



Company/Rig: Noble Energy/CoreTech
WELL/API#: Jurgens 8-14/05-123-20415
DECLINATION: 8.3
TD AS DRILLED: 6952'
COUNTY/STATE: Weld/Colorado
Latitude: 40.415, Longitude: -104.568
GRID North is 0.600 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=Surface Elevation=4590'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run02-01-de_01_mrg.ut

Minimum Curvature Method

Report Date/Time: 12/10/2014 / 15:37

Lat & Long Obtained By Handheld GPS At Wellhead

North Reference: Grid

Henderson, Co.

303-853-4976

Surveyor: Mark Simmons

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	0.142	122.225	100.000	-0.066	0.105	-0.066	0.124	122.225	0.142
200.000	0.192	201.968	200.000	-0.287	0.147	-0.287	0.323	152.937	0.217
300.000	0.751	232.628	299.996	-0.841	-0.437	-0.841	0.947	207.455	0.594
400.000	0.616	221.367	399.989	-1.642	-1.313	-1.642	2.102	218.648	0.190
500.000	1.185	224.384	499.976	-2.784	-2.392	-2.784	3.671	220.659	0.570
600.000	1.205	222.488	599.954	-4.299	-3.825	-4.299	5.754	221.662	0.044
700.000	1.205	224.340	699.932	-5.826	-5.270	-5.826	7.855	222.131	0.039
800.000	1.195	229.367	799.910	-7.257	-6.796	-7.257	9.942	223.122	0.106
900.000	1.197	227.307	899.889	-8.644	-8.355	-8.644	12.022	224.026	0.043
1000.000	1.401	229.992	999.863	-10.138	-10.059	-10.138	14.281	224.775	0.213
1100.000	1.353	224.614	1099.834	-11.764	-11.824	-11.764	16.679	225.145	0.138
1200.000	1.284	221.891	1199.807	-13.439	-13.401	-13.439	18.979	224.920	0.094
1300.000	1.335	221.007	1299.781	-15.152	-14.914	-15.152	21.260	224.547	0.056
1400.000	1.412	224.232	1399.753	-16.914	-16.538	-16.914	23.656	224.356	0.109
1500.000	1.477	227.082	1499.721	-18.675	-18.341	-18.675	26.175	224.484	0.096
1600.000	1.486	216.485	1599.688	-20.594	-20.056	-20.594	28.746	224.241	0.274
1700.000	1.187	198.592	1699.661	-22.618	-21.157	-22.618	30.971	223.088	0.510
1800.000	0.924	182.859	1799.644	-24.405	-21.527	-24.405	32.542	221.415	0.389

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
1900.000	1.081	141.386	1899.630	-25.947	-20.979	-25.947	33.367	218.957	0.725
2000.000	1.354	132.665	1999.607	-27.484	-19.522	-27.484	33.712	215.386	0.330
2100.000	1.521	129.110	2099.576	-29.122	-17.623	-29.122	34.039	211.180	0.189
2200.000	1.860	132.965	2199.532	-31.065	-15.406	-31.065	34.676	206.378	0.357
2300.000	1.976	142.823	2299.476	-33.545	-13.177	-33.545	36.040	201.446	0.349
2400.000	1.911	141.885	2399.419	-36.231	-11.106	-36.231	37.894	197.042	0.073
2500.000	1.628	137.741	2499.371	-38.594	-9.121	-38.594	39.657	193.297	0.310
2600.000	1.612	137.328	2599.331	-40.679	-7.213	-40.679	41.314	190.054	0.020
2700.000	1.458	131.957	2699.295	-42.564	-5.313	-42.564	42.894	187.116	0.210
2800.000	1.268	145.407	2799.267	-44.325	-3.739	-44.325	44.483	184.822	0.371
2900.000	1.282	150.825	2899.242	-46.213	-2.565	-46.213	46.284	183.177	0.121
3000.000	1.233	161.240	2999.219	-48.209	-1.674	-48.209	48.238	181.989	0.233
3100.000	0.688	199.222	3099.205	-49.795	-1.526	-49.795	49.818	181.755	0.810
3200.000	0.609	209.972	3199.199	-50.822	-1.989	-50.822	50.861	182.241	0.145
3300.000	0.379	224.351	3299.195	-51.519	-2.485	-51.519	51.579	182.762	0.259
3400.000	0.424	238.029	3399.192	-51.951	-3.031	-51.951	52.040	183.339	0.106
3500.000	0.388	231.683	3499.190	-52.357	-3.611	-52.357	52.482	183.945	0.058
3600.000	0.329	248.254	3599.188	-52.674	-4.143	-52.674	52.837	184.498	0.119
3700.000	0.363	264.155	3699.186	-52.813	-4.725	-52.813	53.024	185.113	0.102
3800.000	0.432	250.108	3799.184	-52.973	-5.395	-52.973	53.247	185.815	0.118
3900.000	0.480	249.732	3899.181	-53.246	-6.142	-53.246	53.599	186.580	0.048
4000.000	0.513	252.414	3999.177	-53.527	-6.962	-53.527	53.978	187.410	0.041
4100.000	0.527	222.076	4099.173	-54.003	-7.697	-54.003	54.549	188.112	0.272
4200.000	0.693	219.065	4199.167	-54.814	-8.386	-54.814	55.452	188.698	0.169
4300.000	1.073	236.150	4299.155	-55.805	-9.545	-55.805	56.616	189.706	0.459
4400.000	1.101	235.554	4399.137	-56.871	-11.115	-56.871	57.947	191.059	0.030
4500.000	0.578	223.241	4499.126	-57.782	-12.254	-57.782	59.067	191.973	0.550
4600.000	0.640	213.944	4599.121	-58.613	-12.911	-58.613	60.018	192.423	0.117
4700.000	0.650	213.177	4699.114	-59.551	-13.534	-59.551	61.070	192.804	0.013
4800.000	0.762	201.978	4799.107	-60.643	-14.093	-60.643	62.259	193.083	0.178
4900.000	0.823	212.160	4899.097	-61.868	-14.725	-61.868	63.596	193.387	0.153
5000.000	1.045	228.084	4999.084	-63.086	-15.786	-63.086	65.031	194.049	0.340
5100.000	0.780	225.110	5099.071	-64.176	-16.947	-64.176	66.376	194.793	0.269
5200.000	0.593	232.725	5199.064	-64.970	-17.841	-64.970	67.375	195.355	0.208
5300.000	0.634	239.217	5299.058	-65.566	-18.728	-65.566	68.189	195.942	0.081
5400.000	0.596	269.185	5399.053	-65.857	-19.724	-65.857	68.747	196.673	0.320
5500.000	0.402	288.030	5499.049	-65.756	-20.578	-65.756	68.900	197.377	0.251
5600.000	0.454	295.504	5599.046	-65.477	-21.269	-65.477	68.844	197.995	0.076
5700.000	1.203	310.276	5699.035	-64.628	-22.427	-64.628	68.408	199.138	0.773

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
5800.000	2.154	310.363	5798.991	-62.732	-24.660	-62.732	67.405	201.460	0.951
5900.000	2.784	312.348	5898.898	-59.879	-27.886	-59.879	66.054	204.972	0.636
6000.000	2.714	328.803	5998.784	-56.218	-30.907	-56.218	64.154	208.801	0.789
6100.000	2.902	336.362	6098.665	-51.874	-33.148	-51.874	61.561	212.579	0.415
6200.000	2.269	331.433	6198.562	-47.817	-35.110	-47.817	59.322	216.289	0.671
6300.000	1.921	326.115	6298.496	-44.687	-36.991	-44.687	58.011	219.618	0.398
6400.000	1.594	317.218	6398.449	-42.274	-38.871	-42.274	57.428	222.598	0.425
6500.000	1.506	317.555	6498.412	-40.283	-40.702	-40.283	57.266	225.296	0.089
6600.000	1.179	319.226	6598.384	-38.535	-42.261	-38.535	57.192	227.641	0.329
6700.000	1.043	305.098	6698.366	-37.232	-43.678	-37.232	57.393	229.555	0.305