



Company: NOBLE ENERGY
 Well: MILLER 25-5F
 API: 05-123-16225
 Rig Name: PRODUCTION/LIGHTNING
 State/County: COLORADO/WELD
 Latitude: 40.285, Longitude: -104.732
 GRID North is 0.500 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_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 1/24/2013 / 16:31

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

866-835-8333

NICK KULA

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	0.619	330.005	99.998	0.468	-0.270	0.468	0.541	330.005	0.619
200.000	0.378	301.448	199.994	1.109	-0.822	1.109	1.380	323.438	0.339
300.000	0.446	314.148	299.992	1.552	-1.383	1.552	2.079	318.292	0.113
400.000	0.250	323.945	399.990	1.999	-1.791	1.999	2.684	318.150	0.204
500.000	0.356	336.412	499.988	2.461	-2.044	2.461	3.199	320.291	0.125
600.000	0.443	353.631	599.986	3.130	-2.211	3.130	3.832	324.761	0.147
700.000	0.441	355.137	699.983	3.897	-2.286	3.897	4.518	329.602	0.012
800.000	0.379	354.542	799.981	4.610	-2.350	4.610	5.175	332.985	0.063
900.000	0.368	348.831	899.978	5.254	-2.444	5.254	5.795	335.054	0.039
1000.000	0.476	335.149	999.976	5.947	-2.681	5.947	6.523	335.732	0.147
1100.000	0.372	333.861	1099.973	6.615	-2.999	6.615	7.263	335.615	0.105
1200.000	0.638	325.469	1199.969	7.365	-3.457	7.365	8.136	334.855	0.275
1300.000	0.713	341.660	1299.962	8.414	-3.968	8.414	9.303	334.749	0.204
1400.000	0.227	306.246	1399.959	9.121	-4.324	9.121	10.094	334.637	0.543
1500.000	0.217	344.249	1499.958	9.420	-4.535	9.420	10.455	334.293	0.145
1600.000	0.686	339.876	1599.955	10.164	-4.792	10.164	11.237	334.756	0.470
1700.000	0.176	286.160	1699.952	10.769	-5.146	10.769	11.935	334.459	0.598
1800.000	0.289	233.349	1799.951	10.661	-5.496	10.661	11.994	332.728	0.230
1900.000	0.077	269.861	1899.950	10.510	-5.765	10.510	11.988	331.253	0.232
2000.000	0.174	194.233	1999.950	10.363	-5.870	10.363	11.910	330.472	0.172
2100.000	0.426	334.024	2099.949	10.550	-6.070	10.550	12.171	330.086	0.570
2200.000	0.586	311.613	2199.946	11.224	-6.615	11.224	13.028	329.486	0.251
2300.000	0.769	302.777	2299.939	11.926	-7.561	11.926	14.121	327.625	0.210
2400.000	1.040	288.644	2399.926	12.580	-8.985	12.580	15.459	324.463	0.349
2500.000	0.892	296.147	2499.912	13.213	-10.544	13.213	16.904	321.410	0.194
2600.000	1.146	278.563	2599.896	13.705	-12.231	13.705	18.369	318.252	0.400
2700.000	1.097	282.557	2699.877	14.062	-14.154	14.062	19.952	314.812	0.092
2800.000	1.153	284.157	2799.858	14.516	-16.064	14.516	21.651	312.101	0.064
2900.000	1.151	285.113	2899.838	15.024	-18.010	15.024	23.454	309.835	0.019

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	1.144	280.814	2999.818	15.473	-19.960	15.473	25.255	307.783	0.086
3100.000	1.070	280.745	3099.799	15.834	-21.858	15.834	26.990	305.921	0.074
3200.000	0.892	282.718	3199.784	16.180	-23.535	16.180	28.560	304.508	0.181
3300.000	1.055	293.599	3299.770	16.720	-25.138	16.720	30.190	303.629	0.245
3400.000	0.966	273.221	3399.755	17.136	-26.823	17.136	31.829	302.572	0.368
3500.000	1.023	264.520	3499.740	17.098	-28.553	17.098	33.281	300.913	0.161
3600.000	0.826	244.333	3599.727	16.700	-30.092	16.700	34.415	299.029	0.378
3700.000	0.670	243.236	3699.718	16.125	-31.264	16.125	35.177	297.283	0.157
3800.000	0.741	231.746	3799.711	15.461	-32.294	15.461	35.804	295.583	0.158
3900.000	0.974	253.806	3899.700	14.823	-33.618	14.823	36.741	293.795	0.400
4000.000	0.966	231.982	3999.686	14.067	-35.098	14.067	37.812	291.841	0.367
4100.000	1.052	250.385	4099.670	13.240	-36.626	13.240	38.946	289.875	0.334
4200.000	1.234	256.266	4199.651	12.676	-38.537	12.676	40.569	288.208	0.216
4300.000	0.798	233.576	4299.635	12.007	-40.144	12.007	41.901	286.652	0.585
4400.000	0.399	227.475	4399.629	11.358	-40.961	11.358	42.507	285.498	0.404
4500.000	0.442	236.010	4499.627	10.907	-41.538	10.907	42.946	284.712	0.075
4600.000	0.636	239.769	4599.622	10.412	-42.337	10.412	43.598	283.816	0.198
4700.000	0.840	258.103	4699.614	9.981	-43.535	9.981	44.664	282.913	0.310
4800.000	1.237	250.078	4799.597	9.462	-45.267	9.462	46.245	281.806	0.421
4900.000	1.379	250.901	4899.571	8.700	-47.419	8.700	48.210	280.397	0.144
5000.000	1.553	251.417	4999.538	7.875	-49.840	7.875	50.459	278.978	0.174
5100.000	1.579	252.189	5099.501	7.021	-52.437	7.021	52.905	277.627	0.034
5200.000	1.004	254.424	5199.475	6.364	-54.593	6.364	54.963	276.650	0.577
5300.000	1.041	267.033	5299.459	6.082	-56.344	6.082	56.672	276.161	0.227
5400.000	1.099	282.233	5399.442	6.238	-58.189	6.238	58.522	276.119	0.289
5500.000	0.724	266.810	5499.430	6.407	-59.758	6.407	60.100	276.119	0.445
5600.000	0.809	250.462	5599.421	6.135	-61.054	6.135	61.361	275.738	0.233
5700.000	0.806	265.278	5699.411	5.841	-62.420	5.841	62.693	275.346	0.208
5800.000	0.924	289.063	5799.400	6.047	-63.883	6.047	64.169	275.407	0.375
5900.000	0.565	262.095	5899.391	6.243	-65.133	6.243	65.432	275.475	0.493
6000.000	1.043	233.206	5999.382	5.630	-66.350	5.630	66.589	274.850	0.612
6100.000	1.281	230.841	6099.361	4.379	-67.945	4.379	68.086	273.688	0.243
6200.000	1.248	250.230	6199.337	3.305	-69.836	3.305	69.915	272.710	0.427
6300.000	0.404	278.897	6299.326	2.991	-71.209	2.991	71.272	272.406	0.914
6400.000	0.409	244.231	6399.324	2.891	-71.879	2.891	71.937	272.303	0.242
6500.000	0.392	23.152	6499.323	3.051	-72.066	3.051	72.130	272.424	0.750
6600.000	0.451	25.821	6599.320	3.720	-71.759	3.720	71.856	272.967	0.062
6700.000	0.551	18.903	6699.316	4.529	-71.432	4.529	71.576	273.628	0.116
6800.000	0.630	19.946	6799.311	5.500	-71.089	5.500	71.301	274.424	0.079
6900.000	0.794	53.910	6899.304	6.425	-70.342	6.425	70.635	275.219	0.444
7000.000	0.991	81.260	6999.292	6.964	-68.928	6.964	69.279	275.769	0.463
7100.000	1.380	112.010	7099.271	6.644	-66.956	6.644	67.285	275.667	0.732
7200.000	1.543	118.160	7199.239	5.558	-64.653	5.558	64.891	274.913	0.225
HORIZONTAL DISPLACEMENT IS 64.891 FEET AT 274.913 DEGREES									