



Company: NOBLE ENERGY  
 Well: MCMILLEN TRUST 19-5G  
 API: 05-123-14907  
 Rig Name: PRODUCTION/LIGHTNING  
 State/County: COLORADO/WELD  
 Latitude: 40.300, Longitude: -104.713  
 GRID North is 0.510 Degrees East of True North  
 VS-Azi: 0.000 Degrees



# **FIELD COPY ONLY (NOT DEFINITIVE)**

Depth Reference : RKB=GROUND LEVEL

## **DRILLOG MS GYRO SURVEY CALCULATIONS**

Filename: msgyro\_run02-01\_ed.ut  
 Minimum Curvature Method  
 Report Date/Time: 10/19/2012 / 18:14

VAUGHN ENERGY SERVICES  
 HENDERSON, COLORADO  
 866-835-8333  
 Nick Kula

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	0.419	259.125	99.999	-0.069	-0.359	-0.069	0.365	259.125	0.419
200.000	0.423	276.037	199.996	-0.099	-1.084	-0.099	1.089	264.780	0.124
300.000	0.526	233.086	299.993	-0.336	-1.818	-0.336	1.849	259.533	0.360
400.000	0.189	243.840	399.991	-0.684	-2.333	-0.684	2.431	253.656	0.342
500.000	0.909	296.014	499.986	-0.409	-3.194	-0.409	3.220	262.700	0.807
600.000	0.816	306.626	599.975	0.363	-4.478	0.363	4.493	274.639	0.184
700.000	0.768	302.353	699.966	1.146	-5.615	1.146	5.731	281.540	0.076
800.000	1.004	272.464	799.954	1.543	-7.056	1.543	7.223	282.332	0.511
900.000	0.693	276.070	899.943	1.644	-8.533	1.644	8.690	280.907	0.315
1000.000	0.655	267.324	999.936	1.682	-9.706	1.682	9.850	279.829	0.110
1100.000	0.900	267.274	1099.927	1.617	-11.061	1.617	11.179	278.319	0.244
1200.000	0.899	276.900	1199.914	1.674	-12.624	1.674	12.735	277.555	0.151
1300.000	0.809	276.503	1299.903	1.849	-14.105	1.849	14.225	277.467	0.090
1400.000	0.932	280.011	1399.892	2.070	-15.607	2.070	15.744	277.555	0.134
1500.000	0.830	282.375	1499.880	2.366	-17.115	2.366	17.278	277.872	0.108
1600.000	0.886	302.590	1599.869	2.938	-18.474	2.938	18.706	279.036	0.306
1700.000	0.879	284.068	1699.857	3.541	-19.869	3.541	20.182	280.104	0.284
1800.000	0.970	316.898	1799.845	4.345	-21.191	4.345	21.632	281.587	0.530
1900.000	1.122	324.104	1899.828	5.756	-22.343	5.756	23.073	284.446	0.201
2000.000	1.346	318.316	1999.805	7.426	-23.698	7.426	24.834	287.398	0.256
2100.000	1.529	347.834	2099.775	9.607	-24.760	9.607	26.558	291.206	0.753
2200.000	1.754	355.627	2199.734	12.437	-25.158	12.437	28.064	296.306	0.317
2300.000	1.444	22.353	2299.696	15.129	-24.795	15.129	29.046	301.389	0.798
2400.000	1.407	35.224	2399.666	17.297	-23.608	17.297	29.266	306.230	0.322
2500.000	1.480	34.572	2499.634	19.364	-22.167	19.364	29.433	311.139	0.074
2600.000	1.327	52.706	2599.604	21.128	-20.513	21.128	29.448	315.846	0.467
2700.000	1.622	43.201	2699.571	22.861	-18.623	22.861	29.487	320.833	0.382
2800.000	1.509	39.826	2799.534	24.904	-16.811	24.904	30.047	325.979	0.146
2900.000	1.900	31.006	2899.490	27.336	-15.114	27.336	31.236	331.061	0.470
3000.000	1.911	36.458	2999.435	30.098	-13.269	30.098	32.893	336.208	0.182
3100.000	1.495	35.304	3099.390	32.504	-11.525	32.504	34.486	340.477	0.417
3200.000	1.189	47.156	3199.363	34.274	-10.010	34.274	35.706	343.719	0.412
3300.000	0.847	92.189	3299.348	34.951	-8.511	34.951	35.972	346.314	0.841

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
3400.000	0.870	135.159	3399.338	34.384	-7.238	34.384	35.138	348.113	0.629
3500.000	0.977	146.609	3499.325	33.135	-6.233	33.135	33.716	349.346	0.212
3600.000	1.257	140.998	3599.306	31.571	-5.074	31.571	31.976	350.869	0.301
3700.000	1.373	154.619	3699.280	29.636	-3.870	29.636	29.888	352.560	0.332
3800.000	1.433	158.434	3799.250	27.391	-2.897	27.391	27.544	353.962	0.111
3900.000	1.243	152.388	3899.223	25.267	-1.935	25.267	25.341	355.621	0.236
4000.000	0.837	178.117	3999.207	23.576	-1.408	23.576	23.618	356.581	0.609
4100.000	0.614	223.427	4099.199	22.457	-1.753	22.457	22.525	355.537	0.596
4200.000	0.822	233.392	4199.192	21.640	-2.697	21.640	21.807	352.896	0.242
4300.000	0.491	257.067	4299.185	21.116	-3.691	21.116	21.436	350.086	0.421
4400.000	0.654	255.694	4399.180	20.879	-4.661	20.879	21.393	347.415	0.163
4500.000	0.302	256.751	4499.176	20.678	-5.471	20.678	21.389	345.180	0.352
4600.000	0.133	231.321	4599.176	20.545	-5.818	20.545	21.353	344.188	0.191
4700.000	0.152	221.002	4699.175	20.372	-5.996	20.372	21.236	343.601	0.032
4800.000	0.468	268.607	4799.174	20.262	-6.491	20.262	21.277	342.238	0.383
4900.000	0.542	255.341	4899.170	20.133	-7.357	20.133	21.435	339.927	0.138
5000.000	0.279	222.209	4999.167	19.833	-7.978	19.833	21.377	338.087	0.344
5100.000	0.251	278.179	5099.166	19.683	-8.358	19.683	21.384	336.992	0.250
5200.000	0.507	255.315	5199.164	19.602	-9.003	19.602	21.571	335.331	0.293
5300.000	0.442	284.192	5299.161	19.584	-9.806	19.584	21.902	333.404	0.245
5400.000	0.254	297.434	5399.159	19.781	-10.376	19.781	22.337	332.321	0.204
5500.000	0.720	235.417	5499.156	19.526	-11.090	19.526	22.456	330.407	0.641
5600.000	0.671	232.349	5599.148	18.812	-12.070	18.812	22.351	327.314	0.061
5700.000	0.934	269.628	5699.139	18.449	-13.349	18.449	22.772	324.112	0.570
5800.000	0.797	275.858	5799.128	18.514	-14.855	18.514	23.737	321.258	0.166
5900.000	0.787	256.551	5899.118	18.426	-16.215	18.426	24.544	318.652	0.266
6000.000	0.064	217.381	5999.115	18.221	-16.917	18.221	24.864	317.126	0.739
6100.000	0.631	234.843	6099.113	17.860	-17.401	17.860	24.935	315.745	0.570
6200.000	0.384	238.762	6199.109	17.369	-18.138	17.369	25.113	313.759	0.249
6300.000	0.250	238.159	6299.107	17.080	-18.610	17.080	25.260	312.546	0.134
6400.000	0.763	238.294	6399.103	16.615	-19.361	16.615	25.513	310.635	0.514
6500.000	0.640	220.003	6499.096	15.837	-20.287	15.837	25.737	307.978	0.254
6600.000	0.844	224.174	6599.087	14.882	-21.159	14.882	25.868	305.120	0.211
6700.000	0.404	270.608	6699.081	14.357	-22.024	14.357	26.291	303.100	0.637
6800.000	0.498	271.559	6799.078	14.373	-22.812	14.373	26.962	302.214	0.094
6900.000	0.631	245.604	6899.074	14.157	-23.747	14.157	27.647	300.802	0.285
7000.000	0.303	187.392	6999.071	13.668	-24.283	13.668	27.865	299.374	0.537
7100.000	0.676	249.654	7099.067	13.201	-24.870	13.201	28.156	297.959	0.599
7170.000	0.695	260.976	7169.062	12.991	-25.677	12.991	28.776	296.836	0.195
HORIZONTAL DISPLACEMENT IS 28.776 FEET AT 296.836 DEGREES									