



Company/Rig: NOBLE ENERGY/ CORETECH
WELL/API#: FRAN E 25-5/05-123-16793
DECLINATION: 8.31
TD AS DRILLED: 7160
COUNTY/STATE: WELD/COLORADO
VS-Azi: 0.000 Degrees
Latitude: 40.45865, Longitude: -104.61845
Grid North = True North -0.57 degs (NAD 27)
Grid Convergence Applied = -0.57 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4676

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/12/2015 / 15:50

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: BRIAN BREWBAKER / FRAN E 25-5

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	0.193	252.862	100.000	-0.050	-0.161	-0.050	0.168	252.862	0.193
200.000	0.010	306.961	200.000	-0.094	-0.328	-0.094	0.341	254.041	0.187
300.000	0.131	137.067	300.000	-0.172	-0.257	-0.172	0.310	236.241	0.140
400.000	0.151	140.965	399.999	-0.358	-0.097	-0.358	0.371	195.108	0.023
500.000	0.320	214.467	499.999	-0.691	-0.172	-0.691	0.712	193.956	0.313
600.000	0.285	230.002	599.997	-1.081	-0.520	-1.081	1.200	205.699	0.089
700.000	0.134	235.425	699.996	-1.307	-0.807	-1.307	1.536	211.687	0.152
800.000	0.291	226.737	799.996	-1.547	-1.088	-1.547	1.891	215.108	0.159
900.000	0.246	191.259	899.995	-1.932	-1.314	-1.932	2.336	214.229	0.169
1000.000	0.291	214.203	999.994	-2.353	-1.499	-2.353	2.790	212.502	0.116
1100.000	0.175	217.955	1099.993	-2.683	-1.736	-2.683	3.196	212.897	0.117
1200.000	0.152	208.274	1199.992	-2.920	-1.892	-2.920	3.480	212.943	0.036
1300.000	0.123	237.726	1299.992	-3.094	-2.046	-3.094	3.710	213.470	0.075
1400.000	0.049	220.268	1399.992	-3.184	-2.164	-3.184	3.850	214.201	0.078
1500.000	0.087	305.770	1499.992	-3.172	-2.254	-3.172	3.891	215.389	0.097
1600.000	0.290	42.872	1599.991	-2.942	-2.143	-2.942	3.640	216.069	0.313
1700.000	0.520	48.718	1699.989	-2.457	-1.630	-2.457	2.949	213.556	0.233
1800.000	0.651	54.374	1799.984	-1.827	-0.827	-1.827	2.006	204.361	0.144

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
1900.000	0.652	67.678	1899.977	-1.280	0.161	-1.280	1.290	172.854	0.151
2000.000	0.571	88.242	1999.972	-1.049	1.184	-1.049	1.582	131.534	0.232
2100.000	0.477	106.338	2099.968	-1.151	2.082	-1.151	2.379	118.936	0.189
2200.000	0.197	140.493	2199.966	-1.401	2.591	-1.401	2.946	118.399	0.333
2300.000	0.109	294.812	2299.966	-1.494	2.614	-1.494	3.011	119.746	0.300
2400.000	0.219	240.284	2399.965	-1.549	2.361	-1.549	2.824	123.262	0.180
2500.000	0.226	203.343	2499.965	-1.825	2.117	-1.825	2.795	130.764	0.141
2600.000	0.493	275.606	2599.963	-1.964	1.610	-1.964	2.539	140.650	0.476
2700.000	0.440	282.993	2699.960	-1.835	0.807	-1.835	2.005	156.255	0.080
2800.000	0.326	278.200	2799.957	-1.708	0.151	-1.708	1.715	174.944	0.118
2900.000	0.575	273.488	2899.954	-1.637	-0.632	-1.637	1.755	201.098	0.251
3000.000	0.633	282.321	2999.949	-1.489	-1.673	-1.489	2.239	228.332	0.110
3100.000	0.744	289.343	3099.941	-1.156	-2.825	-1.156	3.052	247.749	0.138
3200.000	0.972	243.126	3199.931	-1.324	-4.194	-1.324	4.398	252.476	0.705
3300.000	1.076	243.067	3299.915	-2.133	-5.788	-2.133	6.168	249.769	0.105
3400.000	1.008	237.800	3399.899	-3.027	-7.369	-3.027	7.967	247.668	0.118
3500.000	0.767	214.695	3499.887	-4.046	-8.495	-4.046	9.409	244.530	0.427
3600.000	0.782	183.606	3599.878	-5.278	-8.919	-5.278	10.363	239.385	0.415
3700.000	0.813	178.950	3699.869	-6.668	-8.949	-6.668	11.160	233.309	0.072
3800.000	0.841	190.572	3799.858	-8.099	-9.070	-8.099	12.160	228.238	0.170
3900.000	0.741	168.809	3899.849	-9.455	-9.079	-9.455	13.108	223.839	0.314
4000.000	0.780	163.679	3999.840	-10.742	-8.763	-10.742	13.863	219.205	0.078
4100.000	0.758	142.267	4099.831	-11.918	-8.167	-11.918	14.448	214.421	0.286
4200.000	0.638	127.447	4199.824	-12.779	-7.320	-12.779	14.728	209.805	0.216
4300.000	0.574	147.372	4299.819	-13.539	-6.609	-13.539	15.066	206.017	0.219
4400.000	0.740	140.363	4399.812	-14.458	-5.927	-14.458	15.626	202.289	0.185
4500.000	0.190	211.213	4499.809	-15.098	-5.601	-15.098	16.103	200.353	0.701
4600.000	0.185	191.504	4599.808	-15.398	-5.719	-15.398	16.426	200.375	0.064
4700.000	0.313	326.046	4699.808	-15.329	-5.904	-15.329	16.427	201.063	0.462
4800.000	0.364	11.068	4799.806	-14.791	-5.995	-14.791	15.960	202.065	0.264
4900.000	0.292	335.628	4899.805	-14.246	-6.040	-14.246	15.474	202.974	0.211
5000.000	0.286	336.268	4999.803	-13.786	-6.245	-13.786	15.134	204.372	0.007
5100.000	0.318	318.334	5099.802	-13.350	-6.530	-13.350	14.862	206.064	0.099
5200.000	0.474	310.274	5199.800	-12.876	-7.030	-12.876	14.670	208.633	0.166
5300.000	0.616	331.261	5299.795	-12.137	-7.604	-12.137	14.322	212.068	0.243
5400.000	1.192	319.614	5399.782	-10.873	-8.537	-10.873	13.824	218.137	0.602
5500.000	1.367	306.341	5499.758	-9.374	-10.171	-9.374	13.832	227.337	0.343
5600.000	1.153	297.902	5599.733	-8.196	-12.021	-8.196	14.549	235.713	0.282
5700.000	1.204	307.075	5699.712	-7.092	-13.749	-7.092	15.470	242.714	0.195
5800.000	1.607	314.097	5799.682	-5.483	-15.594	-5.483	16.530	250.629	0.437

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
5900.000	1.832	325.441	5899.637	-3.191	-17.508	-3.191	17.796	259.672	0.407
6000.000	2.623	339.993	5999.562	0.276	-19.197	0.276	19.199	270.823	0.966
6100.000	2.799	351.517	6099.451	4.840	-20.340	4.840	20.908	283.385	0.572
6200.000	1.912	1.985	6199.366	8.922	-20.643	8.922	22.488	293.376	0.982
6300.000	1.360	30.588	6299.326	11.612	-19.981	11.612	23.110	300.163	0.969
6400.000	1.398	59.674	6399.298	13.250	-18.324	13.250	22.612	305.870	0.694
6500.000	1.878	86.245	6499.259	13.973	-15.636	13.973	20.970	311.786	0.886
6600.000	1.861	90.119	6599.205	14.077	-12.377	14.077	18.744	318.676	0.128
6700.000	2.093	107.318	6699.147	13.530	-9.010	13.530	16.256	326.339	0.634
6780.000	2.150	108.091	6779.092	12.629	-6.189	12.629	14.064	333.892	0.079