



Company/Rig: NOBLE ENERGY/ CORETECH
WELL/API#: VIGILANT STATE #AC 16-01/05-123-37246
DECLINATION: 8.25 DEGREES
TD AS DRILLED: 8990 FEET
COUNTY/STATE: WELD/COLORADO
VS-Azi: 0.000 Degrees
Latitude: 40.57937, Longitude: -104.43436
Grid North = True North -0.69 degs (NAD 27)
Grid Convergence Applied = -0.69 degs



DEPTH REFERENCE : RKB=SURFACE ELEVATION= 4866 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 7/16/2015 / 09:53

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976
SURVEYOR: KEVIN MCDOWELL

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	0.323	138.678	99.999	-0.212	0.186	-0.212	0.282	138.678	0.323
200.000	0.183	149.528	199.998	-0.560	0.453	-0.560	0.721	141.065	0.147
300.000	0.381	128.115	299.997	-0.903	0.795	-0.903	1.203	138.637	0.221
400.000	0.410	171.116	399.995	-1.462	1.112	-1.462	1.836	142.749	0.291
500.000	0.431	111.821	499.993	-1.955	1.516	-1.955	2.474	142.215	0.417
600.000	0.463	189.280	599.991	-2.494	1.800	-2.494	3.076	144.187	0.560
700.000	0.521	203.178	699.987	-3.312	1.555	-3.312	3.659	154.841	0.132
800.000	0.467	191.150	799.983	-4.130	1.297	-4.130	4.329	162.561	0.117
900.000	0.177	134.253	899.982	-4.638	1.329	-4.638	4.825	164.008	0.399
1000.000	0.138	250.634	999.982	-4.786	1.326	-4.786	4.967	164.514	0.269
1100.000	0.154	94.831	1099.981	-4.838	1.346	-4.838	5.021	164.455	0.285
1200.000	0.090	248.010	1199.981	-4.878	1.406	-4.878	5.077	163.919	0.237
1300.000	0.102	61.968	1299.981	-4.866	1.412	-4.866	5.067	163.812	0.192
1400.000	0.164	139.608	1399.981	-4.933	1.584	-4.933	5.181	162.196	0.174
1500.000	0.194	105.512	1499.981	-5.087	1.840	-5.087	5.409	160.113	0.109
1600.000	0.068	33.198	1599.980	-5.083	2.036	-5.083	5.475	158.173	0.185
1700.000	0.184	156.897	1699.980	-5.181	2.131	-5.181	5.602	157.641	0.229
1800.000	0.153	150.877	1799.980	-5.446	2.259	-5.446	5.896	157.468	0.035

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	0.059	166.208	1899.980	-5.613	2.337	-5.613	6.080	157.397	0.097
2000.000	0.113	146.826	1999.979	-5.745	2.403	-5.745	6.228	157.305	0.060
2100.000	0.162	131.546	2099.979	-5.921	2.562	-5.921	6.452	156.601	0.061
2200.000	0.207	143.946	2199.979	-6.161	2.774	-6.161	6.757	155.758	0.060
2300.000	0.139	30.239	2299.978	-6.203	2.942	-6.203	6.865	154.624	0.293
2400.000	0.142	201.899	2399.978	-6.213	2.957	-6.213	6.880	154.547	0.280
2500.000	0.192	69.637	2499.978	-6.269	3.068	-6.269	6.980	153.927	0.306
2600.000	0.200	335.337	2599.978	-6.052	3.152	-6.052	6.824	152.494	0.287
2700.000	0.209	330.493	2699.977	-5.735	2.989	-5.735	6.467	152.473	0.020
2800.000	0.220	322.696	2799.976	-5.423	2.782	-5.423	6.095	152.840	0.031
2900.000	0.214	277.499	2899.976	-5.245	2.481	-5.245	5.802	154.690	0.167
3000.000	0.190	286.453	2999.975	-5.174	2.136	-5.174	5.598	157.563	0.039
3100.000	0.121	2.591	3099.975	-5.022	1.982	-5.022	5.399	158.461	0.199
3200.000	0.075	83.629	3199.975	-4.909	2.052	-4.909	5.321	157.321	0.132
3300.000	0.071	173.868	3299.975	-4.963	2.123	-4.963	5.398	156.843	0.103
3400.000	0.130	148.558	3399.975	-5.121	2.189	-5.121	5.569	156.861	0.073
3500.000	0.120	202.242	3499.974	-5.315	2.208	-5.315	5.755	157.442	0.113
3600.000	0.083	155.682	3599.974	-5.478	2.198	-5.478	5.902	158.139	0.087
3700.000	0.050	268.901	3699.974	-5.544	2.184	-5.544	5.959	158.499	0.112
3800.000	0.047	338.508	3799.974	-5.507	2.126	-5.507	5.903	158.894	0.055
3900.000	0.059	295.166	3899.974	-5.446	2.064	-5.446	5.824	159.249	0.041
4000.000	0.147	328.034	3999.974	-5.315	1.949	-5.315	5.661	159.867	0.103
4100.000	0.145	233.693	4099.974	-5.281	1.779	-5.281	5.573	161.383	0.214
4200.000	0.208	143.331	4199.973	-5.501	1.786	-5.501	5.784	162.017	0.254
4300.000	0.252	164.660	4299.973	-5.858	1.952	-5.858	6.175	161.573	0.095
4400.000	0.270	257.764	4399.972	-6.120	1.780	-6.120	6.373	163.787	0.379
4500.000	0.275	254.346	4499.971	-6.235	1.318	-6.235	6.372	168.062	0.017
4600.000	0.224	287.060	4599.970	-6.242	0.900	-6.242	6.306	171.794	0.149
4700.000	0.193	305.117	4699.969	-6.087	0.575	-6.087	6.115	174.603	0.072
4800.000	0.284	71.876	4799.969	-5.913	0.673	-5.913	5.951	173.508	0.429
4900.000	0.243	151.767	4899.968	-6.023	1.009	-6.023	6.107	170.490	0.340
5000.000	0.235	237.200	4999.967	-6.321	0.937	-6.321	6.390	171.566	0.324
5100.000	0.159	173.951	5099.967	-6.570	0.780	-6.570	6.616	173.231	0.216
5200.000	0.109	98.387	5199.967	-6.722	0.889	-6.722	6.781	172.470	0.169
5300.000	0.105	182.711	5299.967	-6.828	0.978	-6.828	6.898	171.847	0.144
5400.000	0.133	218.416	5399.966	-7.011	0.902	-7.011	7.069	172.671	0.078
5500.000	0.162	249.447	5499.966	-7.151	0.697	-7.151	7.185	174.429	0.083
5600.000	0.138	272.664	5599.966	-7.195	0.446	-7.195	7.209	176.457	0.065
5700.000	0.125	308.771	5699.965	-7.121	0.240	-7.121	7.125	178.066	0.082
5800.000	0.071	154.834	5799.965	-7.109	0.182	-7.109	7.111	178.536	0.191

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	0.106	109.207	5899.965	-7.195	0.295	-7.195	7.201	177.650	0.076
6000.000	0.140	189.750	5999.965	-7.346	0.362	-7.346	7.355	177.179	0.161
6100.000	0.195	183.881	6099.965	-7.636	0.330	-7.636	7.643	177.527	0.058
6200.000	0.243	25.856	6199.964	-7.616	0.411	-7.616	7.627	176.913	0.430
6300.000	0.227	315.338	6299.964	-7.284	0.364	-7.284	7.293	177.141	0.272
6400.000	0.264	143.650	6399.963	-7.328	0.361	-7.328	7.337	177.180	0.490
6500.000	0.316	322.796	6499.963	-7.294	0.331	-7.294	7.301	177.405	0.580
6600.000	0.288	77.021	6599.962	-7.018	0.409	-7.018	7.030	176.668	0.508
6700.000	0.214	220.862	6699.962	-7.102	0.531	-7.102	7.122	175.721	0.478
6800.000	0.392	311.545	6799.961	-7.017	0.153	-7.017	7.018	178.750	0.449
6900.000	0.150	168.443	6899.960	-6.918	-0.077	-6.918	6.918	180.635	0.520
7000.000	0.407	235.683	6999.959	-7.247	-0.344	-7.247	7.255	182.717	0.375
7100.000	0.241	242.418	7099.958	-7.544	-0.824	-7.544	7.589	186.233	0.170
7200.000	0.174	217.167	7199.957	-7.763	-1.102	-7.763	7.841	188.082	0.112
7300.000	0.107	251.670	7299.957	-7.913	-1.283	-7.913	8.017	189.209	0.105
7400.000	0.268	170.979	7399.956	-8.173	-1.335	-8.173	8.282	189.277	0.272
7500.000	0.245	156.524	7499.955	-8.600	-1.213	-8.600	8.686	188.029	0.068
7600.000	0.087	312.359	7599.955	-8.745	-1.184	-8.745	8.825	187.711	0.327
7700.000	0.254	342.587	7699.954	-8.483	-1.307	-8.483	8.583	188.756	0.184
7800.000	0.126	309.840	7799.954	-8.201	-1.457	-8.201	8.330	190.077	0.162
7900.000	0.127	346.507	7899.954	-8.022	-1.568	-8.022	8.174	191.060	0.080