



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Eckhardt 2/05-123-10786
DECLINATION: 8.17 Degrees
TD AS DRILLED: 6983 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.35036, Longitude: -104.55695
Grid North = True North -0.61 degs (NAD 27)
Grid Correction Applied = -0.61 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4680 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 9/27/2016 / 09:50

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976
Surveyor: Sean Bratt / Eckhardt 2

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	0.071	74.554	100.000	0.017	0.060	0.017	0.062	74.554	0.071
200.000	0.118	136.602	200.000	-0.042	0.191	-0.042	0.195	102.359	0.105
300.000	0.068	158.616	300.000	-0.172	0.283	-0.172	0.331	121.318	0.060
400.000	0.331	194.392	399.999	-0.508	0.233	-0.508	0.559	155.342	0.278
500.000	0.241	224.887	499.998	-0.936	0.013	-0.936	0.936	179.202	0.174
600.000	0.288	239.003	599.997	-1.214	-0.350	-1.214	1.264	196.090	0.080
700.000	0.313	247.714	699.995	-1.447	-0.818	-1.447	1.663	209.482	0.052
800.000	0.384	196.466	799.994	-1.872	-1.166	-1.872	2.206	211.915	0.308
900.000	0.481	201.992	899.991	-2.583	-1.418	-2.583	2.947	208.771	0.106
1000.000	0.496	206.412	999.987	-3.360	-1.768	-3.360	3.796	207.754	0.040
1100.000	0.519	200.967	1099.983	-4.170	-2.122	-4.170	4.679	206.975	0.053
1200.000	0.353	194.281	1199.980	-4.891	-2.360	-4.891	5.430	205.761	0.173
1300.000	0.396	242.381	1299.979	-5.349	-2.742	-5.349	6.011	207.142	0.308
1400.000	0.334	285.391	1399.977	-5.432	-3.329	-5.432	6.371	211.505	0.274
1500.000	0.434	296.619	1499.974	-5.185	-3.949	-5.185	6.517	217.291	0.124
1600.000	0.660	316.616	1599.970	-4.597	-4.682	-4.597	6.562	225.526	0.292

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	0.840	328.505	1699.961	-3.554	-5.461	-3.554	6.515	236.947	0.238
1800.000	0.861	328.092	1799.950	-2.290	-6.241	-2.290	6.648	249.850	0.022
1900.000	0.905	334.097	1899.939	-0.942	-6.983	-0.942	7.047	262.318	0.102
2000.000	0.918	332.670	1999.926	0.480	-7.696	0.480	7.711	273.569	0.027
2100.000	0.962	344.042	2099.912	1.999	-8.295	1.999	8.533	283.552	0.191
2200.000	0.937	350.480	2199.899	3.613	-8.661	3.613	9.385	292.645	0.110
2300.000	0.782	14.882	2299.888	5.079	-8.621	5.079	10.006	300.506	0.394
2400.000	1.023	15.378	2399.875	6.599	-8.209	6.599	10.533	308.797	0.241
2500.000	0.928	24.323	2499.861	8.198	-7.639	8.198	11.205	317.020	0.179
2600.000	0.979	25.326	2599.847	9.708	-6.940	9.708	11.933	324.440	0.054
2700.000	1.102	29.337	2699.831	11.319	-6.103	11.319	12.859	331.665	0.142
2800.000	1.170	30.728	2799.811	13.034	-5.111	13.034	14.001	338.591	0.074
2900.000	1.725	44.543	2899.779	14.985	-3.533	14.985	15.396	346.735	0.652
3000.000	1.871	51.324	2999.730	17.078	-1.202	17.078	17.121	355.973	0.258
3100.000	1.421	72.023	3099.689	18.481	1.252	18.481	18.524	3.875	0.738
3200.000	1.181	77.282	3199.663	19.091	3.437	19.091	19.398	10.205	0.268
3300.000	0.187	81.166	3299.655	19.343	4.603	19.343	19.883	13.387	0.995
3400.000	0.734	263.609	3399.653	19.297	4.128	19.297	19.733	12.075	0.921
3500.000	1.113	287.490	3499.640	19.517	2.566	19.517	19.685	7.489	0.532
3600.000	1.123	283.231	3599.621	20.033	0.686	20.033	20.045	1.962	0.084
3700.000	1.002	283.596	3699.604	20.463	-1.117	20.463	20.493	356.875	0.121
3800.000	0.729	305.291	3799.592	21.036	-2.487	21.036	21.182	353.259	0.422
3900.000	0.348	325.296	3899.588	21.653	-3.179	21.653	21.885	351.649	0.420
4000.000	0.341	300.869	3999.586	22.055	-3.607	22.055	22.348	350.712	0.146
4100.000	0.289	347.455	4099.585	22.454	-3.917	22.454	22.793	350.104	0.254
4200.000	0.405	18.635	4199.583	23.035	-3.859	23.035	23.356	350.489	0.218
4300.000	0.609	16.180	4299.579	23.881	-3.598	23.881	24.150	351.432	0.205
4400.000	0.686	8.853	4399.573	24.983	-3.358	24.983	25.207	352.345	0.113
4500.000	0.691	352.905	4499.566	26.173	-3.340	26.173	26.385	352.728	0.191
4600.000	0.539	8.426	4599.560	27.237	-3.346	27.237	27.442	352.997	0.224
4700.000	0.854	13.008	4699.552	28.429	-3.109	28.429	28.599	353.759	0.320
4800.000	0.902	339.791	4799.541	29.895	-3.213	29.895	30.067	353.865	0.504
4900.000	1.075	324.065	4899.526	31.393	-4.036	31.393	31.651	352.675	0.320
5000.000	0.813	321.915	4999.513	32.710	-5.023	32.710	33.094	351.269	0.265
5100.000	0.310	280.515	5099.508	33.318	-5.727	33.318	33.806	350.247	0.615
5200.000	0.101	274.601	5199.507	33.374	-6.080	33.374	33.924	349.675	0.210
5300.000	0.498	168.181	5299.506	32.956	-6.079	32.956	33.512	349.549	0.535
5400.000	0.696	141.279	5399.501	32.057	-5.610	32.057	32.544	350.074	0.338
5500.000	0.534	138.193	5499.495	31.235	-4.919	31.235	31.620	351.050	0.165

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	0.489	170.582	5599.491	30.467	-4.539	30.467	30.803	351.527	0.289
5700.000	0.375	154.650	5699.488	29.750	-4.329	29.750	30.064	351.721	0.165
5800.000	0.573	175.793	5799.485	28.956	-4.152	28.956	29.252	351.840	0.261
5900.000	0.216	153.601	5899.482	28.289	-4.032	28.289	28.574	351.889	0.382
6000.000	0.611	166.560	5999.480	27.601	-3.824	27.601	27.865	352.112	0.403
6100.000	0.364	192.905	6099.476	26.774	-3.771	26.774	27.038	351.983	0.327
6200.000	0.371	169.070	6199.474	26.146	-3.781	26.146	26.418	351.773	0.152
6300.000	0.432	197.813	6299.472	25.469	-3.834	25.469	25.756	351.438	0.208
6400.000	0.427	175.852	6399.469	24.738	-3.923	24.738	25.047	350.989	0.164
6500.000	0.379	165.539	6499.467	24.046	-3.813	24.046	24.347	350.989	0.087
6600.000	0.374	153.822	6599.464	23.432	-3.587	23.432	23.705	351.298	0.077
6700.000	0.445	132.121	6699.462	22.879	-3.154	22.879	23.095	352.150	0.169
6750.000	0.401	86.156	6749.461	22.760	-2.836	22.760	22.936	352.898	0.666