



Company/Rig: Noble Energy/ CoreTech  
WELL/API#: Thrall USX AA 19-25/05-123-26516  
DECLINATION: 8.24 Degrees  
TD AS DRILLED: 6895 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.46908, Longitude: -104.48504  
Grid North = True North -0.66 degs (NAD 27)  
Grid Convergence Applied = -0.66 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4647 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut  
Minimum Curvature Method  
Report Date/Time: 10/13/2015 / 10:38

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD  
NORTH REFERENCE: GRID  
HENDERSON, COLORADO  
303-853-4976

Surveyor: Sean Bratt / Thrall USX AA 19-25

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	0.309	39.911	100.000	0.207	0.173	0.207	0.269	39.911	0.309
200.000	0.277	120.246	199.999	0.291	0.554	0.291	0.626	62.281	0.378
300.000	0.155	37.980	299.998	0.276	0.847	0.276	0.891	71.921	0.299
400.000	0.492	51.693	399.996	0.649	1.267	0.649	1.424	62.861	0.343
500.000	0.808	83.849	499.990	0.991	2.305	0.991	2.509	66.729	0.471
600.000	0.884	105.183	599.979	0.865	3.750	0.865	3.849	77.015	0.322
700.000	0.811	98.985	699.968	0.552	5.194	0.552	5.223	83.932	0.117
800.000	1.242	114.177	799.952	-0.002	6.882	-0.002	6.882	90.020	0.506
900.000	0.338	117.285	899.942	-0.582	8.134	-0.582	8.155	94.091	0.905
1000.000	0.332	334.545	999.941	-0.456	8.272	-0.456	8.284	93.152	0.635
1100.000	0.155	2.404	1099.940	-0.059	8.153	-0.059	8.153	90.412	0.208
1200.000	0.120	292.846	1199.940	0.117	8.062	0.117	8.063	89.166	0.160
1300.000	0.042	337.737	1299.940	0.192	7.952	0.192	7.954	88.618	0.095
1400.000	0.107	291.397	1399.940	0.260	7.851	0.260	7.855	88.105	0.084
1500.000	0.010	44.951	1499.940	0.300	7.770	0.300	7.776	87.790	0.111
1600.000	0.062	348.661	1599.940	0.359	7.765	0.359	7.774	87.355	0.057
1700.000	0.077	168.893	1699.940	0.346	7.768	0.346	7.775	87.453	0.139
1800.000	0.030	341.682	1799.940	0.304	7.773	0.304	7.778	87.757	0.107

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	0.070	163.091	1899.940	0.271	7.782	0.271	7.787	88.005	0.099
2000.000	0.025	287.266	1999.940	0.220	7.779	0.220	7.782	88.383	0.086
2100.000	0.109	248.776	2099.940	0.192	7.669	0.192	7.672	88.569	0.091
2200.000	0.238	202.366	2199.939	-0.035	7.501	-0.035	7.501	90.267	0.181
2300.000	0.231	189.092	2299.938	-0.426	7.390	-0.426	7.403	93.301	0.055
2400.000	0.202	103.703	2399.938	-0.667	7.530	-0.667	7.560	95.065	0.295
2500.000	0.230	156.548	2499.937	-0.894	7.782	-0.894	7.833	96.551	0.194
2600.000	0.188	106.055	2599.937	-1.123	8.020	-1.123	8.098	97.974	0.183
2700.000	0.230	290.931	2699.936	-1.097	7.990	-1.097	8.065	97.818	0.418
2800.000	0.205	281.867	2799.936	-0.989	7.627	-0.989	7.691	97.385	0.043
2900.000	0.258	338.567	2899.935	-0.742	7.370	-0.742	7.407	95.749	0.225
3000.000	0.114	291.557	2999.934	-0.496	7.196	-0.496	7.213	93.942	0.199
3100.000	0.443	35.699	3099.933	-0.146	7.329	-0.146	7.330	91.139	0.483
3200.000	0.397	32.382	3199.931	0.461	7.740	0.461	7.753	86.594	0.052
3300.000	0.084	84.028	3299.930	0.761	7.999	0.761	8.035	84.566	0.351
3400.000	0.222	42.950	3399.929	0.910	8.204	0.910	8.254	83.667	0.168
3500.000	0.427	56.296	3499.928	1.259	8.646	1.259	8.737	81.714	0.217
3600.000	0.026	173.955	3599.927	1.444	8.959	1.444	9.074	80.846	0.440
3700.000	0.050	32.436	3699.927	1.458	8.984	1.458	9.102	80.783	0.072
3800.000	0.029	86.693	3799.927	1.496	9.033	1.496	9.156	80.596	0.040
3900.000	0.022	296.561	3899.927	1.506	9.041	1.506	9.165	80.542	0.049
4000.000	0.062	323.236	3999.927	1.558	8.991	1.558	9.125	80.168	0.044
4100.000	0.133	254.312	4099.927	1.570	8.846	1.570	8.985	79.934	0.125
4200.000	0.188	75.565	4199.927	1.580	8.893	1.580	9.033	79.927	0.321
4300.000	0.290	262.167	4299.926	1.586	8.802	1.586	8.944	79.784	0.477
4400.000	0.227	168.091	4399.926	1.358	8.592	1.358	8.699	81.021	0.381
4500.000	0.227	300.848	4499.925	1.265	8.463	1.265	8.557	81.497	0.417
4600.000	0.243	145.974	4599.925	1.191	8.411	1.191	8.495	81.939	0.459
4700.000	0.198	353.037	4699.925	1.187	8.509	1.187	8.591	82.057	0.429
4800.000	0.212	272.476	4799.924	1.367	8.303	1.367	8.414	80.650	0.266
4900.000	0.264	187.029	4899.924	1.147	8.089	1.147	8.170	81.933	0.325
5000.000	0.255	150.885	4999.923	0.723	8.169	0.723	8.201	84.939	0.161
5100.000	0.269	135.763	5099.922	0.361	8.441	0.361	8.449	87.552	0.070
5200.000	0.619	206.342	5199.919	-0.291	8.365	-0.291	8.370	91.993	0.587
5300.000	1.370	208.771	5299.903	-1.823	7.550	-1.823	7.767	103.572	0.752
5400.000	0.523	224.434	5399.889	-3.196	6.656	-3.196	7.383	115.650	0.878
5500.000	0.148	218.606	5499.887	-3.623	6.256	-3.623	7.229	120.077	0.375
5600.000	0.080	202.103	5599.887	-3.789	6.149	-3.789	7.222	121.640	0.075
5700.000	0.102	109.833	5699.887	-3.883	6.206	-3.883	7.321	122.036	0.132
5800.000	0.081	173.872	5799.887	-3.984	6.297	-3.984	7.451	122.320	0.098

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	0.050	324.129	5899.886	-4.019	6.279	-4.019	7.455	122.621	0.127
6000.000	0.117	340.198	5999.886	-3.888	6.219	-3.888	7.334	122.011	0.071
6100.000	0.129	294.251	6099.886	-3.745	6.082	-3.745	7.142	121.627	0.097
6200.000	0.253	167.341	6199.886	-3.914	6.027	-3.914	7.187	123.001	0.346
6300.000	0.128	46.187	6299.886	-4.052	6.156	-4.052	7.370	123.357	0.337
6400.000	0.230	122.674	6399.885	-4.084	6.405	-4.084	7.596	122.520	0.235
6500.000	0.436	175.600	6499.884	-4.571	6.603	-4.571	8.031	124.694	0.349
6600.000	0.192	106.438	6599.882	-4.998	6.793	-4.998	8.434	126.343	0.409
6650.000	0.094	68.700	6649.882	-5.007	6.912	-5.007	8.535	125.917	0.262