



Company/Rig: NOBLE ENERGY / PRODUCTION  
WELL/API#: RAY GLO 04 / 05-123-12988  
DECLINATION: 8.23 DEGREES  
TD AS DRILLED: 7026 FEET  
COUNTY/STATE: WELD / COLORADO  
Latitude: 40.488, Longitude: -104.520  
GRID North is 0.630 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4707 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 4/21/2015 / 15:12

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: NORMAN COWAN

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	0.915	317.805	99.996	0.591	-0.536	0.591	0.798	317.805	0.915
200.000	0.652	324.463	199.986	1.646	-1.403	1.646	2.163	319.553	0.278
300.000	0.279	319.628	299.983	2.294	-1.892	2.294	2.974	320.497	0.375
400.000	0.327	335.745	399.981	2.740	-2.166	2.740	3.493	321.666	0.097
500.000	0.386	336.000	499.980	3.308	-2.421	3.308	4.099	323.802	0.059
600.000	0.238	354.713	599.978	3.822	-2.577	3.822	4.610	326.014	0.178
700.000	0.259	11.840	699.977	4.250	-2.550	4.250	4.956	329.042	0.077
800.000	0.360	345.548	799.976	4.775	-2.581	4.775	5.428	331.604	0.172
900.000	0.350	344.567	899.974	5.374	-2.741	5.374	6.033	332.974	0.011
1000.000	0.403	7.158	999.972	6.018	-2.779	6.018	6.628	335.214	0.156
1100.000	0.489	8.817	1099.969	6.788	-2.669	6.788	7.294	338.532	0.086
1200.000	0.471	357.790	1199.965	7.620	-2.620	7.620	8.058	341.026	0.094
1300.000	0.434	1.746	1299.962	8.410	-2.624	8.410	8.810	342.670	0.048
1400.000	0.512	6.172	1399.959	9.233	-2.565	9.233	9.583	344.476	0.086
1500.000	0.477	20.412	1499.955	10.068	-2.371	10.068	10.343	346.746	0.127
1600.000	0.496	18.664	1599.951	10.868	-2.088	10.868	11.067	349.126	0.024
1700.000	0.284	15.722	1699.949	11.517	-1.882	11.517	11.670	350.719	0.213
1800.000	0.065	277.414	1799.949	11.763	-1.871	11.763	11.911	350.961	0.301
1900.000	0.648	218.639	1899.946	11.329	-2.281	11.329	11.556	348.616	0.617

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
2000.000	1.279	209.941	1999.932	9.920	-3.191	9.920	10.421	342.170	0.645
2100.000	1.259	209.651	2099.907	7.999	-4.291	7.999	9.077	331.789	0.021
2200.000	1.030	214.249	2199.887	6.302	-5.340	6.302	8.260	319.724	0.246
2300.000	0.586	216.745	2299.877	5.149	-6.152	5.149	8.022	309.931	0.445
2400.000	0.359	237.155	2399.874	4.569	-6.721	4.569	8.127	304.208	0.279
2500.000	0.289	203.685	2499.872	4.168	-7.086	4.168	8.221	300.465	0.199
2600.000	0.271	243.989	2599.871	3.834	-7.400	3.834	8.334	297.389	0.194
2700.000	0.290	233.047	2699.870	3.578	-7.814	3.578	8.594	294.602	0.057
2800.000	0.288	246.706	2799.869	3.327	-8.247	3.327	8.893	291.967	0.069
2900.000	0.171	208.522	2899.868	3.096	-8.549	3.096	9.092	289.907	0.186
3000.000	0.189	283.306	2999.867	3.003	-8.781	3.003	9.280	288.878	0.219
3100.000	0.379	288.398	3099.866	3.145	-9.255	3.145	9.774	288.768	0.191
3200.000	0.339	267.247	3199.864	3.235	-9.864	3.235	10.381	288.157	0.137
3300.000	0.828	356.880	3299.860	3.942	-10.199	3.942	10.934	291.132	0.893
3400.000	1.668	20.665	3399.836	6.025	-9.724	6.025	11.440	301.780	0.969
3500.000	1.954	37.302	3499.787	8.743	-8.178	8.743	11.971	316.913	0.596
3600.000	2.064	39.659	3599.725	11.485	-5.995	11.485	12.956	332.436	0.137
3700.000	2.096	43.183	3699.659	14.205	-3.595	14.205	14.652	345.799	0.132
3800.000	2.094	45.229	3799.593	16.825	-1.046	16.825	16.857	356.441	0.075
3900.000	2.015	48.957	3899.528	19.266	1.577	19.266	19.330	4.678	0.155
4000.000	1.940	55.554	3999.469	21.377	4.298	21.377	21.805	11.369	0.240
4100.000	1.656	55.235	4099.420	23.158	6.881	23.158	24.159	16.547	0.284
4200.000	1.183	61.426	4199.389	24.476	8.974	24.476	26.069	20.135	0.496
4300.000	1.051	78.615	4299.370	25.150	10.779	25.150	27.363	23.199	0.358
4400.000	0.882	86.212	4399.356	25.382	12.447	25.382	28.270	26.122	0.211
4500.000	1.018	77.544	4499.342	25.625	14.083	25.625	29.240	28.792	0.198
4600.000	1.504	77.214	4599.318	26.107	16.231	26.107	30.741	31.869	0.486
4700.000	1.635	79.177	4699.280	26.666	18.912	26.666	32.691	35.346	0.141
4800.000	2.106	80.799	4799.226	27.227	22.128	27.227	35.085	39.101	0.474
4900.000	2.629	81.993	4899.141	27.841	26.213	27.841	38.239	43.275	0.525
5000.000	2.491	79.148	4999.041	28.569	30.618	28.569	41.877	46.983	0.187
5100.000	1.598	87.824	5098.976	29.031	34.147	29.031	44.820	49.629	0.942
5200.000	0.932	114.684	5198.952	28.744	36.280	28.744	46.287	51.610	0.875
5300.000	0.689	153.502	5298.943	27.867	37.287	27.867	46.550	53.228	0.586
5400.000	1.018	209.048	5398.933	26.552	37.125	26.552	45.643	54.427	0.847
5500.000	1.957	219.959	5498.899	24.467	35.597	24.467	43.194	55.498	0.978
5600.000	2.008	239.702	5598.840	22.274	32.987	22.274	39.803	55.971	0.681
5700.000	1.275	261.688	5698.799	21.229	30.374	21.229	37.057	55.049	0.953
5800.000	1.164	275.372	5798.777	21.164	28.261	21.164	35.307	53.172	0.311
5900.000	1.092	289.610	5898.757	21.579	26.351	21.579	34.059	50.687	0.289

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
6000.000	1.015	292.278	5998.741	22.234	24.634	22.234	33.184	47.930	0.091
6100.000	0.799	287.892	6098.728	22.785	23.150	22.785	32.482	45.456	0.227
6200.000	0.602	278.540	6198.721	23.077	21.967	23.077	31.860	43.588	0.228
6300.000	0.760	269.333	6298.713	23.147	20.785	23.147	31.110	41.922	0.192
6400.000	0.641	248.324	6398.706	22.933	19.602	22.933	30.169	40.523	0.281
6500.000	0.432	238.877	6498.702	22.531	18.760	22.531	29.319	39.781	0.226
6600.000	0.143	174.445	6598.701	22.213	18.449	22.213	28.875	39.712	0.392
6700.000	0.215	37.744	6698.700	22.237	18.576	22.237	28.975	39.874	0.333
6800.000	0.242	17.349	6798.700	22.587	18.754	22.587	29.358	39.702	0.085