

Company: Anadarko Petroleum Corp.  
 Well/API: HSR-B/R D 7-20/05-123-18320  
 Tool Type: North Seeking Rate Gyro  
 Rig Name: Production/Summit  
 County/State: Weld/Colorado  
 Latitude: 40.213, Longitude: -104.912  
 Directions are relative to True North  
 VS-Azi: 0.000 Degrees



**FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB=GL Elevation= 4874 Feet

**DRILLOG MS GYRO SURVEY CALCULATIONS**

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 8/20/2014 / 10:09

Lat/Long & Elevation Obtained By Handheld GPS At Wellhead

Handheld GPS Reference: NAD83/Device Error: ±9 Feet

VES Survey International - Henderson CO

Mark Simmons

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	0.683	85.828	99.998	0.043	0.594	0.043	0.596	85.828	0.683
200.000	0.417	78.067	199.993	0.162	1.544	0.162	1.553	84.015	0.275
300.000	0.283	59.726	299.991	0.361	2.113	0.361	2.144	80.293	0.173
400.000	0.218	41.742	399.990	0.628	2.453	0.628	2.532	75.640	0.101
500.000	0.233	50.644	499.989	0.899	2.737	0.899	2.881	71.816	0.038
600.000	0.267	44.652	599.988	1.193	3.058	1.193	3.282	68.679	0.043
700.000	0.561	9.394	699.986	1.842	3.301	1.842	3.780	60.837	0.376
800.000	0.603	353.079	799.981	2.848	3.318	2.848	4.372	49.357	0.170
900.000	0.611	338.657	899.975	3.867	3.060	3.867	4.931	38.359	0.153
1000.000	0.600	323.459	999.970	4.784	2.554	4.784	5.423	28.100	0.160
1100.000	0.729	319.025	1099.963	5.685	1.825	5.685	5.971	17.799	0.138
1200.000	0.967	305.044	1199.952	6.650	0.718	6.650	6.688	6.159	0.313
1300.000	0.897	313.043	1299.939	7.668	-0.545	7.668	7.687	355.935	0.147
1400.000	1.095	300.873	1399.924	8.692	-1.937	8.692	8.905	347.440	0.288
1500.000	0.917	308.710	1499.908	9.683	-3.381	9.683	10.256	340.753	0.224
1600.000	0.977	309.990	1599.895	10.732	-4.659	10.732	11.699	336.533	0.064
1700.000	1.013	304.868	1699.880	11.785	-6.038	11.785	13.242	332.874	0.096
1800.000	1.014	313.754	1799.864	12.902	-7.402	12.902	14.875	330.157	0.157
1900.000	1.193	283.188	1899.846	13.752	-9.055	13.752	16.465	326.638	0.607
2000.000	1.241	269.134	1999.824	13.973	-11.151	13.973	17.877	321.408	0.302
2100.000	1.576	249.341	2099.794	13.471	-13.521	13.471	19.086	314.895	0.586
2200.000	1.935	252.155	2199.747	12.469	-16.414	12.469	20.613	307.222	0.369
2300.000	2.145	245.994	2299.684	11.190	-19.731	11.190	22.683	299.560	0.304
2400.000	2.069	243.820	2399.616	9.633	-23.060	9.633	24.991	292.671	0.110
2500.000	2.078	243.949	2499.551	8.040	-26.308	8.040	27.510	286.994	0.010
2600.000	1.850	247.725	2599.492	6.632	-29.430	6.632	30.168	282.700	0.262
2700.000	1.656	257.967	2699.445	5.719	-32.337	5.719	32.839	280.030	0.367
2800.000	1.491	262.468	2799.408	5.248	-35.041	5.248	35.432	278.517	0.206
2900.000	1.448	284.341	2899.376	5.390	-37.555	5.390	37.940	278.168	0.559
3000.000	1.499	295.427	2999.343	6.265	-39.961	6.265	40.449	278.910	0.289
3100.000	1.632	307.996	3099.306	7.703	-42.264	7.703	42.961	280.329	0.367
3200.000	1.838	313.259	3199.260	9.678	-44.554	9.678	45.593	282.256	0.260
3300.000	1.766	334.158	3299.212	12.164	-46.393	12.164	47.962	284.691	0.657

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
3400.000	1.717	342.403	3399.166	14.978	-47.518	14.978	49.823	287.495	0.255
3500.000	1.597	352.265	3499.124	17.787	-48.158	17.787	51.338	290.271	0.309
3600.000	1.497	358.135	3599.087	20.474	-48.388	20.474	52.541	292.934	0.187
3700.000	1.551	357.029	3699.052	23.130	-48.501	23.130	53.734	295.497	0.061
3800.000	1.392	348.206	3799.019	25.671	-48.820	25.671	55.158	297.737	0.276
3900.000	1.298	337.212	3898.992	27.905	-49.506	27.905	56.829	299.408	0.274
4000.000	1.109	314.805	3998.970	29.630	-50.631	29.630	58.664	300.337	0.503
4100.000	1.243	291.764	4098.950	30.714	-52.325	30.714	60.673	300.412	0.488
4200.000	1.057	298.655	4198.930	31.559	-54.142	31.559	62.668	300.238	0.231
4300.000	0.966	311.742	4298.914	32.563	-55.581	32.563	64.417	300.364	0.248
4400.000	1.041	315.573	4398.899	33.773	-56.846	33.773	66.121	300.715	0.101
4500.000	0.996	339.636	4498.883	35.236	-57.784	35.236	67.680	301.374	0.427
4600.000	1.063	345.080	4598.867	36.947	-58.325	36.947	69.043	302.353	0.118
4700.000	1.085	340.780	4698.850	38.737	-58.876	38.737	70.476	303.343	0.084
4800.000	0.836	331.023	4798.836	40.269	-59.541	40.269	71.880	304.072	0.297
4900.000	0.816	328.015	4898.825	41.511	-60.271	41.511	73.183	304.557	0.048
5000.000	1.000	320.835	4998.813	42.791	-61.199	42.791	74.676	304.962	0.217
5100.000	0.879	309.609	5098.799	43.957	-62.342	43.957	76.280	305.188	0.220
5200.000	0.894	294.946	5198.788	44.775	-63.639	44.775	77.812	305.129	0.227
5300.000	0.667	280.134	5298.778	45.206	-64.919	45.206	79.108	304.851	0.301
5400.000	0.724	253.792	5398.771	45.132	-66.099	45.132	80.038	304.325	0.322
5500.000	1.012	250.276	5498.760	44.658	-67.537	44.658	80.967	303.474	0.293
5600.000	0.609	253.817	5598.749	44.212	-68.879	44.212	81.848	302.695	0.406
5700.000	1.034	289.503	5698.740	44.365	-70.240	44.365	83.078	302.277	0.645
5800.000	0.919	295.646	5798.725	45.013	-71.813	45.013	84.754	302.080	0.155
5900.000	0.529	334.205	5898.717	45.776	-72.737	45.776	85.942	302.183	0.603
6000.000	0.587	347.015	5998.713	46.691	-73.053	46.691	86.699	302.584	0.137
6100.000	0.253	16.528	6098.710	47.401	-73.105	47.401	87.128	302.959	0.388
6200.000	0.625	62.180	6198.707	47.867	-72.560	47.867	86.927	303.412	0.483
6300.000	0.703	84.999	6298.701	48.175	-71.467	48.175	86.188	303.983	0.274
6400.000	1.060	95.740	6398.689	48.136	-69.935	48.136	84.900	304.539	0.391
6500.000	1.390	99.254	6498.666	47.848	-67.818	47.848	82.998	305.205	0.338
6600.000	1.576	85.855	6598.632	47.753	-65.249	47.753	80.856	306.199	0.392
6700.000	2.086	108.838	6698.582	47.264	-62.154	47.264	78.084	307.251	0.885
6800.000	2.931	106.415	6798.486	45.954	-57.978	45.954	73.981	308.400	0.851
6900.000	3.650	103.760	6898.320	44.474	-52.433	44.474	68.755	310.305	0.735
6983.000	3.661	104.963	6981.151	43.161	-47.307	43.161	64.038	312.376	0.093
HORIZONTAL DISPLACEMENT IS 64.038 FEET AT 312.376 DEGREES									