



Company/Rig: Noble Energy Inc/Production  
WELL/API#: WPF III A18-7/05-123-26642  
DECLINATION: 8.18 Degrees  
TD AS DRILLED: 7104 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.48782, Longitude: -104.59080  
Grid North = True North -0.59 degs (NAD 27)  
Grid Correction Applied = -0.59 degs



DEPTH REFERENCE : RKB=GL/Elevation=4669'

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 11/28/2016 / 13:39

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / WPF III A18-7

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	0.132	264.259	100.000	-0.012	-0.115	-0.012	0.115	264.259	0.132
200.000	0.056	300.253	200.000	0.001	-0.272	0.001	0.272	270.277	0.093
300.000	0.062	292.010	300.000	0.046	-0.364	0.046	0.367	277.213	0.011
400.000	0.048	136.640	400.000	0.036	-0.385	0.036	0.387	275.332	0.107
500.000	0.110	168.847	500.000	-0.089	-0.338	-0.089	0.349	255.257	0.074
600.000	0.468	136.886	599.998	-0.482	-0.040	-0.482	0.483	184.744	0.379
700.000	0.416	150.141	699.995	-1.095	0.420	-1.095	1.173	159.008	0.114
800.000	0.453	148.060	799.992	-1.746	0.810	-1.746	1.925	155.102	0.040
900.000	0.576	143.931	899.988	-2.488	1.316	-2.488	2.815	152.130	0.129
1000.000	0.470	120.354	999.984	-3.102	1.966	-3.102	3.672	147.639	0.238
1100.000	0.662	127.228	1099.979	-3.659	2.779	-3.659	4.594	142.779	0.204
1200.000	0.656	113.999	1199.973	-4.241	3.762	-4.241	5.669	138.424	0.152
1300.000	0.685	113.388	1299.966	-4.711	4.833	-4.711	6.749	134.264	0.030
1400.000	0.534	117.671	1399.960	-5.165	5.795	-5.165	7.762	131.708	0.157
1500.000	0.351	99.512	1499.957	-5.432	6.510	-5.432	8.479	129.841	0.229
1600.000	0.180	89.448	1599.956	-5.481	6.969	-5.481	8.866	128.184	0.177

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	0.330	82.745	1699.955	-5.443	7.411	-5.443	9.195	126.296	0.153
1800.000	0.606	80.481	1799.952	-5.319	8.218	-5.319	9.789	122.915	0.277
1900.000	0.702	65.438	1899.945	-4.977	9.296	-4.977	10.545	118.165	0.196
2000.000	0.600	44.988	1999.939	-4.353	10.223	-4.353	11.111	113.063	0.252
2100.000	0.084	27.871	2099.937	-3.918	10.627	-3.918	11.327	110.236	0.520
2200.000	0.537	158.644	2199.935	-4.290	10.832	-4.290	11.651	111.603	0.595
2300.000	0.869	168.705	2299.928	-5.470	11.152	-5.470	12.421	116.127	0.352
2400.000	0.846	190.247	2399.917	-6.940	11.169	-6.940	13.149	121.855	0.321
2500.000	1.058	183.195	2499.903	-8.588	10.986	-8.588	13.944	128.016	0.242
2600.000	1.046	172.542	2599.886	-10.415	11.053	-10.415	15.187	133.298	0.196
2700.000	1.106	179.367	2699.869	-12.285	11.182	-12.285	16.612	137.691	0.141
2800.000	1.100	181.433	2799.850	-14.210	11.169	-14.210	18.073	141.832	0.040
2900.000	1.148	180.622	2899.831	-16.171	11.134	-16.171	19.634	145.453	0.051
3000.000	1.541	180.693	2999.803	-18.518	11.107	-18.518	21.593	149.046	0.392
3100.000	0.641	184.565	3099.784	-20.420	11.046	-20.420	23.216	151.590	0.902
3200.000	0.635	273.210	3199.780	-20.947	10.448	-20.947	23.408	153.490	0.892
3300.000	1.326	276.598	3299.765	-20.783	8.746	-20.783	22.548	157.178	0.693
3400.000	2.295	280.771	3399.714	-20.276	5.630	-20.276	21.043	164.482	0.977
3500.000	3.211	278.583	3499.597	-19.484	0.894	-19.484	19.504	177.372	0.922
3600.000	3.570	275.458	3599.422	-18.770	-4.974	-18.770	19.417	194.842	0.404
3700.000	3.641	279.306	3699.224	-17.960	-11.207	-17.960	21.170	211.963	0.252
3800.000	3.569	277.849	3799.026	-17.021	-17.424	-17.021	24.358	225.669	0.117
3900.000	3.362	276.151	3898.844	-16.282	-23.422	-16.282	28.526	235.195	0.231
4000.000	2.834	277.520	3998.697	-15.644	-28.789	-15.644	32.765	241.479	0.534
4100.000	2.653	272.762	4098.583	-15.209	-33.551	-15.209	36.838	245.614	0.290
4200.000	1.985	263.715	4198.500	-15.287	-37.585	-15.287	40.575	247.866	0.760
4300.000	1.630	268.133	4298.451	-15.523	-40.728	-15.523	43.586	249.136	0.382
4400.000	1.405	276.028	4398.416	-15.441	-43.368	-15.441	46.035	250.402	0.306
4500.000	1.330	254.780	4498.388	-15.617	-45.707	-15.617	48.302	251.136	0.510
4600.000	1.103	262.343	4598.365	-16.050	-47.781	-16.050	50.405	251.433	0.277
4700.000	0.630	252.095	4698.353	-16.347	-49.258	-16.347	51.900	251.641	0.497
4800.000	0.714	255.001	4798.347	-16.677	-50.383	-16.677	53.071	251.685	0.091
4900.000	0.628	245.625	4898.340	-17.065	-51.484	-17.065	54.239	251.662	0.139
5000.000	0.061	258.906	4998.338	-17.301	-52.036	-17.301	54.837	251.609	0.569
5100.000	0.454	249.677	5098.336	-17.449	-52.460	-17.449	55.286	251.602	0.394
5200.000	0.551	253.886	5198.332	-17.720	-53.294	-17.720	56.163	251.608	0.104
5300.000	0.539	228.545	5298.328	-18.165	-54.108	-18.165	57.076	251.442	0.239
5400.000	0.431	196.725	5398.325	-18.836	-54.569	-18.836	57.728	250.956	0.285
5500.000	1.023	195.201	5498.316	-20.057	-54.911	-20.057	58.460	249.934	0.593

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	1.872	176.489	5598.284	-22.549	-55.045	-22.549	59.485	247.723	0.961
5700.000	1.889	168.734	5698.230	-25.796	-54.623	-25.796	60.408	244.721	0.255
5800.000	2.086	153.203	5798.171	-29.037	-53.480	-29.037	60.855	241.500	0.571
5900.000	4.901	140.349	5897.976	-33.952	-49.933	-33.952	60.383	235.787	2.905
6000.000	5.460	135.605	5997.568	-40.640	-43.879	-40.640	59.808	227.195	0.704
6100.000	4.490	133.547	6097.190	-46.736	-37.713	-46.736	60.055	218.901	0.986
6200.000	3.519	133.986	6196.945	-51.565	-32.668	-51.565	61.042	212.356	0.972
6300.000	1.318	112.386	6296.851	-54.134	-29.396	-54.134	61.601	208.503	2.344
6400.000	0.378	102.390	6396.839	-54.643	-28.011	-54.643	61.404	207.140	0.948
6500.000	0.559	187.372	6496.837	-55.197	-27.751	-55.197	61.781	206.692	0.646
6600.000	0.649	154.212	6596.831	-56.190	-27.568	-56.190	62.589	206.133	0.355
6700.000	0.193	142.613	6696.828	-56.834	-27.219	-56.834	63.016	205.590	0.461
6800.000	1.055	124.048	6796.821	-57.484	-26.353	-57.484	63.237	204.629	0.874
6850.000	1.059	100.401	6846.813	-57.825	-25.517	-57.825	63.205	203.811	0.866