



**Company:** Anadarko Petroleum Corp.  
**Lease / Well:** Graham E C 1  
**County/Parish:** WELD  
**State:** COLORADO  
**Date:** 10/21/2014  
**Rig:** NA  
**Surveyor:** SHON LANE  
**Job Number:** 407-512309656  
**Instrument Number:** 4015 **Type:** MEMORY  
**Proposed Direction:** 0 **GL Elev:** 5076  
**Magnetic Declination** 9.91 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	0.45	10.26	100.00	0.39	0.39	0.07	0.45	0.39	10.26°
200	0.47	50.40	200.00	1.03	1.03	0.46	0.32	1.13	23.79°
300	0.24	282.05	299.99	1.34	1.34	0.57	0.65	1.45	22.95°
400	0.20	280.44	399.99	1.41	1.41	0.19	0.04	1.43	7.67°
500	0.03	245.06	499.99	1.44	1.44	0.00	0.18	1.44	359.81°
600	0.19	176.48	599.99	1.26	1.26	-0.02	0.18	1.26	359.17°
700	0.08	234.45	699.99	1.05	1.05	-0.06	0.16	1.05	356.47°
800	0.16	189.28	799.99	0.87	0.87	-0.14	0.12	0.89	350.63°
900	0.24	215.87	899.99	0.57	0.57	-0.29	0.12	0.64	332.95°
1000	0.32	236.10	999.99	0.24	0.24	-0.64	0.13	0.69	290.55°
1100	0.42	197.76	1099.99	-0.26	-0.26	-0.99	0.26	1.02	255.06°
1200	0.21	193.27	1199.99	-0.79	-0.79	-1.14	0.21	1.39	235.28°
1300	0.31	220.21	1299.99	-1.18	-1.18	-1.36	0.16	1.80	229.12°
1400	0.39	217.21	1399.99	-1.65	-1.65	-1.74	0.08	2.40	226.44°
1500	0.22	215.24	1499.98	-2.08	-2.08	-2.06	0.17	2.92	224.64°
1600	0.37	209.36	1599.98	-2.52	-2.52	-2.32	0.15	3.43	222.69°
1700	0.39	212.50	1699.98	-3.09	-3.09	-2.67	0.03	4.08	220.80°
1800	0.31	186.99	1799.98	-3.64	-3.64	-2.88	0.17	4.65	218.34°
1900	0.33	217.40	1899.98	-4.14	-4.14	-3.09	0.17	5.17	216.72°
2000	0.44	222.62	1999.97	-4.65	-4.65	-3.52	0.12	5.84	217.14°
2100	0.51	218.01	2099.97	-5.29	-5.29	-4.06	0.08	6.66	217.52°
2200	0.72	239.03	2199.97	-5.96	-5.96	-4.87	0.30	7.70	219.26°
2300	0.59	227.10	2299.96	-6.63	-6.63	-5.79	0.19	8.80	221.10°
2400	0.68	228.54	2399.95	-7.38	-7.38	-6.61	0.09	9.90	221.86°
2500	0.70	244.92	2499.95	-8.03	-8.03	-7.61	0.20	11.06	223.45°
2600	0.71	241.17	2599.94	-8.59	-8.59	-8.70	0.05	12.23	225.39°
2700	0.93	240.72	2699.93	-9.28	-9.28	-9.95	0.22	13.61	227.00°
2800	1.04	231.72	2799.91	-10.24	-10.24	-11.37	0.19	15.30	228.00°
2900	1.12	236.65	2899.90	-11.34	-11.34	-12.90	0.12	17.18	228.69°
3000	1.14	228.57	2999.88	-12.54	-12.54	-14.46	0.16	19.14	229.09°
3100	1.02	234.19	3099.86	-13.71	-13.71	-15.93	0.16	21.02	229.28°
3200	1.11	228.18	3199.84	-14.88	-14.88	-17.38	0.14	22.88	229.42°
3300	1.19	230.53	3299.82	-16.19	-16.19	-18.90	0.09	24.88	229.42°
3400	1.03	239.75	3399.80	-17.30	-17.30	-20.48	0.24	26.81	229.81°
3500	0.95	230.64	3499.79	-18.28	-18.28	-21.89	0.18	28.52	230.14°
3600	0.86	229.77	3599.77	-19.29	-19.29	-23.11	0.09	30.10	230.15°
3700	1.15	222.87	3699.76	-20.51	-20.51	-24.36	0.31	31.85	229.91°
3800	1.43	229.27	3799.73	-22.06	-22.06	-25.99	0.31	34.09	229.68°
3900	1.77	234.73	3899.69	-23.76	-23.76	-28.20	0.37	36.88	229.88°
4000	2.02	231.66	3999.64	-25.75	-25.75	-30.84	0.27	40.18	230.14°
4100	2.38	254.03	4099.57	-27.41	-27.41	-34.22	0.92	43.85	231.30°
4200	2.35	263.44	4199.48	-28.22	-28.22	-38.25	0.39	47.54	233.58°
4300	2.08	264.18	4299.41	-28.64	-28.64	-42.10	0.27	50.91	235.77°
4400	1.82	269.60	4399.35	-28.83	-28.83	-45.49	0.32	53.86	237.63°
4500	1.15	284.09	4499.32	-28.60	-28.60	-48.05	0.76	55.92	239.24°
4600	1.11	298.22	4599.30	-27.90	-27.90	-49.88	0.28	57.15	240.78°
4700	0.77	285.31	4699.28	-27.26	-27.26	-51.38	0.40	58.16	242.05°
4800	0.68	262.84	4799.28	-27.16	-27.16	-52.62	0.30	59.21	242.70°

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	0.59	276.47	4899.27	-27.17	-27.17	-53.72	0.18	60.20	243.17°
5000	0.58	267.84	4999.26	-27.14	-27.14	-54.73	0.09	61.09	243.63°
5100	0.23	197.19	5099.26	-27.35	-27.35	-55.30	0.55	61.69	243.69°
5200	0.18	206.90	5199.26	-27.68	-27.68	-55.43	0.06	61.96	243.46°
5300	0.31	179.88	5299.26	-28.09	-28.09	-55.50	0.17	62.20	243.16°
5400	0.45	190.62	5399.26	-28.75	-28.75	-55.57	0.16	62.57	242.65°
5500	0.33	192.61	5499.26	-29.41	-29.41	-55.71	0.12	62.99	242.17°
5600	0.20	217.52	5599.26	-29.83	-29.83	-55.88	0.17	63.34	241.90°
5700	0.50	106.15	5699.25	-30.09	-30.09	-55.56	0.60	63.19	241.56°
5800	0.12	233.87	5799.25	-30.28	-30.28	-55.23	0.58	62.98	241.27°
5900	0.19	194.60	5899.25	-30.50	-30.50	-55.35	0.12	63.20	241.15°
6000	0.16	219.43	5999.25	-30.77	-30.77	-55.49	0.08	63.44	240.99°
6100	0.61	158.46	6099.25	-31.37	-31.37	-55.38	0.55	63.65	240.47°
6200	0.45	193.66	6199.25	-32.25	-32.25	-55.28	0.35	63.99	239.74°
6300	0.43	132.52	6299.24	-32.88	-32.88	-55.09	0.45	64.16	239.17°
6400	0.39	319.75	6399.24	-32.87	-32.87	-55.04	0.82	64.11	239.15°
6500	0.50	315.52	6499.24	-32.30	-32.30	-55.56	0.11	64.27	239.83°
6600	0.36	281.55	6599.24	-31.93	-31.93	-56.17	0.28	64.61	240.39°
6700	0.53	251.19	6699.23	-32.02	-32.02	-56.92	0.29	65.31	240.64°
6800	0.67	261.79	6799.23	-32.25	-32.25	-57.94	0.18	66.31	240.90°
6900	0.53	257.58	6899.22	-32.43	-32.43	-58.97	0.15	67.30	241.19°
7000	0.38	296.52	6999.22	-32.38	-32.38	-59.72	0.33	67.93	241.53°
7100	0.46	257.54	7099.22	-32.32	-32.32	-60.40	0.29	68.51	241.85°
7200	0.61	224.86	7199.21	-32.78	-32.78	-61.17	0.33	69.40	241.81°
7300	0.68	248.61	7299.21	-33.38	-33.38	-62.10	0.27	70.50	241.74°
7400	0.13	34.31	7399.21	-33.50	-33.50	-62.59	0.79	70.99	241.84°
7500	0.40	207.20	7499.20	-33.72	-33.72	-62.68	0.53	71.18	241.72°
7600	0.52	253.42	7599.20	-34.16	-34.16	-63.28	0.38	71.91	241.64°
7700	0.01	303.95	7699.20	-34.28	-34.28	-63.72	0.51	72.36	241.72°
7800	0.56	259.42	7799.20	-34.37	-34.37	-64.21	0.55	72.83	241.84°
7900	0.35	33.78	7899.20	-34.20	-34.20	-64.52	0.84	73.02	242.07°
8000	0.53	260.52	7999.20	-34.03	-34.03	-64.80	0.81	73.19	242.30°
8100	0.07	188.23	8099.19	-34.16	-34.16	-65.27	0.51	73.67	242.37°
8200	0.52	311.25	8199.19	-33.92	-33.92	-65.62	0.56	73.87	242.66°

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

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Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Vertical Section	Coordinates (+N/-S)	(+E/-W)	Dog-Leg / 100 ft.	Closure Distance	Closure Direction



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Measured Depth (ft.)	Inclination	Azimuth Bearing	Vertical Depth	Vertical Section	Coordinates (+N/-S)	(+E/-W)	Dog-Leg / 100 ft.	Closure Distance	Closure Direction