



**Company:** Noble Energy  
**Rig:** Production / CoreTech  
**API #** 05-123-24754  
**Date:** 4/23/2014  
**Surveyor:** CJ Hines  
**VS:** 0.000  
**Lat :** 40.381  
**Long:** -104.531

**Well:** Emancipator B #22-23  
**Location:** Weld County, Colorado  
**North Reference:** GRID  
**Convergence:** Grid north is 0.63 East of True Noi  
**Declination:** 8.35  
**Depth Reference:** Ground Level  
**Elevation:** 4598  
**Total Depth as Drilled:** 6912

**Lat & Long obtained by handheld GPS at wellhead**

MS Gyro Survey Calculations

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD	Cbrg
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	0.147	68.090	0.048	0.119	100.000	0.147	0.048	0.128	68.090
200.000	0.252	329.737	0.286	0.126	199.999	0.310	0.286	0.312	23.890
300.000	0.197	308.670	0.583	-0.119	299.999	0.098	0.583	0.595	348.493
400.000	0.202	294.419	0.764	-0.414	399.998	0.050	0.764	0.868	331.546
500.000	0.082	66.395	0.865	-0.509	499.998	0.264	0.865	1.004	329.534
600.000	0.301	37.331	1.103	-0.284	599.997	0.233	1.103	1.139	345.570
700.000	0.368	95.255	1.283	0.196	699.996	0.330	1.283	1.298	8.682
800.000	0.343	92.592	1.240	0.815	799.994	0.031	1.240	1.483	33.308
900.000	0.635	105.024	1.083	1.648	899.990	0.309	1.083	1.972	56.704
1000.000	0.537	111.327	0.768	2.620	999.985	0.117	0.768	2.731	73.657
1100.000	0.565	78.857	0.693	3.541	1099.981	0.309	0.693	3.609	78.925
1200.000	0.488	63.941	0.976	4.408	1199.976	0.157	0.976	4.515	77.520
1300.000	0.660	70.359	1.356	5.333	1299.971	0.183	1.356	5.503	75.731
1400.000	0.663	69.472	1.753	6.417	1399.965	0.011	1.753	6.652	74.723
1500.000	0.628	115.845	1.717	7.452	1499.959	0.509	1.717	7.647	77.027
1600.000	0.742	82.022	1.568	8.586	1599.952	0.413	1.568	8.728	79.653
1700.000	0.808	42.441	2.178	9.704	1699.944	0.529	2.178	9.945	77.350
1800.000	1.015	31.665	3.452	10.644	1799.931	0.268	3.452	11.190	72.033
1900.000	1.209	42.169	4.987	11.817	1899.912	0.281	4.987	12.827	67.118
2000.000	0.941	54.547	6.246	13.195	1999.895	0.353	6.246	14.598	64.669
2100.000	1.449	57.329	7.405	14.928	2099.873	0.512	7.405	16.663	63.617
2200.000	1.378	52.209	8.824	16.943	2199.842	0.145	8.824	19.103	62.489
2300.000	1.237	41.219	10.373	18.604	2299.816	0.287	10.373	21.301	60.858
2400.000	0.999	43.103	11.821	19.911	2399.797	0.241	11.821	23.156	59.302
2500.000	0.939	63.316	12.826	21.239	2499.783	0.345	12.826	24.812	58.873
2600.000	1.117	72.508	13.487	22.901	2599.767	0.243	13.487	26.578	59.505
2700.000	0.846	103.442	13.608	24.550	2699.753	0.585	13.608	28.069	60.999
2800.000	1.025	101.138	13.264	26.145	2799.740	0.182	13.264	29.317	63.100
2900.000	0.982	83.649	13.186	27.874	2899.725	0.308	13.186	30.836	64.683
3000.000	0.458	154.619	12.919	28.897	2999.718	0.938	12.919	31.654	65.912
3100.000	0.708	266.044	12.515	28.452	3099.715	0.974	12.515	31.083	66.257
3200.000	0.851	227.815	11.974	27.286	3199.706	0.528	11.974	29.797	66.306
3300.000	0.854	237.850	11.079	26.105	3299.695	0.149	11.079	28.358	67.003
3400.000	0.470	256.626	10.588	25.074	3399.689	0.436	10.588	27.218	67.108

3500.000	1.097	246.379	10.109	23.798	3499.679	0.639	10.109	25.856	66.985
3600.000	1.423	250.119	9.303	21.753	3599.654	0.336	9.303	23.659	66.845
3700.000	1.424	262.314	8.715	19.354	3699.624	0.302	8.715	21.225	65.758
3800.000	1.238	302.361	9.127	17.209	3799.599	0.928	9.127	19.480	62.060
3900.000	1.318	284.108	9.986	15.181	3899.574	0.413	9.986	18.171	56.664
4000.000	0.669	251.785	10.084	13.511	3999.560	0.833	10.084	16.859	53.266
4100.000	0.256	198.044	9.689	12.888	4099.556	0.557	9.689	16.124	53.066
4200.000	0.345	248.481	9.365	12.539	4199.555	0.269	9.365	15.650	53.243
4300.000	0.387	219.505	8.994	12.043	4299.553	0.188	8.994	15.031	53.247
4400.000	1.191	268.214	8.701	10.789	4399.544	0.980	8.701	13.861	51.116
4500.000	1.739	292.657	9.253	8.350	4499.512	0.819	9.253	12.464	42.064
4600.000	1.737	299.844	10.592	5.636	4599.466	0.218	10.592	11.998	28.017
4700.000	1.388	298.075	11.916	3.252	4699.428	0.352	11.916	12.352	15.267
4800.000	1.320	309.765	13.223	1.298	4799.401	0.284	13.223	13.286	5.608
4900.000	0.941	299.970	14.370	-0.299	4899.381	0.424	14.370	14.373	358.809
5000.000	0.861	290.515	15.043	-1.714	4999.369	0.169	15.043	15.141	353.500
5100.000	1.101	265.925	15.239	-3.377	5099.355	0.479	15.239	15.608	347.506
5200.000	1.061	211.706	14.383	-4.822	5199.339	0.986	14.383	15.169	341.467
5300.000	1.248	259.435	13.395	-6.379	5299.321	0.950	13.395	14.837	334.538
5400.000	1.352	271.989	13.237	-8.628	5399.295	0.303	13.237	15.800	326.903
5500.000	1.384	290.609	13.703	-10.938	5499.267	0.444	13.703	17.533	321.403
5600.000	1.184	271.032	14.147	-13.101	5599.243	0.479	14.147	19.281	317.198
5700.000	1.140	268.724	14.143	-15.127	5699.222	0.064	14.143	20.709	313.074
5800.000	1.248	291.472	14.520	-17.135	5799.201	0.483	14.520	22.459	310.276
5900.000	0.710	288.095	15.111	-18.737	5899.186	0.541	15.111	24.071	308.884
6000.000	0.135	305.311	15.371	-19.422	5999.183	0.582	15.371	24.769	308.358
6100.000	0.455	73.640	15.551	-19.138	6099.182	0.549	15.551	24.659	309.097
6200.000	0.591	96.343	15.606	-18.244	6199.178	0.245	15.606	24.008	310.544
6300.000	1.003	89.436	15.557	-16.856	6299.168	0.422	15.557	22.938	312.706
6400.000	1.559	94.768	15.453	-14.625	6399.143	0.568	15.453	21.276	316.577
6500.000	1.577	109.950	14.870	-11.975	6499.106	0.415	14.870	19.093	321.155
6600.000	1.238	129.189	13.718	-9.844	6599.076	0.577	13.718	16.885	324.336
6650.000	0.956	125.044	13.137	-9.084	6649.067	0.587	13.137	15.972	325.337

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