



Company: Noble Energy  
 Well: LHI 14-11  
 API#: 05-123-19972  
 Rig Name: Production / VES  
 Location: Weld County, CO  
 Latitude: 40.317, Longitude: -104.851  
 GRID North is 0.420 Degrees East of True North  
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : PRKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: inrun-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 9/27/2012 / 11:50

Vaughn Energy Services  
 Henderson, CO  
 303-853-4976  
 Robert Davis

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	0.517	271.942	99.999	0.015	-0.451	0.015	0.451	271.942	0.517
200.000	0.408	298.584	199.995	0.201	-1.214	0.201	1.230	279.396	0.238
300.000	0.766	247.018	299.991	0.110	-2.141	0.110	2.144	272.946	0.604
400.000	0.377	231.361	399.986	-0.356	-3.014	-0.356	3.035	263.258	0.415
500.000	0.625	224.938	499.982	-0.948	-3.656	-0.948	3.777	255.465	0.253
600.000	0.831	265.503	599.974	-1.391	-4.764	-1.391	4.963	253.727	0.540
700.000	0.790	222.831	699.965	-1.953	-5.956	-1.953	6.268	251.841	0.591
800.000	0.932	235.044	799.954	-2.925	-7.091	-2.925	7.671	247.583	0.231
900.000	0.819	213.605	899.942	-3.986	-8.153	-3.986	9.076	243.945	0.344
1000.000	0.602	255.567	999.935	-4.713	-9.058	-4.713	10.211	242.513	0.548
1100.000	1.003	233.259	1099.926	-5.367	-10.268	-5.367	11.586	242.404	0.501
1200.000	0.600	239.503	1199.916	-6.157	-11.421	-6.157	12.974	241.672	0.411
1300.000	0.845	235.932	1299.908	-6.835	-12.483	-6.835	14.232	241.296	0.249
1400.000	0.764	237.616	1399.898	-7.605	-13.657	-7.605	15.632	240.886	0.085
1500.000	0.877	231.192	1499.887	-8.442	-14.816	-8.442	17.052	240.326	0.145
1600.000	0.983	232.596	1599.874	-9.442	-16.093	-9.442	18.659	239.599	0.109
1700.000	0.929	239.300	1699.860	-10.377	-17.472	-10.377	20.321	239.292	0.124
1800.000	0.962	240.902	1799.847	-11.199	-18.902	-11.199	21.971	239.354	0.043
1900.000	0.780	243.801	1899.835	-11.908	-20.247	-11.908	23.489	239.538	0.187
2000.000	0.720	243.496	1999.827	-12.489	-21.420	-12.489	24.796	239.755	0.060
2100.000	0.854	250.799	2099.817	-13.015	-22.687	-13.015	26.155	240.158	0.167
2200.000	0.670	242.821	2199.808	-13.527	-23.911	-13.527	27.472	240.501	0.212
2300.000	1.104	195.234	2299.797	-14.724	-24.684	-14.724	28.742	239.184	0.818
2400.000	1.225	191.117	2399.777	-16.702	-25.143	-16.702	30.185	236.405	0.147
2500.000	1.304	209.108	2499.753	-18.745	-25.903	-18.745	31.974	234.108	0.403
2600.000	1.197	204.825	2599.729	-20.687	-26.895	-20.687	33.931	232.433	0.142
2700.000	1.575	193.442	2699.700	-22.972	-27.653	-22.972	35.950	230.283	0.466
2800.000	1.667	192.504	2799.660	-25.728	-28.287	-25.728	38.238	227.713	0.096
2900.000	1.740	213.602	2899.616	-28.413	-29.443	-28.413	40.916	226.020	0.628
3000.000	1.155	218.926	2999.584	-30.461	-30.916	-30.461	43.401	225.424	0.600
3100.000	1.550	209.537	3099.556	-32.422	-32.216	-32.422	45.706	224.818	0.452
3200.000	1.261	218.075	3199.526	-34.464	-33.561	-34.464	48.105	224.239	0.356
3300.000	1.330	213.894	3299.501	-36.293	-34.886	-36.293	50.342	223.868	0.117
3400.000	1.387	220.222	3399.472	-38.181	-36.315	-38.181	52.693	223.565	0.161

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	1.402	222.211	3499.443	-40.011	-37.918	-40.011	55.124	223.462	0.050
3600.000	1.505	214.743	3599.411	-41.996	-39.488	-41.996	57.645	223.238	0.216
3700.000	1.548	213.520	3699.375	-44.200	-40.983	-44.200	60.276	222.837	0.054
3800.000	1.617	216.835	3799.337	-46.456	-42.574	-46.456	63.013	222.504	0.115
3900.000	1.587	221.761	3899.298	-48.618	-44.342	-48.618	65.802	222.367	0.141
4000.000	1.613	220.318	3999.259	-50.723	-46.175	-50.723	68.593	222.312	0.048
4100.000	1.832	227.842	4099.214	-52.869	-48.270	-52.869	71.590	222.397	0.314
4200.000	1.433	223.939	4199.173	-54.842	-50.323	-54.842	74.432	222.539	0.414
4300.000	1.207	237.229	4299.147	-56.313	-52.076	-56.313	76.701	222.761	0.379
4400.000	1.423	240.817	4399.121	-57.488	-54.046	-57.488	78.904	223.232	0.232
4500.000	1.141	234.078	4499.095	-58.678	-55.937	-58.678	81.068	223.630	0.319
4600.000	1.137	264.518	4599.077	-59.358	-57.732	-59.358	82.803	224.204	0.598
4700.000	0.614	262.797	4699.065	-59.520	-59.251	-59.520	83.984	224.870	0.524
4800.000	0.940	276.482	4799.055	-59.494	-60.597	-59.494	84.921	225.526	0.373
4900.000	0.700	294.351	4899.045	-59.150	-61.968	-59.150	85.667	226.333	0.348
5000.000	0.769	295.520	4999.037	-58.608	-63.131	-58.608	86.142	227.128	0.071
5100.000	0.412	291.556	5099.031	-58.187	-64.071	-58.187	86.550	227.755	0.360
5200.000	0.676	282.788	5199.027	-57.925	-64.981	-57.925	87.050	228.286	0.276
5300.000	0.921	276.741	5299.017	-57.700	-66.354	-57.700	87.932	228.990	0.258
5400.000	0.869	264.966	5399.005	-57.672	-67.907	-57.672	89.092	229.659	0.191
5500.000	1.025	258.215	5498.991	-57.921	-69.538	-57.921	90.501	230.208	0.192
5600.000	1.038	244.319	5598.975	-58.496	-71.229	-58.496	92.171	230.606	0.250
5700.000	1.218	239.789	5698.956	-59.423	-72.964	-59.423	94.100	230.840	0.201
5800.000	1.405	233.026	5798.930	-60.695	-74.861	-60.695	96.375	230.966	0.242
5900.000	1.545	230.270	5898.897	-62.294	-76.878	-62.294	98.948	230.982	0.158
6000.000	1.700	234.568	5998.856	-64.017	-79.124	-64.017	101.778	231.025	0.197
6100.000	1.777	238.892	6098.810	-65.678	-81.660	-65.678	104.795	231.191	0.152
6200.000	2.066	228.447	6198.754	-67.674	-84.336	-67.674	108.131	231.255	0.453
6300.000	2.238	232.134	6298.684	-70.068	-87.226	-70.068	111.884	231.225	0.220
6400.000	2.283	240.780	6398.606	-72.239	-90.506	-72.239	115.800	231.404	0.344
6500.000	2.642	237.802	6498.514	-74.439	-94.194	-74.439	120.057	231.682	0.381
6600.000	3.237	229.467	6598.382	-77.502	-98.291	-77.502	125.171	231.744	0.731
6700.000	3.099	233.697	6698.230	-80.937	-102.615	-80.937	130.693	231.735	0.272
6800.000	2.546	227.937	6798.108	-84.025	-106.442	-84.025	135.610	231.712	0.621
6900.000	2.567	236.605	6898.009	-86.745	-109.960	-86.745	140.057	231.731	0.387
7000.000	2.740	227.602	6997.902	-89.590	-113.595	-89.590	144.672	231.738	0.451
7100.000	3.012	243.281	7097.778	-92.383	-117.706	-92.383	149.631	231.873	0.829
HORIZONTAL DISPLACEMENT IS 149.631 FEET AT 231.873 DEGREES									