



Company: Noble Energy  
Well: Bruntz-Boulter 16-01  
API: 05-123-10556  
Rig Name: Production/ Lightning Wireline  
State/County: Colorado/Weld  
Latitude: 40.307, Longitude: -104.661  
GRID North is 0.540 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: 10/11/2012 / 13:13

Vaughn Energy Services  
Henderson, CO  
303-853-4976  
Levi Sheldon

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	0.231	191.806	100.000	-0.197	-0.041	-0.197	0.201	191.806	0.231
200.000	0.115	228.541	199.999	-0.461	-0.158	-0.461	0.487	198.905	0.155
300.000	0.121	111.961	299.999	-0.567	-0.136	-0.567	0.583	193.447	0.201
400.000	0.136	60.244	399.999	-0.547	0.065	-0.547	0.551	173.225	0.113
500.000	0.058	19.989	499.999	-0.441	0.185	-0.441	0.478	157.227	0.099
600.000	0.291	41.469	599.998	-0.203	0.371	-0.203	0.423	118.709	0.238
700.000	0.136	9.586	699.998	0.104	0.559	0.104	0.569	79.429	0.190
800.000	0.336	27.895	799.997	0.480	0.716	0.480	0.862	56.150	0.211
900.000	0.358	25.890	899.995	1.019	0.989	1.019	1.420	44.127	0.025
1000.000	0.315	60.729	999.993	1.435	1.365	1.435	1.980	43.574	0.205
1100.000	0.339	355.470	1099.992	1.864	1.581	1.864	2.444	40.319	0.353
1200.000	0.272	359.383	1199.991	2.396	1.556	2.396	2.856	32.998	0.069
1300.000	0.439	354.092	1299.989	3.014	1.514	3.014	3.373	26.666	0.170
1400.000	0.256	356.836	1399.987	3.618	1.462	3.618	3.902	22.004	0.184
1500.000	0.370	359.977	1499.985	4.163	1.449	4.163	4.409	19.195	0.116
1600.000	0.163	1.791	1599.984	4.629	1.454	4.629	4.852	17.436	0.208
1700.000	0.201	351.692	1699.984	4.944	1.433	4.944	5.148	16.162	0.049
1800.000	0.200	350.084	1799.983	5.290	1.377	5.290	5.466	14.596	0.006
1900.000	0.457	330.759	1899.981	5.810	1.153	5.810	5.923	11.221	0.276
2000.000	0.342	296.476	1999.979	6.291	0.690	6.291	6.329	6.262	0.260
2100.000	0.637	313.501	2099.975	6.807	0.020	6.807	6.807	0.168	0.325
2200.000	0.443	310.118	2199.971	7.438	-0.679	7.438	7.469	354.785	0.196
2300.000	0.624	315.711	2299.966	8.078	-1.355	8.078	8.190	350.476	0.188
2400.000	0.673	296.736	2399.960	8.732	-2.260	8.732	9.019	345.489	0.219
2500.000	0.715	299.316	2499.953	9.302	-3.329	9.302	9.879	340.308	0.052
2600.000	0.706	298.070	2599.945	9.897	-4.417	9.897	10.838	335.949	0.018
2700.000	0.761	296.268	2699.937	10.481	-5.557	10.481	11.863	332.070	0.059
2800.000	0.715	298.879	2799.929	11.077	-6.699	11.077	12.945	328.836	0.057
2900.000	0.801	290.478	2899.920	11.623	-7.900	11.623	14.053	325.796	0.140
3000.000	0.756	314.865	2999.911	12.332	-9.022	12.332	15.280	323.812	0.332
3100.000	0.729	302.089	3099.903	13.135	-10.028	13.135	16.525	322.640	0.167
3200.000	0.601	286.227	3199.896	13.619	-11.070	13.619	17.551	320.894	0.223
3300.000	0.454	242.129	3299.892	13.581	-11.924	13.581	18.073	318.716	0.419
3400.000	0.787	256.466	3399.886	13.235	-12.943	13.235	18.511	315.639	0.365

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	0.537	250.991	3499.879	12.921	-14.054	12.921	19.091	312.596	0.258
3600.000	0.478	276.785	3599.875	12.818	-14.911	12.818	19.663	310.683	0.234
3700.000	0.475	274.728	3699.872	12.902	-15.739	12.902	20.351	309.343	0.018
3800.000	0.417	254.271	3799.869	12.837	-16.502	12.837	20.907	307.880	0.168
3900.000	0.490	254.848	3899.866	12.627	-17.265	12.627	21.389	306.180	0.074
4000.000	0.413	245.639	3999.863	12.366	-18.006	12.366	21.844	304.480	0.106
4100.000	0.521	234.643	4099.859	11.954	-18.706	11.954	22.199	302.582	0.140
4200.000	0.401	242.905	4199.856	11.532	-19.388	11.532	22.558	300.745	0.137
4300.000	0.931	188.322	4299.850	10.569	-19.816	10.569	22.459	298.074	0.771
4400.000	0.911	214.952	4399.837	9.114	-20.389	9.114	22.334	294.085	0.425
4500.000	1.140	216.763	4499.821	7.666	-21.440	7.666	22.769	289.674	0.231
4600.000	1.144	212.811	4599.802	6.029	-22.577	6.029	23.368	284.953	0.079
4700.000	1.145	214.245	4699.782	4.364	-23.680	4.364	24.079	280.443	0.029
4800.000	1.100	213.800	4799.762	2.741	-24.776	2.741	24.927	276.314	0.046
4900.000	0.648	187.952	4899.751	1.384	-25.388	1.384	25.426	273.120	0.589
5000.000	0.733	176.793	4999.744	0.185	-25.430	0.185	25.431	270.418	0.159
5100.000	0.612	167.773	5099.737	-0.975	-25.281	-0.975	25.300	267.791	0.161
5200.000	0.614	177.427	5199.731	-2.032	-25.144	-2.032	25.226	265.380	0.103
5300.000	0.654	185.168	5299.725	-3.135	-25.172	-3.135	25.366	262.900	0.094
5400.000	0.763	177.525	5399.717	-4.368	-25.194	-4.368	25.570	260.163	0.144
5500.000	0.801	177.891	5499.708	-5.732	-25.140	-5.732	25.785	257.157	0.038
5600.000	0.766	176.590	5599.699	-7.097	-25.074	-7.097	26.059	254.197	0.039
5700.000	0.501	190.239	5699.693	-8.194	-25.112	-8.194	26.415	251.929	0.303
5800.000	0.381	223.009	5799.690	-8.867	-25.417	-8.867	26.919	250.767	0.274
5900.000	0.132	243.073	5899.689	-9.163	-25.746	-9.163	27.328	250.410	0.261
6000.000	0.096	71.462	5999.689	-9.188	-25.769	-9.188	27.358	250.376	0.227
6100.000	0.155	57.092	6099.688	-9.088	-25.575	-9.088	27.142	250.438	0.066
6200.000	0.591	36.913	6199.686	-8.602	-25.152	-8.602	26.582	251.120	0.449
6300.000	0.546	101.801	6299.682	-8.286	-24.375	-8.286	25.745	251.224	0.611
6400.000	0.633	109.987	6399.677	-8.573	-23.390	-8.573	24.912	249.872	0.120
6500.000	0.604	120.392	6499.671	-9.028	-22.417	-9.028	24.167	248.064	0.116
6600.000	0.769	125.715	6599.664	-9.686	-21.418	-9.686	23.506	245.665	0.177
6700.000	0.806	134.373	6699.654	-10.570	-20.370	-10.570	22.949	242.575	0.125
6800.000	0.909	136.989	6799.643	-11.642	-19.325	-11.642	22.561	238.934	0.110
6900.000	0.917	125.688	6899.631	-12.689	-18.134	-12.689	22.133	235.018	0.180
7000.000	0.828	135.938	6999.619	-13.675	-16.982	-13.675	21.804	231.156	0.179
7100.000	0.657	130.718	7099.611	-14.568	-16.045	-14.568	21.672	227.762	0.184
HORIZONTAL DISPLACEMENT IS 21.672 FEET AT 227.762 DEGREES									