



**Company:** PDC ENERGY  
**Lease / Well:** BROWN 22-20 05123-25208  
**County/Parish:** WELD 123  
**State:** COLORADO  
**Date:** 2/9/2017  
**Rig:** NA  
**Surveyor:** JOHNNY RIDDLE  
**Job Number:** 3602-05-123-25208  
**Instrument Number:** 3123 **Type:** MEMORY  
**Proposed Direction:** 0 **GL Elev:** 4892  
**Magnetic Declination** 9.80 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	1.21	352.79	99.99	1.05	1.05	-0.13	1.21	1.06	352.79°
200	0.85	9.66	199.98	2.83	2.83	-0.14	0.47	2.83	357.15°
300	1.07	21.53	299.96	4.43	4.43	0.33	0.30	4.44	4.22°
400	1.47	40.48	399.94	6.27	6.27	1.50	0.57	6.45	13.47°
500	1.66	42.10	499.90	8.32	8.32	3.31	0.20	8.95	21.67°
600	1.67	38.68	599.86	10.53	10.53	5.19	0.10	11.74	26.22°
700	1.43	40.06	699.82	12.63	12.63	6.90	0.24	14.39	28.66°
800	1.12	34.79	799.80	14.38	14.38	8.26	0.33	16.59	29.87°
900	1.04	38.60	899.78	15.89	15.89	9.39	0.11	18.46	30.56°
1000	1.03	28.11	999.76	17.40	17.40	10.38	0.19	20.26	30.81°
1100	0.96	6.00	1099.75	19.02	19.02	10.89	0.39	21.92	29.78°
1200	0.42	31.74	1199.74	20.17	20.17	11.17	0.61	23.05	28.97°
1300	0.43	334.74	1299.74	20.82	20.82	11.20	0.41	23.64	28.28°
1400	0.31	73.47	1399.74	21.24	21.24	11.30	0.57	24.05	28.02°
1500	0.02	191.72	1499.74	21.29	21.29	11.55	0.32	24.23	28.48°
1600	0.26	7.34	1599.74	21.50	21.50	11.58	0.28	24.42	28.30°
1700	0.23	101.63	1699.74	21.69	21.69	11.81	0.36	24.69	28.56°
1800	0.23	226.42	1799.74	21.51	21.51	11.86	0.41	24.56	28.87°
1900	0.69	295.97	1899.73	21.63	21.63	11.17	0.65	24.35	27.31°
2000	0.59	277.55	1999.73	21.97	21.97	10.12	0.23	24.18	24.73°
2100	0.63	261.34	2099.72	21.95	21.95	9.06	0.18	23.75	22.44°
2200	0.65	218.67	2199.72	21.42	21.42	8.17	0.47	22.93	20.87°
2300	0.88	211.33	2299.71	20.33	20.33	7.41	0.25	21.64	20.04°
2400	0.57	197.96	2399.70	19.20	19.20	6.86	0.35	20.39	19.66°
2500	0.78	227.37	2499.69	18.26	18.26	6.21	0.40	19.29	18.77°
2600	0.86	209.43	2599.68	17.15	17.15	5.34	0.27	17.96	17.29°
2700	0.92	211.69	2699.67	15.81	15.81	4.55	0.07	16.45	16.04°
2800	0.78	241.64	2799.66	14.80	14.80	3.53	0.46	15.22	13.39°
2900	1.27	243.06	2899.64	13.98	13.98	1.94	0.49	14.11	7.89°
3000	1.53	246.22	2999.61	12.94	12.94	-0.27	0.27	12.94	358.80°
3100	1.42	248.22	3099.58	11.94	11.94	-2.64	0.12	12.23	347.52°
3200	1.26	239.66	3199.55	10.93	10.93	-4.74	0.26	11.91	336.53°
3300	1.27	208.72	3299.53	9.40	9.40	-6.22	0.67	11.27	326.48°
3400	1.34	195.08	3399.50	7.30	7.30	-7.06	0.32	10.15	315.94°
3500	1.30	192.52	3499.48	5.06	5.06	-7.61	0.07	9.14	303.62°
3600	1.12	182.89	3599.45	2.98	2.98	-7.91	0.27	8.45	290.64°
3700	1.60	188.12	3699.43	0.62	0.62	-8.15	0.50	8.18	274.34°
3800	1.39	193.84	3799.39	-1.94	-1.94	-8.64	0.26	8.86	257.34°
3900	1.40	192.19	3899.36	-4.31	-4.31	-9.19	0.04	10.15	244.86°
4000	1.57	190.56	3999.33	-6.85	-6.85	-9.70	0.18	11.87	234.75°
4100	1.91	188.04	4099.28	-9.85	-9.85	-10.18	0.35	14.17	225.95°
4200	1.78	192.67	4199.23	-13.02	-13.02	-10.76	0.20	16.88	219.57°
4300	1.49	201.47	4299.19	-15.74	-15.74	-11.57	0.38	19.54	216.32°
4400	0.97	202.21	4399.17	-17.73	-17.73	-12.37	0.52	21.62	214.89°
4500	0.57	223.66	4499.16	-18.88	-18.88	-13.03	0.49	22.94	214.62°
4600	0.78	201.39	4599.15	-19.87	-19.87	-13.62	0.33	24.09	214.43°
4700	0.48	225.00	4699.14	-20.80	-20.80	-14.17	0.39	25.17	214.26°
4800	0.72	217.16	4799.14	-21.60	-21.60	-14.84	0.25	26.21	214.50°

Directional Survey Report									
Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Vertical Section	Coordinates		Dog-Leg / 100 ft.	Closure Distance	Closure Direction
(+N/-S)					(+E/-W)				
4900	0.78	202.48	4899.13	-22.73	-22.73	-15.48	0.20	27.50	214.26°
5000	0.70	201.64	4999.12	-23.92	-23.92	-15.97	0.08	28.76	213.72°
5100	0.72	199.56	5099.11	-25.08	-25.08	-16.40	0.03	29.97	213.18°
5200	0.78	206.65	5199.11	-26.28	-26.28	-16.92	0.11	31.26	212.77°
5300	0.95	204.45	5299.09	-27.65	-27.65	-17.57	0.17	32.76	212.43°
5400	1.23	212.00	5399.08	-29.31	-29.31	-18.48	0.31	34.65	212.23°
5500	1.49	192.12	5499.05	-31.49	-31.49	-19.32	0.53	36.95	211.53°
5600	1.63	197.61	5599.01	-34.12	-34.12	-20.02	0.20	39.56	210.41°
5700	1.34	198.27	5698.98	-36.59	-36.59	-20.82	0.29	42.10	209.64°
5800	1.36	208.15	5798.95	-38.74	-38.74	-21.75	0.23	44.43	209.31°
5900	1.12	210.99	5898.93	-40.63	-40.63	-22.81	0.25	46.59	209.31°
6000	0.84	203.67	5998.91	-42.14	-42.14	-23.61	0.31	48.30	209.26°
6100	0.88	218.76	6098.90	-43.41	-43.41	-24.38	0.23	49.79	209.33°
6200	0.92	214.74	6198.89	-44.66	-44.66	-25.32	0.07	51.34	209.55°
6300	1.13	213.42	6298.87	-46.15	-46.15	-26.32	0.21	53.13	209.70°
6400	0.89	213.44	6398.86	-47.62	-47.62	-27.29	0.24	54.89	209.82°
6500	1.13	214.00	6498.84	-49.08	-49.08	-28.27	0.24	56.64	209.94°
6600	1.43	222.49	6598.82	-50.82	-50.82	-29.67	0.35	58.85	210.27°
6700	1.70	220.05	6698.78	-52.88	-52.88	-31.46	0.28	61.53	210.75°
6800	2.31	227.49	6798.72	-55.37	-55.37	-33.90	0.66	64.93	211.48°
6900	2.19	228.27	6898.64	-58.01	-58.01	-36.82	0.12	68.71	212.40°
7000	2.29	226.87	6998.56	-60.65	-60.65	-39.70	0.11	72.48	213.21°
7100	2.09	227.12	7098.49	-63.25	-63.25	-42.49	0.20	76.20	213.89°
7200	2.46	224.25	7198.41	-66.03	-66.03	-45.33	0.39	80.09	214.47°

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