



**Company:** PDC ENERGY  
**Lease / Well:** WALSH 13-24  
**County/Parish:** WELD 123  
**State:** COLORADO  
**Date:** 4/22/2016  
**Rig:** NA  
**Surveyor:** SHON LANE  
**Job Number:** 2376-05123-19609  
**Instrument Number:** 3123 **Type:** MEMORY  
**Proposed Direction:** 0 **GL Elev:** 4959  
**Magnetic Declination** 9.85 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	0.61	329.76	100.00	0.46	0.46	-0.27	0.61	0.53	329.76°
200	0.78	329.27	199.99	1.50	1.50	-0.88	0.17	1.75	329.57°
300	0.59	320.71	299.98	2.49	2.49	-1.56	0.22	2.94	327.95°
400	0.92	313.22	399.97	3.44	3.44	-2.47	0.34	4.23	324.31°
500	0.76	316.17	499.96	4.46	4.46	-3.51	0.17	5.68	321.80°
600	0.82	310.60	599.95	5.41	5.41	-4.52	0.10	7.05	320.14°
700	0.89	309.89	699.94	6.37	6.37	-5.66	0.07	8.52	318.41°
800	1.32	320.69	799.92	7.76	7.76	-6.98	0.48	10.44	318.03°
900	1.38	321.76	899.90	9.60	9.60	-8.46	0.07	12.79	318.62°
1000	1.39	315.18	999.87	11.41	11.41	-10.06	0.16	15.21	318.60°
1100	1.62	304.53	1099.83	13.07	13.07	-12.08	0.36	17.79	317.26°
1200	1.76	299.54	1199.79	14.63	14.63	-14.58	0.20	20.65	315.10°
1300	1.88	296.43	1299.74	16.11	16.11	-17.38	0.16	23.70	312.83°
1400	1.93	293.71	1399.68	17.52	17.52	-20.39	0.10	26.88	310.67°
1500	1.88	288.25	1499.63	18.71	18.71	-23.49	0.19	30.03	308.54°
1600	1.70	280.30	1599.58	19.49	19.49	-26.51	0.31	32.90	306.32°
1700	1.53	279.48	1699.54	19.97	19.97	-29.28	0.17	35.45	304.30°
1800	1.42	280.23	1799.51	20.41	20.41	-31.82	0.11	37.81	302.68°
1900	1.32	260.56	1899.48	20.45	20.45	-34.18	0.48	39.82	300.89°
2000	0.96	257.25	1999.46	20.07	20.07	-36.13	0.37	41.33	299.05°
2100	1.05	245.58	2099.44	19.51	19.51	-37.78	0.22	42.52	297.31°
2200	1.07	246.30	2199.43	18.75	18.75	-39.47	0.02	43.70	295.41°
2300	0.98	229.41	2299.41	17.82	17.82	-40.97	0.31	44.68	293.51°
2400	1.22	226.58	2399.39	16.53	16.53	-42.40	0.25	45.51	291.30°
2500	1.59	240.47	2499.36	15.12	15.12	-44.38	0.50	46.88	288.81°
2600	1.75	243.15	2599.32	13.74	13.74	-46.95	0.18	48.92	286.32°
2700	1.53	251.65	2699.28	12.64	12.64	-49.58	0.33	51.16	284.30°
2800	1.42	258.08	2799.25	11.96	11.96	-52.06	0.20	53.41	282.94°
2900	1.51	260.18	2899.21	11.48	11.48	-54.57	0.10	55.76	281.88°
3000	1.67	260.26	2999.18	11.01	11.01	-57.30	0.16	58.35	280.87°
3100	1.85	259.19	3099.13	10.46	10.46	-60.32	0.18	61.22	279.84°
3200	2.04	257.85	3199.07	9.78	9.78	-63.65	0.20	64.40	278.74°
3300	2.23	263.08	3299.00	9.17	9.17	-67.32	0.27	67.94	277.76°
3400	2.31	267.00	3398.92	8.83	8.83	-71.26	0.17	71.81	277.06°
3500	2.33	268.86	3498.84	8.69	8.69	-75.31	0.08	75.81	276.58°
3600	1.81	265.58	3598.77	8.52	8.52	-78.92	0.53	79.37	276.16°
3700	1.42	256.28	3698.74	8.11	8.11	-81.69	0.47	82.09	275.67°
3800	1.23	248.13	3798.71	7.41	7.41	-83.89	0.27	84.22	275.05°
3900	1.20	239.57	3898.69	6.48	6.48	-85.79	0.18	86.04	274.32°
4000	1.18	238.03	3998.66	5.41	5.41	-87.57	0.04	87.74	273.53°
4100	1.25	234.52	4098.64	4.23	4.23	-89.33	0.10	89.43	272.71°
4200	1.20	231.54	4198.62	2.95	2.95	-91.04	0.08	91.09	271.85°
4300	1.01	225.37	4298.60	1.68	1.68	-92.49	0.22	92.50	271.04°
4400	1.34	250.06	4398.58	0.66	0.66	-94.21	0.60	94.21	270.40°
4500	1.79	251.23	4498.54	-0.24	-0.24	-96.79	0.45	96.79	269.86°
4600	1.93	250.14	4598.49	-1.32	-1.32	-99.85	0.14	99.86	269.24°
4700	1.97	249.58	4698.43	-2.49	-2.49	-103.05	0.04	103.08	268.62°
4800	1.36	238.05	4798.39	-3.72	-3.72	-105.66	0.69	105.73	267.98°

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	1.28	238.95	4898.36	-4.92	-4.92	-107.63	0.08	107.74	267.38°
5000	1.28	241.54	4998.34	-6.03	-6.03	-109.57	0.06	109.73	266.85°
5100	1.18	238.76	5098.31	-7.10	-7.10	-111.43	0.12	111.66	266.36°
5200	1.07	239.99	5198.30	-8.10	-8.10	-113.12	0.11	113.41	265.91°
5300	0.84	240.10	5298.28	-8.93	-8.93	-114.56	0.23	114.91	265.54°
5400	0.71	240.48	5398.27	-9.60	-9.60	-115.74	0.13	116.13	265.26°
5500	0.52	244.11	5498.27	-10.10	-10.10	-116.68	0.19	117.12	265.05°
5600	0.51	255.27	5598.26	-10.42	-10.42	-117.52	0.10	117.98	264.94°
5700	0.48	260.87	5698.26	-10.60	-10.60	-118.37	0.06	118.84	264.89°
5800	0.25	244.72	5798.26	-10.75	-10.75	-118.98	0.25	119.46	264.83°
5900	0.93	180.20	5898.25	-11.66	-11.66	-119.18	0.85	119.75	264.41°
6000	1.65	169.94	5998.23	-13.89	-13.89	-118.93	0.75	119.74	263.34°
6100	0.75	160.84	6098.20	-15.92	-15.92	-118.46	0.92	119.53	262.34°
6200	0.42	159.28	6198.20	-16.89	-16.89	-118.12	0.33	119.32	261.86°
6300	0.23	114.49	6298.20	-17.31	-17.31	-117.81	0.30	119.07	261.64°
6400	0.56	69.57	6398.19	-17.22	-17.22	-117.17	0.43	118.42	261.64°
6500	0.69	70.02	6498.19	-16.85	-16.85	-116.14	0.13	117.36	261.75°
6600	0.64	64.15	6598.18	-16.40	-16.40	-115.07	0.08	116.24	261.89°
6700	0.57	75.05	6698.18	-16.03	-16.03	-114.09	0.13	115.21	262.00°
6800	0.39	103.54	6798.17	-15.98	-15.98	-113.28	0.29	114.40	261.97°
6900	0.57	114.62	6898.17	-16.26	-16.26	-112.50	0.20	113.67	261.77°
7000	0.55	105.60	6998.16	-16.60	-16.60	-111.58	0.09	112.81	261.54°
7100	0.42	107.93	7098.16	-16.84	-16.84	-110.77	0.13	112.04	261.35°
7200	0.34	118.51	7198.16	-17.10	-17.10	-110.16	0.11	111.48	261.18°
7300	3.28	255.01	7298.11	-17.98	-17.98	-112.66	3.53	114.09	260.93°
7400	7.93	254.86	7397.60	-20.52	-20.52	-122.09	4.65	123.80	260.46°
7500	10.60	253.31	7496.29	-24.97	-24.97	-137.56	2.68	139.81	259.71°
7600	9.38	254.63	7594.77	-29.77	-29.77	-154.23	1.24	157.08	259.08°
7700	8.82	258.04	7693.51	-33.52	-33.52	-169.59	0.78	172.87	258.82°
7800	10.11	255.71	7792.15	-37.27	-37.27	-185.60	1.35	189.30	258.64°
7900	9.76	252.72	7890.65	-41.96	-41.96	-202.19	0.62	206.50	258.28°

Directional Survey Report									
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