



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Thrall USX AA 19-11/05-123-27051
DECLINATION: 8.24 Degrees
TD AS DRILLED: 6931 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.46965, Longitude: -104.48147
Grid North = True North -0.66 degs (NAD 27)
Grid Convergence Applied = -0.66 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4650 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 10/13/2015 / 10:07

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976
Surveyor: Sean Bratt / Thrall USX AA 19-11

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	0.145	306.781	100.000	0.076	-0.101	0.076	0.127	306.781	0.145
200.000	0.040	81.339	200.000	0.157	-0.169	0.157	0.230	312.940	0.175
300.000	0.164	77.869	300.000	0.192	0.006	0.192	0.192	1.682	0.124
400.000	0.164	36.894	399.999	0.336	0.231	0.336	0.408	34.508	0.115
500.000	0.012	172.353	499.999	0.440	0.318	0.440	0.543	35.863	0.172
600.000	0.123	6.485	599.999	0.537	0.332	0.537	0.631	31.727	0.134
700.000	0.163	199.191	699.999	0.509	0.297	0.509	0.589	30.286	0.284
800.000	0.852	181.440	799.994	-0.369	0.232	-0.369	0.436	147.872	0.698
900.000	0.981	199.190	899.982	-1.921	-0.068	-1.921	1.922	182.041	0.310
1000.000	0.981	196.830	999.967	-3.548	-0.598	-3.548	3.598	189.561	0.040
1100.000	0.827	197.129	1099.955	-5.057	-1.058	-5.057	5.166	191.816	0.154
1200.000	0.622	199.051	1199.947	-6.260	-1.448	-6.260	6.425	193.022	0.206
1300.000	0.543	168.505	1299.942	-7.237	-1.531	-7.237	7.398	191.942	0.316
1400.000	0.412	188.368	1399.938	-8.058	-1.489	-8.058	8.194	190.467	0.209
1500.000	0.375	165.775	1499.936	-8.731	-1.461	-8.731	8.852	189.497	0.159
1600.000	0.769	169.103	1599.931	-9.707	-1.253	-9.707	9.787	187.358	0.395
1700.000	0.395	210.303	1699.926	-10.663	-1.300	-10.663	10.742	186.953	0.539
1800.000	1.075	213.798	1799.917	-11.739	-1.996	-11.739	11.908	189.648	0.681

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
1900.000	0.745	204.629	1899.904	-13.110	-2.788	-13.110	13.403	192.008	0.359
2000.000	1.379	227.868	1999.887	-14.508	-3.952	-14.508	15.036	195.237	0.754
2100.000	1.261	211.059	2099.861	-16.257	-5.412	-16.257	17.134	198.411	0.403
2200.000	1.289	215.961	2199.836	-18.110	-6.639	-18.110	19.289	200.134	0.113
2300.000	1.249	225.512	2299.812	-19.784	-8.077	-19.784	21.369	202.209	0.215
2400.000	1.190	217.726	2399.789	-21.369	-9.490	-21.369	23.382	203.946	0.176
2500.000	1.238	209.662	2499.767	-23.130	-10.661	-23.130	25.468	204.745	0.177
2600.000	1.193	220.447	2599.744	-24.861	-11.871	-24.861	27.549	205.524	0.233
2700.000	1.056	220.706	2699.725	-26.352	-13.147	-26.352	29.449	206.515	0.136
2800.000	1.052	236.288	2799.708	-27.560	-14.512	-27.560	31.148	207.770	0.286
2900.000	0.938	227.665	2899.693	-28.621	-15.881	-28.621	32.732	209.025	0.188
3000.000	0.799	241.652	2999.682	-29.504	-17.100	-29.504	34.101	210.096	0.253
3100.000	0.911	243.519	3099.671	-30.189	-18.425	-30.189	35.368	211.397	0.116
3200.000	0.364	280.653	3199.665	-30.485	-19.449	-30.485	36.161	212.538	0.659
3300.000	0.735	28.463	3299.662	-29.863	-19.456	-29.863	35.641	213.085	0.914
3400.000	1.518	39.362	3399.642	-28.274	-18.310	-28.274	33.685	212.927	0.809
3500.000	1.591	23.715	3499.605	-25.979	-16.912	-25.979	30.999	213.063	0.429
3600.000	1.566	29.296	3599.567	-23.517	-15.685	-23.517	28.267	213.702	0.156
3700.000	1.813	32.162	3699.524	-20.986	-14.174	-20.986	25.324	214.035	0.261
3800.000	1.809	33.287	3799.474	-18.327	-12.465	-18.327	22.164	214.222	0.036
3900.000	1.785	18.348	3899.425	-15.528	-11.108	-15.528	19.093	215.578	0.468
4000.000	1.325	10.263	3999.388	-12.912	-10.412	-12.912	16.587	218.882	0.509
4100.000	1.135	19.022	4099.365	-10.838	-9.883	-10.838	14.667	222.362	0.267
4200.000	0.721	22.658	4199.352	-9.320	-9.318	-9.320	13.179	224.992	0.418
4300.000	0.433	26.410	4299.347	-8.401	-8.907	-8.401	12.244	226.675	0.291
4400.000	0.188	62.905	4399.345	-7.988	-8.593	-7.988	11.732	227.091	0.303
4500.000	0.299	117.107	4499.344	-8.032	-8.215	-8.032	11.489	225.646	0.243
4600.000	0.498	276.987	4599.343	-8.098	-8.414	-8.098	11.678	226.097	0.785
4700.000	1.399	285.149	4699.329	-7.726	-10.024	-7.726	12.656	232.374	0.909
4800.000	2.309	291.694	4799.275	-6.663	-13.074	-6.663	14.674	242.996	0.933
4900.000	2.155	271.422	4899.201	-5.871	-16.826	-5.871	17.820	250.764	0.800
5000.000	2.013	257.876	4999.136	-6.194	-20.423	-6.194	21.341	253.129	0.511
5100.000	1.111	244.628	5099.098	-6.978	-23.017	-6.978	24.051	253.134	0.966
5200.000	1.283	197.430	5199.078	-8.462	-24.229	-8.462	25.664	250.748	0.972
5300.000	0.905	184.782	5299.060	-10.318	-24.630	-10.318	26.704	247.271	0.447
5400.000	0.741	183.344	5399.049	-11.750	-24.733	-11.750	27.382	244.590	0.166
5500.000	0.841	173.441	5499.040	-13.124	-24.687	-13.124	27.959	242.004	0.169
5600.000	0.349	139.342	5599.035	-14.085	-24.405	-14.085	28.178	240.009	0.586
5700.000	0.462	195.936	5699.032	-14.703	-24.317	-14.703	28.417	238.840	0.397
5800.000	0.225	313.141	5799.031	-14.956	-24.571	-14.956	28.765	238.671	0.599

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
5900.000	0.417	317.848	5899.030	-14.552	-24.959	-14.552	28.891	239.756	0.194
6000.000	0.595	305.066	5999.026	-13.984	-25.628	-13.984	29.195	241.382	0.209
6100.000	0.698	321.425	6099.019	-13.209	-26.433	-13.209	29.550	243.448	0.210
6200.000	0.723	328.636	6199.012	-12.194	-27.141	-12.194	29.755	245.807	0.093
6300.000	0.814	319.381	6299.003	-11.116	-27.932	-11.116	30.063	248.299	0.153
6400.000	0.825	306.789	6398.993	-10.146	-28.971	-10.146	30.696	250.699	0.180
6500.000	1.069	314.282	6498.979	-9.064	-30.215	-9.064	31.545	253.302	0.274
6600.000	0.901	321.270	6598.964	-7.799	-31.375	-7.799	32.330	256.041	0.206
6700.000	0.934	310.278	6698.951	-6.658	-32.489	-6.658	33.164	258.419	0.179