

Company: Anadarko Petroleum Corp.  
 Well/API: Wardell 20-41/05-123-17097  
 Tool Type: North Seeking Rate Gyro  
 Rig Name: Production/ VES  
 County/State: Weld/Colorado  
 Latitude: 40.210, Longitude: -104.680  
 Directions are relative to True North  
 VS-Azi: 0.000 Degrees



**FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB= GL Elevation= 4871 Feet

**DRILLOG GYRO SURVEY CALCULATIONS**

Filename: survey.ut

Minimum Curvature Method

Report Date/Time: 10/27/2014 / 20:28

Lat/Long Obtained by Handheld GPS at Wellhead

Handheld GPS Reference: NAD83/ Device Error: +- 9 Feet

VES Survey International- Henderson Co

Sean Bratt

303-853-4976

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.181	202.183	100.000	-0.146	-0.060	-0.146	0.158	202.183	0.181
200.000	0.300	260.458	199.999	-0.335	-0.377	-0.335	0.505	228.336	0.256
300.000	0.303	225.456	299.998	-0.565	-0.824	-0.565	0.998	235.571	0.181
400.000	0.250	246.765	399.997	-0.837	-1.213	-0.837	1.474	235.412	0.115
500.000	0.388	275.748	499.995	-0.889	-1.751	-0.889	1.964	243.090	0.208
600.000	0.565	50.172	599.993	-0.539	-1.710	-0.539	1.793	252.499	0.881
700.000	0.518	105.731	699.990	-0.346	-0.897	-0.346	0.961	248.902	0.506
800.000	0.532	155.891	799.986	-0.892	-0.272	-0.892	0.933	196.953	0.445
900.000	0.142	250.603	899.984	-1.357	-0.199	-1.357	1.372	188.332	0.562
1000.000	0.151	25.972	999.984	-1.280	-0.257	-1.280	1.305	191.376	0.271
1100.000	0.206	72.597	1099.984	-1.107	-0.028	-1.107	1.107	181.460	0.150
1200.000	0.383	144.027	1199.983	-1.324	0.339	-1.324	1.367	165.619	0.373
1300.000	0.723	153.964	1299.978	-2.161	0.812	-2.161	2.309	159.393	0.352
1400.000	0.223	127.843	1399.974	-2.847	1.243	-2.847	3.106	156.416	0.532
1500.000	0.439	158.504	1499.973	-3.322	1.536	-3.322	3.660	155.179	0.272
1600.000	0.510	162.809	1599.969	-4.103	1.808	-4.103	4.484	156.218	0.080
1700.000	0.432	272.738	1699.967	-4.510	1.563	-4.510	4.773	160.885	0.772
1800.000	0.597	202.397	1799.964	-4.974	0.988	-4.974	5.071	168.765	0.608
1900.000	0.675	261.610	1899.959	-5.542	0.206	-5.542	5.546	177.867	0.632
2000.000	0.742	229.985	1999.952	-6.044	-0.873	-6.044	6.107	188.216	0.392
2100.000	0.747	300.321	2099.945	-6.132	-1.932	-6.132	6.429	197.487	0.858
2200.000	0.454	327.324	2199.940	-5.469	-2.709	-5.469	6.103	206.348	0.400
2300.000	0.468	279.513	2299.937	-5.068	-3.325	-5.068	6.061	213.268	0.374
2400.000	1.103	276.945	2399.927	-4.884	-4.683	-4.884	6.766	223.793	0.636
2500.000	0.334	244.110	2499.919	-4.895	-5.900	-4.895	7.666	230.319	0.842
2600.000	0.586	319.077	2599.916	-4.636	-6.497	-4.636	7.982	234.488	0.594
2700.000	0.072	147.605	2699.915	-4.303	-6.798	-4.303	8.046	237.667	0.657
2800.000	0.439	327.909	2799.914	-4.031	-6.968	-4.031	8.050	239.950	0.511
2900.000	0.839	48.744	2899.909	-3.224	-6.622	-3.224	7.365	244.041	0.883
3000.000	0.936	44.658	2999.897	-2.160	-5.497	-2.160	5.906	248.550	0.116
3100.000	0.866	24.882	3099.885	-0.893	-4.605	-0.893	4.690	259.025	0.317
3200.000	1.070	2.271	3199.871	0.726	-4.250	0.726	4.311	279.690	0.429
3300.000	0.665	330.330	3299.860	2.163	-4.500	2.163	4.993	295.671	0.616
3400.000	0.913	14.464	3399.851	3.439	-4.588	3.439	5.734	306.850	0.636

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
3500.000	0.742	324.171	3499.842	4.735	-4.768	4.735	6.720	314.802	0.720
3600.000	0.679	312.351	3599.834	5.659	-5.585	5.659	7.951	315.379	0.159
3700.000	1.392	307.338	3699.817	6.795	-6.988	6.795	9.747	314.197	0.718
3800.000	1.635	279.585	3799.784	7.769	-9.360	7.769	12.164	309.693	0.763
3900.000	2.007	291.834	3899.733	8.658	-12.392	8.658	15.117	304.940	0.537
4000.000	2.073	290.471	3999.670	9.941	-15.712	9.941	18.593	302.323	0.082
4100.000	2.274	302.341	4099.598	11.635	-19.083	11.635	22.350	301.372	0.492
4200.000	2.808	311.411	4199.500	14.317	-22.596	14.317	26.750	302.358	0.667
4300.000	3.224	312.749	4299.361	17.846	-26.498	17.846	31.947	303.959	0.423
4400.000	2.442	302.375	4399.239	20.895	-30.363	20.895	36.858	304.536	0.932
4500.000	2.274	293.647	4499.155	22.832	-33.980	22.832	40.938	303.899	0.396
4600.000	1.903	295.771	4599.088	24.350	-37.293	24.350	44.538	303.142	0.379
4700.000	1.731	307.106	4699.038	25.984	-39.993	25.984	47.693	303.012	0.398
4800.000	2.170	322.745	4798.980	28.402	-42.344	28.402	50.988	303.852	0.686
4900.000	1.389	316.182	4898.932	30.784	-44.330	30.784	53.971	304.777	0.806
5000.000	0.587	285.234	4998.916	31.794	-45.664	31.794	55.642	304.848	0.936
5100.000	0.255	324.667	5098.914	32.110	-46.287	32.110	56.334	304.750	0.422
5200.000	0.509	283.956	5198.912	32.399	-46.847	32.399	56.959	304.667	0.357
5300.000	0.982	335.117	5298.904	33.284	-47.639	33.284	58.114	304.941	0.772
5400.000	1.386	331.289	5398.882	35.122	-48.581	35.122	59.947	305.866	0.412
5500.000	1.142	332.670	5498.858	37.068	-49.619	37.068	61.937	306.762	0.246
5600.000	1.159	339.240	5598.838	38.899	-50.435	38.899	63.693	307.642	0.133
5700.000	1.590	349.978	5698.809	41.211	-51.035	41.211	65.596	308.921	0.501
5800.000	0.713	333.083	5798.788	43.131	-51.558	43.131	67.220	309.914	0.931
5900.000	0.842	272.384	5898.780	43.716	-52.574	43.716	68.375	309.744	0.794
6000.000	0.459	226.769	5998.774	43.472	-53.601	43.472	69.014	309.044	0.616
6100.000	0.532	340.133	6098.772	43.635	-54.050	43.635	69.465	308.914	0.829
6200.000	1.096	331.686	6198.762	44.913	-54.662	44.913	70.747	309.408	0.574
6300.000	1.870	340.173	6298.728	47.290	-55.669	47.290	73.043	310.347	0.803
6400.000	2.783	347.339	6398.644	51.193	-56.754	51.193	76.431	312.051	0.957
6500.000	1.934	357.920	6498.559	55.248	-57.347	55.248	79.631	313.932	0.951
6600.000	1.720	25.675	6598.510	58.286	-56.758	58.286	81.356	315.761	0.900
6700.000	1.624	47.120	6698.469	60.603	-55.070	60.603	81.886	317.739	0.629
6800.000	1.935	75.944	6798.422	61.977	-52.393	61.977	81.156	319.790	0.936
6900.000	1.368	90.030	6898.381	62.387	-49.562	62.387	79.677	321.536	0.694
7000.000	1.656	102.366	6998.346	62.077	-46.957	62.077	77.836	322.895	0.433
HORIZONTAL DISPLACEMENT IS 77.836 FEET AT 322.895 DEGREES									