

Company: NOBLE ENERGY

Well: MERCURE 5-14

API: 05-123-17487

Rig Name: PRODUCTION/LIGHTNING

State/County: COLORADO/WELD

Latitude: 40.336, Longitude: -104.689

GRID North is 0.520 Degrees East of True North

VS-Azi: 0.000 Degrees

**FIELD COPY ONLY (NOT DEFINITIVE)**

Service Company : VAUGHN ENERGY SERVICES

**DRILLOG MS GYRO SURVEY CALCULATIONS**

Filename: msgyro\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 12/8/2011 / 17:28

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

866-835-8333

NICK CAMPBELL

DEPTH REFERENCE=GROUND LEVEL

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	0.373	95.700	99.999	-0.032	0.324	-0.032	0.325	95.700	0.373
200.000	0.387	103.187	199.997	-0.142	0.976	-0.142	0.986	98.259	0.052
300.000	0.373	102.629	299.995	-0.290	1.623	-0.290	1.649	100.131	0.015
400.000	0.230	90.952	399.994	-0.364	2.141	-0.364	2.172	99.662	0.155
500.000	0.197	220.049	499.993	-0.499	2.231	-0.499	2.286	102.616	0.385
600.000	0.437	243.004	599.992	-0.804	1.781	-0.804	1.954	114.291	0.267
700.000	0.460	242.668	699.989	-1.161	1.085	-1.161	1.589	136.941	0.023
800.000	0.546	242.275	799.985	-1.567	0.307	-1.567	1.596	168.916	0.086
900.000	0.515	234.438	899.980	-2.050	-0.480	-2.050	2.105	193.191	0.078
1000.000	0.523	228.108	999.976	-2.616	-1.186	-2.616	2.873	204.392	0.058
1100.000	0.484	232.980	1099.972	-3.176	-1.864	-3.176	3.682	210.407	0.058
1200.000	0.287	242.067	1199.970	-3.547	-2.422	-3.547	4.295	214.328	0.205
1300.000	0.320	253.917	1299.969	-3.742	-2.912	-3.742	4.742	217.893	0.071
1400.000	0.278	239.624	1399.967	-3.942	-3.390	-3.942	5.199	220.695	0.086
1500.000	0.059	272.987	1499.967	-4.062	-3.650	-4.062	5.461	221.944	0.231
1600.000	0.033	37.095	1599.967	-4.036	-3.684	-4.036	5.465	222.386	0.082
1700.000	0.222	218.261	1699.967	-4.166	-3.787	-4.166	5.630	222.270	0.255
1800.000	0.186	187.752	1799.966	-4.479	-3.929	-4.479	5.958	221.257	0.113
1900.000	0.103	202.053	1899.966	-4.723	-3.984	-4.723	6.179	220.153	0.090
2000.000	0.412	270.439	1999.965	-4.803	-4.378	-4.803	6.499	222.350	0.387
2100.000	0.586	300.170	2099.961	-4.543	-5.180	-4.543	6.890	228.750	0.306
2200.000	0.603	269.328	2199.956	-4.292	-6.149	-4.292	7.498	235.084	0.317
2300.000	0.461	260.758	2299.952	-4.363	-7.072	-4.363	8.309	238.328	0.162
2400.000	0.598	212.062	2399.948	-4.870	-7.746	-4.870	9.149	237.842	0.454
2500.000	0.405	201.765	2499.944	-5.641	-8.154	-5.641	9.915	235.326	0.212
2600.000	0.494	177.057	2599.941	-6.400	-8.263	-6.400	10.451	232.242	0.211
2700.000	0.679	202.356	2699.936	-7.379	-8.466	-7.379	11.230	228.926	0.314
2800.000	0.681	228.652	2799.929	-8.320	-9.138	-8.320	12.358	227.683	0.310
2900.000	0.763	223.739	2899.921	-9.193	-10.044	-9.193	13.617	227.533	0.102

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
3000.000	0.682	243.213	2999.913	-9.942	-11.036	-9.942	14.854	227.984	0.257
3100.000	0.813	209.298	3099.905	-10.830	-11.914	-10.830	16.101	227.731	0.454
3200.000	0.566	205.342	3199.898	-11.895	-12.473	-11.895	17.236	226.359	0.251
3300.000	0.454	186.395	3299.894	-12.735	-12.729	-12.735	18.006	224.986	0.201
3400.000	0.622	172.150	3399.890	-13.666	-12.699	-13.666	18.656	222.898	0.214
3500.000	0.820	170.523	3499.882	-14.910	-12.507	-14.910	19.461	219.990	0.199
3600.000	0.726	192.494	3599.873	-16.235	-12.526	-16.235	20.505	217.652	0.309
3700.000	0.527	203.080	3699.867	-17.276	-12.843	-17.276	21.527	216.628	0.230
3800.000	0.651	201.430	3799.861	-18.227	-13.231	-18.227	22.523	215.975	0.125
3900.000	0.523	201.175	3899.856	-19.182	-13.603	-19.182	23.516	215.343	0.128
4000.000	0.525	211.203	3999.852	-20.000	-14.006	-20.000	24.416	215.003	0.092
4100.000	0.470	178.522	4099.848	-20.802	-14.232	-20.802	25.204	214.380	0.285
4200.000	0.377	165.562	4199.846	-21.530	-14.140	-21.530	25.758	213.295	0.133
4300.000	0.468	103.225	4299.843	-21.942	-13.661	-21.942	25.847	211.905	0.444
4400.000	0.626	25.672	4399.840	-21.544	-13.027	-21.544	25.176	211.160	0.696
4500.000	0.548	56.867	4499.835	-20.790	-12.390	-20.790	24.202	210.793	0.324
4600.000	0.667	42.478	4599.829	-20.100	-11.597	-20.100	23.206	209.984	0.193
4700.000	1.031	57.782	4699.818	-19.191	-10.443	-19.191	21.848	208.553	0.426
4800.000	1.754	43.691	4799.789	-17.605	-8.624	-17.605	19.604	206.099	0.795
4900.000	2.147	21.753	4899.732	-14.758	-6.873	-14.758	16.280	204.971	0.837
5000.000	1.975	357.290	4999.669	-11.297	-6.260	-11.297	12.915	208.992	0.889
5100.000	1.416	336.136	5099.626	-8.445	-6.841	-8.445	10.869	219.009	0.830
5200.000	1.077	357.670	5199.602	-6.376	-7.379	-6.376	9.752	229.172	0.573
5300.000	0.467	350.085	5299.593	-5.036	-7.488	-5.036	9.023	236.079	0.618
5400.000	0.276	331.284	5399.591	-4.423	-7.673	-4.423	8.857	240.038	0.224
5500.000	0.282	303.784	5499.590	-4.076	-7.994	-4.076	8.973	242.985	0.133
5600.000	0.748	301.575	5599.585	-3.597	-8.754	-3.597	9.464	247.662	0.466
5700.000	0.214	359.600	5699.582	-3.068	-9.311	-3.068	9.804	251.761	0.660
5800.000	0.343	348.492	5799.581	-2.588	-9.372	-2.588	9.723	254.561	0.139
5900.000	0.272	344.362	5899.579	-2.067	-9.496	-2.067	9.718	257.722	0.074
6000.000	0.537	62.774	5999.577	-1.624	-9.143	-1.624	9.286	259.929	0.551
6100.000	0.214	111.191	6099.575	-1.477	-8.552	-1.477	8.679	260.201	0.426
6200.000	0.139	167.922	6199.575	-1.663	-8.353	-1.663	8.517	258.740	0.180
6300.000	0.200	273.147	6299.574	-1.772	-8.502	-1.772	8.684	258.229	0.271
6400.000	0.252	41.094	6399.574	-1.597	-8.532	-1.597	8.680	259.401	0.406
6500.000	0.259	14.376	6499.573	-1.212	-8.331	-1.212	8.419	261.723	0.118
6600.000	0.186	349.863	6599.572	-0.833	-8.304	-0.833	8.345	264.269	0.119
6700.000	0.559	338.260	6699.570	-0.220	-8.513	-0.220	8.516	268.518	0.379
6800.000	0.383	28.579	6799.567	0.527	-8.534	0.527	8.550	273.534	0.431
6900.000	0.180	25.522	6899.566	0.962	-8.306	0.962	8.362	276.607	0.204
7000.000	0.733	27.863	6999.562	1.669	-7.940	1.669	8.113	281.871	0.554
7100.000	0.611	20.596	7099.555	2.734	-7.453	2.734	7.939	290.142	0.149
HORIZONTAL DISPLACEMENT IS 7.939 FEET AT 290.142 DEGREES									