

**FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB = GL Elevation = 4821 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 9/3/2014 / 13:50

Lat/Long & Elevation 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	0.296	18.485	100.000	0.245	0.082	0.245	0.259	18.485	0.296
200.000	0.142	46.924	199.999	0.576	0.255	0.576	0.630	23.878	0.184
300.000	0.218	66.337	299.998	0.737	0.520	0.737	0.902	35.212	0.096
400.000	0.209	75.380	399.998	0.860	0.871	0.860	1.224	45.391	0.035
500.000	0.117	312.758	499.997	0.975	0.973	0.975	1.378	44.933	0.290
600.000	0.212	314.081	599.997	1.174	0.765	1.174	1.401	33.090	0.095
700.000	0.166	21.623	699.997	1.437	0.685	1.437	1.592	25.489	0.214
800.000	0.142	353.903	799.996	1.696	0.725	1.696	1.844	23.163	0.077
900.000	0.248	16.035	899.996	2.027	0.772	2.027	2.169	20.848	0.128
1000.000	0.185	49.768	999.995	2.340	0.955	2.340	2.527	22.203	0.140
1100.000	0.260	355.727	1099.994	2.670	1.061	2.670	2.874	21.674	0.213
1200.000	0.301	47.012	1199.993	3.076	1.236	3.076	3.315	21.898	0.245
1300.000	0.139	324.451	1299.993	3.353	1.358	3.353	3.618	22.045	0.314
1400.000	0.153	26.651	1399.992	3.571	1.347	3.571	3.817	20.670	0.151
1500.000	0.390	312.295	1499.991	3.919	1.155	3.919	4.086	16.424	0.379
1600.000	0.247	310.924	1599.990	4.289	0.740	4.289	4.353	9.794	0.143
1700.000	0.154	29.799	1699.989	4.547	0.644	4.547	4.592	8.063	0.265
1800.000	0.286	3.821	1799.989	4.913	0.727	4.913	4.966	8.422	0.163
1900.000	0.117	38.188	1899.988	5.242	0.807	5.242	5.304	8.752	0.201
2000.000	0.301	337.761	1999.987	5.565	0.771	5.565	5.618	7.884	0.264
2100.000	0.592	281.426	2099.985	5.911	0.165	5.911	5.913	1.600	0.493
2200.000	0.602	299.095	2199.979	6.268	-0.800	6.268	6.319	352.729	0.184
2300.000	0.632	292.496	2299.974	6.735	-1.768	6.735	6.963	345.287	0.077
2400.000	0.734	299.187	2399.966	7.258	-2.838	7.258	7.793	338.648	0.129
2500.000	0.748	292.523	2499.958	7.821	-4.000	7.821	8.784	332.913	0.087
2600.000	0.717	287.144	2599.950	8.255	-5.201	8.255	9.757	327.789	0.075
2700.000	0.769	302.258	2699.942	8.798	-6.366	8.798	10.860	324.110	0.202
2800.000	0.719	283.025	2799.933	9.298	-7.546	9.298	11.974	320.939	0.253
2900.000	0.767	287.200	2899.925	9.637	-8.796	9.637	13.048	317.612	0.072
3000.000	0.779	310.760	2999.916	10.278	-9.950	10.278	14.306	315.930	0.316
3100.000	0.787	283.897	3099.907	10.887	-11.131	10.887	15.570	314.365	0.364
3200.000	0.722	258.633	3199.899	10.928	-12.415	10.928	16.539	311.353	0.336
3300.000	0.735	255.039	3299.891	10.638	-13.653	10.638	17.308	307.924	0.047
3400.000	1.028	240.036	3399.879	10.024	-15.050	10.024	18.082	303.666	0.370

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	1.122	221.123	3499.861	8.839	-16.470	8.839	18.692	298.221	0.365
3600.000	0.911	199.216	3599.846	7.351	-17.375	7.351	18.867	292.933	0.438
3700.000	1.079	231.870	3699.832	6.020	-18.378	6.020	19.338	288.136	0.582
3800.000	1.007	255.512	3799.816	5.218	-19.969	5.218	20.640	284.645	0.433
3900.000	0.976	270.097	3899.801	5.000	-21.672	5.000	22.242	282.991	0.254
4000.000	1.331	291.142	3999.781	5.420	-23.608	5.420	24.222	282.931	0.547
4100.000	1.084	283.494	4099.759	6.060	-25.611	6.060	26.318	283.312	0.294
4200.000	1.660	314.744	4199.731	7.300	-27.560	7.300	28.511	284.837	0.924
4300.000	1.822	323.154	4299.685	9.593	-29.542	9.593	31.061	287.989	0.302
4400.000	1.842	316.756	4399.634	12.036	-31.597	12.036	33.812	290.853	0.205
4500.000	1.849	324.415	4499.582	14.518	-33.637	14.518	36.636	293.346	0.247
4600.000	2.019	325.707	4599.525	17.285	-35.568	17.285	39.546	295.919	0.175
4700.000	2.044	330.117	4699.462	20.287	-37.449	20.287	42.590	298.445	0.158
4800.000	2.277	328.916	4799.391	23.534	-39.363	23.534	45.861	300.874	0.238
4900.000	2.202	340.377	4899.315	27.045	-41.033	27.045	49.144	303.388	0.453
5000.000	1.823	343.883	4999.253	30.382	-42.120	30.382	51.934	305.804	0.398
5100.000	1.576	355.613	5099.210	33.281	-42.667	33.281	54.112	307.955	0.426
5200.000	1.425	10.828	5199.176	35.873	-42.538	35.873	55.645	310.141	0.424
5300.000	1.513	343.781	5299.144	38.362	-42.673	38.362	57.382	311.955	0.692
5400.000	1.401	351.769	5399.112	40.840	-43.217	40.840	59.461	313.380	0.232
5500.000	0.897	12.078	5499.092	42.815	-43.228	42.815	60.843	314.725	0.640
5600.000	0.682	19.915	5599.082	44.141	-42.862	44.141	61.527	315.842	0.240
5700.000	0.877	30.672	5699.073	45.359	-42.269	45.359	62.000	317.020	0.243
5800.000	1.400	49.020	5799.053	46.818	-40.956	46.818	62.204	318.821	0.631
5900.000	2.151	62.836	5899.005	48.476	-38.364	48.476	61.820	321.642	0.859
6000.000	1.706	87.997	5998.950	49.385	-35.206	49.385	60.649	324.515	0.946
6100.000	1.554	119.133	6098.911	48.777	-32.534	48.777	58.631	326.297	0.887
6200.000	1.265	154.137	6198.883	47.124	-30.868	47.124	56.334	326.773	0.891
6300.000	1.173	182.084	6298.861	45.108	-30.424	45.108	54.409	326.001	0.595
6400.000	1.407	191.499	6398.836	42.882	-30.706	42.882	52.742	324.395	0.315
6500.000	1.516	180.709	6498.803	40.357	-30.967	40.357	50.869	322.500	0.295
6600.000	1.159	172.173	6598.776	38.032	-30.846	38.032	48.969	320.956	0.408
6700.000	1.360	141.132	6698.753	36.107	-29.964	36.107	46.920	320.312	0.701
6800.000	1.843	128.636	6798.714	34.179	-27.963	34.179	44.160	320.712	0.594
6900.000	2.073	125.233	6898.656	32.131	-25.230	32.131	40.853	321.861	0.257
7000.000	1.814	131.756	6998.598	30.034	-22.572	30.034	37.571	323.073	0.340
7100.000	1.361	125.787	7098.560	28.286	-20.428	28.286	34.892	324.163	0.481
7200.000	1.018	91.259	7198.539	27.572	-18.577	27.572	33.246	326.030	0.778
7300.000	0.835	90.266	7298.526	27.549	-16.960	27.549	32.351	328.383	0.184
7400.000	1.573	82.280	7398.503	27.730	-14.871	27.730	31.466	331.796	0.756
7500.000	1.143	110.181	7498.476	27.570	-12.575	27.570	30.303	335.483	0.777
7600.000	0.316	120.300	7598.467	27.087	-11.400	27.087	29.388	337.175	0.833
HORIZONTAL DISPLACEMENT IS 29.388 FEET AT 337.175 DEGREES									