



Company/Rig: Noble Energy Inc/Production
WELL/API#: Ehrlich 1/05-123-05150
DECLINATION: 8.17 Degrees
TD AS DRILLED: 8760 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.34320, Longitude: -104.55762
Grid North = True North -0.61 degs (NAD 27)
Grid Correction Applied = -0.61 degs



DEPTH REFERENCE : RKB=GL/Elevation=4701'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 9/27/2016 / 10:03

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Ehrlich 1

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	0.471	356.727	99.999	0.410	-0.023	0.410	0.411	356.727	0.471
200.000	0.610	348.832	199.994	1.343	-0.150	1.343	1.351	353.625	0.157
300.000	0.544	359.883	299.989	2.340	-0.254	2.340	2.353	353.802	0.129
400.000	0.737	352.474	399.983	3.452	-0.339	3.452	3.469	354.387	0.210
500.000	0.353	340.482	499.978	4.380	-0.526	4.380	4.412	353.147	0.399
600.000	0.465	338.596	599.976	5.049	-0.777	5.049	5.108	351.245	0.113
700.000	0.309	354.485	699.974	5.695	-0.952	5.695	5.774	350.514	0.188
800.000	0.371	348.060	799.972	6.280	-1.044	6.280	6.366	350.557	0.073
900.000	0.478	36.670	899.969	6.931	-0.862	6.931	6.984	352.909	0.363
1000.000	0.295	3.425	999.967	7.523	-0.598	7.523	7.546	355.458	0.282
1100.000	0.451	25.920	1099.965	8.134	-0.410	8.134	8.144	357.112	0.211
1200.000	0.433	21.695	1199.962	8.839	-0.099	8.839	8.839	359.361	0.037
1300.000	0.487	26.807	1299.959	9.569	0.233	9.569	9.572	1.394	0.068
1400.000	0.495	22.537	1399.955	10.348	0.590	10.348	10.365	3.265	0.037
1500.000	0.469	34.651	1499.952	11.085	0.989	11.085	11.129	5.099	0.105
1600.000	0.337	0.887	1599.949	11.716	1.226	11.716	11.780	5.976	0.266

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
1700.000	0.356	345.284	1699.947	12.311	1.152	12.311	12.364	5.346	0.096
1800.000	0.268	348.922	1799.946	12.841	1.028	12.841	12.882	4.577	0.090
1900.000	0.256	356.544	1899.945	13.294	0.970	13.294	13.329	4.171	0.037
2000.000	0.307	9.980	1999.944	13.781	1.002	13.781	13.817	4.160	0.083
2100.000	0.171	347.888	2099.943	14.191	1.017	14.191	14.227	4.101	0.162
2200.000	0.190	311.257	2199.942	14.446	0.862	14.446	14.472	3.414	0.115
2300.000	0.313	318.362	2299.941	14.760	0.555	14.760	14.770	2.155	0.127
2400.000	0.348	311.447	2399.940	15.165	0.146	15.165	15.166	0.553	0.053
2500.000	0.298	293.488	2499.938	15.469	-0.320	15.469	15.473	358.815	0.112
2600.000	0.421	301.628	2599.936	15.766	-0.871	15.766	15.790	356.836	0.132
2700.000	0.353	293.874	2699.934	16.083	-1.466	16.083	16.150	354.792	0.086
2800.000	0.369	301.596	2799.932	16.376	-2.022	16.376	16.501	352.963	0.051
2900.000	0.451	309.946	2899.929	16.798	-2.598	16.798	16.998	351.209	0.102
3000.000	0.460	300.877	2999.926	17.257	-3.244	17.257	17.559	349.353	0.072
3100.000	0.577	323.513	3099.922	17.867	-3.888	17.867	18.285	347.725	0.234
3200.000	0.832	359.976	3199.915	18.998	-4.187	18.998	19.454	347.570	0.503
3300.000	0.949	5.146	3299.903	20.548	-4.113	20.548	20.956	348.680	0.142
3400.000	1.315	14.784	3399.883	22.482	-3.746	22.482	22.792	350.539	0.411
3500.000	1.097	31.554	3499.862	24.406	-2.953	24.406	24.584	353.102	0.412
3600.000	0.982	24.963	3599.845	25.999	-2.090	25.999	26.083	355.403	0.166
3700.000	0.745	21.695	3699.834	27.380	-1.488	27.380	27.420	356.888	0.241
3800.000	0.925	29.112	3799.823	28.690	-0.855	28.690	28.703	358.293	0.209
3900.000	0.548	31.758	3899.815	29.802	-0.211	29.802	29.802	359.595	0.379
4000.000	0.528	359.413	3999.810	30.669	0.036	30.669	30.669	0.068	0.300
4100.000	0.634	340.845	4099.805	31.652	-0.150	31.652	31.652	359.729	0.214
4200.000	0.637	331.411	4199.799	32.662	-0.597	32.662	32.668	358.952	0.105
4300.000	0.639	322.181	4299.793	33.591	-1.205	33.591	33.613	357.945	0.103
4400.000	0.697	315.289	4399.786	34.464	-1.975	34.464	34.520	356.720	0.099
4500.000	0.356	258.540	4499.782	34.834	-2.707	34.834	34.939	355.556	0.583
4600.000	0.576	201.053	4599.780	34.304	-3.192	34.304	34.452	354.684	0.488
4700.000	0.972	168.016	4699.771	33.005	-3.197	33.005	33.160	354.468	0.581
4800.000	0.534	158.861	4799.762	31.742	-2.853	31.742	31.870	354.865	0.453
4900.000	0.873	179.857	4899.754	30.545	-2.683	30.545	30.663	354.981	0.420
5000.000	0.837	161.812	4999.743	29.089	-2.453	29.089	29.193	355.181	0.270
5100.000	0.223	144.119	5099.739	28.238	-2.111	28.238	28.317	355.725	0.629
5200.000	0.582	92.987	5199.736	28.054	-1.490	28.054	28.093	356.960	0.475
5300.000	0.295	126.158	5299.733	27.875	-0.774	27.875	27.886	358.409	0.372
5400.000	0.234	160.154	5399.732	27.531	-0.497	27.531	27.535	358.966	0.165
5500.000	0.444	183.417	5499.731	26.952	-0.450	26.952	26.956	359.043	0.246

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
5600.000	0.334	153.552	5599.728	26.305	-0.344	26.305	26.308	359.251	0.227
5700.000	0.337	267.052	5699.728	26.029	-0.508	26.029	26.034	358.882	0.561
5800.000	0.643	256.542	5799.724	25.884	-1.347	25.884	25.919	357.020	0.317
5900.000	0.412	271.253	5899.720	25.761	-2.253	25.761	25.859	355.003	0.266
6000.000	0.393	58.007	5999.719	25.951	-2.321	25.951	26.054	354.889	0.772
6100.000	0.389	142.010	6099.717	25.865	-1.821	25.865	25.929	355.972	0.523
6200.000	0.684	117.006	6199.713	25.327	-1.081	25.327	25.350	357.556	0.370
6300.000	0.448	118.852	6299.708	24.867	-0.207	24.867	24.868	359.524	0.236
6400.000	0.210	279.984	6399.707	24.711	-0.045	24.711	24.711	359.895	0.651
6500.000	0.161	290.368	6499.706	24.791	-0.358	24.791	24.794	359.172	0.059
6600.000	0.378	260.133	6599.705	24.784	-0.815	24.784	24.797	358.117	0.252
6700.000	0.268	284.455	6699.704	24.786	-1.366	24.786	24.824	356.845	0.173
6800.000	0.321	28.924	6799.703	25.090	-1.458	25.090	25.132	356.675	0.467