



Company/Rig: Noble Energy/CoreTech  
WELL/API#: Ottoson I 12-25/05-123-29233  
DECLINATION: 8.41  
TD AS DRILLED: 7382'  
COUNTY/STATE: Weld/Colorado  
Latitude: 40.499, Longitude: -104.730  
GRID North is 0.500 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=Surface Elevation=4783'

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 10/28/2014 / 10:29

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	0.421	317.276	99.999	0.270	-0.249	0.270	0.368	317.276	0.421
200.000	0.181	63.008	199.998	0.612	-0.358	0.612	0.709	329.691	0.502
300.000	0.061	191.748	299.998	0.631	-0.227	0.631	0.671	340.187	0.225
400.000	0.044	313.221	399.998	0.606	-0.266	0.606	0.662	336.248	0.092
500.000	0.975	58.248	499.993	1.080	0.429	1.080	1.162	21.656	0.987
600.000	1.418	77.580	599.972	1.793	2.360	1.793	2.964	52.773	0.594
700.000	2.060	80.561	699.925	2.354	5.341	2.354	5.837	66.215	0.648
800.000	2.348	81.424	799.851	2.954	9.140	2.954	9.606	72.087	0.290
900.000	2.374	79.486	899.766	3.638	13.202	3.638	13.694	74.594	0.084
1000.000	2.553	78.114	999.674	4.474	17.417	4.474	17.983	75.592	0.189
1100.000	2.879	95.052	1099.563	4.712	22.099	4.712	22.595	77.963	0.862
1200.000	2.970	92.115	1199.433	4.395	27.189	4.395	27.542	80.817	0.175
1300.000	3.343	89.662	1299.281	4.317	32.693	4.317	32.977	82.478	0.396
1400.000	3.825	83.517	1399.085	4.711	38.922	4.711	39.206	83.099	0.616
1500.000	4.450	87.024	1498.824	5.289	46.111	5.289	46.413	83.457	0.674
1600.000	4.840	79.713	1598.497	6.243	54.136	6.243	54.495	83.421	0.708
1700.000	4.902	85.140	1698.136	7.359	62.544	7.359	62.976	83.290	0.465
1800.000	4.676	92.646	1797.788	7.532	70.873	7.532	71.272	83.933	0.665
1900.000	4.539	91.293	1897.465	7.255	78.900	7.255	79.233	84.746	0.175

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	3.933	91.473	1997.191	7.078	86.285	7.078	86.574	85.311	0.606
2100.000	3.944	85.438	2096.955	7.263	93.141	7.263	93.424	85.541	0.414
2200.000	3.706	87.419	2196.732	7.682	99.798	7.682	100.093	85.598	0.272
2300.000	3.430	91.241	2296.539	7.763	106.017	7.763	106.301	85.812	0.364
2400.000	2.963	95.030	2396.383	7.471	111.582	7.471	111.832	86.169	0.512
2500.000	2.853	92.754	2496.254	7.125	116.643	7.125	116.860	86.504	0.160
2600.000	3.133	92.931	2596.118	6.866	121.858	6.866	122.051	86.775	0.280
2700.000	3.632	94.890	2695.943	6.456	127.743	6.456	127.906	87.107	0.512
2800.000	3.628	94.657	2795.743	5.929	134.053	5.929	134.184	87.467	0.015
2900.000	3.949	97.408	2895.524	5.228	140.621	5.228	140.719	87.871	0.369
3000.000	4.078	97.698	2995.279	4.308	147.560	4.308	147.623	88.328	0.131
3100.000	4.034	86.603	3095.030	4.040	154.596	4.040	154.649	88.503	0.785
3200.000	4.181	91.608	3194.773	4.146	161.751	4.146	161.804	88.532	0.387
3300.000	4.037	96.111	3294.516	3.669	168.896	3.669	168.935	88.755	0.353
3400.000	3.672	96.346	3394.290	2.941	175.579	2.941	175.603	89.041	0.365
3500.000	3.927	101.347	3494.070	1.913	182.119	1.913	182.129	89.398	0.418
3600.000	4.618	106.721	3593.792	0.081	189.332	0.081	189.332	89.976	0.798
3700.000	5.469	112.664	3693.405	-2.914	197.586	-2.914	197.608	90.845	0.997
3800.000	5.765	121.833	3792.926	-7.400	206.251	-7.400	206.384	92.055	0.944
3900.000	5.723	118.728	3892.424	-12.445	214.891	-12.445	215.251	93.315	0.313
4000.000	5.415	117.643	3991.952	-17.031	223.443	-17.031	224.091	94.359	0.326
4100.000	5.126	114.389	4091.530	-21.065	231.692	-21.065	232.647	95.195	0.416
4200.000	4.920	117.509	4191.146	-24.890	239.563	-24.890	240.853	95.932	0.342
4300.000	4.866	109.472	4290.783	-28.285	247.365	-28.285	248.977	96.523	0.687
4400.000	4.279	113.975	4390.464	-31.215	254.773	-31.215	256.678	96.985	0.688
4500.000	3.324	114.989	4490.243	-33.955	260.810	-33.955	263.011	97.418	0.957
4600.000	2.413	115.442	4590.117	-36.085	265.339	-36.085	267.781	97.744	0.912
4700.000	2.081	116.368	4690.040	-37.795	268.866	-37.795	271.510	98.002	0.334
4800.000	1.351	116.338	4789.994	-39.125	271.550	-39.125	274.354	98.199	0.730
4900.000	1.000	113.580	4889.973	-39.997	273.406	-39.997	276.316	98.323	0.356
5000.000	0.797	106.165	4989.961	-40.539	274.874	-40.539	277.847	98.390	0.234
5100.000	0.486	107.871	5089.954	-40.863	275.945	-40.863	278.955	98.423	0.311
5200.000	0.913	133.780	5189.947	-41.545	276.924	-41.545	280.023	98.532	0.521
5300.000	1.659	154.248	5289.921	-43.400	278.129	-43.400	281.494	98.869	0.865
5400.000	1.418	151.523	5389.885	-45.792	279.348	-45.792	283.076	99.309	0.252
5500.000	1.068	134.092	5489.862	-47.528	280.607	-47.528	284.604	99.613	0.512
5600.000	0.833	132.994	5589.848	-48.673	281.809	-48.673	285.981	99.799	0.235
5700.000	1.062	109.933	5689.835	-49.485	283.212	-49.485	287.503	99.911	0.440
5800.000	1.091	106.818	5789.817	-50.076	284.995	-50.076	289.361	99.966	0.065
5900.000	0.837	115.976	5889.803	-50.671	286.562	-50.671	291.008	100.028	0.297
6000.000	0.307	121.572	5989.797	-51.132	287.447	-51.132	291.960	100.086	0.532

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
6100.000	0.473	90.028	6089.795	-51.272	288.089	-51.272	292.616	100.092	0.265
6200.000	0.164	164.084	6189.794	-51.410	288.541	-51.410	293.085	100.103	0.456
6300.000	0.600	257.016	6289.792	-51.666	288.070	-51.666	292.667	100.168	0.630
6400.000	0.809	252.390	6389.784	-51.997	286.887	-51.997	291.561	100.273	0.216
6500.000	1.120	247.984	6489.770	-52.577	285.308	-52.577	290.112	100.441	0.320
6600.000	1.129	250.003	6589.751	-53.281	283.476	-53.281	288.439	100.645	0.041
6700.000	1.579	251.720	6689.723	-54.050	281.241	-54.050	286.388	100.879	0.452
6800.000	2.189	252.730	6789.668	-55.049	278.109	-55.049	283.505	101.196	0.611
6900.000	2.107	256.915	6889.598	-56.032	274.494	-56.032	280.155	101.537	0.177
7000.000	2.622	257.108	6989.512	-56.959	270.474	-56.959	276.406	101.892	0.514
7100.000	2.942	264.845	7089.395	-57.700	265.688	-57.700	271.882	102.253	0.493