



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = GL Elevation = 4868 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 9/15/2014 / 16:21

Lat/Long & Elevation Obtained By Handheld GPS At Wellhead

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

VES Survey International - Henderson CO

Norman Cowan

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	0.250	359.317	100.000	0.218	-0.003	0.218	0.218	359.317	0.250
200.000	0.348	356.947	199.998	0.740	-0.021	0.740	0.740	358.346	0.098
300.000	0.367	339.795	299.996	1.343	-0.148	1.343	1.352	353.710	0.108
400.000	0.185	356.303	399.995	1.805	-0.269	1.805	1.825	351.522	0.197
500.000	0.192	320.934	499.995	2.096	-0.385	2.096	2.131	349.593	0.115
600.000	0.506	290.431	599.993	2.380	-0.904	2.380	2.546	339.195	0.355
700.000	0.512	271.925	699.989	2.549	-1.765	2.549	3.101	325.302	0.164
800.000	0.493	284.300	799.985	2.670	-2.628	2.670	3.747	315.455	0.110
900.000	0.438	248.622	899.982	2.637	-3.401	2.637	4.303	307.794	0.290
1000.000	0.434	242.935	999.979	2.325	-4.094	2.325	4.708	299.596	0.043
1100.000	0.388	242.997	1099.977	1.999	-4.734	1.999	5.138	292.895	0.046
1200.000	0.476	254.731	1199.974	1.736	-5.436	1.736	5.706	287.711	0.124
1300.000	0.558	257.405	1299.970	1.521	-6.311	1.521	6.492	283.546	0.085
1400.000	0.585	250.284	1399.965	1.242	-7.266	1.242	7.372	279.701	0.076
1500.000	0.561	258.056	1499.960	0.969	-8.226	0.969	8.283	276.717	0.081
1600.000	0.569	254.982	1599.955	0.739	-9.184	0.739	9.213	274.600	0.031
1700.000	0.587	256.719	1699.950	0.493	-10.161	0.493	10.173	272.777	0.025
1800.000	0.609	258.691	1799.944	0.271	-11.180	0.271	11.183	271.389	0.030
1900.000	0.606	252.095	1899.939	0.004	-12.205	0.004	12.205	270.019	0.070
2000.000	0.489	250.142	1999.934	-0.304	-13.110	-0.304	13.113	268.674	0.119
2100.000	0.352	241.468	2099.931	-0.595	-13.781	-0.595	13.794	267.526	0.151
2200.000	0.418	198.644	2199.929	-1.087	-14.168	-1.087	14.209	265.611	0.288
2300.000	0.129	171.429	2299.928	-1.544	-14.267	-1.544	14.351	263.822	0.309
2400.000	0.125	102.460	2399.928	-1.679	-14.144	-1.679	14.244	263.229	0.144
2500.000	0.098	218.068	2499.928	-1.770	-14.091	-1.770	14.202	262.839	0.189
2600.000	0.185	207.695	2599.928	-1.981	-14.219	-1.981	14.356	262.069	0.090
2700.000	0.159	173.900	2699.927	-2.262	-14.279	-2.262	14.457	260.999	0.103
2800.000	0.168	61.358	2799.927	-2.330	-14.136	-2.330	14.326	260.642	0.272
2900.000	0.150	10.862	2899.927	-2.131	-13.982	-2.131	14.144	261.335	0.137
3000.000	0.593	342.791	2999.924	-1.508	-14.111	-1.508	14.191	263.900	0.466
3100.000	0.593	354.282	3099.919	-0.499	-14.315	-0.499	14.324	268.004	0.119
3200.000	0.468	335.991	3199.915	0.389	-14.533	0.389	14.538	271.534	0.209
3300.000	0.532	312.160	3299.911	1.074	-15.043	1.074	15.082	274.084	0.216

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	0.652	268.209	3399.906	1.368	-15.956	1.368	16.015	274.899	0.457
3500.000	0.941	250.050	3499.896	1.070	-17.296	1.070	17.329	273.539	0.380
3600.000	1.359	223.720	3599.877	-0.067	-18.887	-0.067	18.887	269.797	0.663
3700.000	1.341	226.483	3699.849	-1.729	-20.555	-1.729	20.627	265.191	0.068
3800.000	0.689	219.515	3799.833	-2.999	-21.786	-2.999	21.991	262.163	0.662
3900.000	0.523	235.573	3899.827	-3.720	-22.545	-3.720	22.850	260.629	0.236
4000.000	0.424	241.336	3999.824	-4.156	-23.246	-4.156	23.615	259.863	0.109
4100.000	0.438	238.332	4099.821	-4.534	-23.896	-4.534	24.323	259.256	0.026
4200.000	0.460	234.048	4199.818	-4.970	-24.546	-4.970	25.044	258.553	0.040
4300.000	0.467	242.146	4299.815	-5.396	-25.231	-5.396	25.802	257.928	0.066
4400.000	0.556	296.407	4399.811	-5.371	-26.026	-5.371	26.575	258.340	0.473
4500.000	0.439	277.091	4499.808	-5.108	-26.841	-5.108	27.323	259.226	0.203
4600.000	0.646	280.102	4599.803	-4.961	-27.777	-4.961	28.216	259.873	0.209
4700.000	0.525	249.674	4699.798	-5.022	-28.761	-5.022	29.196	260.096	0.329
4800.000	0.749	257.713	4799.792	-5.320	-29.829	-5.320	30.300	259.888	0.241
4900.000	0.481	249.073	4899.786	-5.609	-30.860	-5.609	31.366	259.699	0.282
5000.000	0.709	272.213	4999.781	-5.735	-31.870	-5.735	32.382	259.799	0.327
5100.000	0.514	278.642	5099.775	-5.644	-32.932	-5.644	33.412	260.276	0.206
5200.000	0.345	268.423	5199.772	-5.584	-33.677	-5.584	34.136	260.584	0.185
5300.000	0.398	271.253	5299.770	-5.585	-34.325	-5.585	34.776	260.758	0.056
5400.000	0.451	273.165	5399.767	-5.556	-35.065	-5.556	35.502	260.997	0.055
5500.000	0.391	294.780	5499.765	-5.391	-35.767	-5.391	36.171	261.428	0.168
5600.000	0.502	282.634	5599.762	-5.153	-36.504	-5.153	36.865	261.966	0.145
5700.000	0.393	302.315	5699.759	-4.874	-37.220	-4.874	37.538	262.540	0.187
5800.000	0.368	309.262	5799.756	-4.488	-37.758	-4.488	38.024	263.222	0.052
5900.000	0.451	339.651	5899.754	-3.916	-38.144	-3.916	38.344	264.139	0.229
6000.000	0.466	352.485	5999.751	-3.143	-38.334	-3.143	38.462	265.312	0.104
6100.000	0.452	359.411	6099.748	-2.345	-38.391	-2.345	38.462	266.504	0.057
6200.000	0.575	353.032	6199.744	-1.453	-38.456	-1.453	38.483	267.836	0.135
6300.000	0.585	359.837	6299.738	-0.445	-38.518	-0.445	38.521	269.338	0.070
6400.000	0.438	340.657	6399.735	0.425	-38.646	0.425	38.648	270.631	0.224
6500.000	0.631	356.661	6499.730	1.336	-38.805	1.336	38.828	271.971	0.243
6600.000	0.487	341.169	6599.725	2.288	-38.974	2.288	39.041	273.360	0.207
6700.000	0.655	320.239	6699.721	3.130	-39.477	3.130	39.601	274.533	0.265
6800.000	0.670	332.957	6799.714	4.090	-40.108	4.090	40.316	275.822	0.148
6900.000	0.465	304.734	6899.709	4.842	-40.707	4.842	40.994	276.783	0.341
7000.000	0.459	328.664	6999.706	5.415	-41.249	5.415	41.603	277.479	0.192
7100.000	0.633	319.322	7099.701	6.176	-41.817	6.176	42.271	278.402	0.195
7200.000	0.666	336.805	7199.695	7.130	-42.407	7.130	43.002	279.544	0.200
7300.000	0.619	341.294	7299.689	8.176	-42.809	8.176	43.583	280.812	0.069
7400.000	0.738	350.547	7399.682	9.323	-43.088	9.323	44.085	282.208	0.161
7500.000	0.683	354.036	7499.674	10.551	-43.256	10.551	44.524	283.708	0.069
7600.000	0.738	345.422	7599.666	11.767	-43.480	11.767	45.044	285.143	0.120
7700.000	0.864	339.990	7699.657	13.098	-43.900	13.098	45.812	286.614	0.147

HORIZONTAL DISPLACEMENT IS
45.812 FEET AT 286.614 DEGREES