



Company: Noble Energy
Well: Wells Ranch USX AA 15-5
API: 05-123-25280
Rig Name: Production/Lightning
Location: Weld County, Colorado
Latitude: 40.488, Longitude: -104.430
GRID North is 0.690 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_ed.ut

Minimum Curvature Method

Report Date/Time: 7/23/2012 / 17:30

Vaughn Energy Services

Henderson, CO.

Justin Williams

303-853-4976

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	0.833	136.947	99.996	-0.531	0.496	-0.531	0.727	136.947	0.833
200.000	0.364	148.023	199.991	-1.332	1.161	-1.332	1.767	138.925	0.481
300.000	0.585	131.507	299.987	-1.939	1.711	-1.939	2.586	138.577	0.258
400.000	0.064	65.413	399.985	-2.255	2.144	-2.255	3.111	136.442	0.562
500.000	0.442	76.055	499.984	-2.139	2.569	-2.139	3.343	129.775	0.380
600.000	0.291	94.598	599.982	-2.066	3.197	-2.066	3.806	122.870	0.191
700.000	0.275	96.056	699.981	-2.112	3.689	-2.112	4.250	119.788	0.018
800.000	0.529	90.377	799.979	-2.140	4.389	-2.140	4.882	115.994	0.256
900.000	0.508	89.439	899.974	-2.139	5.293	-2.139	5.708	112.002	0.023
1000.000	0.496	84.026	999.971	-2.089	6.166	-2.089	6.510	108.717	0.049
1100.000	0.477	108.834	1099.967	-2.179	6.991	-2.179	7.322	107.309	0.210
1200.000	0.626	102.197	1199.962	-2.428	7.919	-2.428	8.283	107.049	0.162
1300.000	0.622	91.109	1299.957	-2.554	8.995	-2.554	9.351	105.853	0.121
1400.000	0.707	91.690	1399.950	-2.583	10.154	-2.583	10.478	104.272	0.086
1500.000	0.764	94.961	1499.942	-2.659	11.435	-2.659	11.740	103.089	0.071
1600.000	0.766	99.848	1599.933	-2.831	12.758	-2.831	13.068	102.510	0.065
1700.000	0.704	100.354	1699.924	-3.055	14.020	-3.055	14.349	102.294	0.062
1800.000	0.594	108.247	1799.918	-3.328	15.117	-3.328	15.479	102.416	0.141
1900.000	0.667	98.825	1899.912	-3.580	16.185	-3.580	16.576	102.472	0.126
2000.000	0.638	102.723	1999.906	-3.792	17.303	-3.792	17.714	102.360	0.053
2100.000	0.663	103.524	2099.899	-4.050	18.409	-4.050	18.849	102.407	0.026
2200.000	0.813	117.347	2199.891	-4.511	19.601	-4.511	20.114	102.960	0.232
2300.000	1.141	135.624	2299.876	-5.548	20.927	-5.548	21.650	104.848	0.449
2400.000	1.334	150.323	2399.853	-7.271	22.200	-7.271	23.361	108.135	0.370
2500.000	1.393	151.078	2499.825	-9.347	23.364	-9.347	25.165	111.804	0.061
2600.000	1.182	154.523	2599.800	-11.341	24.396	-11.341	26.903	114.933	0.225
2700.000	1.145	152.807	2699.779	-13.161	25.296	-13.161	28.514	117.487	0.051
2800.000	1.100	165.237	2799.760	-14.977	25.997	-14.977	30.002	119.947	0.247
2900.000	0.918	172.340	2899.745	-16.699	26.348	-16.699	31.194	122.365	0.220
3000.000	0.999	173.340	2999.731	-18.358	26.556	-18.358	32.284	124.656	0.082
3100.000	0.789	154.086	3099.719	-19.843	26.958	-19.843	33.474	126.356	0.363
3200.000	0.811	160.426	3199.709	-21.130	27.496	-21.130	34.677	127.541	0.091
3300.000	0.951	167.254	3299.697	-22.606	27.916	-22.606	35.921	128.999	0.175
3400.000	1.436	182.154	3399.675	-24.667	28.052	-24.667	37.355	131.326	0.572

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	1.674	173.878	3499.639	-27.371	28.161	-27.371	39.271	134.185	0.327
3600.000	1.928	178.079	3599.589	-30.505	28.373	-30.505	41.660	137.074	0.286
3700.000	2.031	182.708	3699.529	-33.957	28.346	-33.957	44.233	140.146	0.190
3800.000	2.021	187.276	3799.467	-37.476	28.039	-37.476	46.804	143.197	0.162
3900.000	2.009	187.836	3899.405	-40.961	27.576	-40.961	49.379	146.050	0.023
4000.000	2.210	182.714	3999.337	-44.623	27.246	-44.623	52.284	148.592	0.276
4100.000	2.494	194.224	4099.254	-48.658	26.620	-48.658	55.464	151.318	0.550
4200.000	2.696	197.055	4199.151	-53.016	25.396	-53.016	58.785	154.405	0.240
4300.000	2.713	195.371	4299.040	-57.547	24.079	-57.547	62.382	157.295	0.081
4400.000	2.721	195.840	4398.927	-62.113	22.803	-62.113	66.166	159.840	0.023
4500.000	2.611	199.374	4498.819	-66.545	21.400	-66.545	69.901	162.173	0.197
4600.000	2.273	197.579	4598.728	-70.585	20.045	-70.585	73.376	164.146	0.347
4700.000	2.169	182.881	4698.654	-74.365	19.351	-74.365	76.842	165.414	0.577
4800.000	0.496	174.837	4798.623	-76.687	19.295	-76.687	79.077	165.877	1.680
4900.000	0.501	38.131	4898.622	-76.774	19.604	-76.774	79.237	165.676	0.926
5000.000	0.863	38.874	4998.614	-75.844	20.346	-75.844	78.526	164.983	0.363
5100.000	0.744	29.778	5098.605	-74.694	21.141	-74.694	77.628	164.196	0.174
5200.000	0.648	21.017	5198.597	-73.603	21.667	-73.603	76.726	163.597	0.143
5300.000	0.111	23.826	5298.595	-72.986	21.909	-72.986	76.204	163.292	0.537
5400.000	0.372	189.726	5398.594	-73.217	21.893	-73.217	76.420	163.353	0.480
5500.000	0.128	79.476	5498.593	-73.517	21.948	-73.517	76.723	163.378	0.433
5600.000	0.077	263.822	5598.593	-73.504	21.991	-73.504	76.723	163.344	0.204
5700.000	0.094	135.950	5698.593	-73.570	21.981	-73.570	76.784	163.365	0.154
5800.000	0.444	233.400	5798.592	-73.860	21.727	-73.860	76.990	163.608	0.466
5900.000	0.222	210.852	5898.591	-74.258	21.317	-74.258	77.257	163.983	0.254
6000.000	0.551	262.418	5998.588	-74.487	20.741	-74.487	77.321	164.440	0.448
6100.000	0.796	285.754	6098.582	-74.362	19.596	-74.362	76.901	165.237	0.363
6200.000	0.616	290.071	6198.574	-73.989	18.422	-73.989	76.248	166.018	0.188
6300.000	0.972	263.541	6298.564	-73.900	17.074	-73.900	75.847	166.990	0.503
6400.000	1.861	245.416	6398.533	-74.671	14.755	-74.671	76.115	168.822	0.985
6500.000	2.126	241.306	6498.473	-76.237	11.651	-76.237	77.122	171.311	0.301
6600.000	2.715	235.078	6598.383	-78.483	8.082	-78.483	78.899	174.120	0.645
6700.000	2.445	256.102	6698.284	-80.352	4.070	-80.352	80.455	177.100	0.978
6730.000	2.207	259.773	6728.259	-80.608	2.880	-80.608	80.659	177.954	0.933
HORIZONTAL DISPLACEMENT IS 80.659 FEET AT 177.954 DEGREES									