

Company: Noble Energy

Lease/Well: Cecil K / 35-30

API: 05-123-25503

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld County

Latitude: 40.276, Longitude: -104.749

GRID North is 0.490 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_inc.ut

Minimum Curvature Method

Report Date/Time: 1/2/2013 / 15:44

Vaughn Energy Services

Henderson Colorado

303-853-4976

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	0.035	192.425	100.000	-0.030	-0.007	-0.030	0.030	192.425	0.035
200.000	0.317	205.086	199.999	-0.310	-0.130	-0.310	0.336	202.811	0.283
300.000	0.366	221.218	299.998	-0.800	-0.458	-0.800	0.922	209.784	0.108
400.000	0.282	275.396	399.996	-1.018	-0.913	-1.018	1.368	221.906	0.305
500.000	0.274	169.158	499.996	-1.230	-1.113	-1.230	1.659	222.142	0.445
600.000	0.218	235.225	599.995	-1.573	-1.224	-1.573	1.993	217.876	0.272
700.000	0.047	195.754	699.995	-1.722	-1.391	-1.722	2.213	218.939	0.184
800.000	0.192	242.565	799.994	-1.839	-1.551	-1.839	2.406	220.154	0.164
900.000	0.528	236.948	899.992	-2.167	-2.086	-2.167	3.008	223.911	0.337
1000.000	1.549	271.086	999.975	-2.393	-3.824	-2.393	4.511	237.965	1.151
1100.000	2.539	264.969	1099.910	-2.562	-7.383	-2.562	7.814	250.864	1.012
1200.000	4.641	272.686	1199.709	-2.566	-13.631	-2.566	13.871	259.338	2.152
1300.000	6.452	268.738	1299.237	-2.500	-23.290	-2.500	23.424	263.873	1.849
1400.000	7.898	266.904	1398.452	-2.995	-35.768	-2.995	35.893	265.213	1.464
1500.000	8.792	267.058	1497.392	-3.758	-50.261	-3.758	50.401	265.723	0.894
1600.000	10.905	264.673	1595.913	-5.029	-67.313	-5.029	67.501	265.727	2.152
1700.000	11.847	267.260	1693.948	-6.398	-86.985	-6.398	87.220	265.793	1.071
1800.000	12.398	266.464	1791.718	-7.551	-107.953	-7.551	108.216	265.999	0.576
1900.000	13.143	266.392	1889.244	-8.928	-130.014	-8.928	130.320	266.071	0.745
2000.000	13.312	271.370	1986.594	-9.369	-152.870	-9.369	153.157	266.493	1.151
2100.000	15.005	271.526	2083.553	-8.749	-177.322	-8.749	177.537	267.175	1.694
2200.000	15.316	267.899	2180.074	-8.888	-203.461	-8.888	203.655	267.499	0.998
2300.000	15.592	266.201	2276.459	-10.263	-230.069	-10.263	230.298	267.446	0.530
2400.000	16.499	268.420	2372.564	-11.545	-257.673	-11.545	257.932	267.435	1.095
2500.000	17.224	266.629	2468.265	-12.807	-286.648	-12.807	286.934	267.442	0.893
2600.000	18.289	266.616	2563.499	-14.603	-317.093	-14.603	317.429	267.363	1.065
2700.000	18.602	264.708	2658.362	-17.001	-348.638	-17.001	349.053	267.208	0.680
2800.000	17.951	263.938	2753.317	-20.099	-379.845	-20.099	380.376	266.971	0.694
2900.000	16.491	262.723	2848.832	-23.524	-409.249	-23.524	409.925	266.710	1.504
3000.000	15.548	263.076	2944.948	-26.938	-436.634	-26.938	437.464	266.470	0.947
3100.000	14.252	260.151	3041.585	-30.659	-462.068	-30.659	463.084	266.204	1.499

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
3200.000	14.408	260.851	3138.473	-34.743	-486.478	-34.743	487.717	265.915	0.233
3300.000	14.056	261.842	3235.404	-38.444	-510.782	-38.444	512.226	265.696	0.428
3400.000	14.290	262.005	3332.360	-41.884	-535.024	-41.884	536.661	265.524	0.237
3500.000	14.848	264.602	3429.145	-44.806	-560.003	-44.806	561.792	265.425	0.859
3600.000	15.505	264.109	3525.657	-47.383	-586.055	-47.383	587.967	265.378	0.670
3700.000	15.480	267.443	3622.026	-49.351	-612.682	-49.351	614.667	265.395	0.891
3800.000	15.184	266.403	3718.467	-50.768	-639.084	-50.768	641.097	265.458	0.404
3900.000	16.402	266.571	3814.690	-52.434	-666.248	-52.434	668.308	265.500	1.219
4000.000	17.245	267.872	3910.410	-53.829	-695.154	-53.829	697.235	265.572	0.923
4100.000	16.311	267.354	4006.152	-55.027	-723.995	-55.027	726.084	265.654	0.946
4200.000	15.376	268.695	4102.352	-55.978	-751.278	-55.978	753.361	265.739	1.004
4300.000	15.945	268.903	4198.639	-56.542	-778.266	-56.542	780.318	265.845	0.572
4400.000	15.752	268.664	4294.838	-57.122	-805.570	-57.122	807.593	265.944	0.204
4500.000	15.482	268.750	4391.146	-57.730	-832.483	-57.730	834.483	266.033	0.271
4600.000	16.694	264.190	4487.232	-59.475	-860.118	-59.475	862.172	266.044	1.750
4700.000	16.263	262.479	4583.125	-62.761	-888.289	-62.761	890.504	265.959	0.649
4800.000	15.040	260.496	4679.416	-66.737	-914.970	-66.737	917.400	265.828	1.335
4900.000	14.220	261.379	4776.173	-70.720	-939.910	-70.720	942.567	265.697	0.850
5000.000	14.495	261.889	4873.050	-74.327	-964.443	-74.327	967.303	265.593	0.303
5100.000	15.306	264.127	4969.687	-77.443	-989.963	-77.443	992.987	265.527	0.994
5200.000	14.458	262.887	5066.332	-80.339	-1015.48	-80.339	1018.652	265.476	0.906
5300.000	12.054	263.604	5163.661	-83.049	-1038.25	-83.049	1041.563	265.427	2.409
5400.000	11.236	263.156	5261.602	-85.373	-1058.30	-85.373	1061.735	265.388	0.822
5500.000	8.583	262.075	5360.101	-87.564	-1075.36	-87.564	1078.924	265.345	2.659
5600.000	6.251	259.975	5459.258	-89.540	-1088.12	-89.540	1091.796	265.296	2.348
5700.000	4.941	260.670	5558.779	-91.186	-1097.73	-91.186	1101.510	265.251	1.311
5800.000	2.428	251.373	5658.565	-92.561	-1103.99	-92.561	1107.860	265.207	2.575
5900.000	1.596	249.843	5758.502	-93.718	-1107.30	-93.718	1111.260	265.162	0.833
6000.000	0.845	259.241	5858.479	-94.335	-1109.33	-94.335	1113.337	265.139	0.775
6100.000	0.881	268.169	5958.468	-94.498	-1110.83	-94.498	1114.839	265.138	0.139
6200.000	1.328	254.668	6058.449	-94.829	-1112.71	-94.829	1116.746	265.129	0.515
6300.000	1.557	234.610	6158.418	-95.922	-1114.94	-95.922	1119.057	265.083	0.550
6400.000	1.473	230.407	6258.383	-97.528	-1117.04	-97.528	1121.286	265.010	0.139
6500.000	1.323	215.348	6358.354	-99.289	-1118.70	-99.289	1123.093	264.928	0.396
6600.000	1.335	204.197	6458.327	-101.293	-1119.84	-101.293	1124.412	264.831	0.258
6700.000	1.391	204.238	6558.299	-103.462	-1120.82	-103.462	1125.581	264.726	0.056
6800.000	1.328	205.533	6658.270	-105.614	-1121.81	-105.614	1126.774	264.622	0.070
6900.000	1.309	200.845	6758.244	-107.727	-1122.72	-107.727	1127.876	264.519	0.109
7000.000	1.495	206.082	6858.214	-109.967	-1123.70	-109.967	1129.068	264.411	0.225
7100.000	1.681	199.554	6958.176	-112.520	-1124.76	-112.520	1130.378	264.287	0.259
7200.000	1.645	211.289	7058.134	-115.128	-1126.00	-115.128	1131.870	264.162	0.342
HORIZONTAL DISPLACEMENT IS 1131.870 FEET AT 264.162 DEGREES									