



Company/Rig: NOBLE ENERGY/ CORETECH
WELL: NOPENS D 19-31
DECLINATION: 8.32
TD AS DRILLED: 7,778 FEET
COUNTY/STATE: WELD/COLORADO
Latitude: 40.214, Longitude: -104.603
GRID North is 0.580 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4,804 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/13/2014 / 12:38

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: LEVI SHELDON

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	0.499	68.674	99.999	0.158	0.406	0.158	0.435	68.674	0.499
200.000	0.421	75.200	199.996	0.410	1.166	0.410	1.236	70.608	0.094
300.000	0.260	61.881	299.994	0.611	1.721	0.611	1.827	70.449	0.178
400.000	0.141	40.151	399.993	0.812	2.001	0.812	2.160	67.907	0.140
500.000	0.050	57.033	499.993	0.930	2.117	0.930	2.312	66.284	0.094
600.000	0.354	106.322	599.992	0.867	2.450	0.867	2.599	70.513	0.324
700.000	0.508	161.454	699.990	0.360	2.888	0.360	2.910	82.892	0.421
800.000	0.600	168.388	799.985	-0.573	3.134	-0.573	3.186	100.361	0.114
900.000	0.634	173.716	899.979	-1.636	3.300	-1.636	3.683	116.366	0.066
1000.000	0.624	175.520	999.973	-2.729	3.403	-2.729	4.362	128.721	0.022
1100.000	0.665	186.835	1099.967	-3.848	3.377	-3.848	5.119	138.729	0.133
1200.000	0.572	191.414	1199.961	-4.913	3.209	-4.913	5.868	146.847	0.105
1300.000	0.683	206.397	1299.955	-5.936	2.845	-5.936	6.582	154.390	0.197
1400.000	1.013	196.977	1399.944	-7.315	2.322	-7.315	7.674	162.388	0.357
1500.000	1.067	215.136	1499.928	-8.921	1.528	-8.921	9.051	170.280	0.333
1600.000	1.024	226.922	1599.911	-10.293	0.340	-10.293	10.299	178.110	0.219
1700.000	1.149	209.348	1699.894	-11.778	-0.804	-11.778	11.805	183.908	0.354
1800.000	1.159	215.764	1799.873	-13.472	-1.887	-13.472	13.604	187.974	0.130
1900.000	1.188	237.141	1899.853	-14.856	-3.349	-14.856	15.229	192.705	0.436

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	0.950	218.156	1999.836	-16.070	-4.732	-16.070	16.752	196.408	0.424
2100.000	0.787	221.713	2099.824	-17.234	-5.701	-17.234	18.153	198.304	0.171
2200.000	0.524	221.518	2199.818	-18.089	-6.461	-18.089	19.209	199.656	0.264
2300.000	0.471	223.281	2299.814	-18.731	-7.046	-18.731	20.012	200.615	0.055
2400.000	0.385	229.584	2399.811	-19.248	-7.584	-19.248	20.688	201.504	0.098
2500.000	0.317	244.004	2499.809	-19.587	-8.088	-19.587	21.191	202.437	0.111
2600.000	0.154	207.199	2599.808	-19.827	-8.398	-19.827	21.532	202.954	0.215
2700.000	0.421	159.578	2699.807	-20.291	-8.331	-20.291	21.934	202.321	0.337
2800.000	0.408	143.609	2799.805	-20.922	-7.991	-20.922	22.396	200.905	0.116
2900.000	0.365	147.553	2899.802	-21.477	-7.609	-21.477	22.785	199.509	0.050
3000.000	0.391	113.700	2999.800	-21.883	-7.126	-21.883	23.014	198.038	0.221
3100.000	0.429	76.500	3099.798	-21.933	-6.450	-21.933	22.861	196.387	0.264
3200.000	0.783	44.800	3199.792	-21.361	-5.604	-21.361	22.083	194.701	0.474
3300.000	1.055	41.141	3299.779	-20.183	-4.517	-20.183	20.682	192.616	0.279
3400.000	0.843	50.170	3399.766	-19.018	-3.347	-19.018	19.311	189.981	0.259
3500.000	1.452	25.864	3499.746	-17.408	-2.230	-17.408	17.550	187.299	0.767
3600.000	1.957	358.907	3599.703	-14.561	-1.710	-14.561	14.661	186.697	0.934
3700.000	2.546	353.826	3699.625	-10.645	-1.981	-10.645	10.828	190.543	0.622
3800.000	2.425	1.295	3799.531	-6.321	-2.172	-6.321	6.684	198.964	0.346
3900.000	2.477	5.616	3899.440	-2.056	-1.913	-2.056	2.808	222.935	0.192
4000.000	2.718	3.166	3999.337	2.462	-1.570	2.462	2.921	327.473	0.266
4100.000	3.040	2.661	4099.211	7.479	-1.316	7.479	7.594	350.018	0.322
4200.000	3.079	5.401	4199.068	12.801	-0.940	12.801	12.836	355.798	0.151
4300.000	2.616	8.198	4298.945	17.734	-0.362	17.734	17.738	358.830	0.483
4400.000	2.340	12.772	4398.851	21.984	0.415	21.984	21.988	1.080	0.339
4500.000	2.369	10.719	4498.767	26.007	1.250	26.007	26.037	2.753	0.089
4600.000	2.570	31.512	4598.676	29.949	2.807	29.949	30.081	5.354	0.913
4700.000	2.663	34.660	4698.572	33.771	5.300	33.771	34.185	8.919	0.171
4800.000	2.824	31.979	4798.457	37.772	7.925	37.772	38.594	11.850	0.206
4900.000	3.225	42.637	4898.318	41.930	11.135	41.930	43.384	14.872	0.689
5000.000	3.315	37.561	4998.156	46.292	14.803	46.292	48.601	17.733	0.303
5100.000	3.450	31.419	5097.982	51.152	18.135	51.152	54.271	19.521	0.386
5200.000	3.209	29.797	5197.813	56.149	21.094	56.149	59.980	20.590	0.259
5300.000	2.945	28.122	5297.669	60.844	23.696	60.844	65.295	21.279	0.279
5400.000	2.851	24.574	5397.541	65.371	25.941	65.371	70.330	21.645	0.202
5500.000	2.697	31.561	5497.424	69.638	28.207	69.638	75.134	22.051	0.371
5600.000	2.045	27.142	5597.338	73.230	30.253	73.230	79.233	22.446	0.676
5700.000	2.349	34.280	5697.264	76.512	32.221	76.512	83.019	22.837	0.408
5800.000	2.486	23.224	5797.176	80.198	34.230	80.198	87.198	23.114	0.485
5900.000	2.563	26.557	5897.079	84.191	36.085	84.191	91.599	23.201	0.166

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	2.634	25.079	5996.976	88.273	38.059	88.273	96.128	23.323	0.097
6100.000	2.464	20.533	6096.877	92.367	39.787	92.367	100.571	23.304	0.264
6200.000	2.520	26.197	6196.783	96.352	41.511	96.352	104.914	23.308	0.252
6300.000	2.194	30.771	6296.698	99.969	43.461	99.969	109.008	23.497	0.377
6400.000	1.925	25.980	6396.633	103.124	45.176	103.124	112.585	23.657	0.318
6500.000	1.653	28.827	6496.585	105.897	46.607	105.897	115.700	23.755	0.287
6600.000	1.354	26.127	6596.550	108.222	47.823	108.222	118.317	23.841	0.307
6700.000	1.221	28.635	6696.525	110.218	48.854	110.218	120.560	23.905	0.145
6800.000	1.254	6.604	6796.502	112.239	49.490	112.239	122.666	23.794	0.474
6900.000	1.574	358.614	6896.472	114.699	49.583	114.699	124.957	23.378	0.375
7000.000	1.561	10.553	6996.434	117.411	49.799	117.411	127.535	22.984	0.326
7100.000	1.574	16.240	7096.397	120.068	50.433	120.068	130.230	22.784	0.156
7200.000	1.214	8.940	7196.367	122.433	50.981	122.433	132.623	22.607	0.401
7300.000	0.962	27.863	7296.350	124.222	51.538	124.222	134.489	22.533	0.435
7400.000	0.258	60.868	7396.344	125.073	52.127	125.073	135.501	22.625	0.758