



MWD Survey Report  
for  
ANADARKO PETROLEUM CORP.

Well Location	NRC 4N-8HZ
Well Name	NRC 4N-8HZ
Rig Number	H&P 311
Survey Date	2/19/2014
Latitude	40°3'33.628"N
B Total	52757, 52805, 52821 NT
Dip	66.53, 66.55, 66.56 deg
Magnetic Declination	8.53 deg
North Reference	True North
Grid Correction	None
Depth Reference	RKB (25.00 ft)
Calculation Method	Minimum Curvature
Section (VS) Ref	0.00N (ft), 0.00E (ft), 0.00Azim (deg)
Definitive Survey	NRC 4N-8HZ
Operator(s)	B. GREER, M. SHARKER

**Well Notes**

SURVEYS FROM 0 FT. TO 1118 FT. WERE ACQUIRED BY MS GYRO MWD.

SURVEYS FROM 1118 FT. TO 12485 FT. WERE ACQUIRED BY SCIENTIFIC DRILLING INTERNATIONAL MWD.

# Survey Report

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**Survey Date:** 2/19/2014

MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Course Length ft
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	Invalid
100.00	0.71	169.39	100.00	-0.61	-0.61	0.11	0.71	100.00
200.00	0.20	2.36	200.00	-1.04	-1.04	0.24	0.91	100.00
300.00	0.76	130.80	299.99	-1.30	-1.30	0.74	0.90	100.00
400.00	0.32	252.85	399.99	-1.82	-1.82	0.98	0.97	100.00
500.00	0.49	78.17	499.99	-1.81	-1.81	1.13	0.81	100.00
600.00	0.59	192.22	599.99	-2.23	-2.23	1.44	0.91	100.00
700.00	0.43	55.66	699.98	-2.52	-2.52	1.64	0.95	100.00
800.00	0.53	141.67	799.98	-2.67	-2.67	2.24	0.66	100.00
900.00	0.57	7.25	899.98	-2.54	-2.54	2.59	1.01	100.00
1000.00	0.69	117.48	999.98	-2.32	-2.32	3.19	1.04	100.00
1100.00	0.47	19.20	1099.97	-2.22	-2.22	3.85	0.89	100.00
1167.00	0.92	67.02	1166.97	-1.75	-1.75	4.44	1.04	67.00
1332.00	0.36	55.36	1331.96	-0.93	-0.93	6.09	0.35	165.00
1423.00	1.45	158.74	1422.95	-1.84	-1.84	6.74	1.73	91.00
1515.00	3.16	170.33	1514.87	-5.43	-5.43	7.59	1.92	92.00
1607.00	4.29	188.28	1606.68	-11.34	-11.34	7.52	1.75	92.00
1698.00	5.48	189.01	1697.35	-19.00	-19.00	6.35	1.31	91.00
1790.00	7.24	185.76	1788.78	-29.11	-29.11	5.08	1.95	92.00
1882.00	7.73	181.35	1879.99	-41.06	-41.06	4.35	0.82	92.00
1973.00	8.77	171.76	1970.05	-54.05	-54.05	5.20	1.90	91.00
2065.00	9.92	174.10	2060.83	-68.88	-68.88	7.02	1.32	92.00
2156.00	11.14	172.71	2150.30	-85.40	-85.40	8.94	1.36	91.00
2247.00	11.05	169.99	2239.60	-102.70	-102.70	11.57	0.58	91.00
2339.00	9.64	166.35	2330.10	-118.87	-118.87	14.92	1.69	92.00
2431.00	11.10	166.55	2420.59	-134.97	-134.97	18.80	1.59	92.00
2523.00	11.14	165.59	2510.87	-152.19	-152.19	23.07	0.20	92.00
2614.00	10.01	166.23	2600.32	-168.39	-168.39	27.15	1.24	91.00
2706.00	10.42	166.78	2690.86	-184.26	-184.26	30.95	0.46	92.00
2797.00	10.54	168.98	2780.34	-200.44	-200.44	34.43	0.46	91.00
2891.00	10.75	167.62	2872.73	-217.44	-217.44	37.95	0.34	94.00
2986.00	10.27	168.94	2966.13	-234.40	-234.40	41.47	0.56	95.00
3080.00	10.25	166.42	3058.63	-250.76	-250.76	45.04	0.48	94.00
3175.00	9.23	169.13	3152.26	-266.47	-266.47	48.47	1.18	95.00
3269.00	8.68	162.55	3245.11	-280.64	-280.64	52.02	1.24	94.00
3363.00	9.52	164.92	3337.93	-294.91	-294.91	56.17	0.98	94.00

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MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Course Length ft
3458.00	10.11	167.34	3431.54	-310.63	-310.63	60.04	0.76	95.00
3552.00	8.57	167.55	3524.29	-325.52	-325.52	63.35	1.64	94.00
3646.00	8.81	166.21	3617.21	-339.35	-339.35	66.58	0.34	94.00
3740.00	8.47	166.80	3710.15	-353.08	-353.08	69.87	0.38	94.00
3835.00	9.67	162.66	3803.96	-367.50	-367.50	73.85	1.44	95.00
3929.00	9.75	159.90	3896.61	-382.51	-382.51	78.94	0.50	94.00
4024.00	9.97	154.61	3990.21	-397.49	-397.49	85.23	0.98	95.00
4118.00	10.59	151.66	4082.70	-412.44	-412.44	92.81	0.87	94.00
4213.00	10.04	158.86	4176.17	-427.84	-427.84	99.94	1.47	95.00
4307.00	9.91	158.53	4268.75	-443.02	-443.02	105.86	0.15	94.00
4401.00	10.71	165.39	4361.24	-459.00	-459.00	111.03	1.55	94.00
4495.00	11.70	172.93	4453.45	-476.90	-476.90	114.40	1.88	94.00
4590.00	10.19	176.14	4546.72	-494.84	-494.84	116.15	1.71	95.00
4684.00	10.21	173.94	4639.24	-511.41	-511.41	117.59	0.41	94.00
4778.00	11.26	175.70	4731.59	-528.84	-528.84	119.16	1.17	94.00
4873.00	12.12	170.60	4824.62	-547.93	-547.93	121.48	1.42	95.00
4967.00	12.63	169.23	4916.44	-567.77	-567.77	125.02	0.63	94.00
5061.00	11.53	171.87	5008.35	-587.17	-587.17	128.26	1.31	94.00
5156.00	10.42	172.62	5101.61	-605.10	-605.10	130.71	1.18	95.00
5250.00	10.12	167.22	5194.11	-621.58	-621.58	133.63	1.07	94.00
5344.00	10.90	164.84	5286.53	-638.21	-638.21	137.78	0.95	94.00
5439.00	9.69	171.27	5380.01	-654.79	-654.79	141.34	1.75	95.00
5533.00	8.19	175.81	5472.86	-669.28	-669.28	143.03	1.77	94.00
5627.00	8.69	172.59	5565.84	-683.00	-683.00	144.44	0.74	94.00
5721.00	8.79	173.17	5658.75	-697.17	-697.17	146.21	0.14	94.00
5816.00	8.32	173.66	5752.70	-711.21	-711.21	147.83	0.49	95.00
5910.00	7.19	173.24	5845.83	-723.81	-723.81	149.27	1.21	94.00
6005.00	6.90	168.57	5940.12	-735.31	-735.31	151.10	0.67	95.00
6099.00	6.62	165.52	6033.46	-746.09	-746.09	153.58	0.48	94.00
6194.00	5.15	164.25	6127.96	-755.50	-755.50	156.10	1.56	95.00
6288.00	3.53	173.16	6221.69	-762.43	-762.43	157.59	1.86	94.00
6383.00	2.64	182.35	6316.55	-767.52	-767.52	157.85	1.07	95.00
6477.00	1.81	164.65	6410.48	-771.12	-771.12	158.16	1.14	94.00
6571.00	1.90	148.94	6504.43	-773.88	-773.88	159.35	0.55	94.00
6666.00	0.99	155.17	6599.40	-775.97	-775.97	160.51	0.97	95.00
6760.00	0.80	159.94	6693.39	-777.33	-777.33	161.07	0.21	94.00

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<b>Survey Date:</b>		2/19/2014						
<b>MD</b> ft	<b>Inc</b> deg	<b>Azim</b> deg	<b>TVD</b> ft	<b>VS</b> ft	<b>+N/-S</b> ft	<b>+E/-W</b> ft	<b>DLS</b> °/100ft	<b>Course Length</b> ft
6854.00	0.78	167.52	6787.38	-778.57	-778.57	161.44	0.11	94.00
6901.00	0.80	22.17	6834.38	-778.58	-778.58	161.63	3.22	47.00
6949.00	4.86	8.28	6882.31	-776.26	-776.26	162.05	8.51	48.00
6996.00	8.03	13.62	6929.01	-771.09	-771.09	163.11	6.86	47.00
7043.00	10.23	7.96	6975.41	-763.77	-763.77	164.46	5.05	47.00
7090.00	13.10	3.52	7021.44	-754.31	-754.31	165.37	6.39	47.00
7138.00	15.71	3.60	7067.92	-742.40	-742.40	166.11	5.43	48.00
7185.00	17.98	3.70	7112.90	-728.80	-728.80	166.98	4.83	47.00
7232.00	21.07	2.62	7157.19	-713.12	-713.12	167.83	6.62	47.00
7279.00	24.36	2.72	7200.54	-695.00	-695.00	168.68	6.99	47.00
7327.00	27.76	2.27	7243.66	-673.93	-673.93	169.59	7.10	48.00
7374.00	32.48	0.30	7284.30	-650.36	-650.36	170.09	10.25	47.00
7421.00	38.11	357.04	7322.65	-623.23	-623.23	169.41	12.64	47.00
7468.00	44.22	358.89	7358.02	-592.33	-592.33	168.34	13.26	47.00
7515.00	50.35	0.41	7389.88	-557.82	-557.82	168.16	13.25	47.00
7562.00	55.88	0.89	7418.08	-520.24	-520.24	168.59	11.79	47.00
7609.00	61.24	0.72	7442.59	-480.16	-480.16	169.15	11.41	47.00
7656.00	65.91	0.23	7463.50	-438.08	-438.08	169.50	9.97	47.00
7704.00	69.29	0.55	7481.79	-393.72	-393.72	169.80	7.07	48.00
7751.00	73.44	0.33	7496.81	-349.19	-349.19	170.14	8.86	47.00
7798.00	77.16	0.22	7508.73	-303.74	-303.74	170.36	7.92	47.00
7845.00	82.88	359.30	7516.87	-257.47	-257.47	170.16	12.31	47.00
7924.00	88.32	359.96	7522.93	-178.73	-178.73	169.66	6.93	79.00
8018.00	90.30	359.03	7524.06	-84.75	-84.75	168.83	2.33	94.00
8113.00	92.35	358.77	7521.86	10.20	10.20	167.01	2.18	95.00
8207.00	92.45	357.83	7517.91	104.08	104.08	164.22	1.00	94.00
8301.00	92.69	358.62	7513.70	197.94	197.94	161.31	0.88	94.00
8395.00	91.82	358.98	7510.00	291.84	291.84	159.35	1.00	94.00
8490.00	90.77	0.33	7507.86	386.81	386.81	158.78	1.80	95.00
8584.00	90.30	0.29	7506.97	480.81	480.81	159.29	0.50	94.00
8679.00	89.46	0.14	7507.17	575.81	575.81	159.65	0.90	95.00
8773.00	89.56	0.37	7507.97	669.80	669.80	160.06	0.26	94.00
8867.00	89.03	359.57	7509.13	763.79	763.79	160.02	1.02	94.00
8962.00	90.34	358.74	7509.66	858.78	858.78	158.62	1.64	95.00
9056.00	88.45	358.81	7510.65	952.75	952.75	156.60	2.00	94.00
9150.00	87.88	358.83	7513.65	1046.68	1046.68	154.67	0.61	94.00

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MD ft	Inc deg	Azim deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS °/100ft	Course Length ft
9245.00	88.55	358.19	7516.60	1141.60	1141.60	152.19	0.97	95.00
9339.00	90.84	358.85	7517.10	1235.56	1235.56	149.77	2.53	94.00
9434.00	90.44	359.26	7516.04	1330.54	1330.54	148.20	0.61	95.00
9528.00	90.10	359.89	7515.60	1424.54	1424.54	147.50	0.76	94.00
9623.00	89.73	0.75	7515.74	1519.54	1519.54	148.03	0.99	95.00
9717.00	89.23	0.99	7516.60	1613.52	1613.52	149.46	0.59	94.00
9812.00	88.52	1.54	7518.46	1708.48	1708.48	151.56	0.95	95.00
9906.00	88.86	1.89	7520.61	1802.41	1802.41	154.38	0.52	94.00
10001.00	90.47	1.33	7521.17	1897.37	1897.37	157.05	1.80	95.00
10095.00	91.04	1.25	7519.93	1991.34	1991.34	159.16	0.61	94.00
10189.00	90.74	359.78	7518.47	2085.32	2085.32	160.00	1.60	94.00
10284.00	89.97	0.12	7517.88	2180.32	2180.32	159.91	0.89	95.00
10379.00	90.57	0.56	7517.44	2275.31	2275.31	160.48	0.79	95.00
10473.00	90.61	359.69	7516.47	2369.31	2369.31	160.69	0.93	94.00
10568.00	89.87	0.06	7516.08	2464.30	2464.30	160.48	0.87	95.00
10662.00	89.06	359.13	7516.96	2558.30	2558.30	159.81	1.31	94.00
10756.00	88.55	359.55	7518.92	2652.27	2652.27	158.73	0.69	94.00
10851.00	88.69	359.87	7521.21	2747.24	2747.24	158.25	0.37	95.00
10945.00	88.32	359.78	7523.66	2841.21	2841.21	157.97	0.41	94.00
11039.00	89.23	359.64	7525.67	2935.18	2935.18	157.49	0.98	94.00
11134.00	90.91	0.11	7525.56	3030.18	3030.18	157.28	1.84	95.00
11228.00	91.28	0.82	7523.77	3124.16	3124.16	158.04	0.86	94.00
11322.00	91.48	1.38	7521.51	3218.11	3218.11	159.85	0.63	94.00
11417.00	91.31	1.69	7519.20	3313.05	3313.05	162.40	0.36	95.00
11511.00	91.21	0.87	7517.13	3407.00	3407.00	164.49	0.87	94.00
11605.00	89.80	0.42	7516.30	3500.99	3500.99	165.55	1.58	94.00
11700.00	88.96	0.16	7517.33	3595.98	3595.98	166.03	0.93	95.00
11794.00	90.47	359.13	7517.80	3689.98	3689.98	165.45	1.95	94.00
11888.00	90.64	359.00	7516.89	3783.96	3783.96	163.91	0.22	94.00
11983.00	89.43	357.85	7516.84	3878.92	3878.92	161.30	1.76	95.00
12077.00	87.95	356.91	7518.99	3972.79	3972.79	157.01	1.86	94.00
12172.00	89.66	356.83	7520.96	4067.63	4067.63	151.82	1.81	95.00
12266.00	89.03	357.19	7522.04	4161.49	4161.49	146.92	0.78	94.00
12360.00	89.43	356.90	7523.31	4255.36	4255.36	142.07	0.53	94.00
12455.00	90.10	356.54	7523.70	4350.20	4350.20	136.63	0.80	95.00
12485.00	90.67	356.77	7523.49	4380.15	4380.15	134.88	2.05	30.00