



**Company:** Noble Energy  
**Rig:** Production/ CoreTech  
**API #** 05-123-12526  
**Date:** 9/27/2013  
**Surveyor:** Sean Bratt  
**VS:** 0.000  
**Lat :** 40.339  
**Long:** -104.613

**Well:** Muirhead #1-2  
**Location:** Weld County, Colorado  
**North Reference:** GRID  
**Convergence:** Grid north is 0.57 Degr  
**Declination:** 8.47 Degrees  
**Depth Reference:** Ground Level  
**Elevation:** 4762 Feet  
**Total Depth as Drilled:** 7175 feet

**Lat & Long obtained by handheld GPS at wellhead**  
**MS Gyro Survey Calculations**

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD
0.000	0.000	0.000	0.000	0.000	0.000	****	0.000	0.000
100.000	0.476	167.047	-0.404	0.093	99.999	0.476	-0.404	0.415
200.000	0.450	155.276	-1.166	0.350	199.996	0.098	-1.166	1.217
300.000	0.524	154.591	-1.935	0.711	299.992	0.074	-1.935	2.062
400.000	0.515	135.850	-2.671	1.220	399.988	0.169	-2.671	2.936
500.000	0.390	113.696	-3.130	1.845	499.985	0.213	-3.130	3.633
600.000	0.475	121.792	-3.485	2.509	599.982	0.104	-3.485	4.294
700.000	0.526	134.084	-4.023	3.191	699.978	0.119	-4.023	5.135
800.000	0.449	148.353	-4.676	3.727	799.975	0.143	-4.676	5.980
900.000	0.491	119.083	-5.218	4.307	899.971	0.241	-5.218	6.766
1000.000	0.382	143.833	-5.696	4.878	999.969	0.215	-5.696	7.499
1100.000	0.794	134.523	-6.450	5.568	1099.963	0.422	-6.450	8.521
1200.000	1.005	150.988	-7.703	6.487	1199.951	0.332	-7.703	10.071
1300.000	0.994	166.521	-9.313	7.115	1299.936	0.270	-9.313	11.720
1400.000	0.809	171.686	-10.856	7.419	1399.923	0.202	-10.856	13.149
1500.000	0.737	176.634	-12.197	7.559	1499.914	0.098	-12.197	14.349
1600.000	0.881	166.430	-13.586	7.777	1599.904	0.203	-13.586	15.655
1700.000	0.848	181.365	-15.073	7.940	1699.893	0.227	-15.073	17.037
1800.000	0.937	187.403	-16.623	7.817	1799.881	0.129	-16.623	18.369
1900.000	1.091	197.406	-18.342	7.427	1899.865	0.234	-18.342	19.789
2000.000	1.130	194.802	-20.204	6.890	1999.847	0.064	-20.204	21.346
2100.000	1.152	189.824	-22.148	6.467	2099.827	0.102	-22.148	23.073
2200.000	1.040	198.517	-23.999	6.007	2199.809	0.200	-23.999	24.739
2300.000	0.928	196.770	-25.635	5.485	2299.794	0.116	-25.635	26.215
2400.000	0.849	205.718	-27.077	4.930	2399.782	0.159	-27.077	27.522
2500.000	0.821	231.351	-28.192	4.050	2499.772	0.371	-28.192	28.481
2600.000	0.833	233.838	-29.068	2.903	2599.761	0.038	-29.068	29.213
2700.000	0.693	238.577	-29.813	1.800	2699.752	0.153	-29.813	29.867
2800.000	0.478	242.103	-30.323	0.915	2799.747	0.218	-30.323	30.337
2900.000	0.452	237.625	-30.730	0.213	2899.744	0.045	-30.730	30.730
3000.000	0.292	288.555	-30.860	-0.362	2999.742	0.351	-30.860	30.862
3100.000	0.118	312.333	-30.709	-0.680	3099.741	0.190	-30.709	30.716
3200.000	0.441	218.356	-30.941	-0.995	3199.740	0.464	-30.941	30.957
3300.000	0.441	229.679	-31.492	-1.527	3299.737	0.087	-31.492	31.529
3400.000	0.391	263.550	-31.779	-2.159	3399.735	0.247	-31.779	31.852
3500.000	0.539	174.389	-32.285	-2.452	3499.732	0.661	-32.285	32.378

3600.000	0.698	185.152	-33.359	-2.461	3599.727	0.196	-33.359	33.450
3700.000	1.160	198.064	-34.928	-2.829	3699.713	0.504	-34.928	35.043
3800.000	1.075	208.494	-36.715	-3.591	3799.694	0.220	-36.715	36.890
3900.000	0.997	215.020	-38.252	-4.538	3899.678	0.141	-38.252	38.520
4000.000	1.080	218.210	-39.705	-5.620	3999.662	0.101	-39.705	40.101
4100.000	1.099	225.656	-41.116	-6.889	4099.644	0.143	-41.116	41.689
4200.000	1.283	231.706	-42.480	-8.453	4199.622	0.223	-42.480	43.312
4300.000	1.116	247.496	-43.546	-10.231	4299.600	0.369	-43.546	44.732
4400.000	1.533	256.347	-44.235	-12.430	4399.574	0.463	-44.235	45.948
4500.000	1.836	254.232	-44.986	-15.272	4499.530	0.310	-44.986	47.508
4600.000	1.690	259.379	-45.693	-18.264	4599.483	0.216	-45.693	49.208
4700.000	1.780	258.096	-46.285	-21.233	4699.437	0.099	-46.285	50.923
4800.000	1.382	277.472	-46.449	-23.948	4799.399	0.661	-46.449	52.259
4900.000	1.613	290.155	-45.807	-26.465	4899.366	0.403	-45.807	52.902
5000.000	1.566	287.632	-44.908	-29.088	4999.327	0.084	-44.908	53.506
5100.000	1.247	303.259	-43.898	-31.300	5099.297	0.496	-43.898	53.914
5200.000	1.147	302.521	-42.763	-33.054	5199.275	0.100	-42.763	54.049
5300.000	0.661	311.082	-41.845	-34.334	5299.263	0.503	-41.845	54.128
5400.000	0.667	339.068	-40.922	-34.977	5399.256	0.321	-40.922	53.833
5500.000	0.587	336.756	-39.908	-35.387	5499.250	0.084	-39.908	53.337
5600.000	0.550	12.516	-38.969	-35.485	5599.246	0.351	-38.969	52.704
5700.000	0.436	42.800	-38.221	-35.122	5699.242	0.280	-38.221	51.908
5800.000	0.535	53.488	-37.664	-34.489	5799.238	0.134	-37.664	51.069
5900.000	0.593	53.052	-37.075	-33.700	5899.234	0.058	-37.075	50.103
6000.000	0.607	39.638	-36.357	-32.949	5999.228	0.141	-36.357	49.065
6100.000	0.680	34.949	-35.462	-32.271	6099.222	0.090	-35.462	47.948
6200.000	0.934	11.794	-34.178	-31.764	6199.212	0.408	-34.178	46.660
6300.000	0.766	355.369	-32.714	-31.652	6299.201	0.294	-32.714	45.520
6400.000	0.929	345.833	-31.262	-31.904	6399.190	0.215	-31.262	44.668
6500.000	1.173	334.042	-29.556	-32.551	6499.174	0.325	-29.556	43.967
6600.000	1.911	324.115	-27.284	-33.976	6599.137	0.782	-27.284	43.575
6700.000	4.001	318.830	-23.306	-37.251	6698.998	2.105	-23.306	43.941
6800.000	4.724	314.933	-17.772	-42.462	6798.708	0.781	-17.772	46.032
6900.000	2.513	315.406	-13.302	-46.917	6898.503	2.210	-13.302	48.767
7000.000	1.600	313.537	-10.779	-49.469	6998.437	0.915	-10.779	50.630

0

rees East of True North

**Cbrg**

0.000

167.047

163.273

159.835

155.450

149.484

144.251

141.580

141.449

140.468

139.424

139.198

139.896

142.622

145.650

148.211

150.212

152.221

154.815

157.956

161.168

163.723

165.947

167.922

169.680

171.826

174.296

176.545

178.272

179.603

180.672

181.268

181.842

182.776

183.887

184.343

184.219  
184.631  
185.586  
186.765  
188.056  
189.511  
191.254  
193.221  
195.696  
198.752  
201.787  
204.643  
207.275  
210.017  
212.932  
215.490  
217.703  
219.368  
220.521  
221.563  
222.321  
222.581  
222.480  
222.270  
222.185  
222.302  
222.904  
224.054  
225.582  
227.761  
231.234  
237.967  
247.289  
254.171  
257.708