



Company: Noble Energy
Well: Samuel J7-16
API #: 05-123-25606
Rig Name: Production/Lightning
State/County: Colorado/Weld
Latitude: 40.412, Longitude: -104.818
GRID North is 0.440 Degrees East of True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01_ed.ut

Minimum Curvature Method

Report Date/Time: 8/17/2012 / 18:12

Vaughn Energy Services

Henderson, Colorado

866-835-8333

Randy Holcomb

RKB=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	0.228	342.162	100.000	0.189	-0.061	0.189	0.199	342.162	0.228
200.000	0.292	344.475	199.999	0.624	-0.190	0.624	0.652	343.066	0.066
300.000	0.358	339.686	299.997	1.162	-0.367	1.162	1.219	342.496	0.071
400.000	0.369	336.495	399.995	1.750	-0.603	1.750	1.851	340.981	0.023
500.000	0.402	324.432	499.993	2.331	-0.936	2.331	2.511	338.127	0.087
600.000	0.691	284.662	599.989	2.768	-1.723	2.768	3.260	328.109	0.460
700.000	0.700	286.820	699.981	3.098	-2.891	3.098	4.237	316.982	0.028
800.000	0.835	290.746	799.972	3.533	-4.157	3.533	5.455	310.359	0.144
900.000	1.134	295.559	899.957	4.218	-5.731	4.218	7.116	306.351	0.310
1000.000	0.523	171.522	999.951	4.193	-6.556	4.193	7.782	302.601	1.491
1100.000	0.763	160.235	1099.945	3.115	-6.264	3.115	6.996	296.444	0.270
1200.000	0.756	165.421	1199.936	1.851	-5.873	1.851	6.157	287.491	0.069
1300.000	0.702	170.065	1299.928	0.609	-5.601	0.609	5.634	276.204	0.080
1400.000	0.842	179.025	1399.919	-0.729	-5.483	-0.729	5.531	262.424	0.185
1500.000	2.425	164.939	1499.875	-3.507	-4.921	-3.507	6.043	234.520	1.621
1600.000	3.311	159.316	1599.749	-8.252	-3.351	-8.252	8.906	202.100	0.929
1700.000	3.604	158.537	1699.567	-13.879	-1.181	-13.879	13.929	184.863	0.297
1800.000	6.155	154.634	1799.197	-21.650	2.267	-21.650	21.768	174.023	2.571
1900.000	7.608	153.530	1898.474	-32.420	7.514	-32.420	33.280	166.950	1.459
2000.000	8.814	153.579	1997.447	-45.208	13.874	-45.208	47.289	162.939	1.206
2100.000	10.023	151.963	2096.097	-59.750	21.374	-59.750	63.458	160.317	1.238
2200.000	11.791	150.165	2194.287	-76.295	30.548	-76.295	82.184	158.179	1.800
2300.000	13.736	150.997	2291.811	-95.543	41.389	-95.543	104.123	156.578	1.954
2400.000	14.943	151.754	2388.694	-117.285	53.247	-117.285	128.806	155.582	1.221
2500.000	18.106	151.108	2484.552	-142.254	66.860	-142.254	157.183	154.826	3.169
2600.000	20.161	151.997	2579.023	-171.077	82.460	-171.077	189.913	154.266	2.075
2700.000	22.851	154.233	2672.054	-203.785	98.995	-203.785	226.558	154.090	2.812
2800.000	23.608	154.450	2763.947	-239.338	116.073	-239.338	265.999	154.128	0.762
2900.000	22.108	151.299	2856.094	-273.912	133.748	-273.912	304.822	153.974	1.935
3000.000	23.612	150.333	2948.238	-307.822	152.698	-307.822	343.615	153.616	1.549
3100.000	23.713	148.696	3039.831	-342.405	173.059	-342.405	383.654	153.187	0.665
3200.000	23.591	149.154	3131.431	-376.766	193.767	-376.766	423.672	152.784	0.221
3300.000	24.783	151.120	3222.652	-412.300	214.151	-412.300	464.598	152.552	1.438
3400.000	24.499	152.294	3313.547	-449.009	233.913	-449.009	506.285	152.483	0.566

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
3500.000	23.720	151.894	3404.823	-485.108	253.029	-485.108	547.132	152.454	0.795
3600.000	24.009	153.671	3496.274	-521.084	271.528	-521.084	587.585	152.477	0.775
3700.000	25.337	151.929	3587.143	-558.200	290.621	-558.200	629.324	152.497	1.514
3800.000	25.953	151.645	3677.292	-596.337	311.082	-596.337	672.600	152.451	0.628
3900.000	27.473	149.577	3766.618	-635.487	333.157	-635.487	717.522	152.334	1.782
4000.000	28.479	150.027	3854.932	-676.032	356.750	-676.032	764.389	152.179	1.028
4100.000	29.054	151.201	3942.591	-717.965	380.358	-717.965	812.494	152.087	0.806
4200.000	28.331	152.361	4030.312	-760.264	403.063	-760.264	860.501	152.069	0.912
4300.000	26.144	151.356	4119.219	-800.625	424.635	-800.625	906.265	152.059	2.235
4400.000	25.868	150.320	4209.094	-838.913	445.998	-838.913	950.100	152.003	0.531
4500.000	24.084	150.424	4299.739	-875.614	466.872	-875.614	992.306	151.934	1.785
4600.000	24.129	149.117	4391.018	-910.901	487.434	-910.901	1033.118	151.848	0.536
4700.000	24.344	151.033	4482.206	-946.476	507.908	-946.476	1074.144	151.781	0.815
4800.000	23.112	152.877	4573.752	-981.978	526.838	-981.978	1114.378	151.786	1.438
4900.000	20.569	152.640	4666.567	-1015.05	543.862	-1015.05	1151.572	151.818	2.545
5000.000	18.486	151.375	4760.810	-1044.57	559.532	-1044.57	1184.994	151.824	2.125
5100.000	17.292	152.770	4855.974	-1071.71	573.928	-1071.71	1215.708	151.830	1.269
5200.000	15.094	152.989	4952.001	-1096.52	586.643	-1096.52	1243.589	151.853	2.199
5300.000	12.516	151.577	5049.105	-1117.66	597.716	-1117.66	1267.446	151.862	2.600
5400.000	10.928	148.812	5147.017	-1135.30	607.783	-1135.30	1287.748	151.838	1.684
5500.000	7.844	146.911	5245.666	-1149.13	616.419	-1149.13	1304.017	151.790	3.100
5600.000	5.910	147.083	5344.942	-1159.16	622.942	-1159.16	1315.948	151.746	1.934
5700.000	4.449	145.934	5444.531	-1166.70	627.913	-1166.70	1324.939	151.711	1.465
5800.000	3.164	144.775	5544.309	-1172.17	631.677	-1172.17	1331.538	151.680	1.287
5900.000	1.266	159.991	5644.230	-1175.46	633.647	-1175.46	1335.371	151.673	1.970
6000.000	0.343	91.756	5744.221	-1176.51	634.324	-1176.51	1336.614	151.668	1.183
6100.000	0.332	49.537	5844.219	-1176.33	634.843	-1176.33	1336.703	151.645	0.243
6200.000	0.336	72.953	5944.217	-1176.05	635.343	-1176.05	1336.700	151.621	0.135
6300.000	0.302	21.379	6044.216	-1175.72	635.719	-1175.72	1336.587	151.600	0.279
6400.000	0.306	17.681	6144.215	-1175.22	635.896	-1175.22	1336.232	151.583	0.020
6500.000	0.301	348.649	6244.213	-1174.71	635.925	-1174.71	1335.795	151.571	0.152
6600.000	0.299	321.541	6344.212	-1174.25	635.712	-1174.25	1335.287	151.570	0.141
6700.000	0.325	321.098	6444.210	-1173.83	635.371	-1173.83	1334.752	151.574	0.026
6800.000	0.316	320.851	6544.209	-1173.39	635.019	-1173.39	1334.202	151.579	0.009
6900.000	0.346	320.424	6644.207	-1172.94	634.652	-1172.94	1333.635	151.583	0.030
7000.000	0.365	320.410	6744.205	-1172.47	634.257	-1172.47	1333.026	151.588	0.019
7100.000	0.359	280.949	6844.203	-1172.16	633.747	-1172.16	1332.515	151.601	0.244
7200.000	0.391	259.664	6944.201	-1172.16	633.103	-1172.16	1332.211	151.626	0.142
7300.000	0.318	173.704	7044.200	-1172.50	632.797	-1172.50	1332.362	151.644	0.487
7400.000	0.295	78.225	7144.199	-1172.72	633.080	-1172.72	1332.694	151.638	0.455
7500.000	0.265	57.618	7244.198	-1172.55	633.528	-1172.55	1332.751	151.618	0.105
HORIZONTAL DISPLACEMENT IS 1332.751 FEET AT 151.618 DEGREES									