

Company: Noble Energy

Lease/Well: Rayglo / #1

API: 05-123-12985

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld

Latitude: 40.491, Longitude: -104.520

GRID North is 0.630 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: 3/2/2012 / 18:59

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	0.379	232.627	99.999	-0.201	-0.263	-0.201	0.331	232.627	0.379
200.000	0.326	179.209	199.998	-0.686	-0.522	-0.686	0.862	217.260	0.320
300.000	0.225	199.356	299.996	-1.155	-0.583	-1.155	1.294	206.768	0.138
400.000	0.139	198.902	399.996	-1.455	-0.687	-1.455	1.609	205.276	0.087
500.000	0.595	166.531	499.994	-2.075	-0.605	-2.075	2.161	196.266	0.484
600.000	0.590	174.527	599.988	-3.092	-0.435	-3.092	3.123	188.012	0.083
700.000	0.710	171.913	699.982	-4.219	-0.299	-4.219	4.229	184.054	0.124
800.000	0.613	148.734	799.975	-5.289	0.066	-5.289	5.290	179.286	0.282
900.000	0.580	151.590	899.970	-6.192	0.585	-6.192	6.220	174.607	0.045
1000.000	0.513	153.999	999.965	-7.039	1.021	-7.039	7.113	171.744	0.071
1100.000	0.630	155.796	1099.960	-7.943	1.443	-7.943	8.073	169.704	0.118
1200.000	0.601	144.468	1199.955	-8.871	1.973	-8.871	9.087	167.461	0.125
1300.000	0.346	152.228	1299.951	-9.564	2.418	-9.564	9.865	165.811	0.262
1400.000	0.455	157.977	1399.949	-10.199	2.708	-10.199	10.553	165.132	0.116
1500.000	0.427	155.782	1499.946	-10.907	3.009	-10.907	11.315	164.575	0.032
1600.000	0.632	152.915	1599.942	-11.738	3.413	-11.738	12.225	163.786	0.207
1700.000	0.615	144.152	1699.936	-12.664	3.979	-12.664	13.275	162.558	0.097
1800.000	0.795	171.068	1799.928	-13.784	4.401	-13.784	14.470	162.294	0.372
1900.000	1.003	196.416	1899.916	-15.309	4.261	-15.309	15.891	164.446	0.443
2000.000	1.365	205.588	1999.895	-17.223	3.499	-17.223	17.575	168.515	0.408
2100.000	1.646	218.334	2099.861	-19.424	2.094	-19.424	19.536	173.847	0.435
2200.000	1.614	226.753	2199.820	-21.515	0.177	-21.515	21.516	179.528	0.241
2300.000	1.645	228.665	2299.780	-23.428	-1.926	-23.428	23.507	184.700	0.062
2400.000	1.667	232.730	2399.738	-25.257	-4.161	-25.257	25.597	189.356	0.119
2500.000	1.621	232.566	2499.697	-26.997	-6.442	-26.997	27.755	193.420	0.046
2600.000	1.670	231.712	2599.656	-28.760	-8.709	-28.760	30.050	196.847	0.055
2700.000	1.363	229.967	2699.621	-30.428	-10.764	-30.428	32.276	199.481	0.310
2800.000	1.197	234.627	2799.596	-31.798	-12.527	-31.798	34.177	201.501	0.196
2900.000	1.210	231.770	2899.573	-33.057	-14.208	-33.057	35.981	203.259	0.061
3000.000	1.150	232.160	2999.552	-34.326	-15.830	-34.326	37.800	204.758	0.061
3100.000	1.077	227.541	3099.533	-35.575	-17.315	-35.575	39.566	205.953	0.116
3200.000	0.917	246.701	3199.519	-36.526	-18.743	-36.526	41.055	207.165	0.367
3300.000	0.817	264.874	3299.507	-36.906	-20.188	-36.906	42.067	208.679	0.291
3400.000	0.939	281.118	3399.496	-36.812	-21.702	-36.812	42.733	210.521	0.276

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	1.004	288.903	3499.481	-36.370	-23.335	-36.370	43.212	212.684	0.147
3600.000	1.211	294.920	3599.463	-35.641	-25.122	-35.641	43.605	215.179	0.237
3700.000	1.233	280.024	3699.440	-35.009	-27.140	-35.009	44.296	217.784	0.318
3800.000	1.261	280.523	3799.416	-34.621	-29.281	-34.621	45.343	220.224	0.030
3900.000	1.260	282.244	3899.392	-34.186	-31.437	-34.186	46.444	222.601	0.038
4000.000	1.083	279.499	3999.371	-33.797	-33.444	-33.797	47.547	224.699	0.186
4100.000	1.033	272.184	4099.354	-33.607	-35.276	-33.607	48.722	226.388	0.144
4200.000	0.795	284.941	4199.342	-33.394	-36.847	-33.394	49.728	227.815	0.312
4300.000	0.509	270.791	4299.335	-33.209	-37.962	-33.209	50.437	228.821	0.327
4400.000	0.462	268.383	4399.332	-33.214	-38.808	-33.214	51.081	229.442	0.051
4500.000	0.524	270.159	4499.328	-33.224	-39.668	-33.224	51.744	230.052	0.064
4600.000	0.514	255.016	4599.324	-33.339	-40.558	-33.339	52.502	230.580	0.137
4700.000	0.574	273.821	4699.319	-33.421	-41.492	-33.421	53.278	231.149	0.187
4800.000	0.885	228.054	4799.312	-33.904	-42.566	-33.904	54.419	231.463	0.636
4900.000	1.494	251.178	4899.290	-34.841	-44.375	-34.841	56.419	231.863	0.764
5000.000	1.281	245.981	4999.261	-35.717	-46.631	-35.717	58.738	232.549	0.247
5100.000	1.177	269.229	5099.239	-36.186	-48.679	-36.186	60.655	233.374	0.506
5200.000	1.233	258.359	5199.217	-36.417	-50.759	-36.417	62.471	234.343	0.235
5300.000	1.111	275.257	5299.196	-36.545	-52.778	-36.545	64.195	235.300	0.365
5400.000	1.193	251.794	5399.176	-36.781	-54.732	-36.781	65.943	236.098	0.475
5500.000	1.325	290.305	5499.154	-36.706	-56.805	-36.706	67.632	237.131	0.840
5600.000	1.081	287.002	5599.132	-36.029	-58.791	-36.029	68.953	238.499	0.254
5700.000	1.525	302.132	5699.106	-35.045	-60.820	-35.045	70.194	240.049	0.558
5800.000	0.966	272.462	5799.083	-34.302	-62.789	-34.302	71.547	241.352	0.836
5900.000	1.044	227.244	5899.069	-34.884	-64.300	-34.884	73.153	241.519	0.776
6000.000	0.546	172.804	5999.060	-35.975	-64.909	-35.975	74.212	241.003	0.851
6100.000	0.735	200.794	6099.054	-37.048	-65.077	-37.048	74.884	240.347	0.360
6200.000	1.513	192.513	6199.034	-38.936	-65.591	-38.936	76.277	239.306	0.792
6300.000	1.266	169.310	6299.006	-41.310	-65.672	-41.310	77.584	237.828	0.609
6400.000	1.357	189.589	6398.980	-43.563	-65.664	-43.563	78.801	236.439	0.470
6500.000	1.559	180.520	6498.948	-46.091	-65.874	-46.091	80.397	235.020	0.306
6600.000	1.664	198.460	6598.909	-48.828	-66.346	-48.828	82.377	233.648	0.513
6700.000	1.945	203.212	6698.859	-51.765	-67.474	-51.765	85.044	232.505	0.318
6800.000	1.961	187.715	6798.802	-55.020	-68.373	-55.020	87.761	231.176	0.527
HORIZONTAL DISPLACEMENT IS 87.761 FEET AT 231.176 DEGREES									