



Company/Rig: NOBLE ENERGY/CORETECH
WELL/API#: HAYTHORN E 7-3/05-123-26438
DECLINATION: 8.38
TD AS DRILLED: 7344 FEET
COUNTY/STATE: WELD / COLORADO
Latitude: 40.508, Longitude: -104.709
GRID North is 0.510 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION=5091 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro-de_01.ut

Minimum Curvature Method

Report Date/Time: 12/8/2014 / 08:49

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

SURVEYOR: BRIAN BUDD

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	0.179	196.393	100.000	-0.150	-0.044	-0.150	0.156	196.393	0.179
200.000	0.353	158.328	199.999	-0.586	0.026	-0.586	0.587	177.479	0.240
300.000	0.372	191.601	299.997	-1.190	0.074	-1.190	1.193	176.421	0.208
400.000	0.344	255.095	399.995	-1.585	-0.281	-1.585	1.610	190.042	0.377
500.000	0.378	244.739	499.993	-1.804	-0.869	-1.804	2.002	205.736	0.074
600.000	0.482	267.858	599.991	-1.960	-1.588	-1.960	2.523	219.016	0.200
700.000	0.553	273.681	699.986	-1.945	-2.490	-1.945	3.160	232.010	0.089
800.000	0.546	245.771	799.982	-2.110	-3.407	-2.110	4.007	238.233	0.265
900.000	0.462	266.234	899.978	-2.332	-4.244	-2.332	4.842	241.212	0.198
1000.000	0.652	275.375	999.974	-2.305	-5.212	-2.305	5.699	246.141	0.209
1100.000	0.611	267.810	1099.967	-2.272	-6.311	-2.272	6.707	250.200	0.092
1200.000	0.815	263.227	1199.960	-2.376	-7.550	-2.376	7.916	252.529	0.211
1300.000	0.816	265.322	1299.950	-2.518	-8.966	-2.518	9.313	254.312	0.030
1400.000	0.858	258.051	1399.939	-2.732	-10.409	-2.732	10.761	255.296	0.114
1500.000	0.910	264.024	1499.927	-2.969	-11.931	-2.969	12.295	256.025	0.106
1600.000	0.843	250.632	1599.915	-3.296	-13.416	-3.296	13.815	256.197	0.215
1700.000	0.882	256.695	1699.904	-3.717	-14.859	-3.717	15.317	255.955	0.099
1800.000	0.732	246.372	1799.894	-4.150	-16.194	-4.150	16.717	255.624	0.208
1900.000	0.616	263.494	1899.887	-4.467	-17.313	-4.467	17.880	255.531	0.231

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	0.600	307.936	1999.882	-4.206	-18.259	-4.206	18.738	257.027	0.460
2100.000	0.586	327.964	2099.877	-3.451	-18.943	-3.451	19.255	259.674	0.207
2200.000	0.410	331.152	2199.873	-2.705	-19.387	-2.705	19.575	262.057	0.178
2300.000	0.396	350.963	2299.871	-2.050	-19.614	-2.050	19.721	264.033	0.139
2400.000	0.464	311.585	2399.868	-1.439	-19.971	-1.439	20.023	265.878	0.297
2500.000	0.596	285.877	2499.864	-1.028	-20.775	-1.028	20.800	267.167	0.269
2600.000	0.278	288.883	2599.861	-0.807	-21.505	-0.807	21.520	267.850	0.319
2700.000	0.605	286.092	2699.858	-0.582	-22.242	-0.582	22.249	268.500	0.328
2800.000	0.501	266.809	2799.853	-0.460	-23.185	-0.460	23.190	268.863	0.212
2900.000	0.451	232.001	2899.850	-0.727	-23.932	-0.727	23.943	268.260	0.289
3000.000	0.251	249.965	2999.848	-1.044	-24.447	-1.044	24.470	267.554	0.226
3100.000	0.324	71.046	3099.848	-1.027	-24.385	-1.027	24.407	267.588	0.575
3200.000	0.328	83.059	3199.846	-0.901	-23.833	-0.901	23.850	267.836	0.068
3300.000	0.282	129.226	3299.845	-1.022	-23.358	-1.022	23.381	267.495	0.243
3400.000	0.499	166.266	3399.843	-1.600	-23.064	-1.600	23.120	266.031	0.322
3500.000	0.612	167.069	3499.838	-2.543	-22.842	-2.543	22.983	263.646	0.114
3600.000	0.717	153.903	3599.831	-3.626	-22.447	-3.626	22.738	260.823	0.185
3700.000	1.399	133.471	3699.814	-5.028	-21.285	-5.028	21.871	256.708	0.768
3800.000	1.785	119.492	3799.775	-6.635	-19.044	-6.635	20.167	250.791	0.545
3900.000	1.989	129.539	3899.721	-8.506	-16.350	-8.506	18.430	242.514	0.388
4000.000	2.087	130.733	3999.658	-10.799	-13.632	-10.799	17.391	231.615	0.107
4100.000	1.678	123.577	4099.604	-12.797	-11.033	-12.797	16.896	220.768	0.471
4200.000	1.039	121.831	4199.576	-14.084	-9.043	-14.084	16.738	212.705	0.640
4300.000	1.066	141.432	4299.559	-15.289	-7.694	-15.289	17.116	206.712	0.359
4400.000	0.815	111.190	4399.546	-16.273	-6.451	-16.273	17.505	201.622	0.547
4500.000	0.639	115.077	4499.538	-16.767	-5.282	-16.767	17.579	197.486	0.183
4600.000	0.086	328.017	4599.536	-16.939	-4.817	-16.939	17.611	195.874	0.713
4700.000	0.207	171.004	4699.536	-17.054	-4.829	-17.054	17.725	195.809	0.288
4800.000	0.279	266.647	4799.535	-17.247	-5.044	-17.247	17.969	196.301	0.364
4900.000	0.314	305.969	4899.534	-17.100	-5.508	-17.100	17.966	197.855	0.202
5000.000	0.080	112.877	4999.534	-16.967	-5.665	-16.967	17.888	198.465	0.393
5100.000	0.117	97.641	5099.534	-17.008	-5.499	-17.008	17.875	197.918	0.045
5200.000	0.257	8.222	5199.533	-16.800	-5.366	-16.800	17.636	197.713	0.281
5300.000	0.230	22.368	5299.532	-16.393	-5.257	-16.393	17.216	197.782	0.066
5400.000	0.159	32.279	5399.532	-16.090	-5.107	-16.090	16.881	197.609	0.078
5500.000	0.513	331.633	5499.530	-15.579	-5.245	-15.579	16.439	198.607	0.456
5600.000	0.710	307.870	5599.524	-14.805	-5.947	-14.805	15.955	201.883	0.317
5700.000	0.923	305.735	5699.514	-13.955	-7.090	-13.955	15.652	206.934	0.216
5800.000	0.697	2.490	5799.506	-12.876	-7.717	-12.876	15.012	210.937	0.795
5900.000	0.912	15.617	5899.496	-11.502	-7.477	-11.502	13.719	213.026	0.282

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	1.119	15.762	5999.480	-9.796	-6.997	-9.796	12.038	215.539	0.207
6100.000	1.135	25.089	6099.461	-7.959	-6.312	-7.959	10.158	218.417	0.184
6200.000	1.125	35.515	6199.441	-6.264	-5.322	-6.264	8.219	220.355	0.205
6300.000	1.109	23.980	6299.423	-4.581	-4.359	-4.581	6.323	223.578	0.225
6400.000	1.495	358.946	6399.397	-2.392	-3.990	-2.392	4.652	239.053	0.679
6500.000	1.323	359.319	6499.367	0.067	-4.027	0.067	4.028	270.947	0.173
6600.000	1.024	341.985	6599.346	2.071	-4.318	2.071	4.788	295.623	0.461
6700.000	0.799	303.401	6699.334	3.304	-5.176	3.304	6.141	302.555	0.639
6800.000	0.574	235.540	6799.329	3.405	-6.171	3.405	7.048	298.888	0.789
6900.000	0.565	177.277	6899.325	2.629	-6.560	2.629	7.067	291.837	0.554
7000.000	0.839	121.263	6999.318	1.756	-5.911	1.756	6.166	286.548	0.702
7100.000	1.102	74.242	7099.305	1.638	-4.359	1.638	4.656	290.589	0.811