

Company: Noble Energy

Lease/Well: SH Farms C / 17-6

API: 05-123-22998

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld

Latitude: 40.315, Longitude: -104.579

GRID North is 0.600 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: 12/6/2011 / 19:06

Vaughn Energy Services

Henderson Colorado

866-835-8333

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	0.644	95.085	99.998	-0.050	0.560	-0.050	0.562	95.085	0.644
200.000	0.220	85.943	199.995	-0.086	1.311	-0.086	1.314	93.755	0.428
300.000	0.225	162.043	299.994	-0.260	1.564	-0.260	1.585	99.427	0.275
400.000	0.344	104.887	399.993	-0.524	1.915	-0.524	1.985	105.303	0.292
500.000	0.218	94.351	499.992	-0.616	2.394	-0.616	2.472	104.416	0.136
600.000	0.361	132.478	599.991	-0.843	2.816	-0.843	2.940	106.657	0.232
700.000	0.546	148.192	699.988	-1.460	3.300	-1.460	3.609	113.874	0.222
800.000	0.273	153.555	799.985	-2.079	3.657	-2.079	4.207	119.618	0.276
900.000	0.686	151.921	899.981	-2.821	4.045	-2.821	4.932	124.888	0.413
1000.000	0.931	115.564	999.972	-3.700	5.060	-3.700	6.268	126.172	0.556
1100.000	3.211	117.915	1099.900	-5.362	8.268	-5.362	9.855	122.961	2.281
1200.000	4.336	139.414	1199.686	-9.544	13.203	-9.544	16.292	125.862	1.789
1300.000	6.165	162.373	1299.273	-17.535	17.290	-17.535	24.625	135.403	2.751
1400.000	9.342	165.430	1398.347	-30.512	20.959	-30.512	37.017	145.514	3.203
1500.000	11.041	162.324	1496.766	-47.492	25.909	-47.492	54.100	151.386	1.784
1600.000	11.802	157.032	1594.788	-66.032	32.807	-66.032	73.733	153.580	1.294
1700.000	12.493	143.287	1692.569	-84.122	43.265	-84.122	94.596	152.783	2.966
1800.000	13.241	130.032	1790.078	-100.163	58.504	-100.163	115.997	149.711	3.038
1900.000	13.273	122.697	1887.420	-113.732	76.935	-113.732	137.309	145.923	1.681
2000.000	13.419	121.410	1984.720	-125.980	96.498	-125.980	158.692	142.549	0.331
2100.000	13.545	126.834	2081.968	-139.049	115.775	-139.049	180.937	140.218	1.270
2200.000	13.544	126.092	2179.187	-152.967	134.610	-152.967	203.761	138.652	0.174
2300.000	13.665	131.707	2276.386	-167.724	152.891	-167.724	226.951	137.649	1.326
2400.000	13.089	122.429	2373.684	-181.657	171.269	-181.657	249.664	136.686	2.220
2500.000	13.046	121.084	2471.094	-193.556	190.492	-193.556	271.572	135.457	0.307
2600.000	15.579	121.611	2567.983	-206.424	211.598	-206.424	295.609	134.291	2.537
2700.000	17.265	120.831	2663.900	-221.069	235.778	-221.069	323.207	133.156	1.700
2800.000	17.449	120.716	2759.346	-236.332	261.410	-236.332	352.403	132.116	0.188
2900.000	18.425	117.270	2854.488	-251.232	288.347	-251.232	382.441	131.065	1.441
3000.000	16.293	117.586	2949.928	-264.970	314.829	-264.970	411.493	130.085	2.133
3100.000	17.553	114.337	3045.598	-277.681	341.003	-277.681	439.761	129.156	1.574
3200.000	16.891	116.785	3141.115	-290.442	367.712	-290.442	468.581	128.304	0.981
3300.000	13.373	118.705	3237.633	-302.547	390.832	-302.547	494.252	127.744	3.553
3400.000	12.497	119.449	3335.094	-313.422	410.398	-313.422	516.391	127.369	0.892

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	11.997	123.111	3432.820	-324.419	428.525	-324.419	537.477	127.128	0.924
3600.000	9.114	126.752	3531.118	-334.837	443.580	-334.837	555.769	127.047	2.958
3700.000	9.602	136.747	3629.793	-345.652	455.642	-345.652	571.913	127.184	1.695
3800.000	12.297	129.215	3727.969	-358.462	469.610	-358.462	590.787	127.355	3.045
3900.000	16.416	127.697	3824.826	-373.842	489.050	-373.842	615.571	127.395	4.136
4000.000	17.824	122.612	3920.398	-390.732	513.125	-390.732	644.956	127.288	2.054
4100.000	15.673	116.308	4016.158	-404.970	538.129	-404.970	673.486	126.963	2.812
4200.000	16.063	122.874	4112.355	-418.467	561.859	-418.467	700.571	126.678	1.836
4300.000	16.852	121.041	4208.258	-433.451	585.897	-433.451	728.804	126.494	0.944
4400.000	16.653	120.775	4304.014	-448.256	610.628	-448.256	757.496	126.282	0.213
4500.000	16.058	118.529	4399.968	-462.193	635.090	-462.193	785.470	126.046	0.869
4600.000	16.539	116.730	4495.950	-475.201	659.954	-475.201	813.237	125.756	0.698
4700.000	15.348	113.494	4592.103	-486.879	684.805	-486.879	840.243	125.412	1.486
4800.000	14.388	114.519	4688.754	-497.312	708.246	-497.312	865.408	125.076	0.996
4900.000	12.885	99.725	4785.963	-504.354	730.547	-504.354	887.734	124.620	3.785
5000.000	12.508	97.800	4883.517	-507.707	752.266	-507.707	907.563	124.016	0.567
5100.000	12.239	101.638	4981.196	-511.315	773.377	-511.315	927.122	123.471	0.865
5200.000	12.047	105.222	5078.960	-516.193	793.829	-516.193	946.900	123.034	0.778
5300.000	9.595	115.835	5177.184	-522.567	811.404	-522.567	965.117	122.783	3.150
5400.000	7.178	110.203	5276.109	-528.357	824.771	-528.357	979.494	122.644	2.549
5500.000	6.393	114.790	5375.409	-532.849	835.689	-532.849	991.113	122.522	0.953
5600.000	4.371	110.798	5474.963	-536.537	844.307	-536.537	1000.364	122.435	2.055
5700.000	2.214	100.844	5574.793	-538.254	849.768	-538.254	1005.894	122.351	2.224
5800.000	1.074	83.333	5674.750	-538.509	852.595	-538.509	1008.420	122.277	1.233
5900.000	0.661	22.794	5774.741	-537.868	853.750	-537.868	1009.054	122.211	0.944
6000.000	0.511	340.272	5874.736	-536.916	853.823	-536.916	1008.609	122.163	0.447
6100.000	1.163	320.321	5974.725	-535.715	853.024	-535.715	1007.294	122.130	0.705
6200.000	1.351	316.346	6074.701	-534.081	851.562	-534.081	1005.187	122.095	0.207
6300.000	1.620	309.918	6174.667	-532.321	849.664	-532.321	1002.644	122.067	0.316
6400.000	1.863	308.137	6274.621	-530.411	847.302	-530.411	999.628	122.047	0.249
6500.000	2.212	305.540	6374.557	-528.285	844.453	-528.285	996.085	122.030	0.361
6600.000	2.585	302.063	6474.470	-525.966	840.971	-525.966	991.903	122.023	0.400
6700.000	2.778	314.811	6574.361	-523.061	837.340	-523.061	987.285	121.992	0.625
6800.000	2.409	321.787	6674.259	-519.701	834.321	-519.701	982.945	121.919	0.485
HORIZONTAL DISPLACEMENT IS 982.945 FEET AT 121.919 DEGREES									