



COMPANY/RIG: Noble Energy/Production/CoreTech
 WELL/API: Nelson 17-12/05-123-22225
 DECLINATION: 8.17 Degrees
 TD AS DRILLED: 7238 Feet
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.33089, Longitude: -104.60719
 Grid North = True North -0.58 degs (NAD 27)
 Grid Correction Applied = -0.58 degs



DEPTH REFERENCE : RKB = GL Elevation = 4779

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 12/6/2016 / 11:16

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Nelson 17-12

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	0.097	7.815	100.000	0.084	0.012	0.084	0.085	7.815	0.097
200.000	0.078	126.390	200.000	0.127	0.078	0.127	0.149	31.556	0.151
300.000	0.338	113.796	299.999	-0.033	0.403	-0.033	0.405	94.629	0.262
400.000	0.364	113.048	399.997	-0.276	0.966	-0.276	1.004	105.958	0.026
500.000	0.475	118.436	499.995	-0.598	1.622	-0.598	1.729	110.228	0.118
600.000	0.379	128.585	599.992	-1.001	2.245	-1.001	2.458	114.036	0.122
700.000	0.554	111.822	699.989	-1.387	2.952	-1.387	3.262	115.166	0.220
800.000	0.405	74.642	799.985	-1.473	3.741	-1.473	4.021	111.491	0.337
900.000	0.738	90.743	899.980	-1.388	4.726	-1.388	4.925	106.367	0.367
1000.000	0.367	81.840	999.975	-1.351	5.687	-1.351	5.845	103.362	0.379
1100.000	0.392	91.985	1099.973	-1.317	6.346	-1.317	6.481	101.726	0.072
1200.000	0.383	70.162	1199.971	-1.216	7.002	-1.216	7.107	99.848	0.147
1300.000	0.293	65.923	1299.969	-0.998	7.550	-0.998	7.616	97.527	0.093
1400.000	0.283	64.816	1399.968	-0.788	8.008	-0.788	8.047	95.620	0.011
1500.000	0.392	68.441	1499.966	-0.557	8.550	-0.557	8.568	93.729	0.110
1600.000	0.198	50.920	1599.965	-0.323	9.002	-0.323	9.007	92.053	0.211

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	0.136	89.717	1699.964	-0.213	9.254	-0.213	9.257	91.319	0.126
1800.000	0.232	232.906	1799.964	-0.335	9.211	-0.335	9.217	92.080	0.350
1900.000	0.575	234.026	1899.962	-0.752	8.643	-0.752	8.676	94.970	0.343
2000.000	0.584	236.295	1999.956	-1.329	7.813	-1.329	7.925	99.656	0.025
2100.000	0.624	204.775	2099.951	-2.107	7.161	-2.107	7.464	106.395	0.331
2200.000	0.557	174.638	2199.946	-3.085	6.978	-3.085	7.630	113.852	0.314
2300.000	0.831	182.551	2299.939	-4.293	6.991	-4.293	8.204	121.554	0.290
2400.000	1.094	160.034	2399.925	-5.915	7.285	-5.915	9.384	129.076	0.456
2500.000	1.351	148.304	2499.902	-7.816	8.230	-7.816	11.350	133.520	0.358
2600.000	1.232	151.006	2599.877	-9.760	9.371	-9.760	13.530	136.164	0.134
2700.000	1.413	135.527	2699.850	-11.580	10.756	-11.580	15.805	137.113	0.399
2800.000	1.238	143.730	2799.824	-13.331	12.259	-13.331	18.111	137.398	0.258
2900.000	1.341	120.288	2899.799	-14.792	13.909	-14.792	20.304	136.763	0.533
3000.000	1.565	103.911	2999.767	-15.710	16.244	-15.710	22.598	134.043	0.469
3100.000	1.366	104.342	3099.734	-16.334	18.724	-16.334	24.847	131.099	0.198
3200.000	1.039	99.672	3199.712	-16.782	20.774	-16.782	26.705	128.933	0.341
3300.000	0.509	91.622	3299.703	-16.947	22.111	-16.947	27.859	127.467	0.540
3400.000	0.308	95.399	3399.700	-16.984	22.823	-16.984	28.449	126.656	0.203
3500.000	0.271	80.824	3499.699	-16.972	23.324	-16.972	28.845	126.042	0.082
3600.000	0.429	174.700	3599.698	-17.307	23.593	-17.307	29.260	126.263	0.523
3700.000	1.164	181.127	3699.687	-18.695	23.607	-18.695	30.114	128.377	0.738
3800.000	1.210	185.943	3799.666	-20.761	23.478	-20.761	31.341	131.486	0.110
3900.000	1.184	190.220	3899.644	-22.828	23.185	-22.828	32.537	134.556	0.093
4000.000	1.248	184.412	3999.622	-24.931	22.918	-24.931	33.864	137.408	0.139
4100.000	0.987	205.029	4099.603	-26.797	22.470	-26.797	34.971	140.019	0.475
4200.000	0.606	204.254	4199.593	-28.060	21.888	-28.060	35.587	142.043	0.381
4300.000	0.464	166.842	4299.589	-28.936	21.763	-28.936	36.207	143.053	0.369
4400.000	0.475	217.274	4399.586	-29.661	21.604	-29.661	36.695	143.931	0.400
4500.000	0.427	229.890	4499.583	-30.231	21.068	-30.231	36.848	145.127	0.110
4600.000	0.383	249.183	4599.581	-30.590	20.471	-30.590	36.808	146.209	0.142
4700.000	0.364	242.032	4699.578	-30.857	19.879	-30.857	36.706	147.210	0.050
4800.000	0.098	145.346	4799.578	-31.076	19.647	-31.076	36.766	147.698	0.387
4900.000	0.287	251.620	4899.577	-31.225	19.458	-31.225	36.791	148.071	0.328
5000.000	0.176	256.333	4999.576	-31.340	19.071	-31.340	36.687	148.679	0.113
5100.000	0.275	161.212	5099.576	-31.604	18.999	-31.604	36.875	148.987	0.340
5200.000	0.299	138.704	5199.575	-32.028	19.249	-32.028	37.367	148.994	0.114
5300.000	0.360	135.759	5299.573	-32.448	19.640	-32.448	37.929	148.815	0.063
5400.000	0.356	143.880	5399.571	-32.924	20.042	-32.924	38.545	148.670	0.051
5500.000	0.398	131.725	5499.569	-33.406	20.484	-33.406	39.186	148.484	0.090

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	0.542	135.546	5599.566	-33.975	21.074	-33.975	39.980	148.189	0.147
5700.000	0.697	119.827	5699.560	-34.614	21.932	-34.614	40.978	147.641	0.228
5800.000	0.800	126.855	5799.551	-35.335	23.018	-35.335	42.171	146.919	0.138
5900.000	0.687	146.487	5899.543	-36.254	23.907	-36.254	43.427	146.597	0.277
6000.000	0.790	191.496	5999.535	-37.429	24.101	-37.429	44.517	147.222	0.573
6100.000	1.077	229.082	6099.523	-38.720	23.254	-38.720	45.166	149.013	0.660
6200.000	1.118	216.793	6199.505	-40.116	21.959	-40.116	45.733	151.304	0.238
6300.000	0.875	208.146	6299.490	-41.571	21.015	-41.571	46.580	153.182	0.285
6400.000	1.427	182.835	6399.470	-43.487	20.593	-43.487	48.117	154.660	0.738
6500.000	1.734	163.903	6499.432	-46.184	20.951	-46.184	50.714	155.599	0.602
6600.000	1.920	159.870	6599.381	-49.211	21.947	-49.211	53.883	155.964	0.226
6700.000	2.242	157.079	6699.315	-52.586	23.286	-52.586	57.511	156.116	0.338
6800.000	2.458	150.331	6799.231	-56.251	25.109	-56.251	61.601	155.945	0.350
6900.000	3.196	146.039	6899.109	-60.426	27.727	-60.426	66.484	155.351	0.767
6950.000	3.478	143.441	6949.024	-62.800	29.409	-62.800	69.345	154.906	0.641