



Company/Rig: Noble Energy Inc/Production
WELL/API#: Gemini B 31-25/05-123-22099
DECLINATION: 8.23 Degrees
TD AS DRILLED: 7697'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.35247, Longitude: -104.59820
Grid North = True North -0.58 degs (NAD 27)
Grid Correction Applied = -0.58 degs



DEPTH REFERENCE : RKB=GL/Elevation=4794'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 6/6/2016 / 15:17

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Gemini B 31-25

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	0.312	275.359	100.000	0.025	-0.271	0.025	0.272	275.359	0.312
200.000	0.198	259.810	199.999	0.020	-0.712	0.020	0.713	271.638	0.133
300.000	0.292	276.786	299.998	0.020	-1.135	0.020	1.135	271.006	0.118
400.000	0.314	301.527	399.996	0.193	-1.621	0.193	1.633	276.803	0.132
500.000	0.530	313.627	499.993	0.656	-2.190	0.656	2.286	286.680	0.233
600.000	0.674	307.150	599.988	1.331	-2.994	1.331	3.277	293.966	0.159
700.000	0.878	287.905	699.979	1.922	-4.193	1.922	4.612	294.628	0.328
800.000	0.817	283.465	799.968	2.324	-5.616	2.324	6.078	292.480	0.090
900.000	0.950	279.544	899.956	2.627	-7.127	2.627	7.596	290.237	0.145
1000.000	1.007	278.753	999.941	2.899	-8.813	2.899	9.277	288.207	0.059
1100.000	1.033	272.898	1099.926	3.078	-10.581	3.078	11.020	286.219	0.107
1200.000	1.088	271.019	1199.908	3.140	-12.431	3.140	12.822	284.177	0.066
1300.000	1.041	276.045	1299.891	3.253	-14.284	3.253	14.650	282.829	0.105
1400.000	0.883	269.327	1399.877	3.340	-15.959	3.340	16.304	281.819	0.194
1500.000	0.753	264.491	1499.867	3.267	-17.384	3.267	17.688	280.645	0.147
1600.000	0.696	263.422	1599.859	3.135	-18.642	3.135	18.903	279.545	0.059
1700.000	0.642	253.437	1699.852	2.905	-19.782	2.905	19.994	278.355	0.128
1800.000	0.739	248.776	1799.845	2.512	-20.920	2.512	21.070	276.848	0.112

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	0.546	251.771	1899.839	2.130	-21.973	2.130	22.076	275.536	0.196
2000.000	0.720	264.434	1999.832	1.920	-23.051	1.920	23.131	274.761	0.222
2100.000	0.779	250.709	2099.824	1.635	-24.317	1.635	24.372	273.846	0.188
2200.000	0.929	276.774	2199.813	1.506	-25.764	1.506	25.808	273.345	0.412
2300.000	1.482	287.003	2299.791	1.979	-27.805	1.979	27.876	274.072	0.591
2400.000	1.665	281.703	2399.753	2.652	-30.464	2.652	30.579	274.975	0.234
2500.000	1.678	285.359	2499.711	3.335	-33.299	3.335	33.466	275.719	0.107
2600.000	1.406	290.733	2599.674	4.157	-35.859	4.157	36.099	276.613	0.308
2700.000	1.370	293.479	2699.645	5.068	-38.103	5.068	38.438	277.576	0.076
2800.000	1.366	289.472	2799.617	5.941	-40.323	5.941	40.758	278.382	0.096
2900.000	1.315	288.684	2899.589	6.706	-42.533	6.706	43.059	278.960	0.054
3000.000	1.263	287.218	2999.564	7.400	-44.673	7.400	45.282	279.405	0.061
3100.000	1.267	280.455	3099.540	7.927	-46.814	7.927	47.480	279.611	0.149
3200.000	1.019	311.316	3199.520	8.714	-48.569	8.714	49.344	280.172	0.654
3300.000	1.105	321.052	3299.503	10.051	-49.843	10.051	50.846	281.401	0.199
3400.000	1.159	335.548	3399.484	11.721	-50.867	11.721	52.200	282.976	0.290
3500.000	1.154	339.819	3499.464	13.587	-51.633	13.587	53.391	284.743	0.086
3600.000	1.535	359.965	3599.437	15.872	-51.981	15.872	54.350	286.979	0.602
3700.000	2.438	357.641	3699.375	19.337	-52.070	19.337	55.544	290.373	0.906
3800.000	2.536	352.642	3799.281	23.656	-52.441	23.656	57.529	294.281	0.238
3900.000	2.496	353.128	3899.185	28.012	-52.984	28.012	59.934	297.865	0.046
4000.000	2.567	357.671	3999.087	32.411	-53.336	32.411	62.411	301.286	0.213
4100.000	2.418	4.407	4098.993	36.751	-53.265	36.751	64.713	304.605	0.328
4200.000	2.108	11.547	4198.915	40.657	-52.735	40.657	66.587	307.631	0.418
4300.000	2.161	14.668	4298.846	44.283	-51.889	44.283	68.216	310.478	0.128
4400.000	2.092	13.070	4398.777	47.885	-50.999	47.885	69.956	313.196	0.091
4500.000	1.825	359.461	4498.719	51.256	-50.601	51.256	72.025	315.368	0.534
4600.000	1.407	355.309	4598.679	54.072	-50.716	54.072	74.134	316.834	0.434
4700.000	0.843	28.988	4698.660	55.939	-50.460	55.939	75.335	317.948	0.846
4800.000	0.178	11.100	4798.656	56.735	-50.074	56.735	75.672	318.569	0.676
4900.000	1.641	240.250	4898.643	56.177	-51.287	56.177	76.067	317.606	1.762
5000.000	1.950	232.893	4998.594	54.441	-53.886	54.441	76.600	315.293	0.385
5100.000	1.688	232.578	5098.543	52.519	-56.412	52.519	77.076	312.953	0.262
5200.000	1.357	220.067	5198.508	50.718	-58.344	50.718	77.307	311.000	0.467
5300.000	1.606	197.725	5298.476	48.477	-59.534	48.477	76.774	309.155	0.624
5400.000	1.612	199.996	5398.436	45.820	-60.441	45.820	75.846	307.165	0.064
5500.000	1.260	193.425	5498.405	43.429	-61.178	43.429	75.025	305.370	0.389
5600.000	0.774	142.142	5598.390	41.826	-61.018	41.826	73.977	304.429	0.983
5700.000	0.605	130.225	5698.383	40.952	-60.200	40.952	72.809	304.226	0.221
5800.000	0.607	99.510	5798.378	40.523	-59.275	40.523	71.803	304.358	0.321

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
5900.000	0.621	87.517	5898.372	40.459	-58.212	40.459	70.892	304.801	0.129
6000.000	0.686	88.432	5998.366	40.499	-57.073	40.499	69.982	305.360	0.066
6100.000	0.525	104.124	6098.360	40.404	-56.031	40.404	69.079	305.795	0.229
6200.000	0.351	86.962	6198.357	40.308	-55.280	40.308	68.415	306.098	0.217
6300.000	0.567	90.981	6298.354	40.316	-54.480	40.316	67.775	306.502	0.219
6400.000	0.491	73.782	6398.350	40.427	-53.574	40.427	67.116	307.038	0.175
6500.000	0.495	79.549	6498.346	40.625	-52.738	40.625	66.571	307.608	0.050
6600.000	0.542	90.056	6598.342	40.703	-51.839	40.703	65.909	308.138	0.106
6700.000	0.504	96.676	6698.338	40.651	-50.930	40.651	65.164	308.596	0.072
6800.000	0.556	90.405	6798.334	40.597	-50.008	40.597	64.412	309.070	0.078
6900.000	0.558	98.374	6898.329	40.523	-49.041	40.523	63.617	309.567	0.077