



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Thrall USX AA 19-12/05-123-27052
DECLINATION: 8.24 Degrees
TD AS DRILLED: 6918 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.47050, Longitude: -104.48733
Grid North = True North -0.65 degs (NAD 27)
Grid Convergence Applied = -0.65 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 / 10:23

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

Surveyor: Sean Bratt / Thrall USX AA 19-12

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	0.083	269.310	100.000	-0.001	-0.073	-0.001	0.073	269.310	0.083
200.000	0.025	174.579	200.000	-0.024	-0.143	-0.024	0.145	260.604	0.089
300.000	0.366	298.293	299.999	0.106	-0.422	0.106	0.435	284.047	0.381
400.000	0.226	39.143	399.998	0.410	-0.579	0.410	0.710	305.272	0.465
500.000	0.493	127.164	499.997	0.302	-0.112	0.302	0.322	339.687	0.535
600.000	0.515	165.179	599.993	-0.392	0.346	-0.392	0.523	138.565	0.329
700.000	0.704	158.092	699.988	-1.397	0.690	-1.397	1.558	153.698	0.204
800.000	0.706	172.041	799.980	-2.577	1.005	-2.577	2.766	158.696	0.171
900.000	0.173	286.436	899.978	-3.145	0.946	-3.145	3.284	163.265	0.793
1000.000	0.201	179.974	999.977	-3.278	0.801	-3.278	3.374	166.269	0.300
1100.000	0.178	146.502	1099.977	-3.583	0.887	-3.583	3.691	166.098	0.111
1200.000	0.085	213.429	1199.977	-3.774	0.932	-3.774	3.888	166.131	0.165
1300.000	0.083	98.048	1299.977	-3.846	0.963	-3.846	3.965	165.940	0.142
1400.000	0.085	348.871	1399.977	-3.784	1.021	-3.784	3.919	164.900	0.137
1500.000	0.072	133.186	1499.976	-3.754	1.052	-3.754	3.899	164.341	0.149
1600.000	0.059	257.851	1599.976	-3.808	1.048	-3.808	3.949	164.618	0.116
1700.000	0.070	38.503	1699.976	-3.771	1.035	-3.771	3.910	164.651	0.121
1800.000	0.032	326.649	1799.976	-3.700	1.058	-3.700	3.849	164.045	0.067

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	0.081	258.280	1899.976	-3.692	0.973	-3.692	3.818	165.233	0.076
2000.000	0.075	291.583	1999.976	-3.682	0.842	-3.682	3.777	167.112	0.045
2100.000	0.120	301.415	2099.976	-3.603	0.692	-3.603	3.669	169.131	0.048
2200.000	0.208	224.251	2199.976	-3.678	0.476	-3.678	3.709	172.630	0.216
2300.000	0.215	212.940	2299.975	-3.966	0.247	-3.966	3.974	176.434	0.042
2400.000	0.161	8.792	2399.975	-3.985	0.166	-3.985	3.988	177.607	0.368
2500.000	0.193	350.806	2499.974	-3.679	0.161	-3.679	3.683	177.495	0.064
2600.000	0.171	150.359	2599.974	-3.642	0.208	-3.642	3.648	176.736	0.358
2700.000	0.150	17.013	2699.974	-3.647	0.320	-3.647	3.661	174.989	0.295
2800.000	0.179	240.987	2799.974	-3.597	0.221	-3.597	3.604	176.478	0.305
2900.000	0.142	189.619	2899.974	-3.795	0.064	-3.795	3.796	179.034	0.143
3000.000	0.236	223.624	2999.973	-4.066	-0.099	-4.066	4.068	181.390	0.142
3100.000	0.174	332.189	3099.973	-4.081	-0.312	-4.081	4.093	184.368	0.335
3200.000	0.111	217.011	3199.972	-4.023	-0.441	-4.023	4.047	186.256	0.243
3300.000	0.071	133.573	3299.972	-4.143	-0.455	-4.143	4.168	186.262	0.125
3400.000	0.072	299.418	3399.972	-4.155	-0.465	-4.155	4.181	186.380	0.142
3500.000	0.020	48.220	3499.972	-4.112	-0.506	-4.112	4.143	187.017	0.081
3600.000	0.097	284.976	3599.972	-4.079	-0.575	-4.079	4.119	188.024	0.110
3700.000	0.102	46.982	3699.972	-3.996	-0.592	-3.996	4.040	188.427	0.174
3800.000	0.076	183.254	3799.972	-4.002	-0.531	-4.002	4.037	187.555	0.166
3900.000	0.070	161.383	3899.972	-4.126	-0.515	-4.126	4.158	187.116	0.028
4000.000	0.075	60.413	3999.972	-4.151	-0.439	-4.151	4.175	186.033	0.112
4100.000	0.150	195.158	4099.972	-4.245	-0.416	-4.245	4.266	185.598	0.210
4200.000	0.211	240.842	4199.971	-4.462	-0.611	-4.462	4.503	187.801	0.151
4300.000	0.182	124.431	4299.971	-4.641	-0.641	-4.641	4.685	187.866	0.334
4400.000	0.179	166.062	4399.971	-4.883	-0.473	-4.883	4.906	185.529	0.128
4500.000	0.277	33.805	4499.970	-4.834	-0.300	-4.834	4.843	183.556	0.419
4600.000	0.174	146.379	4599.970	-4.759	-0.082	-4.759	4.760	180.984	0.380
4700.000	0.185	257.463	4699.970	-4.921	-0.155	-4.921	4.923	181.809	0.296
4800.000	0.219	37.958	4799.969	-4.806	-0.196	-4.806	4.810	182.333	0.380
4900.000	0.189	229.765	4899.969	-4.761	-0.204	-4.761	4.766	182.454	0.405
5000.000	0.190	223.265	4999.969	-4.989	-0.444	-4.989	5.008	185.082	0.022
5100.000	0.125	149.082	5099.968	-5.203	-0.502	-5.203	5.227	185.508	0.197
5200.000	0.328	17.700	5199.968	-5.023	-0.359	-5.023	5.036	184.084	0.421
5300.000	0.624	75.922	5299.965	-4.618	0.257	-4.618	4.625	176.820	0.530
5400.000	0.269	125.412	5399.962	-4.622	0.976	-4.622	4.724	168.073	0.493
5500.000	0.172	121.224	5499.961	-4.836	1.296	-4.836	5.006	164.998	0.099
5600.000	0.098	235.949	5599.961	-4.961	1.353	-4.961	5.142	164.745	0.230
5700.000	0.038	143.093	5699.961	-5.035	1.302	-5.035	5.201	165.502	0.107
5800.000	0.115	22.510	5799.961	-4.969	1.360	-4.969	5.152	164.690	0.138

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	0.077	223.433	5899.961	-4.925	1.353	-4.925	5.107	164.640	0.189
6000.000	0.123	129.769	5999.961	-5.042	1.389	-5.042	5.230	164.595	0.149
6100.000	0.120	277.272	6099.961	-5.098	1.368	-5.098	5.278	164.980	0.233
6200.000	0.151	26.907	6199.960	-4.966	1.324	-4.966	5.140	165.076	0.223
6300.000	0.172	54.165	6299.960	-4.761	1.505	-4.761	4.993	162.453	0.079
6400.000	0.274	231.644	6399.960	-4.821	1.440	-4.821	5.031	163.374	0.446
6500.000	0.146	235.323	6499.959	-5.042	1.148	-5.042	5.171	167.177	0.129
6600.000	0.110	293.345	6599.959	-5.076	0.955	-5.076	5.165	169.344	0.128
6650.000	0.206	159.598	6649.959	-5.141	0.942	-5.141	5.227	169.613	0.585