



Company: Noble Energy, Inc.
Rig: Production / Lightning
Latitude: 40.398
Longitude: -104.826
API # 05-123-22962
Date: 8/30/12

Well: Lundvall J 18-12
Location: Weld County, Colorado
North Reference: GRID / -.44
Depth Reference: RKB = Ground Level
Surveyor: Robert Davis
VS: 0.000

MS Gyro Survey Calculations

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD	Cbrg
0.000	0.000	0.000	0.000	0.000	0.000	****	0.000	0.000	0.000
100.000	1.439	209.785	-1.090	-0.624	99.989	1.439	-1.090	1.256	209.785
200.000	0.384	231.419	-2.389	-1.510	199.976	1.092	-2.389	2.826	212.290
300.000	0.752	256.205	-2.754	-2.409	299.971	0.434	-2.754	3.659	221.168
400.000	0.478	166.031	-3.316	-2.945	399.967	0.892	-3.316	4.435	221.610
500.000	1.809	264.947	-3.860	-4.417	499.950	1.942	-3.860	5.866	228.851
600.000	2.045	269.622	-4.011	-7.773	599.893	0.283	-4.011	8.747	242.709
700.000	1.627	287.664	-3.592	-10.910	699.842	0.708	-3.592	11.486	251.778
800.000	2.279	279.619	-2.829	-14.223	799.784	0.706	-2.829	14.501	258.752
900.000	1.568	264.135	-2.636	-17.544	899.727	0.875	-2.636	17.741	261.455
1000.000	1.699	293.265	-2.190	-20.267	999.689	0.831	-2.190	20.385	263.832
1100.000	2.119	282.531	-1.203	-23.435	1099.633	0.550	-1.203	23.465	267.060
1200.000	2.153	287.772	-0.229	-27.028	1199.564	0.198	-0.229	27.029	269.515
1300.000	2.087	302.726	1.329	-30.349	1299.496	0.556	1.329	30.378	272.507
1400.000	1.849	302.894	3.189	-33.235	1399.437	0.238	3.189	33.387	275.481
1500.000	2.795	283.074	4.617	-36.965	1499.355	1.228	4.617	37.252	277.119
1600.000	4.862	260.795	4.490	-43.524	1599.132	2.510	4.490	43.755	275.890
1700.000	6.809	255.403	2.318	-53.445	1698.610	2.020	2.318	53.496	272.484
1800.000	8.227	251.111	-1.492	-65.952	1797.748	1.524	-1.492	65.969	268.704
1900.000	10.274	249.494	-6.933	-81.075	1896.443	2.064	-6.933	81.371	265.113
2000.000	11.471	250.440	-13.386	-98.798	1994.646	1.210	-13.386	99.701	262.284
2100.000	12.766	255.064	-19.563	-118.844	2092.418	1.618	-19.563	120.444	260.652
2200.000	14.619	258.460	-24.936	-141.886	2189.573	2.019	-24.936	144.061	260.032
2300.000	15.964	260.439	-29.745	-167.812	2286.031	1.442	-29.745	170.428	259.949
2400.000	17.218	265.114	-33.290	-196.122	2381.871	1.831	-33.290	198.927	260.366
2500.000	18.862	264.733	-36.034	-226.968	2476.951	1.648	-36.034	229.810	260.979
2600.000	20.101	264.006	-39.313	-260.156	2571.224	1.262	-39.313	263.109	261.407
2700.000	20.617	263.801	-43.009	-294.749	2664.977	0.521	-43.009	297.870	261.698
2800.000	22.341	264.308	-46.795	-331.167	2758.029	1.734	-46.795	334.456	261.957
2900.000	23.332	262.256	-51.348	-369.702	2850.191	1.271	-51.348	373.251	262.093
3000.000	21.153	262.697	-56.311	-407.225	2942.745	2.185	-56.311	411.100	262.127
3100.000	20.999	261.202	-61.345	-442.828	3036.056	0.559	-61.345	447.057	262.113
3200.000	21.340	259.649	-67.354	-478.434	3129.308	0.657	-67.354	483.152	261.987
3300.000	21.219	257.631	-74.500	-514.010	3222.492	0.742	-74.500	519.381	261.753
3400.000	21.378	259.171	-81.801	-549.588	3315.663	0.581	-81.801	555.642	261.534
3500.000	21.497	260.165	-88.355	-585.543	3408.745	0.383	-88.355	592.171	261.419
3600.000	20.037	260.540	-94.301	-620.497	3502.245	1.466	-94.301	627.622	261.359
3700.000	18.935	260.745	-99.726	-653.410	3596.516	1.104	-99.726	660.977	261.322
3800.000	19.189	259.817	-105.240	-685.599	3691.032	0.395	-105.240	693.630	261.273

3900.000	19.858	259.437	-111.259	-718.472	3785.282	0.681	-111.259	727.035	261.197
4000.000	20.160	261.551	-116.905	-752.214	3879.248	0.784	-116.905	761.244	261.166
4100.000	20.775	260.695	-122.305	-786.761	3972.935	0.684	-122.305	796.210	261.164
4200.000	20.673	260.280	-128.153	-821.661	4066.464	0.179	-128.153	831.594	261.135
4300.000	19.666	258.799	-134.401	-855.566	4160.331	1.129	-134.401	866.058	261.072
4400.000	18.073	259.677	-140.450	-887.335	4254.954	1.618	-140.450	898.381	261.006
4500.000	18.631	261.548	-145.578	-918.396	4349.869	0.812	-145.578	929.862	260.993
4600.000	19.385	261.747	-150.307	-950.621	4444.415	0.756	-150.307	962.430	261.015
4700.000	19.013	264.660	-154.206	-983.264	4538.856	1.027	-154.206	995.282	261.087
4800.000	17.543	266.487	-156.645	-1014.530	4633.808	1.578	-156.645	1026.549	261.223
4900.000	15.532	267.118	-158.242	-1042.940	4729.667	2.018	-158.242	1054.881	261.373
5000.000	13.687	268.247	-159.277	-1068.140	4826.430	1.867	-159.277	1079.954	261.519
5100.000	13.007	271.123	-159.418	-1091.220	4923.729	0.950	-159.418	1102.805	261.688
5200.000	11.499	272.297	-158.798	-1112.430	5021.448	1.529	-158.798	1123.711	261.876
5300.000	10.498	269.059	-158.549	-1131.500	5119.611	1.175	-158.549	1142.557	262.024
5400.000	7.955	265.432	-159.249	-1147.510	5218.310	2.608	-159.249	1158.510	262.099
5500.000	5.996	262.174	-160.512	-1159.590	5317.565	1.998	-160.512	1170.642	262.119
5600.000	4.556	258.625	-162.006	-1168.650	5417.139	1.476	-162.006	1179.830	262.108
5700.000	3.285	248.967	-163.818	-1175.220	5516.905	1.428	-163.818	1186.585	262.064
5800.000	1.057	230.979	-165.427	-1178.610	5616.827	2.303	-165.427	1190.166	262.010
5900.000	0.314	281.862	-165.952	-1179.600	5716.820	0.893	-165.952	1191.214	261.992
6000.000	0.665	230.800	-166.262	-1180.320	5816.817	0.528	-166.262	1191.968	261.982
6100.000	0.617	309.074	-166.290	-1181.180	5916.812	0.810	-166.290	1192.832	261.986
6200.000	0.633	195.638	-166.482	-1181.750	6016.809	1.046	-166.482	1193.420	261.981
6300.000	0.377	171.378	-167.340	-1181.850	6116.805	0.328	-167.340	1193.639	261.941
6400.000	0.857	259.133	-167.807	-1182.540	6216.800	0.923	-167.807	1194.383	261.923
6500.000	0.480	165.508	-168.353	-1183.170	6316.796	1.009	-168.353	1195.083	261.902
6600.000	0.560	253.437	-168.898	-1183.530	6416.793	0.724	-168.898	1195.520	261.878
6700.000	0.420	20.821	-168.695	-1183.870	6516.791	0.880	-168.695	1195.826	261.890
6800.000	0.671	323.160	-167.885	-1184.090	6616.787	0.570	-167.885	1195.931	261.930
6900.000	0.408	242.650	-167.580	-1184.760	6716.784	0.726	-167.580	1196.549	261.949
7000.000	0.434	27.941	-167.409	-1184.890	6816.783	0.804	-167.409	1196.662	261.958
7100.000	0.748	346.479	-166.439	-1184.870	6916.778	0.511	-166.439	1196.502	262.004
7200.000	0.702	326.955	-165.290	-1185.360	7016.770	0.250	-165.290	1196.825	262.062
7300.000	0.283	249.751	-164.862	-1185.920	7116.767	0.696	-164.862	1197.326	262.086
7400.000	0.352	118.051	-165.092	-1185.880	7216.766	0.580	-165.092	1197.319	262.075
7500.000	0.210	281.787	-165.199	-1185.790	7316.766	0.557	-165.199	1197.242	262.069