77.98	296.10	21.48	21.48	33.67	9.73	39.93	57.47°
400	18.76	87.25	391.28	25.30	25.30	64.06	3.33	68.87	68.45°
500	18.25	89.23	486.11	26.28	26.28	95.78	0.81	99.32	74.66°
600	17.43	92.04	581.30	25.96	25.96	126.40	1.19	129.04	78.40°
700	16.67	92.07	676.91	24.91	24.91	155.71	0.76	157.68	80.91°
800	15.98	91.17	772.87	24.11	24.11	183.80	0.73	185.38	82.53°
900	15.37	91.32	869.15	23.52	23.52	210.81	0.61	212.12	83.63°
1000	14.27	92.14	965.83	22.76	22.76	236.38	1.12	237.47	84.50°
1100	13.34	91.73	1062.94	21.95	21.95	260.23	0.94	261.15	85.18°
1200	12.31	91.32	1160.44	21.35	21.35	282.42	1.03	283.22	85.68°
1300	11.48	90.92	1258.29	20.95	20.95	303.02	0.83	303.75	86.05°
1400	10.98	91.95	1356.38	20.46	20.46	322.49	0.54	323.14	86.37°
1500	10.09	92.58	1454.69	19.75	19.75	340.76	0.90	341.33	86.68°
1600	9.43	91.72	1553.24	19.10	19.10	357.70	0.68	358.21	86.94°
1700	8.51	90.47	1652.02	18.80	18.80	373.29	0.94	373.76	87.12°
1800	7.35	92.47	1751.06	18.46	18.46	387.08	1.19	387.52	87.27°
1900	6.66	89.15	1850.32	18.27	18.27	399.27	0.80	399.68	87.38°
2000	5.90	87.50	1949.71	18.58	18.58	410.20	0.78	410.62	87.41°
2100	5.34	84.70	2049.23	19.24	19.24	419.97	0.62	420.41	87.38°
2200	4.82	87.29	2148.84	19.86	19.86	428.80	0.57	429.26	87.35°
2300	4.19	85.32	2248.53	20.36	20.36	436.64	0.65	437.11	87.33°
2400	4.18	85.96	2348.26	20.92	20.92	443.91	0.05	444.40	87.30°
2500	3.88	85.12	2448.02	21.46	21.46	450.92	0.31	451.43	87.28°
2600	3.30	89.37	2547.82	21.78	21.78	457.17	0.64	457.69	87.27°
2700	3.04	92.86	2647.67	21.68	21.68	462.69	0.32	463.20	87.32°
2800	2.88	91.71	2747.53	21.47	21.47	467.85	0.17	468.35	87.37°
2900	2.55	91.41	2847.42	21.34	21.34	472.59	0.33	473.07	87.41°
3000	2.23	91.76	2947.33	21.23	21.23	476.76	0.32	477.23	87.45°
3100	2.07	91.36	3047.26	21.13	21.13	480.51	0.16	480.97	87.48°
3200	1.92	87.52	3147.20	21.16	21.16	483.99	0.20	484.45	87.50°
3300	1.95	77.76	3247.15	21.59	21.59	487.32	0.33	487.80	87.46°
3400	2.02	76.94	3347.09	22.35	22.35	490.70	0.08	491.21	87.39°
3500	1.87	78.37	3447.03	23.07	23.07	494.02	0.16	494.56	87.33°
3600	1.80	79.47	3546.98	23.69	23.69	497.16	0.08	497.72	87.27°
3700	1.61	81.32	3646.93	24.19	24.19	500.09	0.20	500.68	87.23°
3800	1.47	82.38	3746.90	24.57	24.57	502.75	0.14	503.35	87.20°
3900	0.93	55.92	3846.88	25.20	25.20	504.70	0.76	505.32	87.14°
4000	0.82	38.46	3946.86	26.21	26.21	505.81	0.29	506.49	87.03°
4100	0.81	30.83	4046.85	27.38	27.38	506.62	0.11	507.36	86.91°
4200	0.85	36.71	4146.84	28.58	28.58	507.43	0.09	508.23	86.78°
4300	0.71	52.11	4246.83	29.56	29.56	508.36	0.25	509.22	86.67°
4400	0.66	65.59	4346.83	30.17	30.17	509.37	0.17	510.26	86.61°
4500	0.55	68.16	4446.82	30.59	30.59	510.34	0.11	511.26	86.57°
4600	0.55	66.55	4546.82	30.96	30.96	511.23	0.02	512.16	86.53°
4700	0.52	75.19	4646.81	31.27	31.27	512.11	0.09	513.06	86.51°
4800	0.38	97.97	4746.81	31.34	31.34	512.87	0.22	513.83	86.50°

Directional Survey Report									
Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Vertical Section	Coordinates (+N/-S) (+E/-W)		Dog-Leg / 100 ft.	Closure Distance	Closure Direction
4900	0.27	133.81	4846.81	31.13	31.13	513.37	0.23	514.32	86.53°
5000	0.20	124.07	4946.81	30.87	30.87	513.69	0.08	514.61	86.56°
5100	0.28	130.18	5046.81	30.61	30.61	514.02	0.08	514.93	86.59°
5200	0.34	165.69	5146.81	30.17	30.17	514.28	0.20	515.16	86.64°
5300	0.27	173.50	5246.80	29.65	29.65	514.38	0.08	515.23	86.70°
5400	0.60	81.82	5346.80	29.49	29.49	514.92	0.67	515.77	86.72°
5500	0.65	75.96	5446.80	29.70	29.70	515.99	0.08	516.85	86.71°
5600	0.55	62.91	5546.79	30.05	30.05	516.97	0.17	517.84	86.67°
5700	0.63	67.92	5646.79	30.48	30.48	517.91	0.10	518.80	86.63°
5800	0.52	65.65	5746.78	30.87	30.87	518.83	0.11	519.75	86.59°
5900	0.50	70.83	5846.78	31.20	31.20	519.65	0.05	520.59	86.56°
6000	0.43	69.46	5946.77	31.48	31.48	520.42	0.07	521.37	86.54°
6100	0.55	51.28	6046.77	31.91	31.91	521.14	0.19	522.12	86.50°
6200	0.56	35.21	6146.76	32.61	32.61	521.80	0.16	522.82	86.42°
6300	0.63	37.42	6246.76	33.45	33.45	522.42	0.07	523.49	86.34°
6400	0.76	31.34	6346.75	34.45	34.45	523.09	0.15	524.23	86.23°
6500	0.86	50.12	6446.74	35.50	35.50	524.02	0.28	525.22	86.12°
6600	1.06	59.26	6546.73	36.45	36.45	525.39	0.25	526.65	86.03°
6700	1.21	69.29	6646.71	37.30	37.30	527.17	0.25	528.49	85.95°
6800	1.10	71.45	6746.69	37.98	37.98	529.07	0.12	530.43	85.89°
6900	1.28	87.48	6846.67	38.33	38.33	531.09	0.38	532.47	85.87°
7000	1.35	92.12	6946.64	38.34	38.34	533.39	0.13	534.76	85.89°

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