



Company/Rig: Noble Energy Inc/Production
 WELL/API#: Larson Fairmeadows 6-30/05-123-29707
 DECLINATION: 8.13 Degrees
 TD AS DRILLED: 6932 Feet
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.45567, Longitude: -104.48178
 Grid North = True North -0.66 degs (NAD 27)
 Grid Correction Applied = -0.66 degs



DEPTH REFERENCE : RKB=GL/Elevation=4640'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 10/17/2016 / 15:52

Lat/Long Obtained By Handheld GPS at Wellhead
 North Reference: Grid
 Denver, Colorado
 303-853-4976

Surveyor: Jason Kinchelow / Larson Fairmeadows 6-30

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	0.374	185.961	99.999	-0.325	-0.034	-0.325	0.326	185.961	0.374
200.000	0.492	186.277	199.996	-1.076	-0.115	-1.076	1.082	186.087	0.118
300.000	0.451	202.552	299.993	-1.866	-0.313	-1.866	1.892	189.507	0.140
400.000	0.369	217.773	399.991	-2.484	-0.661	-2.484	2.570	194.895	0.135
500.000	0.243	201.309	499.989	-2.936	-0.935	-2.936	3.081	197.666	0.153
600.000	0.141	206.260	599.989	-3.244	-1.067	-3.244	3.415	198.201	0.103
700.000	0.134	183.751	699.988	-3.471	-1.129	-3.471	3.650	198.016	0.054
800.000	0.081	41.547	799.988	-3.535	-1.090	-3.535	3.699	197.136	0.203
900.000	0.155	355.658	899.988	-3.348	-1.053	-3.348	3.509	197.469	0.115
1000.000	0.198	35.734	999.988	-3.072	-0.963	-3.072	3.219	197.397	0.128
1100.000	0.045	233.415	1099.987	-2.955	-0.893	-2.955	3.087	196.818	0.242
1200.000	0.112	89.783	1199.987	-2.978	-0.827	-2.978	3.091	195.516	0.151
1300.000	0.016	193.771	1299.987	-2.991	-0.732	-2.991	3.080	193.751	0.117

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
1400.000	0.096	142.324	1399.987	-3.071	-0.684	-3.071	3.146	192.559	0.087
1500.000	0.196	357.062	1499.987	-2.966	-0.642	-2.966	3.035	192.209	0.281
1600.000	0.534	318.343	1599.985	-2.447	-0.960	-2.447	2.628	201.429	0.400
1700.000	0.590	261.267	1699.981	-2.177	-1.779	-2.177	2.811	219.254	0.539
1800.000	0.662	225.606	1799.975	-2.659	-2.700	-2.659	3.790	225.440	0.390
1900.000	0.747	203.910	1899.968	-3.659	-3.378	-3.659	4.980	222.707	0.278
2000.000	0.704	204.822	1999.960	-4.813	-3.900	-4.813	6.194	219.017	0.044
2100.000	0.621	204.622	2099.953	-5.863	-4.383	-5.863	7.321	216.782	0.083
2200.000	0.406	244.226	2199.949	-6.510	-4.929	-6.510	8.166	217.128	0.403
2300.000	0.579	216.006	2299.946	-7.073	-5.545	-7.073	8.987	218.095	0.292
2400.000	0.956	221.287	2399.937	-8.108	-6.392	-8.108	10.325	218.250	0.383
2500.000	0.807	233.396	2499.925	-9.155	-7.507	-9.155	11.839	219.354	0.237
2600.000	0.878	259.576	2599.914	-9.713	-8.826	-9.713	13.124	222.261	0.388
2700.000	1.025	275.797	2699.901	-9.761	-10.470	-9.761	14.314	227.005	0.306
2800.000	0.969	282.867	2799.886	-9.483	-12.184	-9.483	15.439	232.107	0.135
2900.000	0.975	288.636	2899.871	-9.022	-13.815	-9.022	16.500	236.852	0.098
3000.000	0.654	301.005	2999.861	-8.456	-15.110	-8.456	17.316	240.767	0.364
3100.000	0.118	286.280	3099.859	-8.134	-15.698	-8.134	17.680	242.610	0.541
3200.000	0.388	147.786	3199.858	-8.391	-15.616	-8.391	17.728	241.750	0.482
3300.000	0.856	155.964	3299.852	-9.360	-15.132	-9.360	17.793	238.262	0.475
3400.000	1.500	171.723	3399.830	-11.337	-14.639	-11.337	18.516	232.245	0.715
3500.000	1.714	195.306	3499.792	-14.074	-14.845	-14.074	20.457	226.527	0.689
3600.000	1.658	182.997	3599.749	-16.961	-15.316	-16.961	22.853	222.082	0.366
3700.000	1.736	183.005	3699.705	-19.918	-15.471	-19.918	25.220	217.837	0.078
3800.000	1.767	193.538	3799.659	-22.929	-15.911	-22.929	27.909	214.758	0.323
3900.000	1.950	200.143	3899.606	-26.025	-16.858	-26.025	31.007	212.933	0.282
4000.000	2.278	206.973	3999.538	-29.393	-18.345	-29.393	34.648	211.969	0.413
4100.000	2.448	217.642	4099.454	-32.855	-20.550	-32.855	38.753	212.026	0.471
4200.000	2.360	220.639	4199.366	-36.109	-23.196	-36.109	42.917	212.716	0.154
4300.000	1.005	209.329	4299.320	-38.435	-24.966	-38.435	45.832	213.006	1.389
4400.000	0.355	208.980	4399.313	-39.470	-25.546	-39.470	47.016	212.911	0.650
4500.000	0.404	175.776	4499.311	-40.093	-25.670	-40.093	47.606	212.630	0.222
4600.000	0.363	104.826	4599.309	-40.525	-25.338	-40.525	47.795	212.015	0.446
4700.000	0.667	87.863	4699.305	-40.585	-24.451	-40.585	47.381	211.067	0.337

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
4800.000	0.838	121.349	4799.297	-40.944	-23.245	-40.944	47.082	209.585	0.464
4900.000	1.133	134.013	4899.282	-42.011	-21.909	-42.011	47.381	207.542	0.365
5000.000	1.336	149.408	4999.259	-43.701	-20.604	-43.701	48.315	205.243	0.387
5100.000	1.624	154.463	5099.226	-45.983	-19.400	-45.983	49.908	202.875	0.316
5200.000	1.523	149.538	5199.188	-48.407	-18.116	-48.407	51.686	200.518	0.169
5300.000	1.213	116.283	5299.161	-50.021	-16.493	-50.021	52.670	198.249	0.837
5400.000	1.946	103.267	5399.123	-50.879	-13.891	-50.879	52.742	195.271	0.812
5500.000	1.558	104.092	5499.076	-51.600	-10.920	-51.600	52.743	191.949	0.389
5600.000	1.600	125.166	5599.038	-52.735	-8.460	-52.735	53.409	189.114	0.579
5700.000	1.547	116.251	5699.001	-54.136	-6.109	-54.136	54.480	186.438	0.250
5800.000	1.564	135.859	5798.965	-55.712	-3.948	-55.712	55.852	184.054	0.530
5900.000	1.601	107.331	5898.928	-57.108	-1.664	-57.108	57.132	181.669	0.781
6000.000	1.614	97.265	5998.889	-57.702	1.067	-57.702	57.712	178.941	0.282
6100.000	2.173	108.796	6098.834	-58.491	4.259	-58.491	58.646	175.836	0.673
6200.000	2.243	116.767	6198.760	-59.983	7.800	-59.983	60.488	172.591	0.315
6300.000	2.398	114.667	6298.678	-61.737	11.448	-61.737	62.790	169.495	0.177
6400.000	2.499	109.559	6398.587	-63.340	15.404	-63.340	65.186	166.332	0.241
6500.000	2.316	124.021	6498.500	-65.200	19.133	-65.200	67.950	163.646	0.633
6600.000	2.120	116.008	6598.425	-67.142	22.469	-67.142	70.802	161.497	0.366
6650.000	2.259	117.664	6648.389	-68.005	24.173	-68.005	72.173	160.431	0.307