



Company/Rig: Noble Energy Inc/Production
WELL/API#: Hamilton 25-12B/05-123-16496
DECLINATION: 8.22 Degrees
TD AS DRILLED: 7107'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.36789, Longitude: -104.61850
Grid North = True North -0.57 degs (NAD 27)
Grid Correction Applied = -0.57 degs



DEPTH REFERENCE : RKB=GL/Elevation=4656'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/28/2016 / 08:47

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Hamilton 25-12B

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	0.157	343.845	100.000	0.132	-0.038	0.132	0.137	343.845	0.157
200.000	0.242	299.799	199.999	0.369	-0.260	0.369	0.451	324.834	0.169
300.000	0.166	269.569	299.999	0.473	-0.588	0.473	0.754	308.801	0.129
400.000	0.105	306.031	399.998	0.525	-0.806	0.525	0.962	303.080	0.103
500.000	0.184	27.593	499.998	0.721	-0.806	0.721	1.081	311.809	0.197
600.000	0.254	12.432	599.997	1.079	-0.684	1.079	1.278	327.625	0.090
700.000	0.470	37.087	699.995	1.623	-0.389	1.623	1.669	346.523	0.262
800.000	0.445	25.984	799.992	2.300	0.029	2.300	2.300	0.721	0.092
900.000	0.367	7.034	899.990	2.967	0.238	2.967	2.976	4.595	0.155
1000.000	0.452	0.828	999.987	3.678	0.283	3.678	3.689	4.404	0.096
1100.000	0.486	5.104	1099.984	4.495	0.327	4.495	4.507	4.157	0.048
1200.000	0.515	23.152	1199.980	5.330	0.541	5.330	5.357	5.796	0.160
1300.000	0.450	29.768	1299.977	6.083	0.912	6.083	6.152	8.530	0.085
1400.000	0.531	14.477	1399.973	6.873	1.223	6.873	6.981	10.091	0.153
1500.000	0.576	25.217	1499.968	7.776	1.553	7.776	7.929	11.294	0.113
1600.000	0.784	29.734	1599.961	8.824	2.106	8.824	9.072	13.425	0.215

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	0.663	20.053	1699.953	9.961	2.644	9.961	10.306	14.864	0.171
1800.000	0.721	12.209	1799.946	11.119	2.975	11.119	11.510	14.979	0.111
1900.000	0.724	1.013	1899.938	12.365	3.119	12.365	12.753	14.157	0.141
2000.000	0.735	355.968	1999.930	13.637	3.085	13.637	13.981	12.748	0.065
2100.000	0.887	329.772	2099.920	14.945	2.651	14.945	15.178	10.057	0.396
2200.000	1.105	313.260	2199.905	16.274	1.559	16.274	16.349	5.472	0.359
2300.000	1.414	307.253	2299.881	17.682	-0.126	17.682	17.682	359.593	0.336
2400.000	1.584	304.607	2399.847	19.214	-2.245	19.214	19.345	353.335	0.183
2500.000	1.604	309.393	2499.808	20.887	-4.465	20.887	21.359	347.935	0.135
2600.000	1.570	303.062	2599.770	22.523	-6.694	22.523	23.496	343.447	0.179
2700.000	1.706	291.115	2699.729	23.806	-9.231	23.806	25.533	338.806	0.367
2800.000	1.589	319.646	2799.690	25.399	-11.518	25.399	27.888	335.608	0.820
2900.000	1.560	314.899	2899.652	27.416	-13.379	27.416	30.507	333.987	0.134
3000.000	1.522	304.816	2999.616	29.135	-15.434	29.135	32.971	332.089	0.273
3100.000	1.217	320.971	3099.588	30.719	-17.193	30.719	35.203	330.765	0.489
3200.000	0.638	288.980	3199.575	31.725	-18.388	31.725	36.669	329.902	0.756
3300.000	0.752	236.999	3299.568	31.549	-19.465	31.549	37.070	328.325	0.618
3400.000	0.864	229.182	3399.558	30.698	-20.587	30.698	36.962	326.154	0.157
3500.000	1.163	238.587	3499.543	29.676	-22.024	29.676	36.955	323.420	0.341
3600.000	1.159	224.289	3599.522	28.423	-23.596	28.423	36.941	320.302	0.289
3700.000	1.082	229.280	3699.503	27.084	-25.017	27.084	36.870	317.271	0.124
3800.000	1.172	223.818	3799.484	25.730	-26.440	25.730	36.894	314.220	0.140
3900.000	1.215	216.215	3899.462	24.137	-27.775	24.137	36.797	310.991	0.164
4000.000	1.181	221.022	3999.440	22.504	-29.078	22.504	36.769	307.736	0.106
4100.000	1.222	231.318	4099.419	21.060	-30.587	21.060	37.136	304.548	0.219
4200.000	1.195	229.143	4199.396	19.711	-32.208	19.711	37.761	301.466	0.053
4300.000	0.995	264.410	4299.379	18.944	-33.861	18.944	38.800	299.225	0.690
4400.000	1.138	264.452	4399.362	18.763	-35.714	18.763	40.343	297.717	0.143
4500.000	1.090	231.455	4499.344	18.075	-37.446	18.075	41.580	295.766	0.634
4600.000	1.615	195.202	4599.317	16.123	-38.559	16.123	41.794	292.691	0.978
4700.000	1.624	188.758	4699.278	13.363	-39.144	13.363	41.362	288.848	0.182
4800.000	2.339	187.991	4799.217	9.942	-39.644	9.942	40.871	284.079	0.716
4900.000	2.409	186.892	4899.131	5.835	-40.180	5.835	40.601	278.263	0.084
5000.000	2.161	185.516	4999.052	1.872	-40.613	1.872	40.656	272.639	0.254
5100.000	1.690	189.553	5098.995	-1.459	-41.039	-1.459	41.065	267.964	0.490
5200.000	1.045	177.913	5198.966	-3.824	-41.251	-3.824	41.427	264.704	0.699
5300.000	1.084	185.128	5298.949	-5.677	-41.302	-5.677	41.690	262.174	0.139
5400.000	0.882	195.274	5398.934	-7.361	-41.589	-7.361	42.236	259.962	0.265
5500.000	0.660	160.989	5498.926	-8.648	-41.604	-8.648	42.494	258.257	0.502

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	0.629	107.699	5598.920	-9.360	-40.894	-9.360	41.951	257.108	0.579
5700.000	0.969	92.959	5698.911	-9.570	-39.526	-9.570	40.668	256.389	0.394
5800.000	1.013	84.439	5798.896	-9.528	-37.802	-9.528	38.984	255.852	0.154
5900.000	1.286	70.433	5898.876	-9.067	-35.865	-9.067	36.993	255.812	0.390
6000.000	1.644	57.863	5998.843	-7.928	-33.593	-7.928	34.516	256.721	0.479
6100.000	1.466	50.992	6098.806	-6.360	-31.385	-6.360	32.022	258.544	0.257
6200.000	0.822	88.250	6198.787	-5.533	-29.674	-5.533	30.185	259.438	0.953
6300.000	0.836	158.718	6298.779	-6.190	-28.692	-6.190	29.353	257.825	0.956
6400.000	1.553	173.209	6398.757	-8.216	-28.267	-8.216	29.437	253.794	0.773
6500.000	1.635	174.786	6498.718	-10.982	-27.978	-10.982	30.056	248.568	0.093
6600.000	1.681	209.078	6598.679	-13.685	-28.561	-13.685	31.670	244.399	0.978
6700.000	1.663	213.398	6698.636	-16.177	-30.072	-16.177	34.147	241.722	0.127
6800.000	1.639	228.806	6798.595	-18.331	-31.947	-18.331	36.832	240.153	0.443
6900.000	1.562	232.225	6898.556	-20.107	-34.100	-20.107	39.587	239.474	0.122