



Company/Rig: Noble Energy/CoreTech  
WELL: Ottoson 3  
DECLINATION: 8.41  
TD AS DRILLED: 7310'  
COUNTY/STATE: Weld/Colorado  
Latitude: 40.497, Longitude: -104.732  
GRID North is 0.500 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=Surface Elevation=4794'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 10/23/2014 / 11:06

Lat & Long Obtained By Handheld GPS At Wellhead

North Reference: Grid

Henderson, Co.

303-853-4976

Surveyor: Mark Simmons

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	0.319	295.898	99.999	0.122	-0.250	0.122	0.278	295.898	0.319
200.000	0.412	305.355	199.997	0.451	-0.794	0.451	0.913	299.605	0.110
300.000	0.264	301.910	299.996	0.781	-1.282	0.781	1.501	301.333	0.149
400.000	0.449	306.157	399.994	1.133	-1.794	1.133	2.122	302.285	0.187
500.000	0.516	312.482	499.990	1.669	-2.442	1.669	2.958	304.342	0.086
600.000	0.497	309.015	599.986	2.246	-3.111	2.246	3.837	305.822	0.036
700.000	0.600	301.030	699.982	2.789	-3.897	2.789	4.792	305.587	0.128
800.000	0.710	297.074	799.975	3.341	-4.898	3.341	5.929	304.298	0.119
900.000	0.629	300.411	899.968	3.901	-5.923	3.901	7.092	303.368	0.090
1000.000	0.746	292.484	999.961	4.428	-6.998	4.428	8.281	302.321	0.151
1100.000	0.686	292.194	1099.953	4.903	-8.154	4.903	9.514	301.017	0.061
1200.000	0.586	306.023	1199.947	5.429	-9.121	5.429	10.615	300.762	0.183
1300.000	0.736	307.184	1299.940	6.118	-10.046	6.118	11.763	301.341	0.151
1400.000	0.703	298.242	1399.933	6.796	-11.098	6.796	13.014	301.483	0.117
1500.000	0.652	309.270	1499.926	7.447	-12.079	7.447	14.190	301.654	0.140
1600.000	0.559	312.637	1599.920	8.137	-12.878	8.137	15.233	302.287	0.100
1700.000	0.621	284.255	1699.915	8.601	-13.762	8.601	16.229	302.004	0.295
1800.000	0.676	298.260	1799.909	9.014	-14.807	9.014	17.335	301.330	0.167
1900.000	0.169	291.179	1899.906	9.347	-15.465	9.347	18.070	301.147	0.509

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	0.365	220.604	1999.905	9.158	-15.810	9.158	18.271	300.082	0.347
2100.000	0.486	208.587	2099.902	8.544	-16.220	8.544	18.333	297.777	0.150
2200.000	0.377	192.851	2199.899	7.850	-16.497	7.850	18.269	295.449	0.160
2300.000	0.556	213.114	2299.896	7.124	-16.835	7.124	18.280	292.936	0.241
2400.000	0.555	213.418	2399.891	6.313	-17.366	6.313	18.478	289.977	0.003
2500.000	0.480	197.366	2499.887	5.509	-17.758	5.509	18.593	287.235	0.163
2600.000	0.462	199.129	2599.884	4.729	-18.015	4.729	18.626	284.708	0.023
2700.000	0.579	195.206	2699.880	3.861	-18.280	3.861	18.683	281.925	0.122
2800.000	0.382	189.641	2799.876	3.045	-18.468	3.045	18.717	279.361	0.202
2900.000	0.532	180.014	2899.873	2.251	-18.524	2.251	18.660	276.930	0.168
3000.000	0.479	182.344	2999.869	1.370	-18.541	1.370	18.592	274.225	0.058
3100.000	0.538	195.452	3099.865	0.500	-18.683	0.500	18.690	271.532	0.130
3200.000	0.364	206.948	3199.862	-0.236	-18.952	-0.236	18.954	269.287	0.195
3300.000	0.423	198.008	3299.860	-0.870	-19.211	-0.870	19.230	267.406	0.085
3400.000	0.727	185.282	3399.854	-1.854	-19.383	-1.854	19.472	264.537	0.328
3500.000	1.542	172.599	3499.834	-3.820	-19.268	-3.820	19.643	258.785	0.848
3600.000	1.918	166.387	3599.788	-6.782	-18.701	-6.782	19.893	250.068	0.420
3700.000	1.919	165.401	3699.732	-10.029	-17.885	-10.029	20.505	240.719	0.033
3800.000	1.836	165.969	3799.679	-13.204	-17.075	-13.204	21.584	232.285	0.085
3900.000	1.600	168.573	3899.634	-16.126	-16.410	-16.126	23.007	225.499	0.249
4000.000	1.618	172.269	3999.594	-18.893	-15.943	-18.893	24.721	220.159	0.105
4100.000	1.465	169.654	4099.558	-21.550	-15.524	-21.550	26.559	215.767	0.169
4200.000	1.319	173.762	4199.529	-23.951	-15.169	-23.951	28.351	212.347	0.177
4300.000	1.231	169.897	4299.504	-26.153	-14.856	-26.153	30.078	209.598	0.123
4400.000	1.069	175.505	4399.484	-28.141	-14.594	-28.141	31.700	207.412	0.197
4500.000	1.013	187.195	4499.467	-29.948	-14.632	-29.948	33.331	206.038	0.219
4600.000	1.099	189.505	4599.450	-31.771	-14.901	-31.771	35.092	205.127	0.095
4700.000	0.980	186.447	4699.434	-33.566	-15.155	-33.566	36.829	204.299	0.131
4800.000	0.790	174.457	4799.422	-35.102	-15.184	-35.102	38.246	203.392	0.264
4900.000	0.764	153.549	4899.413	-36.385	-14.821	-36.385	39.288	202.163	0.283
5000.000	0.426	157.950	4999.407	-37.326	-14.385	-37.326	40.002	201.076	0.341
5100.000	0.516	191.052	5099.404	-38.113	-14.331	-38.113	40.718	200.608	0.282
5200.000	0.216	177.645	5199.402	-38.743	-14.410	-38.743	41.336	200.402	0.310
5300.000	0.136	214.375	5299.402	-39.029	-14.469	-39.029	41.625	200.341	0.134
5400.000	0.354	240.773	5399.401	-39.278	-14.806	-39.278	41.976	200.654	0.240
5500.000	0.559	287.166	5499.398	-39.285	-15.541	-39.285	42.248	201.584	0.406
5600.000	0.612	308.572	5599.393	-38.808	-16.425	-38.808	42.141	202.940	0.224
5700.000	0.810	316.223	5699.385	-37.965	-17.331	-37.965	41.734	204.537	0.219
5800.000	0.659	324.621	5799.377	-36.986	-18.153	-36.986	41.201	206.143	0.185
5900.000	0.676	329.166	5899.370	-36.010	-18.789	-36.010	40.617	207.554	0.056

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	0.610	321.767	5999.364	-35.085	-19.421	-35.085	40.102	208.966	0.106
6100.000	1.314	343.717	6099.349	-33.566	-20.072	-33.566	39.110	210.878	0.782
6200.000	1.470	339.039	6199.320	-31.267	-20.852	-31.267	37.583	213.700	0.193
6300.000	2.019	346.394	6299.273	-28.357	-21.726	-28.357	35.723	217.458	0.592
6400.000	1.922	5.614	6399.215	-24.975	-21.976	-24.975	33.267	221.345	0.665
6500.000	1.183	21.773	6499.178	-22.347	-21.429	-22.347	30.962	223.798	0.852
6600.000	0.517	74.537	6599.168	-21.268	-20.611	-21.268	29.617	224.101	0.963
6700.000	0.448	175.941	6699.166	-21.538	-20.149	-21.538	29.493	223.090	0.749
6800.000	0.552	193.352	6799.162	-22.397	-20.232	-22.397	30.182	222.092	0.182
6900.000	0.920	199.247	6899.153	-23.623	-20.608	-23.623	31.348	221.100	0.375
7000.000	0.880	203.268	6999.141	-25.086	-21.176	-25.086	32.829	220.168	0.074
7100.000	0.896	196.604	7099.129	-26.542	-21.703	-26.542	34.285	219.272	0.105