

**FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB = GL Elevation = 4792 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 11/7/2014 / 17:33

Lat/Long Obtained By Handheld GPS At Wellhead

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

VES Survey International - Henderson, CO

Kevin McDowell

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	0.638	101.362	99.998	-0.110	0.546	-0.110	0.557	101.362	0.638
200.000	0.170	124.748	199.995	-0.304	1.214	-0.304	1.251	104.057	0.487
300.000	0.121	239.227	299.995	-0.442	1.245	-0.442	1.321	109.564	0.246
400.000	0.126	266.778	399.995	-0.502	1.044	-0.502	1.159	115.699	0.059
500.000	0.211	231.054	499.994	-0.624	0.791	-0.624	1.008	128.283	0.131
600.000	0.175	246.311	599.994	-0.802	0.508	-0.802	0.949	147.638	0.062
700.000	0.163	236.045	699.993	-0.943	0.250	-0.943	0.975	165.150	0.033
800.000	0.179	246.951	799.993	-1.083	-0.012	-1.083	1.083	180.619	0.036
900.000	0.313	262.358	899.992	-1.180	-0.426	-1.180	1.255	199.823	0.148
1000.000	0.386	250.534	999.990	-1.329	-1.013	-1.329	1.671	217.322	0.102
1100.000	0.544	250.187	1099.987	-1.602	-1.777	-1.602	2.392	227.965	0.158
1200.000	0.594	246.788	1199.982	-1.967	-2.700	-1.967	3.341	233.924	0.061
1300.000	0.635	257.980	1299.976	-2.287	-3.718	-2.287	4.365	238.407	0.126
1400.000	0.949	268.193	1399.967	-2.428	-5.087	-2.428	5.637	244.484	0.343
1500.000	1.377	270.845	1499.946	-2.437	-7.117	-2.437	7.522	251.099	0.432
1600.000	1.627	263.019	1599.911	-2.592	-9.728	-2.592	10.067	255.082	0.323
1700.000	1.621	264.400	1699.871	-2.902	-12.545	-2.902	12.876	256.974	0.040
1800.000	1.584	260.861	1799.832	-3.260	-15.317	-3.260	15.660	257.986	0.105
1900.000	1.727	257.526	1899.790	-3.805	-18.153	-3.805	18.548	258.163	0.172
2000.000	1.628	266.903	1999.748	-4.207	-21.042	-4.207	21.459	258.694	0.291
2100.000	1.737	256.053	2099.705	-4.649	-23.932	-4.649	24.379	259.007	0.336
2200.000	1.607	266.264	2199.662	-5.106	-26.802	-5.106	27.284	259.215	0.325
2300.000	1.856	256.314	2299.617	-5.580	-29.775	-5.580	30.293	259.385	0.389
2400.000	1.907	259.698	2399.563	-6.261	-32.985	-6.261	33.574	259.253	0.122
2500.000	1.867	252.144	2499.509	-7.058	-36.173	-7.058	36.855	258.959	0.252
2600.000	1.802	227.212	2599.459	-8.625	-38.878	-8.625	39.823	257.491	0.794
2700.000	1.956	240.003	2699.406	-10.546	-41.509	-10.546	42.828	255.744	0.446
2800.000	2.193	255.586	2799.341	-11.876	-44.840	-11.876	46.386	255.166	0.610
2900.000	2.232	266.453	2899.267	-12.472	-48.637	-12.472	50.210	255.617	0.421
3000.000	2.586	258.023	2999.179	-13.061	-52.787	-13.061	54.379	256.102	0.500
3100.000	2.384	263.840	3099.085	-13.752	-57.062	-13.752	58.696	256.450	0.323
3200.000	2.020	280.509	3199.012	-13.654	-60.862	-13.654	62.375	257.355	0.733
3300.000	1.890	294.837	3298.954	-12.640	-64.091	-12.640	65.326	258.843	0.504
3400.000	1.859	303.077	3398.901	-11.062	-66.947	-11.062	67.855	260.617	0.271

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	1.964	309.956	3498.845	-9.076	-69.620	-9.076	70.209	262.572	0.252
3600.000	1.995	310.062	3598.786	-6.855	-72.266	-6.855	72.590	264.581	0.031
3700.000	1.818	308.018	3698.730	-4.758	-74.847	-4.758	74.999	266.362	0.190
3800.000	1.706	322.576	3798.684	-2.599	-77.002	-2.599	77.046	268.067	0.460
3900.000	1.375	337.938	3898.648	-0.305	-78.357	-0.305	78.358	269.777	0.527
4000.000	0.879	353.196	3998.628	1.568	-78.899	1.568	78.914	271.139	0.576
4100.000	0.763	357.469	4098.618	2.995	-79.019	2.995	79.076	272.170	0.131
4200.000	0.876	339.927	4198.608	4.378	-79.311	4.378	79.431	273.160	0.274
4300.000	0.834	320.283	4298.597	5.656	-80.038	5.656	80.238	274.042	0.295
4400.000	0.487	318.660	4398.590	6.535	-80.784	6.535	81.048	274.625	0.348
4500.000	0.481	316.451	4498.587	7.159	-81.354	7.159	81.668	275.029	0.020
4600.000	1.204	309.787	4598.575	8.136	-82.451	8.136	82.851	275.635	0.729
4700.000	1.507	324.021	4698.547	9.872	-84.031	9.872	84.609	276.700	0.450
4800.000	1.286	330.853	4798.518	11.916	-85.350	11.916	86.178	277.948	0.276
4900.000	1.195	322.220	4898.494	13.721	-86.536	13.721	87.617	279.010	0.208
5000.000	1.235	297.976	4998.473	15.050	-88.126	15.050	89.402	279.692	0.512
5100.000	1.596	275.850	5098.443	15.698	-90.463	15.698	91.815	279.844	0.649
5200.000	1.709	267.861	5198.401	15.784	-93.339	15.784	94.664	279.598	0.256
5300.000	1.981	278.737	5298.349	15.991	-96.538	15.991	97.853	279.405	0.442
5400.000	2.351	266.991	5398.278	16.146	-100.294	16.146	101.586	279.145	0.576
5500.000	2.201	284.836	5498.201	16.530	-104.198	16.530	105.501	279.014	0.721
5600.000	1.932	287.958	5598.136	17.541	-107.658	17.541	109.077	279.254	0.292
5700.000	2.610	294.511	5698.057	19.006	-111.333	19.006	112.943	279.688	0.726
5800.000	3.205	303.484	5797.928	21.493	-115.737	21.493	117.715	280.520	0.748
5900.000	4.102	304.062	5897.724	25.038	-121.031	25.038	123.594	281.688	0.897
6000.000	3.564	301.118	5997.500	28.648	-126.655	28.648	129.855	282.745	0.572
6100.000	2.357	298.812	6097.364	31.246	-131.119	31.246	134.790	283.404	1.213
6200.000	1.534	278.234	6197.307	32.428	-134.245	32.428	138.106	283.580	1.067
6300.000	1.242	226.906	6297.281	31.879	-136.361	31.879	140.038	283.159	1.231
6400.000	1.649	204.252	6397.250	29.827	-137.744	29.827	140.936	282.218	0.694
6500.000	2.074	222.754	6497.198	27.186	-139.563	27.186	142.186	281.023	0.731
6600.000	2.225	223.054	6597.128	24.439	-142.117	24.439	144.203	279.757	0.151
6700.000	2.261	229.444	6697.051	21.737	-144.941	21.737	146.562	278.529	0.253
6800.000	2.280	248.300	6796.974	19.719	-148.289	19.719	149.594	277.575	0.744
6900.000	2.461	264.045	6896.889	18.761	-152.273	18.761	153.424	277.024	0.674
7000.000	1.676	278.581	6996.824	18.756	-155.855	18.756	156.980	276.862	0.938
7100.000	1.528	313.940	7096.787	19.899	-158.262	19.899	159.508	277.167	0.983
7200.000	1.079	293.920	7196.762	21.206	-160.082	21.206	161.481	277.546	0.633
7300.000	1.508	303.171	7296.736	22.308	-162.045	22.308	163.573	277.838	0.476
7400.000	1.991	275.792	7396.691	23.203	-164.874	23.203	166.499	278.011	0.952

HORIZONTAL DISPLACEMENT IS
166.499 FEET AT 278.011 DEGREES