



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Cecil 23-13/05-123-18514
DECLINATION: 8.26 Degrees
TD AS DRILLED: 6985 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.47394, Longitude: -104.51607
Grid North = True North -0.64 degs (NAD 27)
Grid Convergence Applied = -0.64 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4655 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/14/2015 / 16:10

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt / Cecil 23-13

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	0.285	159.134	100.000	-0.232	0.089	-0.232	0.249	159.134	0.285
200.000	0.288	63.899	199.999	-0.354	0.403	-0.354	0.537	131.311	0.423
300.000	0.175	160.781	299.998	-0.388	0.679	-0.388	0.782	119.742	0.355
400.000	0.184	77.873	399.998	-0.499	0.887	-0.499	1.018	119.353	0.238
500.000	0.229	88.955	499.997	-0.461	1.244	-0.461	1.327	110.346	0.060
600.000	0.230	167.055	599.997	-0.653	1.489	-0.653	1.626	113.684	0.289
700.000	0.449	154.812	699.995	-1.203	1.700	-1.203	2.083	125.272	0.229
800.000	0.093	142.807	799.994	-1.621	1.916	-1.621	2.510	130.241	0.358
900.000	0.168	114.852	899.993	-1.748	2.098	-1.748	2.731	129.792	0.097
1000.000	0.447	105.728	999.992	-1.915	2.607	-1.915	3.235	126.302	0.282
1100.000	0.422	120.444	1099.989	-2.208	3.300	-2.208	3.970	123.780	0.114
1200.000	0.324	128.328	1199.987	-2.569	3.839	-2.569	4.620	123.792	0.110
1300.000	0.267	134.557	1299.985	-2.908	4.227	-2.908	5.131	124.528	0.065
1400.000	0.295	139.709	1399.984	-3.268	4.559	-3.268	5.610	125.631	0.038
1500.000	0.441	139.887	1499.982	-3.759	4.974	-3.759	6.234	127.078	0.146
1600.000	0.521	138.721	1599.979	-4.394	5.521	-4.394	7.056	128.515	0.080
1700.000	0.595	144.138	1699.974	-5.156	6.125	-5.156	8.007	130.092	0.091
1800.000	0.611	143.032	1799.968	-6.004	6.750	-6.004	9.034	131.649	0.020
1900.000	0.386	153.245	1899.965	-6.731	7.223	-6.731	9.873	132.980	0.241

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
2000.000	0.411	183.027	1999.962	-7.390	7.356	-7.390	10.427	135.134	0.206
2100.000	0.531	211.678	2099.959	-8.143	7.093	-8.143	10.799	138.940	0.260
2200.000	0.521	226.905	2199.955	-8.848	6.518	-8.848	10.989	143.623	0.140
2300.000	0.463	256.511	2299.951	-9.253	5.793	-9.253	10.917	147.951	0.258
2400.000	0.649	268.319	2399.947	-9.364	4.834	-9.364	10.538	152.697	0.218
2500.000	0.727	282.084	2499.939	-9.248	3.647	-9.248	9.941	158.476	0.182
2600.000	0.530	281.756	2599.933	-9.021	2.574	-9.021	9.381	164.073	0.196
2700.000	0.586	293.968	2699.929	-8.718	1.654	-8.718	8.874	169.260	0.131
2800.000	0.767	269.480	2799.922	-8.517	0.517	-8.517	8.532	176.528	0.337
2900.000	0.748	293.215	2899.913	-8.265	-0.753	-8.265	8.300	185.203	0.312
3000.000	0.912	295.228	2999.903	-7.669	-2.073	-7.669	7.944	195.123	0.167
3100.000	0.784	271.318	3099.892	-7.314	-3.477	-7.314	8.098	205.426	0.373
3200.000	0.734	295.869	3199.884	-7.019	-4.738	-7.019	8.468	214.021	0.327
3300.000	1.278	338.652	3299.869	-5.700	-5.720	-5.700	8.076	225.100	0.892
3400.000	1.399	0.361	3399.842	-3.441	-6.119	-3.441	7.020	240.645	0.518
3500.000	1.680	32.541	3499.808	-0.985	-5.322	-0.985	5.413	259.517	0.895
3600.000	1.810	45.763	3599.762	1.353	-3.402	1.353	3.661	291.678	0.422
3700.000	1.915	29.207	3699.710	3.913	-1.456	3.913	4.175	339.589	0.546
3800.000	1.912	4.625	3799.656	7.034	-0.506	7.034	7.052	355.885	0.814
3900.000	2.054	1.008	3899.596	10.488	-0.340	10.488	10.494	358.143	0.190
4000.000	1.999	351.774	3999.534	14.006	-0.558	14.006	14.017	357.719	0.331
4100.000	2.162	347.997	4099.468	17.577	-1.200	17.577	17.618	356.095	0.213
4200.000	2.031	358.015	4199.401	21.193	-1.653	21.193	21.257	355.539	0.389
4300.000	2.197	16.441	4299.334	24.802	-1.172	24.802	24.829	357.294	0.696
4400.000	2.211	11.433	4399.260	28.530	-0.247	28.530	28.532	359.503	0.193
4500.000	2.008	37.565	4499.195	31.810	1.203	31.810	31.832	2.166	0.974
4600.000	1.811	51.124	4599.140	34.190	3.501	34.190	34.369	5.846	0.491
4700.000	1.978	53.115	4699.085	36.217	6.111	36.217	36.729	9.577	0.179
4800.000	2.138	66.411	4799.021	37.999	9.200	37.999	39.097	13.610	0.502
4900.000	1.944	68.982	4898.958	39.354	12.493	39.354	41.289	17.612	0.214
5000.000	1.723	52.386	4998.907	40.880	15.267	40.880	43.638	20.479	0.572
5100.000	1.196	58.646	5098.875	42.341	17.350	42.341	45.758	22.282	0.550
5200.000	1.163	22.929	5198.855	43.819	18.637	43.819	47.617	23.041	0.724
5300.000	1.645	348.552	5298.826	46.160	18.747	46.160	49.821	22.104	0.949
5400.000	1.808	337.724	5398.781	49.026	17.864	49.026	52.180	20.021	0.364
5500.000	1.471	347.106	5498.740	51.737	16.980	51.737	54.452	18.170	0.430
5600.000	2.224	7.346	5598.688	54.913	16.942	54.913	57.467	17.146	0.985
5700.000	1.767	25.849	5698.628	58.225	17.862	58.225	60.903	17.055	0.784
5800.000	2.127	49.006	5798.572	60.831	19.935	60.831	64.014	18.145	0.857
5900.000	1.795	66.448	5898.514	62.674	22.772	62.674	66.683	19.968	0.679

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
6000.000	1.297	85.342	5998.478	63.392	25.336	63.392	68.268	21.785	0.706
6100.000	1.031	94.458	6098.457	63.414	27.361	63.414	69.065	23.339	0.324
6200.000	0.905	123.784	6198.444	62.905	28.914	62.905	69.232	24.686	0.505
6300.000	0.925	109.075	6298.431	62.202	30.334	62.202	69.204	25.997	0.235
6400.000	1.049	154.987	6398.418	61.108	31.484	61.108	68.742	27.259	0.778
6500.000	1.118	135.978	6498.400	59.577	32.549	59.577	67.889	28.649	0.364
6600.000	1.304	144.159	6598.378	57.953	33.893	57.953	67.137	30.321	0.254
6700.000	0.994	129.598	6698.358	56.478	35.228	56.478	66.564	31.954	0.424
6750.000	0.742	102.835	6748.352	56.129	35.878	56.129	66.616	32.587	0.942