



Company: NOBLE ENERGY  
 Lease/Well: JOHNSON/10-45  
 API: 05-123-25264  
 Rig Name: PRODUCTION  
 State/County: COLORADO/WELD COUNTY, CO.  
 Latitude: 40.323, Longitude: -104.643  
 GRID North is 0.550 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: 8/11/2011 / 11:45

VAUGHN ENERGY SERVICES  
 HENDERSON COLORADO  
 866-835-8333  
 RKB = GROUND LEVEL  
 NICK CAMPBELL

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	0.817	286.295	99.997	0.200	-0.684	0.200	0.713	286.295	0.817
200.000	0.514	271.429	199.990	0.411	-1.817	0.411	1.863	282.754	0.346
300.000	0.543	314.567	299.986	0.755	-2.604	0.755	2.711	286.178	0.390
400.000	0.326	257.578	399.983	1.027	-3.219	1.027	3.379	287.693	0.457
500.000	0.048	63.482	499.983	0.985	-3.459	0.985	3.597	285.888	0.373
600.000	0.345	276.487	599.982	1.037	-3.720	1.037	3.862	285.582	0.386
700.000	0.070	28.594	699.982	1.125	-3.989	1.125	4.145	285.753	0.377
800.000	0.107	18.458	799.982	1.268	-3.930	1.268	4.130	287.880	0.040
900.000	0.186	21.597	899.981	1.508	-3.841	1.508	4.126	291.429	0.079
1000.000	0.060	269.467	999.981	1.658	-3.833	1.658	4.177	293.389	0.216
1100.000	0.114	336.773	1099.981	1.749	-3.925	1.749	4.297	294.020	0.106
1200.000	0.458	25.347	1199.980	2.202	-3.793	2.202	4.386	300.134	0.392
1300.000	0.308	305.638	1299.978	2.719	-3.840	2.719	4.705	305.304	0.504
1400.000	0.515	309.892	1399.975	3.164	-4.403	3.164	5.422	305.700	0.209
1500.000	0.388	280.810	1499.972	3.515	-5.080	3.515	6.178	304.684	0.258
1600.000	0.483	269.554	1599.970	3.575	-5.833	3.575	6.842	301.505	0.127
1700.000	0.515	337.476	1699.967	3.987	-6.427	3.987	7.563	301.816	0.558
1800.000	0.215	331.207	1799.964	4.567	-6.690	4.567	8.100	304.322	0.302
1900.000	0.670	331.779	1899.961	5.247	-7.057	5.247	8.793	306.632	0.455
2000.000	0.145	147.920	1999.959	5.655	-7.266	5.655	9.207	307.892	0.815
2100.000	0.636	95.955	2099.957	5.490	-6.646	5.490	8.620	309.557	0.559
2200.000	0.615	100.439	2199.951	5.335	-5.566	5.335	7.709	313.785	0.053
2300.000	0.441	56.099	2299.947	5.452	-4.719	5.452	7.210	319.123	0.430
2400.000	0.377	101.481	2399.945	5.601	-4.078	5.601	6.928	323.944	0.321
2500.000	0.442	167.072	2499.943	5.159	-3.669	5.159	6.331	324.580	0.447
2600.000	0.996	141.934	2599.935	4.099	-3.047	4.099	5.108	323.374	0.624
2700.000	0.599	151.201	2699.925	2.956	-2.259	2.956	3.721	322.613	0.416
2800.000	1.041	162.253	2799.914	1.633	-1.730	1.633	2.379	313.341	0.467
2900.000	0.974	164.488	2899.899	-0.051	-1.226	-0.051	1.227	267.619	0.077
3000.000	1.322	140.562	2999.879	-1.761	-0.266	-1.761	1.781	188.593	0.585

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
3100.000	1.086	132.141	3099.857	-3.288	1.170	-3.288	3.490	160.419	0.294
3200.000	0.521	144.743	3199.847	-4.295	2.135	-4.295	4.796	153.571	0.589
3300.000	0.375	127.801	3299.844	-4.867	2.656	-4.867	5.544	151.379	0.195
3400.000	0.979	130.057	3399.836	-5.617	3.568	-5.617	6.655	147.574	0.604
3500.000	0.639	169.880	3499.827	-6.716	4.320	-6.716	7.986	147.250	0.637
3600.000	1.537	184.083	3599.808	-8.603	4.323	-8.603	9.628	153.323	0.930
3700.000	1.681	201.470	3699.769	-11.306	3.690	-11.306	11.893	161.923	0.507
3800.000	0.563	203.983	3799.749	-13.120	2.954	-13.120	13.448	167.312	1.119
3900.000	0.976	174.543	3899.740	-14.417	2.835	-14.417	14.693	168.875	0.559
4000.000	1.837	185.629	3999.709	-16.861	2.759	-16.861	17.085	170.707	0.899
4100.000	1.860	188.041	4099.657	-20.063	2.375	-20.063	20.203	173.250	0.081
4200.000	1.889	182.479	4199.603	-23.316	2.076	-23.316	23.409	174.911	0.184
4300.000	1.405	211.066	4299.563	-26.013	1.372	-26.013	26.050	176.980	0.939
4400.000	1.925	199.030	4399.521	-28.652	0.192	-28.652	28.652	179.616	0.624
4500.000	1.389	206.166	4499.479	-31.328	-0.890	-31.328	31.341	181.628	0.573
4600.000	1.901	189.988	4599.438	-34.049	-1.713	-34.049	34.093	182.880	0.686
4700.000	1.026	197.191	4699.404	-36.538	-2.265	-36.538	36.609	183.547	0.892
4800.000	1.037	218.009	4799.389	-38.107	-3.087	-38.107	38.232	184.631	0.373
4900.000	0.688	160.673	4899.379	-39.387	-3.446	-39.387	39.538	185.000	0.883
5000.000	0.897	160.432	4999.369	-40.692	-2.985	-40.692	40.801	184.195	0.209
5100.000	1.420	191.538	5099.349	-42.643	-2.970	-42.643	42.746	183.985	0.800
5200.000	1.817	203.194	5199.309	-45.314	-3.842	-45.314	45.477	184.847	0.514
5300.000	2.066	184.872	5299.253	-48.567	-4.620	-48.567	48.787	185.434	0.665
5400.000	2.110	179.031	5399.187	-52.204	-4.742	-52.204	52.419	185.190	0.217
5500.000	2.224	183.520	5499.115	-55.981	-4.830	-55.981	56.189	184.931	0.204
5600.000	2.165	179.586	5599.042	-59.806	-4.935	-59.806	60.010	184.717	0.162
5700.000	2.313	174.473	5698.966	-63.703	-4.727	-63.703	63.878	184.244	0.249
5800.000	2.078	167.599	5798.892	-67.483	-4.144	-67.483	67.610	183.514	0.352
5900.000	2.036	160.930	5898.828	-70.932	-3.174	-70.932	71.003	182.562	0.243
6000.000	2.065	157.753	5998.764	-74.278	-1.912	-74.278	74.303	181.474	0.117
6100.000	2.232	169.435	6098.694	-77.860	-0.873	-77.860	77.864	180.642	0.468
6200.000	2.705	177.241	6198.601	-82.130	-0.402	-82.130	82.131	180.280	0.579
6300.000	3.384	179.123	6298.460	-87.438	-0.243	-87.438	87.438	180.159	0.686
6400.000	4.399	164.686	6398.230	-94.087	0.815	-94.087	94.091	179.504	1.403
6500.000	4.629	169.311	6497.920	-101.751	2.576	-101.751	101.784	178.550	0.431
6600.000	4.432	164.945	6597.608	-109.447	4.328	-109.447	109.533	177.736	0.397
6700.000	4.399	158.958	6697.312	-116.758	6.709	-116.758	116.951	176.712	0.462
6800.000	3.869	150.752	6797.052	-123.282	9.734	-123.282	123.665	175.485	0.793
6900.000	4.455	152.962	6896.788	-129.685	13.148	-129.685	130.349	174.211	0.607
7000.000	4.423	139.823	6996.491	-136.090	17.401	-136.090	137.198	172.713	1.015
HORIZONTAL DISPLACEMENT IS 137.198 FEET AT 172.713 DEGREES									