



Company/Rig: Noble Energy Inc/Production
 WELL/API#: Winters 10-19/05-123-13569
 DECLINATION: 8.24
 TD AS DRILLED: 7071'
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.46968, Longitude: -104.59145
 Grid North = True North -0.59 degs (NAD 27)
 Grid Correction Applied = -0.59 degs



FIELD COPY ONLY (NOT DEFINITIVE)

DEPTH REFERENCE : RKB=GL/Elevation=4680'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 5/6/2016 / 16:21

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid
 Denver, Colorado
 303-853-4976
 Jason Kinchelow

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	0.201	138.961	100.000	-0.132	0.115	-0.132	0.175	138.961	0.201
200.000	0.091	244.920	200.000	-0.298	0.158	-0.298	0.338	152.060	0.243
300.000	0.420	252.550	299.998	-0.442	-0.263	-0.442	0.514	210.765	0.329
400.000	0.808	266.339	399.993	-0.597	-1.316	-0.597	1.445	245.607	0.413
500.000	0.909	269.130	499.981	-0.654	-2.813	-0.654	2.888	256.913	0.109
600.000	1.086	265.990	599.966	-0.732	-4.551	-0.732	4.609	260.861	0.185
700.000	1.170	267.513	699.947	-0.843	-6.517	-0.843	6.571	262.632	0.090
800.000	1.285	269.520	799.924	-0.896	-8.658	-0.896	8.705	264.089	0.122
900.000	1.338	272.556	899.898	-0.854	-10.946	-0.854	10.979	265.540	0.087
1000.000	1.359	277.397	999.870	-0.649	-13.288	-0.649	13.304	267.204	0.116
1100.000	1.515	288.129	1099.839	-0.085	-15.721	-0.085	15.721	269.691	0.311
1200.000	1.718	298.513	1199.799	1.042	-18.294	1.042	18.324	273.260	0.355
1300.000	2.032	301.440	1299.745	2.682	-21.124	2.682	21.294	277.237	0.329
1400.000	2.212	299.204	1399.677	4.549	-24.322	4.549	24.743	280.594	0.198
1500.000	2.415	303.126	1499.595	6.642	-27.771	6.642	28.554	283.451	0.258
1600.000	2.573	308.057	1599.501	9.177	-31.303	9.177	32.621	286.340	0.266
1700.000	2.546	316.608	1699.401	12.175	-34.596	12.175	36.676	289.388	0.382
1800.000	2.851	322.222	1799.290	15.754	-37.645	15.754	40.809	292.709	0.403
1900.000	3.067	316.344	1899.157	19.655	-41.015	19.655	45.482	295.604	0.372
2000.000	3.332	324.910	1999.002	23.968	-44.533	23.968	50.573	298.290	0.546
2100.000	3.454	324.745	2098.827	28.806	-47.942	28.806	55.931	301.000	0.122
2200.000	3.547	328.484	2198.640	33.903	-51.298	33.903	61.489	303.461	0.246
2300.000	3.550	331.030	2298.448	39.249	-54.414	39.249	67.092	305.803	0.158
2400.000	3.774	329.201	2398.244	44.784	-57.599	44.784	72.961	307.866	0.253
2500.000	3.785	330.336	2498.027	50.480	-60.918	50.480	79.115	309.647	0.076
2600.000	3.936	331.926	2597.800	56.376	-64.166	56.376	85.414	311.302	0.185
2700.000	4.121	332.135	2697.553	62.581	-67.461	62.581	92.018	312.851	0.186
2800.000	4.381	330.487	2797.278	69.081	-71.022	69.081	99.077	314.206	0.287
2900.000	4.589	335.050	2896.972	76.032	-74.591	76.032	106.511	315.548	0.413
3000.000	4.586	335.985	2996.651	83.310	-77.905	83.310	114.060	316.920	0.075
3100.000	4.753	334.904	3096.319	90.713	-81.289	90.713	121.806	318.136	0.189
3200.000	4.845	337.336	3195.969	98.362	-84.673	98.362	129.787	319.277	0.223
3300.000	4.738	338.123	3295.619	106.091	-87.839	106.091	137.736	320.377	0.126

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
3400.000	5.209	340.052	3395.243	114.191	-90.927	114.191	145.970	321.471	0.500
3500.000	5.365	339.914	3494.817	122.848	-94.081	122.848	154.735	322.554	0.157
3600.000	5.499	340.218	3594.368	131.748	-97.308	131.748	163.788	323.551	0.137
3700.000	5.965	342.570	3693.868	141.214	-100.486	141.214	173.317	324.565	0.522
3800.000	6.225	345.654	3793.303	151.424	-103.386	151.424	183.352	325.676	0.418
3900.000	6.288	344.623	3892.707	161.956	-106.182	161.956	193.661	326.750	0.129
4000.000	6.209	343.867	3992.113	172.432	-109.136	172.432	204.067	327.669	0.114
4100.000	6.474	344.648	4091.501	183.063	-112.132	183.063	214.676	328.511	0.278
4200.000	6.150	344.239	4190.895	193.654	-115.079	193.654	225.267	329.279	0.327
4300.000	5.609	345.273	4290.369	203.536	-117.776	203.536	235.155	329.944	0.551
4400.000	5.343	346.065	4389.912	212.781	-120.140	212.781	244.355	330.550	0.276
4500.000	5.146	347.917	4489.494	221.686	-122.200	221.686	253.135	331.135	0.260
4600.000	5.203	348.539	4589.086	230.515	-124.040	230.515	261.769	331.715	0.080
4700.000	4.602	349.757	4688.720	238.907	-125.654	238.907	269.936	332.258	0.610
4800.000	4.263	353.045	4788.421	246.544	-126.817	246.544	277.248	332.780	0.424
4900.000	4.045	350.574	4888.158	253.713	-127.845	253.713	284.103	333.257	0.281
5000.000	3.873	346.209	4987.920	260.473	-129.228	260.473	290.768	333.613	0.347
5100.000	3.828	348.477	5087.694	267.024	-130.700	267.024	297.295	333.920	0.159
5200.000	3.751	346.302	5187.475	273.473	-132.142	273.473	303.725	334.210	0.163
5300.000	3.350	341.502	5287.283	279.421	-133.843	279.421	309.823	334.406	0.499
5400.000	2.775	347.024	5387.140	284.551	-135.313	284.551	315.086	334.567	0.645
5500.000	2.338	339.734	5487.041	288.824	-136.564	288.824	319.482	334.694	0.544
5600.000	1.838	338.781	5586.974	292.233	-137.851	292.233	323.114	334.746	0.502
5700.000	1.519	320.409	5686.932	294.749	-139.276	294.749	325.998	334.708	0.621
5800.000	1.515	321.868	5786.897	296.810	-140.937	296.810	328.571	334.600	0.039
5900.000	0.895	341.179	5886.875	298.588	-142.005	298.588	330.636	334.565	0.733
6000.000	1.002	323.690	5986.861	300.032	-142.774	300.032	332.270	334.552	0.307
6100.000	0.819	283.247	6086.849	300.900	-143.987	300.900	333.576	334.428	0.652
6200.000	0.731	309.023	6186.841	301.465	-145.179	301.465	334.601	334.286	0.356
6300.000	0.579	272.496	6286.834	301.889	-146.179	301.889	335.418	334.163	0.435
6400.000	0.594	268.109	6386.829	301.894	-147.202	301.894	335.869	334.006	0.047
6500.000	0.602	304.841	6486.824	302.177	-148.152	302.177	336.541	333.882	0.377
6600.000	0.975	324.620	6586.815	303.171	-149.076	303.171	337.840	333.816	0.457
6700.000	0.937	337.981	6686.801	304.622	-149.875	304.622	339.496	333.803	0.226
6800.000	1.168	23.587	6786.786	306.315	-149.773	306.315	340.970	333.944	0.843
HORIZONTAL DISPLACEMENT IS 340.970 FEET AT 333.944 DEGREES									