



**Company:** Anadarko Petroleum Corp.  
**Lease / Well:** HSR- Parker 15-16A  
**County/Parish:** WELD  
**State:** COLORADO  
**Date:** 11/17/2014  
**Rig:** NA  
**Surveyor:** SHON LANE  
**Job Number:** 583-512320336  
**Instrument Number:** 4015 **Type:** MEMORY  
**Proposed Direction:** 0 **GL Elev:** 5011  
**Magnetic Declination** 9.88 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	0.34	68.74	100.00	0.11	0.11	0.28	0.34	0.30	68.74°
200	0.21	118.74	200.00	0.13	0.13	0.71	0.26	0.72	79.91°
300	0.22	125.68	300.00	-0.07	-0.07	1.03	0.03	1.03	94.05°
400	0.09	146.61	400.00	-0.25	-0.25	1.23	0.14	1.25	101.52°
500	0.12	116.54	500.00	-0.36	-0.36	1.37	0.06	1.41	104.88°
600	0.08	105.22	600.00	-0.43	-0.43	1.53	0.04	1.59	105.66°
700	0.05	228.50	700.00	-0.48	-0.48	1.56	0.12	1.63	106.92°
800	0.12	206.01	800.00	-0.60	-0.60	1.48	0.08	1.60	111.97°
900	0.27	208.30	900.00	-0.90	-0.90	1.33	0.15	1.60	124.17°
1000	0.53	205.97	999.99	-1.52	-1.52	1.01	0.26	1.83	146.41°
1100	0.74	215.21	1099.99	-2.47	-2.47	0.44	0.23	2.50	169.96°
1200	0.88	211.84	1199.98	-3.65	-3.65	-0.34	0.15	3.66	185.34°
1300	0.98	215.25	1299.96	-5.00	-5.00	-1.24	0.11	5.15	193.93°
1400	1.04	215.02	1399.95	-6.44	-6.44	-2.25	0.06	6.82	199.29°
1500	1.08	219.45	1499.93	-7.91	-7.91	-3.37	0.09	8.60	203.10°
1600	1.16	225.30	1599.91	-9.35	-9.35	-4.69	0.14	10.46	206.65°
1700	1.30	238.60	1699.89	-10.65	-10.65	-6.38	0.32	12.42	210.92°
1800	1.30	243.83	1799.86	-11.74	-11.74	-8.37	0.12	14.42	215.46°
1900	1.48	253.03	1899.83	-12.62	-12.62	-10.62	0.29	16.49	220.08°
2000	1.56	253.52	1999.80	-13.38	-13.38	-13.16	0.08	18.77	224.51°
2100	1.53	256.92	2099.76	-14.07	-14.07	-15.76	0.10	21.13	228.25°
2200	1.45	253.40	2199.73	-14.74	-14.74	-18.28	0.12	23.48	231.12°
2300	1.21	251.78	2299.70	-15.43	-15.43	-20.49	0.24	25.65	233.03°
2400	0.86	256.37	2399.69	-15.93	-15.93	-22.23	0.36	27.35	234.36°
2500	0.48	275.61	2499.68	-16.07	-16.07	-23.37	0.44	28.36	235.49°
2600	0.40	312.64	2599.68	-15.79	-15.79	-24.05	0.29	28.77	236.70°
2700	0.44	346.30	2699.67	-15.18	-15.18	-24.39	0.25	28.73	238.10°
2800	0.42	337.33	2799.67	-14.47	-14.47	-24.63	0.07	28.56	239.56°
2900	0.64	328.91	2899.67	-13.66	-13.66	-25.05	0.23	28.53	241.41°
3000	0.79	309.85	2999.66	-12.74	-12.74	-25.87	0.28	28.84	243.79°
3100	0.98	297.72	3099.65	-11.90	-11.90	-27.16	0.27	29.65	246.35°
3200	0.94	284.71	3199.63	-11.29	-11.29	-28.71	0.22	30.85	248.53°
3300	1.03	282.74	3299.62	-10.88	-10.88	-30.38	0.10	32.27	250.29°
3400	0.83	259.30	3399.61	-10.82	-10.82	-31.97	0.43	33.75	251.30°
3500	0.97	228.72	3499.59	-11.51	-11.51	-33.32	0.49	35.25	250.94°
3600	1.56	210.77	3599.57	-13.24	-13.24	-34.65	0.70	37.09	249.09°
3700	1.67	206.77	3699.53	-15.71	-15.71	-36.00	0.16	39.28	246.42°
3800	1.87	208.17	3799.48	-18.45	-18.45	-37.43	0.20	41.73	243.76°
3900	2.09	206.57	3899.42	-21.52	-21.52	-39.01	0.23	44.55	241.12°
4000	2.09	204.72	3999.36	-24.81	-24.81	-40.59	0.07	47.57	238.57°
4100	2.02	202.62	4099.29	-28.09	-28.09	-42.03	0.10	50.55	236.24°
4200	2.05	203.66	4199.23	-31.36	-31.36	-43.43	0.05	53.56	234.17°
4300	2.04	205.12	4299.16	-34.61	-34.61	-44.90	0.05	56.69	232.38°
4400	1.84	223.02	4399.11	-37.39	-37.39	-46.75	0.64	59.86	231.35°
4500	2.14	239.96	4499.05	-39.50	-39.50	-49.46	0.66	63.30	231.39°
4600	2.35	243.84	4598.97	-41.34	-41.34	-52.92	0.26	67.15	232.01°
4700	2.42	242.67	4698.89	-43.21	-43.21	-56.64	0.09	71.24	232.66°
4800	2.33	238.69	4798.80	-45.24	-45.24	-60.25	0.19	75.34	233.10°

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	2.26	238.52	4898.72	-47.32	-47.32	-63.67	0.07	79.33	233.38°
5000	1.90	233.44	4998.65	-49.34	-49.34	-66.68	0.40	82.95	233.50°
5100	1.87	230.70	5098.60	-51.36	-51.36	-69.27	0.09	86.24	233.45°
5200	1.68	234.25	5198.55	-53.25	-53.25	-71.73	0.22	89.33	233.41°
5300	1.51	239.90	5298.51	-54.77	-54.77	-74.05	0.23	92.11	233.52°
5400	1.28	253.27	5398.48	-55.75	-55.75	-76.26	0.40	94.47	233.83°
5500	1.24	256.97	5498.46	-56.32	-56.32	-78.39	0.09	96.52	234.31°
5600	1.22	258.99	5598.44	-56.76	-56.76	-80.49	0.05	98.49	234.81°
5700	0.93	256.11	5698.42	-57.16	-57.16	-82.32	0.29	100.22	235.23°
5800	0.87	253.61	5798.41	-57.57	-57.57	-83.84	0.07	101.70	235.52°
5900	0.64	246.29	5898.40	-58.01	-58.01	-85.08	0.25	102.97	235.71°
6000	0.46	205.27	5998.39	-58.60	-58.60	-85.76	0.42	103.87	235.66°
6100	0.39	156.03	6098.39	-59.27	-59.27	-85.79	0.36	104.27	235.36°
6200	0.50	154.73	6198.39	-59.98	-59.98	-85.47	0.11	104.41	234.94°
6300	0.38	182.06	6298.38	-60.70	-60.70	-85.29	0.24	104.69	234.56°
6400	0.47	213.99	6398.38	-61.37	-61.37	-85.53	0.25	105.27	234.34°
6500	0.45	218.11	6498.38	-62.02	-62.02	-86.01	0.04	106.04	234.20°
6600	0.53	216.05	6598.37	-62.71	-62.71	-86.52	0.08	106.85	234.07°
6700	0.57	237.87	6698.37	-63.34	-63.34	-87.21	0.21	107.79	234.01°
6800	0.69	235.38	6798.36	-63.95	-63.95	-88.13	0.12	108.89	234.03°
6900	0.64	238.17	6898.36	-64.59	-64.59	-89.10	0.06	110.05	234.06°
7000	0.61	242.02	6998.35	-65.13	-65.13	-90.05	0.05	111.13	234.12°
7100	0.74	258.43	7098.34	-65.51	-65.51	-91.15	0.23	112.25	234.29°
7200	0.95	254.90	7198.33	-65.86	-65.86	-92.58	0.22	113.61	234.57°
7300	0.61	245.33	7298.32	-66.29	-66.29	-93.87	0.36	114.92	234.77°
7400	2.48	239.97	7398.28	-67.60	-67.60	-96.22	1.87	117.59	234.91°
7500	2.86	242.08	7498.17	-69.85	-69.85	-100.30	0.39	122.23	235.15°
7600	2.23	249.35	7598.08	-71.70	-71.70	-104.32	0.71	126.59	235.50°
7700	1.61	250.92	7698.02	-72.85	-72.85	-107.47	0.62	129.84	235.87°
7800	1.63	253.48	7797.98	-73.71	-73.71	-110.16	0.08	132.55	236.21°
7900	1.29	260.34	7897.95	-74.31	-74.31	-112.64	0.38	134.94	236.59°