



Company/Rig: Noble Energy/ CoreTech  
WELL/API#: Amigo 17-24/05-123-18485  
DECLINATION: 8.21 Degrees  
TD AS DRILLED: 7166 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.48742, Longitude: -104.57634  
Grid North = True North -0.60 degs (NAD 27)  
Grid Correction Applied = -0.60 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4761 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 8/10/2016 / 15:38

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt / Amigo 17-24

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	0.256	356.693	100.000	0.223	-0.013	0.223	0.223	356.693	0.256
200.000	0.489	15.266	199.998	0.858	0.087	0.858	0.862	5.768	0.260
300.000	0.338	358.682	299.995	1.565	0.192	1.565	1.577	7.007	0.191
400.000	0.500	3.880	399.992	2.295	0.215	2.295	2.305	5.354	0.166
500.000	0.478	346.234	499.989	3.135	0.145	3.135	3.138	2.655	0.151
600.000	0.529	4.839	599.985	4.000	0.085	4.000	4.001	1.220	0.171
700.000	0.384	345.374	699.982	4.784	0.039	4.784	4.785	0.473	0.211
800.000	0.411	1.493	799.979	5.467	-0.036	5.467	5.467	359.625	0.114
900.000	0.413	339.816	899.977	6.163	-0.151	6.163	6.165	358.598	0.155
1000.000	0.325	320.599	999.975	6.721	-0.455	6.721	6.736	356.124	0.151
1100.000	0.248	284.412	1099.974	6.994	-0.845	6.994	7.045	353.111	0.193
1200.000	0.075	330.287	1199.973	7.105	-1.087	7.105	7.188	351.301	0.203
1300.000	0.343	292.448	1299.972	7.277	-1.397	7.277	7.410	349.135	0.287
1400.000	0.308	294.817	1399.971	7.504	-1.917	7.504	7.745	345.666	0.038
1500.000	0.341	301.864	1499.969	7.774	-2.414	7.774	8.140	342.747	0.052
1600.000	0.436	340.835	1599.967	8.290	-2.792	8.290	8.748	341.387	0.274

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	0.226	9.799	1699.965	8.844	-2.883	8.844	9.302	341.943	0.262
1800.000	0.349	29.744	1799.964	9.302	-2.699	9.302	9.686	343.823	0.157
1900.000	0.446	4.288	1899.962	9.955	-2.518	9.955	10.269	345.804	0.199
2000.000	0.207	49.703	1999.960	10.460	-2.351	10.460	10.721	347.330	0.335
2100.000	0.090	132.253	2099.960	10.524	-2.155	10.524	10.742	348.425	0.215
2200.000	0.623	198.418	2199.958	9.955	-2.269	9.955	10.210	347.160	0.593
2300.000	0.807	185.109	2299.950	8.737	-2.504	8.737	9.089	344.011	0.246
2400.000	0.952	196.627	2399.938	7.240	-2.804	7.240	7.764	338.827	0.228
2500.000	1.066	189.497	2499.923	5.525	-3.195	5.525	6.383	329.959	0.169
2600.000	1.087	187.187	2599.905	3.667	-3.468	3.667	5.047	316.598	0.048
2700.000	0.819	198.964	2699.891	2.050	-3.819	2.050	4.334	298.224	0.330
2800.000	0.749	202.379	2799.882	0.769	-4.300	0.769	4.368	280.139	0.084
2900.000	0.618	227.187	2899.875	-0.202	-4.944	-0.202	4.948	267.661	0.320
3000.000	0.649	224.275	2999.869	-0.974	-5.735	-0.974	5.817	260.363	0.045
3100.000	0.564	245.255	3099.863	-1.585	-6.578	-1.585	6.766	256.448	0.236
3200.000	0.658	270.612	3199.858	-1.785	-7.599	-1.785	7.806	256.778	0.284
3300.000	0.606	296.408	3299.852	-1.544	-8.648	-1.544	8.784	259.876	0.287
3400.000	0.062	116.880	3399.850	-1.333	-9.073	-1.333	9.170	261.639	0.668
3500.000	0.762	142.425	3499.847	-1.885	-8.619	-1.885	8.823	257.664	0.706
3600.000	1.231	142.232	3599.832	-3.261	-7.555	-3.261	8.229	246.651	0.469
3700.000	1.419	127.658	3699.805	-4.867	-5.917	-4.867	7.662	230.558	0.384
3800.000	1.324	138.450	3799.777	-6.489	-4.170	-6.489	7.713	212.729	0.275
3900.000	1.643	139.617	3899.743	-8.445	-2.475	-8.445	8.800	196.336	0.320
4000.000	1.547	143.328	3999.704	-10.619	-0.741	-10.619	10.645	183.989	0.141
4100.000	0.887	118.062	4099.682	-12.066	0.749	-12.066	12.089	176.450	0.835
4200.000	1.225	110.811	4199.665	-12.810	2.431	-12.810	13.039	169.254	0.363
4300.000	1.238	107.211	4299.642	-13.509	4.462	-13.509	14.227	161.722	0.078
4400.000	1.176	97.072	4399.620	-13.955	6.512	-13.955	15.400	154.984	0.222
4500.000	1.080	96.098	4499.600	-14.182	8.467	-14.182	16.517	149.160	0.098
4600.000	1.095	115.493	4599.583	-14.693	10.267	-14.693	17.925	145.055	0.367
4700.000	1.214	148.872	4699.563	-16.011	11.677	-16.011	19.817	143.896	0.673
4800.000	1.325	142.940	4799.539	-17.840	12.921	-17.840	22.028	144.085	0.172
4900.000	1.364	147.436	4899.512	-19.765	14.258	-19.765	24.371	144.194	0.112
5000.000	1.576	142.407	4999.479	-21.858	15.738	-21.858	26.934	144.246	0.248
5100.000	1.203	165.256	5099.450	-23.963	16.844	-23.963	29.290	144.896	0.660
5200.000	0.694	217.014	5199.437	-25.462	16.746	-25.462	30.475	146.667	0.947
5300.000	0.838	258.984	5299.429	-26.085	15.664	-26.085	30.427	149.016	0.565
5400.000	0.911	241.636	5399.418	-26.602	14.246	-26.602	30.177	151.830	0.273
5500.000	1.312	247.837	5499.399	-27.412	12.487	-27.412	30.122	155.509	0.418

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	1.442	254.861	5599.370	-28.172	10.213	-28.172	29.966	160.073	0.213
5700.000	1.166	235.048	5699.344	-29.084	8.164	-29.084	30.208	164.319	0.524
5800.000	0.950	230.531	5799.327	-30.193	6.690	-30.193	30.926	167.506	0.232
5900.000	1.080	212.467	5899.312	-31.515	5.545	-31.515	31.999	170.022	0.343
6000.000	0.750	187.604	5999.299	-32.959	4.952	-32.959	33.329	171.455	0.509
6100.000	0.803	172.571	6099.290	-34.303	4.956	-34.303	34.659	171.778	0.210
6200.000	0.871	165.917	6199.280	-35.735	5.232	-35.735	36.116	171.671	0.118
6300.000	0.566	171.538	6299.272	-36.961	5.490	-36.961	37.367	171.552	0.312
6400.000	0.709	162.756	6399.265	-38.041	5.746	-38.041	38.473	171.411	0.173
6500.000	0.299	193.281	6499.261	-38.886	5.869	-38.886	39.327	171.417	0.477
6600.000	0.507	175.124	6599.259	-39.581	5.847	-39.581	40.011	171.597	0.242
6700.000	0.659	224.156	6699.254	-40.435	5.484	-40.435	40.805	172.277	0.503
6800.000	0.821	217.153	6799.246	-41.419	4.650	-41.419	41.679	173.594	0.185
6850.000	0.604	187.539	6849.242	-41.965	4.400	-41.965	42.195	174.015	0.840