



Company: Noble Energy
 Well: Vannoy 11-41
 API#: 05-123-17675
 Rig Name: Production / Lightning
 Location: Weld County, Colorado
 Latitude: 40.499, Longitude: -104.623
 GRID North is 0.570 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: vannoy 11-41_ed.ut
 Minimum Curvature Method
 Report Date/Time: 4/4/2012 / 14:47

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	0.193	193.883	100.000	-0.164	-0.041	-0.164	0.169	193.883	0.193
200.000	0.307	200.576	199.999	-0.578	-0.175	-0.578	0.604	196.842	0.117
300.000	0.105	148.762	299.998	-0.907	-0.222	-0.907	0.934	193.718	0.255
400.000	0.284	168.877	399.998	-1.229	-0.126	-1.229	1.235	185.859	0.188
500.000	0.480	224.135	499.996	-1.772	-0.370	-1.772	1.810	191.784	0.394
600.000	0.647	215.584	599.991	-2.532	-0.990	-2.532	2.718	201.350	0.187
700.000	1.456	212.751	699.973	-4.059	-2.005	-4.059	4.528	206.291	0.810
800.000	1.891	214.589	799.930	-6.486	-3.629	-6.486	7.433	209.230	0.438
900.000	2.622	217.607	899.852	-9.657	-5.962	-9.657	11.349	211.691	0.741
1000.000	3.304	217.359	999.718	-13.760	-9.107	-13.760	16.500	213.498	0.682
1100.000	3.557	213.663	1099.539	-18.632	-12.575	-18.632	22.478	214.016	0.336
1200.000	3.207	216.833	1199.364	-23.452	-15.971	-23.452	28.374	214.255	0.396
1300.000	2.824	210.670	1299.226	-27.810	-18.904	-27.810	33.627	214.207	0.501
1400.000	2.627	215.848	1399.113	-31.786	-21.503	-31.786	38.376	214.078	0.316
1500.000	2.320	209.704	1499.020	-35.402	-23.848	-35.402	42.685	213.965	0.405
1600.000	1.817	207.650	1598.954	-38.564	-25.586	-38.564	46.280	213.563	0.509
1700.000	1.328	204.979	1698.917	-41.018	-26.811	-41.018	49.003	213.170	0.494
1800.000	0.943	198.127	1798.897	-42.850	-27.556	-42.850	50.946	212.744	0.408
1900.000	0.676	212.338	1898.887	-44.131	-28.128	-44.131	52.332	212.512	0.332
2000.000	0.719	209.289	1998.879	-45.176	-28.750	-45.176	53.549	212.473	0.057
2100.000	0.355	199.216	2098.875	-46.016	-29.159	-46.016	54.477	212.361	0.375
2200.000	0.445	255.738	2198.873	-46.404	-29.638	-46.404	55.062	212.566	0.387
2300.000	0.193	153.617	2298.872	-46.651	-29.940	-46.651	55.432	212.692	0.521
2400.000	0.694	6.448	2398.870	-46.199	-29.797	-46.199	54.975	212.821	0.863
2500.000	0.262	173.553	2498.868	-45.824	-29.703	-45.824	54.609	212.951	0.951
2600.000	1.014	126.299	2598.861	-46.575	-28.964	-46.575	54.847	211.877	0.858
2700.000	0.602	174.904	2698.852	-47.622	-28.204	-47.622	55.348	210.636	0.764
2800.000	0.282	167.919	2798.849	-48.387	-28.106	-48.387	55.957	210.151	0.323
2900.000	0.527	176.214	2898.846	-49.086	-28.024	-49.086	56.522	209.723	0.251
3000.000	0.660	183.535	2998.841	-50.119	-28.029	-50.119	57.424	209.217	0.153
3100.000	0.681	214.854	3098.835	-51.181	-28.405	-51.181	58.535	209.030	0.362
3200.000	0.887	222.450	3198.825	-52.240	-29.267	-52.240	59.879	209.259	0.230
3300.000	0.618	188.413	3298.817	-53.344	-29.868	-53.344	61.137	209.245	0.510
3400.000	0.169	149.992	3398.814	-54.005	-29.873	-54.005	61.716	208.950	0.497

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	0.306	141.260	3498.814	-54.340	-29.633	-54.340	61.895	208.604	0.142
3600.000	0.697	100.076	3598.810	-54.655	-28.866	-54.655	61.810	207.841	0.509
3700.000	0.964	70.504	3698.800	-54.481	-27.474	-54.481	61.017	206.761	0.496
3800.000	0.861	63.155	3798.787	-53.861	-26.012	-53.861	59.813	205.778	0.156
3900.000	0.859	53.859	3898.776	-53.080	-24.736	-53.080	58.561	204.986	0.139
4000.000	0.802	36.519	3998.765	-52.075	-23.714	-52.075	57.220	204.484	0.257
4100.000	0.759	40.434	4098.756	-51.008	-22.868	-51.008	55.900	204.147	0.069
4200.000	0.948	24.192	4198.745	-49.750	-22.100	-49.750	54.437	203.951	0.306
4300.000	1.247	66.173	4298.728	-48.555	-20.765	-48.555	52.809	203.154	0.835
4400.000	0.702	19.587	4398.715	-47.539	-19.564	-47.539	51.407	202.369	0.919
4500.000	0.437	329.391	4498.710	-46.633	-19.553	-46.633	50.567	202.748	0.539
4600.000	1.071	296.345	4598.702	-45.890	-20.585	-45.890	50.296	204.159	0.744
4700.000	0.921	342.481	4698.688	-44.709	-21.664	-44.709	49.681	205.853	0.793
4800.000	1.908	343.088	4798.656	-42.349	-22.391	-42.349	47.904	207.866	0.987
4900.000	2.350	323.338	4898.588	-39.111	-24.099	-39.111	45.940	211.640	0.850
5000.000	2.278	326.465	4998.507	-35.810	-26.422	-35.810	44.502	216.421	0.145
5100.000	2.593	324.602	5098.416	-32.309	-28.830	-32.309	43.302	221.744	0.325
5200.000	1.982	315.164	5198.336	-29.238	-31.360	-29.238	42.876	227.005	0.716
5300.000	1.115	298.232	5298.299	-27.552	-33.437	-27.552	43.326	230.512	0.971
5400.000	0.702	240.414	5398.288	-27.394	-34.827	-27.394	44.310	231.812	0.950
5500.000	0.475	179.113	5498.284	-28.112	-35.354	-28.112	45.168	231.510	0.631
5600.000	0.325	257.582	5598.282	-28.588	-35.625	-28.588	45.677	231.254	0.520
5700.000	0.333	178.692	5698.281	-28.939	-35.895	-28.939	46.108	231.124	0.418
5800.000	0.808	191.400	5798.276	-29.922	-36.028	-29.922	46.833	230.290	0.489
5900.000	1.094	169.124	5898.262	-31.551	-35.987	-31.551	47.859	228.758	0.462
6000.000	1.044	172.808	5998.245	-33.392	-35.693	-33.392	48.878	226.907	0.085
6100.000	0.727	141.098	6098.233	-34.790	-35.181	-34.790	49.478	225.320	0.572
6200.000	0.457	86.264	6198.229	-35.257	-34.384	-35.257	49.248	224.282	0.595
6300.000	0.931	31.393	6298.222	-34.538	-33.563	-34.538	48.160	224.180	0.765
6400.000	0.839	30.543	6398.210	-33.214	-32.768	-33.214	46.657	224.612	0.093
6500.000	0.722	96.717	6498.203	-32.657	-31.770	-32.657	45.561	224.211	0.858
6600.000	1.234	117.709	6598.188	-33.232	-30.191	-33.232	44.898	222.256	0.616
6700.000	1.951	136.984	6698.149	-34.977	-28.077	-34.977	44.852	218.755	0.886
6800.000	2.348	158.798	6798.080	-38.131	-26.175	-38.131	46.250	214.467	0.902
6900.000	2.115	161.833	6898.005	-41.794	-24.859	-41.794	48.628	210.744	0.261
7000.000	1.975	159.130	6997.941	-45.158	-23.669	-45.158	50.985	207.661	0.170
HORIZONTAL DISPLACEMENT IS 50.985 FEET AT 207.661 DEGREES									