

Company: Noble Energy

Lease/Well: UPRC/ 23-6 I7

API: 05-123-18308

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld

Latitude: 40.296, Longitude: -104.865

GRID North is 0.410 Degrees East of True North

VS-Azi: 0.000 Degrees



## FIELD COPY ONLY (NOT DEFINITIVE - DEFAULT CONFIGURATION)

Depth Reference : RKB = Ground Level

## DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 9/25/2012 / 16:21

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	0.504	6.087	99.999	0.438	0.047	0.438	0.440	6.087	0.504
200.000	0.364	3.322	199.996	1.192	0.112	1.192	1.198	5.355	0.142
300.000	0.337	350.578	299.994	1.799	0.082	1.799	1.801	2.611	0.082
400.000	0.400	334.429	399.992	2.403	-0.117	2.403	2.406	357.223	0.121
500.000	0.477	316.704	499.989	3.021	-0.552	3.021	3.071	349.638	0.155
600.000	0.727	295.039	599.984	3.592	-1.412	3.592	3.860	338.535	0.334
700.000	0.646	258.178	699.977	3.745	-2.539	3.745	4.524	325.868	0.441
800.000	0.726	267.620	799.970	3.603	-3.723	3.603	5.181	314.067	0.138
900.000	0.923	280.578	899.959	3.725	-5.147	3.725	6.353	305.893	0.270
1000.000	0.953	278.432	999.946	3.995	-6.761	3.995	7.853	300.575	0.046
1100.000	0.820	290.429	1099.934	4.366	-8.254	4.366	9.338	297.878	0.228
1200.000	0.809	286.421	1199.924	4.816	-9.602	4.816	10.742	296.635	0.058
1300.000	0.884	284.759	1299.913	5.212	-11.025	5.212	12.195	295.300	0.078
1400.000	0.739	250.624	1399.904	5.194	-12.379	5.194	13.425	292.763	0.496
1500.000	0.790	255.939	1499.895	4.813	-13.656	4.813	14.480	289.414	0.088
1600.000	0.812	248.151	1599.885	4.382	-14.983	4.382	15.611	286.302	0.111
1700.000	0.783	259.589	1699.875	3.995	-16.313	3.995	16.795	283.760	0.162
1800.000	0.962	264.703	1799.864	3.794	-17.821	3.794	18.220	282.018	0.195
1900.000	1.037	255.876	1899.849	3.495	-19.534	3.495	19.844	280.145	0.171
2000.000	1.014	264.070	1999.833	3.183	-21.291	3.183	21.528	278.503	0.148
2100.000	1.110	258.041	2099.815	2.891	-23.119	2.891	23.299	277.128	0.147
2200.000	0.992	246.194	2199.799	2.341	-24.858	2.341	24.968	275.381	0.247
2300.000	1.006	228.530	2299.784	1.411	-26.307	1.411	26.345	273.069	0.307
2400.000	0.996	209.866	2399.769	0.076	-27.398	0.076	27.398	270.158	0.325
2500.000	1.174	217.882	2499.751	-1.486	-28.459	-1.486	28.498	267.011	0.234
2600.000	0.911	211.183	2599.734	-2.975	-29.500	-2.975	29.650	264.242	0.289
2700.000	0.656	229.565	2699.725	-4.026	-30.347	-4.026	30.613	262.442	0.355
2800.000	0.730	233.044	2799.718	-4.781	-31.292	-4.781	31.655	261.314	0.085
2900.000	0.699	241.707	2899.710	-5.453	-32.338	-5.453	32.795	260.429	0.112
3000.000	0.880	231.366	2999.700	-6.221	-33.476	-6.221	34.049	259.472	0.230
3100.000	1.721	355.514	3099.686	-5.204	-34.193	-5.204	34.587	261.347	2.332
3200.000	6.587	40.222	3199.410	0.678	-30.604	0.678	30.612	271.269	5.498
3300.000	11.188	41.693	3298.183	12.308	-20.442	12.308	23.861	301.051	4.606
3400.000	13.055	42.595	3395.949	27.868	-6.344	27.868	28.581	347.175	1.876

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	15.108	41.968	3492.939	45.873	10.016	45.873	46.954	12.317	2.059
3600.000	18.022	40.912	3588.779	67.258	28.865	67.258	73.190	23.228	2.929
3700.000	19.870	40.167	3683.357	91.937	49.959	91.937	104.634	28.520	1.864
3800.000	22.727	38.974	3776.518	119.946	73.076	119.946	140.453	31.351	2.889
3900.000	27.150	37.968	3867.172	152.967	99.275	152.967	182.358	32.983	4.443
4000.000	28.817	37.363	3955.478	190.112	127.940	190.112	229.153	33.939	1.691
4100.000	29.880	37.641	4042.642	228.993	157.779	228.993	278.086	34.567	1.071
4200.000	29.799	39.384	4129.386	267.923	188.758	267.923	327.739	35.166	0.871
4300.000	29.410	38.661	4216.332	306.301	219.863	306.301	377.042	35.671	0.528
4400.000	30.854	39.477	4302.817	345.269	251.507	345.269	427.161	36.071	1.501
4500.000	31.322	38.379	4388.454	385.439	283.948	385.439	478.737	36.379	0.735
4600.000	32.723	37.789	4473.237	427.177	316.649	427.177	531.740	36.548	1.435
4700.000	33.204	39.198	4557.139	469.758	350.517	469.758	586.118	36.729	0.905
4800.000	34.445	39.055	4640.212	512.941	385.642	512.941	641.738	36.937	1.243
4900.000	34.345	38.239	4722.729	557.058	420.921	557.058	698.203	37.075	0.472
5000.000	34.309	40.162	4805.315	600.753	456.558	600.753	754.552	37.234	1.085
5100.000	33.342	43.473	4888.395	642.238	493.646	642.238	810.035	37.547	2.081
5200.000	32.009	45.967	4972.571	680.607	531.611	680.607	863.618	37.993	1.894
5300.000	30.232	47.977	5058.178	715.885	569.371	715.885	914.699	38.497	2.058
5400.000	29.693	47.299	5144.814	749.535	606.275	749.535	964.039	38.968	0.637
5500.000	29.105	46.198	5231.936	783.166	642.030	783.166	1012.695	39.344	0.798
5600.000	29.606	48.849	5319.099	816.257	678.184	816.257	1061.230	39.721	1.392
5700.000	30.320	49.897	5405.734	848.772	716.091	848.772	1110.496	40.154	0.885
5800.000	27.645	53.161	5493.209	878.949	753.974	878.949	1158.028	40.623	3.107
5900.000	28.223	51.529	5581.558	907.569	791.055	907.569	1203.931	41.076	0.958
6000.000	29.832	45.397	5669.014	939.754	827.287	939.754	1252.015	41.358	3.381
6100.000	31.480	45.650	5755.035	975.474	863.670	975.474	1302.872	41.521	1.653
6200.000	30.009	46.504	5840.978	1010.940	900.484	1010.940	1353.836	41.693	1.535
6300.000	30.626	47.848	5927.303	1045.247	937.509	1045.247	1404.089	41.890	0.917
6400.000	31.088	49.955	6013.151	1078.953	976.158	1078.953	1455.000	42.137	1.175
6500.000	30.089	49.524	6099.235	1111.836	1014.992	1111.836	1505.452	42.393	1.023
6600.000	28.114	49.380	6186.606	1143.450	1051.948	1143.450	1553.728	42.613	1.976
6700.000	29.319	50.730	6274.307	1174.288	1088.788	1174.288	1601.378	42.836	1.368
6800.000	30.502	51.443	6360.986	1205.605	1127.589	1205.605	1650.739	43.085	1.235
6900.000	29.736	52.361	6447.485	1236.569	1167.074	1236.569	1700.342	43.344	0.893
7000.000	29.664	53.012	6534.348	1266.602	1206.478	1266.602	1749.249	43.607	0.330
7100.000	23.244	55.771	6623.834	1292.618	1242.597	1292.618	1793.017	43.870	6.535
7200.000	18.220	58.928	6717.332	1311.799	1272.322	1311.799	1827.462	44.125	5.145
7300.000	11.119	63.928	6814.014	1324.122	1294.402	1324.122	1851.695	44.350	7.206
7400.000	7.240	77.420	6912.726	1329.735	1309.221	1329.735	1866.080	44.555	4.411
7500.000	5.800	79.267	7012.076	1332.048	1320.336	1332.048	1875.537	44.747	1.455
7600.000	3.749	94.147	7111.728	1332.753	1328.562	1332.753	1881.836	44.910	2.380
7700.000	3.319	96.895	7211.537	1332.169	1334.696	1332.169	1885.759	45.054	0.462
HORIZONTAL DISPLACEMENT IS 1885.759 FEET AT 45.054 DEGREES									