

Company: Noble Energy

Lease/Well: Hoffner / 33-35

API: 05-123-22825

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld County

Latitude: 40.440, Longitude: -104.514

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_run01-01_ed.ut

Minimum Curvature Method

Report Date/Time: 9/24/2011 / 20:18

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	0.230	2.480	100.000	0.200	0.009	0.200	0.201	2.480	0.230
200.000	0.277	334.607	199.999	0.619	-0.086	0.619	0.625	352.065	0.130
300.000	0.189	329.426	299.998	0.979	-0.274	0.979	1.017	344.386	0.091
400.000	0.317	85.111	399.997	1.144	-0.082	1.144	1.147	355.908	0.433
500.000	0.492	104.372	499.995	1.061	0.610	1.061	1.224	29.873	0.220
600.000	0.348	113.211	599.992	0.835	1.305	0.835	1.549	57.381	0.158
700.000	0.434	102.930	699.990	0.631	1.953	0.631	2.052	72.102	0.110
800.000	0.577	86.693	799.986	0.575	2.824	0.575	2.882	78.493	0.201
900.000	0.427	101.286	899.982	0.531	3.692	0.531	3.730	81.814	0.196
1000.000	0.458	99.576	999.979	0.392	4.451	0.392	4.468	84.970	0.034
1100.000	0.450	91.447	1099.976	0.315	5.238	0.315	5.247	86.554	0.065
1200.000	0.502	83.764	1199.973	0.353	6.066	0.353	6.076	86.669	0.082
1300.000	0.548	85.914	1299.968	0.435	6.978	0.435	6.992	86.435	0.050
1400.000	0.546	85.875	1399.964	0.503	7.930	0.503	7.946	86.370	0.002
1500.000	0.438	87.216	1499.960	0.556	8.788	0.556	8.805	86.380	0.108
1600.000	0.421	88.154	1599.957	0.586	9.537	0.586	9.555	86.482	0.018
1700.000	0.378	81.831	1699.955	0.645	10.231	0.645	10.251	86.393	0.062
1800.000	0.413	30.793	1799.953	1.001	10.742	1.001	10.788	84.674	0.342
1900.000	0.605	19.370	1899.949	1.809	11.101	1.809	11.248	80.746	0.216
2000.000	0.792	16.046	1999.941	2.971	11.467	2.971	11.846	75.474	0.192
2100.000	0.838	6.436	2099.931	4.363	11.740	4.363	12.525	69.616	0.144
2200.000	0.903	18.079	2199.920	5.838	12.067	5.838	13.405	64.181	0.188
2300.000	0.951	358.556	2299.907	7.417	12.291	7.417	14.355	58.890	0.318
2400.000	0.904	342.164	2399.894	8.998	12.028	8.998	15.021	53.201	0.268
2500.000	0.907	339.959	2499.882	10.493	11.515	10.493	15.579	47.659	0.035
2600.000	0.828	350.810	2599.870	11.950	11.128	11.950	16.329	42.961	0.182
2700.000	0.819	351.595	2699.860	13.370	10.908	13.370	17.255	39.210	0.015
2800.000	0.789	354.638	2799.850	14.763	10.739	14.763	18.256	36.035	0.052
2900.000	0.547	353.812	2899.843	15.923	10.624	15.923	19.142	33.711	0.242
3000.000	0.255	25.625	2999.841	16.598	10.668	16.598	19.731	32.731	0.357
3100.000	0.244	24.828	3099.840	16.992	10.854	16.992	20.162	32.569	0.011
3200.000	0.112	16.055	3199.839	17.279	10.970	17.279	20.467	32.411	0.134
3300.000	0.149	341.923	3299.839	17.497	10.957	17.497	20.644	32.057	0.084
3400.000	0.271	9.062	3399.838	17.854	10.954	17.854	20.946	31.531	0.155

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	0.659	32.931	3499.835	18.570	11.304	18.570	21.740	31.330	0.425
3600.000	0.635	28.169	3599.829	19.541	11.878	19.541	22.868	31.293	0.059
3700.000	0.767	33.038	3699.821	20.591	12.505	20.591	24.090	31.270	0.145
3800.000	0.678	31.567	3799.813	21.655	13.179	21.655	25.350	31.324	0.091
3900.000	0.729	32.484	3899.806	22.695	13.830	22.695	26.577	31.357	0.052
4000.000	0.717	25.316	3999.798	23.797	14.439	23.797	27.835	31.247	0.091
4100.000	1.068	28.610	4099.785	25.180	15.152	25.180	29.388	31.037	0.355
4200.000	1.667	39.128	4199.757	27.127	16.516	27.127	31.759	31.336	0.648
4300.000	1.980	43.108	4299.706	29.517	18.615	29.517	34.897	32.238	0.338
4400.000	2.443	49.801	4399.631	32.154	21.424	32.154	38.638	33.675	0.529
4500.000	2.863	51.369	4499.524	35.089	25.003	35.089	43.086	35.472	0.426
4600.000	3.159	69.226	4599.388	37.625	29.530	37.625	47.830	38.126	0.979
4700.000	3.175	85.493	4699.237	38.820	34.867	38.820	52.179	41.929	0.896
4800.000	2.979	99.808	4799.095	38.595	40.188	38.595	55.719	46.158	0.791
4900.000	2.401	103.084	4898.984	37.678	44.789	37.678	58.529	49.928	0.597
5000.000	1.451	98.549	4998.926	37.015	48.081	37.015	60.679	52.409	0.962
5100.000	0.872	94.380	5098.905	36.769	50.092	36.769	62.139	53.720	0.585
5200.000	0.593	119.377	5198.897	36.457	51.302	36.457	62.937	54.601	0.418
5300.000	0.164	16.234	5298.896	36.340	51.794	36.340	63.271	54.945	0.650
5400.000	0.340	319.337	5398.895	36.703	51.640	36.703	63.355	54.597	0.286
5500.000	0.326	330.368	5498.893	37.175	51.306	37.175	63.359	54.073	0.066
5600.000	0.238	313.393	5598.892	37.565	51.015	37.565	63.353	53.633	0.121
5700.000	0.282	260.265	5698.891	37.666	50.622	37.666	63.097	53.348	0.236
5800.000	0.485	237.826	5798.889	37.399	50.021	37.399	62.456	53.216	0.249
5900.000	0.717	226.687	5898.883	36.744	49.207	36.744	61.412	53.250	0.258
6000.000	0.872	231.930	5998.873	35.846	48.153	35.846	60.030	53.335	0.171
6100.000	1.073	227.652	6098.859	34.746	46.862	34.746	58.338	53.445	0.214
6200.000	1.453	226.723	6198.835	33.247	45.247	33.247	56.149	53.692	0.380
6300.000	1.634	222.501	6298.798	31.327	43.361	31.327	53.494	54.154	0.214
6400.000	1.713	218.488	6398.756	29.105	41.468	29.105	50.663	54.936	0.141
6500.000	1.841	214.528	6498.708	26.612	39.627	26.612	47.734	56.116	0.177
6600.000	2.276	210.499	6598.643	23.578	37.709	23.578	44.473	57.984	0.459
6700.000	2.641	210.293	6698.551	19.877	35.539	19.877	40.720	60.781	0.365
HORIZONTAL DISPLACEMENT IS 40.720 FEET AT 60.781 DEGREES									