



Company: PDC ENERGY
Lease / Well: HAHN 13-27 05123-20347
County/Parish: WELD 123
State: COLORADO
Date: 2/1/2017
Rig: NA
Surveyor: JOHNNY RIDDLE
Job Number: 3541-05-123-20347
Instrument Number: 3123 **Type:** MEMORY
Proposed Direction: 0 **GL Elev:** 4851
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	6.77	113.03	99.77	-2.31	-2.31	5.43	6.77	5.90	113.03°
200	16.40	129.05	197.64	-13.54	-13.54	21.86	10.06	25.71	121.77°
300	22.90	146.73	291.84	-38.75	-38.75	43.54	8.74	58.28	131.67°
400	25.42	153.31	383.09	-74.20	-74.20	63.86	3.68	97.90	139.28°
500	24.91	153.39	473.60	-112.21	-112.21	82.93	0.51	139.53	143.53°
600	24.15	152.99	564.58	-149.26	-149.26	101.66	0.78	180.59	145.74°
700	22.95	154.00	656.25	-185.01	-185.01	119.49	1.27	220.25	147.14°
800	22.22	154.06	748.58	-219.54	-219.54	136.31	0.73	258.41	148.16°
900	21.33	153.99	841.44	-252.89	-252.89	152.56	0.89	295.34	148.90°
1000	20.37	154.04	934.89	-284.88	-284.88	168.15	0.96	330.81	149.45°
1100	19.27	154.57	1028.97	-315.43	-315.43	182.86	1.11	364.60	149.90°
1200	18.06	154.35	1123.70	-344.31	-344.31	196.65	1.21	396.51	150.27°
1300	16.82	153.25	1219.11	-371.20	-371.20	209.88	1.28	426.43	150.52°
1400	15.42	153.54	1315.17	-396.03	-396.03	222.31	1.40	454.16	150.69°
1500	14.43	152.57	1411.80	-418.99	-418.99	233.98	1.02	479.89	150.82°
1600	12.88	152.37	1508.97	-439.92	-439.92	244.89	1.55	503.49	150.90°
1700	11.88	151.72	1606.64	-458.86	-458.86	254.93	1.01	524.92	150.94°
1800	10.88	151.99	1704.67	-476.26	-476.26	264.24	1.00	544.65	150.98°
1900	10.02	151.26	1803.01	-492.22	-492.22	272.86	0.87	562.79	151.00°
2000	9.01	150.12	1901.64	-506.64	-506.64	280.94	1.03	579.32	150.99°
2100	7.99	150.68	2000.54	-519.49	-519.49	288.25	1.02	594.10	150.98°
2200	7.28	148.69	2099.65	-530.96	-530.96	294.94	0.76	607.38	150.95°
2300	7.03	146.16	2198.87	-541.46	-541.46	301.64	0.40	619.81	150.88°
2400	6.99	148.50	2298.13	-551.73	-551.73	308.23	0.29	631.99	150.81°
2500	6.65	149.36	2397.42	-561.90	-561.90	314.36	0.35	643.85	150.77°
2600	6.50	149.67	2496.76	-571.76	-571.76	320.17	0.15	655.30	150.75°
2700	6.02	148.02	2596.16	-581.10	-581.10	325.80	0.51	666.20	150.72°
2800	5.48	148.44	2695.66	-589.61	-589.61	331.08	0.54	676.21	150.68°
2900	4.74	149.44	2795.26	-597.24	-597.24	335.68	0.75	685.11	150.66°
3000	3.73	146.51	2894.99	-603.51	-603.51	339.58	1.03	692.49	150.64°
3100	3.02	142.89	2994.81	-608.32	-608.32	342.96	0.74	698.34	150.59°
3200	2.83	132.12	3094.68	-612.08	-612.08	346.38	0.58	703.29	150.49°
3300	2.71	129.04	3194.57	-615.23	-615.23	350.05	0.19	707.84	150.36°
3400	2.32	126.51	3294.47	-617.92	-617.92	353.51	0.41	711.89	150.23°
3500	1.69	130.31	3394.41	-620.08	-620.08	356.26	0.64	715.14	150.12°
3600	1.55	134.92	3494.37	-621.99	-621.99	358.34	0.19	717.83	150.05°
3700	1.40	135.53	3594.34	-623.81	-623.81	360.16	0.15	720.32	150.00°
3800	1.29	143.54	3694.31	-625.59	-625.59	361.68	0.22	722.62	149.97°
3900	0.53	149.48	3794.29	-626.89	-626.89	362.59	0.76	724.20	149.96°
4000	0.54	320.30	3894.29	-626.93	-626.93	362.52	1.07	724.20	149.96°
4100	0.75	310.31	3994.29	-626.14	-626.14	361.72	0.24	723.12	149.99°
4200	0.74	302.20	4094.28	-625.38	-625.38	360.67	0.11	721.93	150.03°
4300	0.73	301.17	4194.27	-624.70	-624.70	359.58	0.02	720.80	150.07°
4400	0.93	235.93	4294.26	-624.83	-624.83	358.37	0.91	720.30	150.16°
4500	1.08	224.32	4394.25	-625.96	-625.96	357.03	0.25	720.62	150.30°
4600	0.85	238.82	4494.23	-627.01	-627.01	355.74	0.33	720.90	150.43°
4700	0.76	251.15	4594.22	-627.61	-627.61	354.48	0.19	720.80	150.54°
4800	0.65	257.42	4694.22	-627.95	-627.95	353.30	0.13	720.51	150.64°

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	0.53	257.02	4794.21	-628.18	-628.18	352.29	0.12	720.22	150.72°
5000	0.49	253.26	4894.21	-628.41	-628.41	351.43	0.05	720.00	150.78°
5100	0.50	266.14	4994.20	-628.56	-628.56	350.59	0.11	719.72	150.85°
5200	0.45	261.35	5094.20	-628.65	-628.65	349.77	0.06	719.40	150.91°
5300	0.04	317.41	5194.20	-628.68	-628.68	349.35	0.43	719.23	150.94°
5400	0.31	75.88	5294.20	-628.59	-628.59	349.59	0.33	719.26	150.92°
5500	1.06	88.07	5394.19	-628.49	-628.49	350.78	0.76	719.75	150.83°
5600	1.02	99.65	5494.17	-628.61	-628.61	352.58	0.21	720.74	150.71°
5700	0.78	119.70	5594.16	-629.10	-629.10	354.05	0.39	721.88	150.63°
5800	0.57	130.74	5694.15	-629.76	-629.76	355.02	0.25	722.93	150.59°
5900	0.49	132.94	5794.15	-630.37	-630.37	355.71	0.08	723.81	150.56°
6000	0.42	121.89	5894.15	-630.86	-630.86	356.33	0.11	724.54	150.54°
6100	0.43	105.47	5994.14	-631.15	-631.15	357.00	0.12	725.12	150.51°
6200	0.58	83.10	6094.14	-631.19	-631.19	357.87	0.25	725.58	150.45°
6300	0.73	81.85	6194.13	-631.04	-631.04	359.00	0.15	726.01	150.36°
6400	0.92	87.20	6294.12	-630.91	-630.91	360.43	0.20	726.61	150.26°
6500	1.15	89.69	6394.11	-630.87	-630.87	362.24	0.23	727.47	150.14°
6600	1.21	82.49	6494.09	-630.72	-630.72	364.29	0.16	728.37	149.99°
6700	1.56	84.87	6594.06	-630.46	-630.46	366.69	0.35	729.35	149.82°
6800	1.92	87.26	6694.01	-630.26	-630.26	369.72	0.37	730.70	149.60°
6900	2.21	92.52	6793.94	-630.27	-630.27	373.32	0.35	732.53	149.36°
7000	2.39	113.82	6893.87	-631.19	-631.19	377.15	0.87	735.29	149.14°
7100	2.64	164.62	6993.78	-634.26	-634.26	379.67	2.17	739.21	149.09°

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

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

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

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

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

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

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