

Company: Noble Energy

Lease/Well: Amigos Farms / 1-12

API: 05-123-17530

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld County

Latitude: 40.339, Longitude: -104.505

GRID North is 0.640 Degrees East of True North

VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run05-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 10/12/2011 / 10:34

Vaughn Energy Services

Henderson Colorado

866-835-8333

RKB = Ground Level

Norman Cowan

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	0.285	130.740	100.000	-0.163	0.189	-0.163	0.249	130.740	0.285
200.000	0.305	140.483	199.998	-0.531	0.547	-0.531	0.762	134.132	0.054
300.000	0.220	126.109	299.997	-0.849	0.872	-0.849	1.217	134.256	0.107
400.000	0.035	4.207	399.997	-0.932	1.029	-0.932	1.389	132.162	0.241
500.000	0.202	115.036	499.997	-0.976	1.192	-0.976	1.540	129.329	0.217
600.000	0.188	112.448	599.996	-1.114	1.503	-1.114	1.871	126.533	0.016
700.000	0.109	87.938	699.996	-1.173	1.750	-1.173	2.107	123.834	0.100
800.000	0.348	114.767	799.995	-1.297	2.120	-1.297	2.485	121.448	0.255
900.000	0.202	13.965	899.994	-1.253	2.438	-1.253	2.741	117.189	0.434
1000.000	0.412	130.912	999.993	-1.317	2.752	-1.317	3.051	115.564	0.535
1100.000	0.341	118.594	1099.991	-1.694	3.285	-1.694	3.696	117.282	0.107
1200.000	0.448	133.947	1199.989	-2.108	3.827	-2.108	4.369	118.841	0.149
1300.000	0.364	143.727	1299.986	-2.635	4.297	-2.635	5.040	121.521	0.108
1400.000	0.310	136.835	1399.985	-3.089	4.670	-3.089	5.599	123.482	0.068
1500.000	0.185	41.202	1499.984	-3.165	4.961	-3.165	5.885	122.531	0.376
1600.000	0.286	10.616	1599.983	-2.798	5.114	-2.798	5.829	118.684	0.158
1700.000	0.416	325.512	1699.981	-2.254	4.954	-2.254	5.443	114.460	0.295
1800.000	0.387	308.521	1799.979	-1.744	4.484	-1.744	4.811	111.251	0.122
1900.000	0.536	318.421	1899.976	-1.184	3.910	-1.184	4.085	106.847	0.168
2000.000	0.549	307.212	1999.971	-0.545	3.218	-0.545	3.264	99.607	0.107
2100.000	0.751	273.050	2099.965	-0.220	2.183	-0.220	2.194	95.762	0.428
2200.000	1.165	301.473	2199.952	0.345	0.662	0.345	0.747	62.450	0.618
2300.000	1.053	296.149	2299.933	1.281	-1.030	1.281	1.643	321.204	0.152
2400.000	0.943	248.527	2399.919	1.385	-2.620	1.385	2.963	297.858	0.812
2500.000	0.526	289.984	2499.912	1.240	-3.817	1.240	4.013	288.005	0.650
2600.000	0.586	237.089	2599.907	1.120	-4.677	1.120	4.809	283.464	0.498
2700.000	0.578	322.542	2699.904	1.242	-5.413	1.242	5.553	282.926	0.789
2800.000	0.374	211.716	2799.902	1.365	-5.891	1.365	6.047	283.045	0.792
2900.000	0.190	221.562	2899.901	0.963	-6.172	0.963	6.247	278.872	0.190
3000.000	0.598	126.058	2999.899	0.533	-5.860	0.533	5.884	275.192	0.644
3100.000	1.834	97.379	3099.875	0.020	-3.851	0.020	3.851	270.296	1.340
3200.000	1.185	70.021	3199.841	0.168	-1.293	0.168	1.303	277.394	0.952
3300.000	1.163	64.113	3299.820	0.964	0.592	0.964	1.132	31.568	0.123
3400.000	1.022	72.447	3399.802	1.676	2.356	1.676	2.891	54.567	0.212

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	0.691	35.930	3499.791	2.434	3.560	2.434	4.313	55.644	0.622
3600.000	0.461	24.358	3599.786	3.289	4.081	3.289	5.241	51.129	0.257
3700.000	0.482	14.721	3699.783	4.062	4.353	4.062	5.954	46.981	0.082
3800.000	0.578	356.015	3799.779	4.972	4.425	4.972	6.656	41.671	0.197
3900.000	0.428	339.733	3899.775	5.825	4.261	5.825	7.217	36.182	0.206
4000.000	0.755	281.113	3999.770	6.302	3.485	6.302	7.202	28.940	0.645
4100.000	0.887	295.941	4099.760	6.768	2.143	6.768	7.099	17.568	0.249
4200.000	0.810	307.039	4199.749	7.532	0.883	7.532	7.584	6.685	0.181
4300.000	1.039	300.332	4299.736	8.416	-0.464	8.416	8.429	356.844	0.254
4400.000	0.937	276.080	4399.721	8.960	-2.060	8.960	9.194	347.052	0.427
4500.000	1.430	234.794	4499.701	8.328	-3.893	8.328	9.193	334.947	0.953
4600.000	0.937	231.274	4599.680	7.097	-5.550	7.097	9.010	321.975	0.498
4700.000	0.316	215.797	4699.673	6.362	-6.349	6.362	8.988	315.055	0.638
4800.000	0.448	231.657	4799.671	5.895	-6.818	5.895	9.013	310.850	0.168
4900.000	0.418	269.679	4899.669	5.650	-7.489	5.650	9.382	307.034	0.284
5000.000	0.242	22.879	4999.668	5.843	-7.772	5.843	9.723	306.936	0.559
5100.000	0.591	30.859	5099.665	6.480	-7.425	6.480	9.855	311.111	0.353
5200.000	1.380	37.896	5199.649	7.873	-6.421	7.873	10.159	320.800	0.796
5300.000	1.294	37.412	5299.622	9.719	-4.996	9.719	10.928	332.798	0.087
5400.000	0.888	37.303	5399.604	11.233	-3.840	11.233	11.871	341.125	0.406
5500.000	0.355	40.784	5499.597	12.083	-3.168	12.083	12.492	345.308	0.534
5600.000	0.709	34.268	5599.593	12.829	-2.618	12.829	13.094	348.469	0.359
5700.000	0.174	108.115	5699.590	13.294	-2.124	13.294	13.462	350.920	0.682
5800.000	0.452	304.538	5799.589	13.470	-2.305	13.470	13.666	350.291	0.621
5900.000	0.767	46.964	5899.586	14.150	-2.140	14.150	14.311	351.399	0.970
6000.000	0.404	116.532	5999.581	14.449	-1.335	14.449	14.511	354.720	0.732
6100.000	0.752	47.530	6099.577	14.735	-0.536	14.735	14.744	357.918	0.715
6200.000	0.887	22.898	6199.567	15.891	0.249	15.891	15.892	0.899	0.374
6300.000	0.726	0.416	6299.557	17.237	0.555	17.237	17.246	1.844	0.352
6400.000	0.808	27.151	6399.549	18.497	0.881	18.497	18.518	2.728	0.363
6500.000	0.615	0.193	6499.541	19.661	1.205	19.661	19.698	3.506	0.381
6600.000	0.252	132.694	6599.540	20.048	1.368	20.048	20.095	3.904	0.807
<div> <div>HORIZONTAL DISPLACEMENT IS</div> <div>20.095 FEET AT 3.904 DEGREES</div> </div>									