



**Company:** Noble Energy

**Rig:** Production/CoreTech

**API #** 05-123-26610

**Date:** 1/9/2014

**Surveyor:** Randy Holcomb

**VS:** 0.000

**Lat :** 40.481

**Long:** -104.491

**Well:** Roth A 13-16

**Location:** Weld County, Colorado

**North Reference:** GRID

**Convergence:** Grid north is 0.65 East of True North

**Declination:** 8.38

**Depth Reference:** Ground Level

**Elevation:** 4654 Feet

**Total Depth as Drilled:** 6948 Feet

**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
100.000	0.206	239.844	-0.090	-0.155	100.000	0.206	-0.090	0.179	239.844
200.000	0.228	231.846	-0.303	-0.466	199.999	0.037	-0.303	0.556	236.997
300.000	0.278	296.154	-0.319	-0.841	299.998	0.273	-0.319	0.899	249.243
400.000	0.172	265.242	-0.224	-1.208	399.998	0.158	-0.224	1.229	259.498
500.000	0.184	266.073	-0.248	-1.519	499.997	0.012	-0.248	1.539	260.745
600.000	0.344	277.551	-0.219	-1.977	599.996	0.168	-0.219	1.990	263.678
700.000	0.244	309.695	-0.044	-2.439	699.995	0.189	-0.044	2.439	268.974
800.000	0.213	269.661	0.091	-2.789	799.994	0.159	0.091	2.790	271.871
900.000	0.407	274.632	0.119	-3.329	899.992	0.196	0.119	3.331	272.042
1000.000	0.449	276.058	0.189	-4.073	999.990	0.044	0.189	4.078	272.653
1100.000	0.297	286.393	0.303	-4.712	1099.988	0.166	0.303	4.722	273.684
1200.000	0.412	302.608	0.571	-5.264	1199.986	0.152	0.571	5.295	276.186
1300.000	0.474	295.272	0.941	-5.942	1299.983	0.084	0.941	6.016	279.002
1400.000	0.298	319.616	1.316	-6.485	1399.980	0.237	1.316	6.617	281.471
1500.000	0.369	309.669	1.719	-6.901	1499.979	0.092	1.719	7.112	283.991
1600.000	0.305	296.151	2.042	-7.388	1599.977	0.102	2.042	7.665	285.454
1700.000	0.337	307.912	2.340	-7.858	1699.975	0.073	2.340	8.199	286.583
1800.000	0.808	60.221	2.871	-7.479	1799.972	0.986	2.871	8.011	291.001
1900.000	0.826	79.648	3.350	-6.157	1899.962	0.276	3.350	7.010	298.551
2000.000	0.418	156.466	3.146	-5.302	1999.957	0.837	3.146	6.165	300.677
2100.000	0.377	192.689	2.490	-5.229	2099.955	0.250	2.490	5.792	295.461
2200.000	0.857	221.366	1.607	-5.796	2199.949	0.556	1.607	6.014	285.499
2300.000	1.145	221.585	0.298	-6.953	2299.934	0.288	0.298	6.960	272.458
2400.000	1.003	228.271	-1.032	-8.270	2399.916	0.189	-1.032	8.334	262.888
2500.000	0.685	239.596	-1.917	-9.439	2499.905	0.358	-1.917	9.632	258.518
2600.000	0.626	256.621	-2.346	-10.486	2599.899	0.203	-2.346	10.746	257.388
2700.000	0.560	260.598	-2.553	-11.500	2699.893	0.077	-2.553	11.780	257.485
2800.000	0.619	265.447	-2.675	-12.521	2799.888	0.077	-2.675	12.803	257.939
2900.000	0.786	261.122	-2.824	-13.736	2899.881	0.175	-2.824	14.023	258.383
3000.000	0.752	250.268	-3.151	-15.031	2999.872	0.149	-3.151	15.358	258.159
3100.000	0.743	242.309	-3.674	-16.223	3099.863	0.104	-3.674	16.634	257.239
3200.000	0.880	203.256	-4.681	-17.100	3199.854	0.557	-4.681	17.729	254.692
3300.000	1.457	168.197	-6.630	-17.143	3299.834	0.893	-6.630	18.381	248.857
3400.000	1.163	149.727	-8.751	-16.372	3399.808	0.510	-8.751	18.563	241.876
3500.000	1.045	152.461	-10.436	-15.438	3499.790	0.129	-10.436	18.634	235.942
3600.000	1.241	150.530	-12.188	-14.484	3599.770	0.200	-12.188	18.929	229.920
3700.000	1.522	143.043	-14.192	-13.152	3699.740	0.333	-14.192	19.349	222.822

3800.000	1.891	141.401	-16.543	-11.324	3799.696	0.372	-16.543	20.048	214.393
3900.000	1.732	140.143	-18.992	-9.327	3899.646	0.164	-18.992	21.158	206.156
4000.000	1.054	127.726	-20.714	-7.631	3999.616	0.738	-20.714	22.075	200.224
4100.000	0.721	113.224	-21.525	-6.325	4099.604	0.399	-21.525	22.435	196.376
4200.000	0.639	69.612	-21.579	-5.224	4199.598	0.511	-21.579	22.203	193.609
4300.000	1.004	57.750	-20.917	-3.960	4299.587	0.401	-20.917	21.289	190.721
4400.000	1.275	42.804	-19.633	-2.463	4399.568	0.400	-19.633	19.787	187.150
4500.000	1.494	37.346	-17.780	-0.916	4499.538	0.255	-17.780	17.804	182.949
4600.000	1.986	15.317	-15.073	0.333	4599.493	0.821	-15.073	15.077	178.736
4700.000	2.062	347.383	-11.646	0.397	4699.433	0.980	-11.646	11.653	178.047
4800.000	1.435	322.151	-8.902	-0.764	4799.387	0.979	-8.902	8.935	184.905
4900.000	0.908	278.838	-7.792	-2.315	4899.368	0.993	-7.792	8.128	196.544
5000.000	0.794	207.713	-8.284	-3.420	4999.359	0.994	-8.284	8.962	202.431
5100.000	0.154	11.902	-8.766	-3.714	5099.357	0.944	-8.766	9.520	202.963
5200.000	0.387	351.651	-8.299	-3.735	5199.356	0.248	-8.299	9.101	204.232
5300.000	0.977	330.849	-7.220	-4.200	5299.348	0.630	-7.220	8.353	210.186
5400.000	0.953	335.853	-5.717	-4.955	5399.334	0.088	-5.717	7.566	220.919
5500.000	0.801	334.830	-4.326	-5.593	5499.322	0.152	-4.326	7.070	232.279
5600.000	0.811	348.145	-3.000	-6.035	5599.312	0.187	-3.000	6.740	243.569
5700.000	0.824	344.545	-1.614	-6.372	5699.302	0.053	-1.614	6.574	255.786
5800.000	0.806	357.264	-0.219	-6.598	5799.292	0.181	-0.219	6.601	268.102
5900.000	0.663	349.227	1.052	-6.739	5899.284	0.176	1.052	6.821	278.873
6000.000	0.570	339.968	2.087	-7.018	5999.278	0.136	2.087	7.322	286.566
6100.000	0.570	334.213	3.003	-7.405	6099.273	0.057	3.003	7.990	292.074
6200.000	0.639	324.166	3.903	-7.947	6199.268	0.126	3.903	8.854	296.154
6300.000	0.232	317.494	4.504	-8.410	6299.265	0.409	4.504	9.540	298.169
6400.000	0.389	349.419	4.987	-8.609	6399.263	0.228	4.987	9.949	300.079
6500.000	0.381	341.741	5.636	-8.776	6499.261	0.052	5.636	10.430	302.709
6600.000	0.167	358.565	6.098	-8.884	6599.260	0.227	6.098	10.775	304.465
6700.000	0.123	323.106	6.329	-8.952	6699.260	0.098	6.329	10.963	305.261