



Company/Rig: Noble Energy/CoreTech
WELL/API#: Ottoson I 12-12/05-123-29234
DECLINATION: 8.41
TD AS DRILLED: 7393'
COUNTY/STATE: Weld/Colorado
Latitude: 40.501, Longitude: -104.733
GRID North is 0.500 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=Surface Elevation= 4793'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/23/2014 / 12:34

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	0.297	303.959	100.000	0.145	-0.215	0.145	0.259	303.959	0.297
200.000	0.391	290.276	199.998	0.408	-0.750	0.408	0.854	298.536	0.124
300.000	0.217	281.202	299.996	0.563	-1.256	0.563	1.377	294.141	0.180
400.000	0.104	62.662	399.996	0.641	-1.362	0.641	1.505	295.220	0.305
500.000	0.574	102.808	499.994	0.572	-0.793	0.572	0.977	305.805	0.499
600.000	1.302	99.319	599.980	0.277	0.817	0.277	0.863	71.282	0.730
700.000	1.588	100.354	699.948	-0.156	3.301	-0.156	3.305	92.709	0.287
800.000	1.765	104.149	799.905	-0.782	6.158	-0.782	6.207	97.235	0.209
900.000	1.876	102.288	899.855	-1.507	9.251	-1.507	9.373	99.250	0.126
1000.000	1.711	111.757	999.806	-2.408	12.237	-2.408	12.471	101.134	0.339
1100.000	1.877	110.551	1099.757	-3.537	15.157	-3.537	15.564	103.134	0.170
1200.000	1.860	104.461	1199.704	-4.517	18.261	-4.517	18.812	103.892	0.199
1300.000	1.707	111.903	1299.656	-5.477	21.215	-5.477	21.910	104.477	0.278
1400.000	1.478	102.192	1399.617	-6.305	23.857	-6.305	24.676	104.805	0.353
1500.000	1.568	102.258	1499.582	-6.868	26.455	-6.868	27.332	104.554	0.090
1600.000	1.280	103.065	1599.551	-7.411	28.880	-7.411	29.816	104.393	0.289
1700.000	0.609	126.042	1699.537	-7.977	30.398	-7.977	31.427	104.703	0.758
1800.000	0.520	162.008	1799.532	-8.721	30.968	-8.721	32.173	105.728	0.359
1900.000	0.571	169.239	1899.528	-9.643	31.202	-9.643	32.658	107.173	0.086

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	0.320	144.631	1999.525	-10.360	31.456	-10.360	33.119	108.229	0.310
2100.000	0.507	186.311	2099.522	-11.028	31.570	-11.028	33.440	109.255	0.342
2200.000	0.379	176.238	2199.519	-11.797	31.543	-11.797	33.677	110.506	0.149
2300.000	0.373	166.136	2299.517	-12.444	31.642	-12.444	34.001	111.468	0.066
2400.000	0.173	83.634	2399.516	-12.743	31.871	-12.743	34.324	111.793	0.391
2500.000	0.221	69.669	2499.516	-12.659	32.203	-12.659	34.601	111.460	0.068
2600.000	0.087	75.788	2599.515	-12.574	32.457	-12.574	34.808	111.176	0.135
2700.000	0.173	214.177	2699.515	-12.680	32.446	-12.680	34.836	111.345	0.245
2800.000	0.344	241.738	2799.514	-12.946	32.097	-12.946	34.610	111.967	0.206
2900.000	0.729	205.948	2899.510	-13.661	31.555	-13.661	34.385	113.409	0.493
3000.000	0.980	201.229	2999.499	-15.030	30.966	-15.030	34.421	115.890	0.260
3100.000	0.293	215.490	3099.492	-16.036	30.508	-16.036	34.466	117.727	0.700
3200.000	0.470	191.725	3199.490	-16.645	30.276	-16.645	34.550	118.801	0.233
3300.000	0.380	146.949	3299.487	-17.324	30.374	-17.324	34.967	119.699	0.334
3400.000	0.742	119.363	3399.482	-17.919	31.118	-17.919	35.909	119.935	0.442
3500.000	1.273	98.899	3499.467	-18.408	32.780	-18.408	37.595	119.317	0.634
3600.000	1.662	131.468	3599.436	-19.540	34.965	-19.540	40.054	119.199	0.904
3700.000	1.031	162.322	3699.409	-21.358	36.324	-21.358	42.138	120.454	0.940
3800.000	0.620	135.422	3799.399	-22.600	36.977	-22.600	43.337	121.433	0.554
3900.000	0.083	189.892	3899.396	-23.058	37.345	-23.058	43.890	121.692	0.576
4000.000	0.290	64.329	3999.396	-23.020	37.561	-23.020	44.054	121.503	0.346
4100.000	0.152	183.420	4099.396	-23.042	37.781	-23.042	44.254	121.379	0.388
4200.000	0.254	215.160	4199.395	-23.356	37.646	-23.356	44.303	121.816	0.148
4300.000	0.656	215.884	4299.392	-24.001	37.182	-24.001	44.256	122.842	0.403
4400.000	0.772	206.545	4399.384	-25.068	36.546	-25.068	44.317	124.448	0.164
4500.000	1.730	200.578	4499.359	-27.084	35.714	-27.084	44.822	127.175	0.965
4600.000	2.858	199.160	4599.277	-30.852	34.365	-30.852	46.182	131.916	1.130
4700.000	3.689	195.100	4699.113	-36.313	32.709	-36.313	48.872	137.989	0.863
4800.000	3.633	187.551	4798.910	-42.560	31.454	-42.560	52.922	143.533	0.485
4900.000	3.411	185.089	4898.721	-48.665	30.774	-48.665	57.579	147.692	0.269
5000.000	3.066	191.493	4998.561	-54.249	29.977	-54.249	61.980	151.075	0.499
5100.000	2.158	193.157	5098.456	-58.703	29.016	-58.703	65.483	153.698	0.911
5200.000	1.647	202.663	5198.401	-61.863	28.034	-61.863	67.918	155.622	0.599
5300.000	0.959	232.625	5298.376	-63.697	26.815	-63.697	69.111	157.170	0.946
5400.000	1.006	252.422	5398.361	-64.470	25.313	-64.470	69.261	158.563	0.341
5500.000	1.300	293.025	5498.343	-64.291	23.432	-64.291	68.428	159.974	0.846
5600.000	1.700	312.715	5598.309	-62.841	21.299	-62.841	66.352	161.277	0.647
5700.000	1.106	298.095	5698.279	-61.380	19.357	-61.380	64.360	162.496	0.689
5800.000	1.125	246.706	5798.262	-61.314	17.605	-61.314	63.791	163.980	0.967
5900.000	0.823	214.212	5898.248	-62.296	16.299	-62.296	64.393	165.338	0.617

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	0.985	214.773	5998.236	-63.596	15.405	-63.596	65.436	166.383	0.162
6100.000	0.613	217.187	6098.226	-64.729	14.591	-64.729	66.353	167.297	0.373
6200.000	0.637	220.035	6198.220	-65.581	13.910	-65.581	67.040	168.024	0.039
6300.000	0.806	220.604	6298.212	-66.540	13.095	-66.540	67.816	168.866	0.170
6400.000	0.677	221.756	6398.204	-67.515	12.244	-67.515	68.616	169.721	0.130
6500.000	0.666	209.774	6498.197	-68.460	11.562	-68.460	69.430	170.414	0.141
6600.000	0.515	213.488	6598.191	-69.340	11.025	-69.340	70.211	170.965	0.156
6700.000	0.728	221.999	6698.185	-70.186	10.352	-70.186	70.946	171.609	0.231
6800.000	0.864	239.070	6798.176	-71.046	9.281	-71.046	71.649	172.558	0.272
6900.000	1.051	241.423	6898.162	-71.872	7.828	-71.872	72.297	173.784	0.191
7000.000	0.746	242.039	6998.150	-72.616	6.448	-72.616	72.902	174.926	0.306
7100.000	0.553	215.505	7098.143	-73.314	5.593	-73.314	73.527	175.637	0.352