



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Heldt B 29-21/05-123-25759
DECLINATION: 8.21 Degrees
TD AS DRILLED: 7107 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.36986, Longitude: -104.57436
Grid North = True North -0.60 degs (NAD 27)
Grid Correction Applied = -0.60 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4708 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 6/7/2016 / 08:30

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976
Surveyor: Sean Bratt / Heldt B 29-21

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	0.879	182.985	99.996	-0.766	-0.040	-0.766	0.767	182.985	0.879
200.000	0.817	171.817	199.985	-2.238	0.022	-2.238	2.238	179.447	0.176
300.000	0.674	166.105	299.977	-3.515	0.264	-3.515	3.525	175.698	0.161
400.000	0.687	162.850	399.970	-4.660	0.583	-4.660	4.696	172.873	0.041
500.000	0.682	161.953	499.963	-5.799	0.944	-5.799	5.875	170.755	0.012
600.000	0.761	157.726	599.955	-6.980	1.380	-6.980	7.115	168.814	0.095
700.000	0.850	162.291	699.945	-8.301	1.858	-8.301	8.506	167.386	0.109
800.000	1.064	168.078	799.931	-9.916	2.275	-9.916	10.173	167.078	0.235
900.000	1.204	173.945	899.911	-11.869	2.578	-11.869	12.146	167.747	0.182
1000.000	1.249	179.413	999.888	-14.004	2.700	-14.004	14.262	169.089	0.125
1100.000	1.340	179.239	1099.863	-16.263	2.726	-16.263	16.489	170.483	0.091
1200.000	1.428	188.717	1199.834	-18.663	2.553	-18.663	18.837	172.211	0.245
1300.000	1.607	193.117	1299.799	-21.260	2.046	-21.260	21.359	174.503	0.213
1400.000	1.673	197.411	1399.758	-24.019	1.291	-24.019	24.053	176.923	0.140
1500.000	1.702	201.211	1499.714	-26.796	0.317	-26.796	26.798	179.322	0.115
1600.000	1.757	196.580	1599.669	-29.650	-0.658	-29.650	29.657	181.271	0.150
1700.000	1.873	193.526	1699.619	-32.708	-1.478	-32.708	32.741	182.587	0.150
1800.000	2.108	194.303	1799.558	-36.079	-2.314	-36.079	36.153	183.670	0.237

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	2.238	202.367	1899.487	-39.667	-3.512	-39.667	39.822	185.059	0.332
2000.000	2.363	188.535	1999.407	-43.512	-4.561	-43.512	43.750	185.984	0.568
2100.000	2.448	185.674	2099.319	-47.676	-5.078	-47.676	47.946	186.079	0.147
2200.000	2.391	192.148	2199.230	-51.840	-5.728	-51.840	52.156	186.305	0.279
2300.000	2.460	189.053	2299.140	-55.999	-6.504	-55.999	56.375	186.625	0.148
2400.000	2.475	188.704	2399.047	-60.252	-7.169	-60.252	60.677	186.785	0.021
2500.000	2.398	184.537	2498.957	-64.472	-7.661	-64.472	64.925	186.777	0.193
2600.000	2.498	187.370	2598.866	-68.719	-8.106	-68.719	69.195	186.728	0.157
2700.000	2.971	183.457	2698.752	-73.467	-8.542	-73.467	73.962	186.632	0.508
2800.000	3.168	187.633	2798.608	-78.793	-9.065	-78.793	79.313	186.563	0.298
2900.000	3.170	184.000	2898.455	-84.290	-9.625	-84.290	84.838	186.514	0.201
3000.000	3.249	193.042	2998.299	-89.809	-10.458	-89.809	90.416	186.642	0.512
3100.000	3.100	184.148	3098.146	-95.266	-11.293	-95.266	95.933	186.760	0.514
3200.000	2.845	182.390	3198.012	-100.443	-11.592	-100.443	101.110	186.583	0.270
3300.000	2.552	179.832	3297.901	-105.149	-11.689	-105.149	105.797	186.343	0.317
3400.000	2.596	175.636	3397.800	-109.633	-11.510	-109.633	110.235	185.993	0.193
3500.000	3.046	172.701	3497.679	-114.526	-11.000	-114.526	115.053	185.486	0.473
3600.000	3.242	169.664	3597.528	-119.943	-10.155	-119.943	120.372	184.839	0.257
3700.000	3.338	166.531	3697.363	-125.557	-8.969	-125.557	125.877	184.086	0.204
3800.000	3.273	168.145	3797.197	-131.182	-7.705	-131.182	131.408	183.361	0.114
3900.000	2.953	171.590	3897.049	-136.524	-6.741	-136.524	136.690	182.827	0.371
4000.000	2.449	178.771	3996.938	-141.208	-6.319	-141.208	141.350	182.562	0.606
4100.000	2.224	188.281	4096.855	-145.265	-6.553	-145.265	145.412	182.583	0.448
4200.000	2.265	193.183	4196.779	-149.108	-7.283	-149.108	149.286	182.796	0.196
4300.000	1.797	202.171	4296.716	-152.484	-8.325	-152.484	152.711	183.125	0.565
4400.000	1.345	218.715	4396.679	-154.852	-9.651	-154.852	155.153	183.566	0.636
4500.000	1.358	221.693	4496.651	-156.653	-11.173	-156.653	157.051	184.080	0.071
4600.000	1.028	216.182	4596.629	-158.262	-12.491	-158.262	158.754	184.513	0.349
4700.000	0.717	195.885	4696.618	-159.588	-13.192	-159.588	160.132	184.725	0.434
4800.000	0.966	171.513	4796.607	-161.024	-13.238	-161.024	161.567	184.700	0.431
4900.000	1.112	177.349	4896.591	-162.827	-13.069	-162.827	163.350	184.589	0.179
5000.000	1.130	172.567	4996.571	-164.773	-12.897	-164.773	165.277	184.475	0.095
5100.000	1.264	168.943	5096.550	-166.833	-12.558	-166.833	167.305	184.305	0.154
5200.000	1.109	176.541	5196.528	-168.882	-12.288	-168.882	169.328	184.161	0.221
5300.000	1.233	167.576	5296.507	-170.898	-11.998	-170.898	171.319	184.016	0.221
5400.000	1.203	182.557	5396.485	-172.997	-11.813	-172.997	173.400	183.906	0.319
5500.000	1.366	199.524	5496.460	-175.169	-12.258	-175.169	175.597	184.003	0.412
5600.000	1.577	210.935	5596.427	-177.472	-13.364	-177.472	177.975	184.306	0.360
5700.000	1.784	210.908	5696.384	-179.989	-14.871	-179.989	180.602	184.723	0.208
5800.000	1.866	209.242	5796.334	-182.745	-16.466	-182.745	183.485	185.149	0.097

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	1.656	233.931	5896.288	-185.017	-18.430	-185.017	185.932	185.689	0.780
6000.000	1.481	207.938	5996.252	-187.009	-20.203	-187.009	188.097	186.166	0.726
6100.000	0.796	207.351	6096.231	-188.767	-21.128	-188.767	189.946	186.386	0.685
6200.000	0.541	180.004	6196.225	-189.856	-21.447	-189.856	191.064	186.445	0.402
6300.000	1.180	144.419	6296.213	-191.166	-20.848	-191.166	192.299	186.224	0.805
6400.000	2.089	134.141	6396.172	-193.273	-18.940	-193.273	194.199	185.597	0.951
6500.000	2.522	115.835	6496.092	-195.501	-15.652	-195.501	196.126	184.577	0.849
6600.000	2.219	118.025	6596.006	-197.369	-11.964	-197.369	197.731	183.469	0.316
6700.000	1.960	98.612	6695.941	-198.535	-8.564	-198.535	198.719	182.470	0.749
6800.000	1.180	80.446	6795.903	-198.620	-5.858	-198.620	198.706	181.689	0.916