



Rig Name: PRODUCTION/LIGHTNING

State/County: COLORADO/WELD

Latitude: 40.410, Longitude: -104.532

GRID North is 0.630 Degrees East of True North

VS-Azi: 0.000 Degrees

**FIELD COPY ONLY (NOT DEFINITIVE)**

Service Company : VAUGHN ENERGY SERVICES

**DRILLOG MS GYRO SURVEY CALCULATIONS**

Filename: msgyro\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 11/3/2011 / 18:02

Vaughn Energy Services

Henderson, Colorado

866-835-8333

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	0.295	290.812	100.000	0.091	-0.240	0.091	0.257	290.812	0.295
200.000	0.417	280.671	199.998	0.250	-0.839	0.250	0.875	286.610	0.137
300.000	0.291	243.035	299.996	0.203	-1.423	0.203	1.437	278.101	0.258
400.000	0.409	232.068	399.994	-0.132	-1.931	-0.132	1.936	266.087	0.136
500.000	0.376	286.357	499.992	-0.259	-2.528	-0.259	2.541	264.145	0.360
600.000	0.413	308.071	599.990	0.056	-3.127	0.056	3.127	271.019	0.153
700.000	0.454	309.706	699.987	0.531	-3.715	0.531	3.753	278.136	0.043
800.000	0.484	306.844	799.983	1.038	-4.358	1.038	4.480	283.391	0.038
900.000	0.500	307.909	899.980	1.559	-5.040	1.559	5.276	287.186	0.019
1000.000	0.551	306.988	999.975	2.116	-5.769	2.116	6.145	290.146	0.052
1100.000	0.574	308.603	1099.971	2.718	-6.544	2.718	7.086	292.555	0.027
1200.000	0.590	301.938	1199.966	3.302	-7.372	3.302	8.078	294.131	0.069
1300.000	0.641	307.654	1299.960	3.916	-8.252	3.916	9.134	295.391	0.080
1400.000	0.657	305.441	1399.953	4.591	-9.162	4.591	10.248	296.615	0.030
1500.000	0.645	303.148	1499.947	5.232	-10.101	5.232	11.375	297.381	0.029
1600.000	0.717	306.771	1599.940	5.914	-11.074	5.914	12.554	298.105	0.084
1700.000	0.582	337.317	1699.934	6.758	-11.771	6.758	13.573	299.860	0.366
1800.000	1.042	39.093	1799.925	7.933	-11.394	7.933	13.883	304.847	0.923
1900.000	1.466	59.105	1899.901	9.296	-9.722	9.296	13.451	313.715	0.604
2000.000	1.518	53.479	1999.867	10.741	-7.560	10.741	13.134	324.859	0.155
2100.000	1.752	33.289	2099.827	12.806	-5.657	12.806	14.000	336.168	0.618
2200.000	1.859	33.355	2199.778	15.439	-3.926	15.439	15.930	345.733	0.108
2300.000	1.739	32.451	2299.728	18.075	-2.220	18.075	18.210	352.998	0.124
2400.000	1.725	33.161	2399.683	20.615	-0.582	20.615	20.623	358.382	0.025
2500.000	1.772	37.235	2499.636	23.106	1.177	23.106	23.136	2.915	0.133
2600.000	1.826	34.268	2599.587	25.654	3.009	25.654	25.830	6.691	0.108
2700.000	1.964	35.389	2699.532	28.368	4.899	28.368	28.787	9.798	0.142
2800.000	2.023	39.022	2799.472	31.136	7.002	31.136	31.914	12.675	0.140
2900.000	2.029	37.367	2899.409	33.914	9.188	33.914	35.137	15.159	0.059

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
3000.000	1.972	42.447	2999.348	36.591	11.424	36.591	38.333	17.339	0.186
3100.000	1.852	63.183	3099.294	38.590	14.028	38.590	41.061	19.976	0.698
3200.000	1.848	88.213	3199.243	39.369	17.081	39.369	42.915	23.455	0.802
3300.000	1.905	102.953	3299.190	39.047	20.313	39.047	44.015	27.484	0.485
3400.000	1.849	115.839	3399.137	37.972	23.384	37.972	44.594	31.626	0.425
3500.000	1.845	117.640	3499.085	36.522	26.262	36.522	44.984	35.719	0.058
3600.000	1.838	119.496	3599.034	34.985	29.084	34.985	45.496	39.738	0.060
3700.000	1.781	117.534	3698.984	33.477	31.858	33.477	46.213	43.581	0.084
3800.000	1.694	127.570	3798.938	31.857	34.408	31.857	46.891	47.204	0.316
3900.000	1.754	132.306	3898.893	29.927	36.710	29.927	47.363	50.813	0.155
4000.000	2.169	150.488	3998.835	27.250	38.774	27.250	47.392	54.902	0.743
4100.000	3.057	160.267	4098.730	23.092	40.607	23.092	46.714	60.374	0.990
4200.000	3.321	159.560	4198.575	17.868	42.519	17.868	46.121	67.206	0.267
4300.000	3.581	164.190	4298.394	12.149	44.382	12.149	46.014	74.691	0.381
4400.000	3.464	160.150	4398.205	6.303	46.258	6.303	46.686	82.241	0.275
4500.000	3.117	170.356	4498.041	0.781	47.739	0.781	47.746	89.063	0.679
4600.000	3.059	167.658	4597.896	-4.506	48.765	-4.506	48.973	95.279	0.156
4700.000	2.822	162.053	4697.765	-9.454	50.094	-9.454	50.978	100.688	0.372
4800.000	2.831	161.099	4797.643	-14.133	51.653	-14.133	53.551	105.302	0.048
4900.000	2.649	164.855	4897.529	-18.699	53.056	-18.699	56.255	109.414	0.256
5000.000	2.160	174.409	4997.441	-22.805	53.843	-22.805	58.474	112.955	0.630
5100.000	1.616	175.070	5097.386	-26.086	54.148	-26.086	60.104	115.722	0.544
5200.000	1.375	181.523	5197.352	-28.691	54.237	-28.691	61.359	117.878	0.294
5300.000	1.130	207.780	5297.329	-30.763	53.746	-30.763	61.927	119.786	0.617
5400.000	0.851	206.257	5397.314	-32.301	52.958	-32.301	62.032	121.381	0.281
5500.000	0.639	190.400	5497.305	-33.515	52.529	-33.515	62.310	122.539	0.294
5600.000	0.436	179.482	5597.301	-34.444	52.432	-34.444	62.733	123.302	0.226
5700.000	0.438	196.478	5697.298	-35.191	52.327	-35.191	63.059	123.922	0.129
5800.000	0.409	192.560	5797.295	-35.906	52.141	-35.906	63.308	124.553	0.041
5900.000	0.361	196.761	5897.293	-36.557	51.972	-36.557	63.541	125.123	0.056
6000.000	0.214	207.350	5997.292	-37.025	51.795	-37.025	63.668	125.559	0.156
6100.000	0.224	239.641	6097.291	-37.290	51.541	-37.290	63.616	125.886	0.122
6200.000	0.187	253.643	6197.291	-37.434	51.216	-37.434	63.438	126.164	0.062
6300.000	0.326	251.769	6297.289	-37.569	50.790	-37.569	63.175	126.490	0.139
6400.000	0.469	237.581	6397.287	-37.878	50.174	-37.878	62.866	127.050	0.173
6500.000	0.955	240.099	6497.279	-38.512	49.106	-38.512	62.407	128.106	0.486
6600.000	0.690	235.971	6597.269	-39.265	47.885	-39.265	61.925	129.351	0.271
6650.000	0.887	233.603	6647.264	-39.663	47.324	-39.663	61.747	129.967	0.400
HORIZONTAL DISPLACEMENT IS 61.747 FEET AT 129.967 DEGREES									