



**Company:** Noble Energy  
**Rig:** Production/VES  
**API #** 05-123-26666

**Date:** 7/24/2013  
**Surveyor:** Nick Kula

**VS:**  
**Lat :** 40.19482  
**Long:** -104.656

**Well:** Ritchey H #27-12  
**Location:** Weld County, Colorado  
**North Reference:** GRID  
**Convergence:** Grid north is -0.55 of Tr  
**Declination:** 8.51

**Depth Reference:** Ground Level  
**Elevation:** 4821'

**Total Depth as Drilled:** 7288'

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

HA Gryo 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	0.255	97.691	-0.030	0.220	100.000	0.255	-0.030	0.222	97.691
200.000	0.256	252.365	-0.127	0.228	199.999	0.498	-0.127	0.261	119.172
300.000	0.341	246.929	-0.311	-0.259	299.998	0.090	-0.311	0.405	219.732
400.000	0.530	278.719	-0.358	-0.990	399.995	0.300	-0.358	1.053	250.127
500.000	0.654	286.617	-0.124	-1.994	499.990	0.148	-0.124	1.998	266.431
600.000	1.083	286.828	0.313	-3.446	599.978	0.429	0.313	3.461	275.182
700.000	2.026	285.826	1.068	-6.052	699.940	0.943	1.068	6.146	280.011
800.000	2.089	294.459	2.305	-9.412	799.876	0.316	2.305	9.690	283.762
900.000	1.795	284.286	3.446	-12.589	899.819	0.452	3.446	13.052	285.310
1000.000	1.700	271.377	3.868	-15.589	999.773	0.404	3.868	16.062	283.936
1100.000	1.915	275.637	4.068	-18.734	1099.723	0.254	4.068	19.171	282.252
1200.000	1.788	276.853	4.418	-21.946	1199.671	0.133	4.418	22.387	281.383
1300.000	1.877	272.126	4.665	-25.132	1299.619	0.175	4.665	25.561	280.516
1400.000	1.348	271.313	4.753	-27.945	1399.579	0.530	4.753	28.346	279.653
1500.000	1.021	266.811	4.730	-30.010	1499.558	0.340	4.730	30.381	278.958
1600.000	0.880	278.371	4.793	-31.660	1599.544	0.237	4.793	32.020	278.608
1700.000	0.619	269.745	4.902	-32.959	1699.536	0.284	4.902	33.322	278.460
1800.000	0.646	268.255	4.882	-34.063	1799.530	0.032	4.882	34.411	278.157
1900.000	0.871	304.749	5.298	-35.251	1899.521	0.521	5.298	35.647	278.548
2000.000	0.821	298.586	6.074	-36.504	1999.510	0.103	6.074	37.006	279.448
2100.000	0.415	312.209	6.661	-37.402	2099.504	0.429	6.661	37.991	280.098
2200.000	0.174	25.737	7.042	-37.605	2199.503	0.402	7.042	38.258	280.606
2300.000	0.380	140.114	6.924	-37.326	2299.503	0.479	6.924	37.963	280.509
2400.000	0.882	118.321	6.305	-36.436	2399.496	0.547	6.305	36.977	279.817
2500.000	1.034	114.775	5.562	-34.939	2499.482	0.163	5.562	35.379	279.045
2600.000	0.752	113.582	4.921	-33.519	2599.470	0.283	4.921	33.879	278.353
2700.000	0.523	109.214	4.509	-32.487	2699.464	0.234	4.509	32.799	277.901
2800.000	0.594	87.621	4.380	-31.539	2799.459	0.220	4.380	31.842	277.907
2900.000	0.597	82.049	4.474	-30.505	2899.454	0.058	4.474	30.832	278.343
3000.000	0.589	48.621	4.885	-29.604	2999.449	0.341	4.885	30.004	279.371
3100.000	0.488	63.556	5.415	-28.837	3099.444	0.172	5.415	29.341	280.635
3200.000	0.454	54.331	5.836	-28.133	3199.441	0.083	5.836	28.732	281.719
3300.000	1.022	60.019	6.513	-27.038	3299.432	0.572	6.513	27.811	283.543
3400.000	0.822	64.357	7.269	-25.619	3399.419	0.212	7.269	26.630	285.840
3500.000	1.035	42.512	8.245	-24.362	3499.406	0.410	8.245	25.719	288.698

3600.000	1.050	19.707	9.774	-23.442	3599.390	0.412	9.774	25.398	292.632
3700.000	1.366	359.099	11.828	-23.152	3699.368	0.533	11.828	25.999	297.062
3800.000	1.820	342.552	14.536	-23.647	3799.330	0.642	14.536	27.757	301.578
3900.000	1.727	323.342	17.260	-25.023	3899.283	0.599	17.260	30.398	304.596
4000.000	2.095	313.057	19.717	-27.259	3999.227	0.502	19.717	33.642	305.879
4100.000	2.460	299.772	22.031	-30.457	4099.149	0.639	22.031	37.590	305.879
4200.000	2.448	288.330	23.768	-34.348	4199.058	0.489	23.768	41.770	304.682
4300.000	2.337	294.508	25.285	-38.230	4298.971	0.281	25.285	45.836	303.480
4400.000	1.933	295.102	26.846	-41.612	4398.901	0.404	26.846	49.521	302.828
4500.000	2.077	313.543	28.810	-44.453	4498.841	0.658	28.810	52.973	302.947
4600.000	2.139	330.083	31.676	-46.698	4598.774	0.609	31.676	56.427	304.150
4700.000	2.075	331.421	34.883	-48.494	4698.707	0.080	34.883	59.737	305.728
4800.000	1.815	338.992	37.951	-49.928	4798.649	0.365	37.951	62.714	307.239
4900.000	2.233	353.466	41.365	-50.717	4898.587	0.657	41.365	65.447	309.200
5000.000	2.779	358.243	45.723	-51.013	4998.491	0.584	45.723	68.505	311.870
5100.000	2.961	359.004	50.729	-51.132	5098.366	0.186	50.729	72.027	314.773
5200.000	2.873	7.156	55.798	-50.865	5198.237	0.424	55.798	75.503	317.648
5300.000	2.289	16.135	60.203	-49.998	5298.135	0.708	60.203	78.258	320.291
5400.000	2.081	32.817	63.648	-48.459	5398.063	0.666	63.648	79.996	322.716
5500.000	2.495	44.682	66.721	-45.945	5497.984	0.627	66.721	81.010	325.448
5600.000	2.531	38.146	70.005	-43.050	5597.888	0.289	70.005	82.183	328.410
5700.000	2.514	33.077	73.579	-40.490	5697.791	0.224	73.579	83.984	331.177
5800.000	2.268	20.337	77.272	-38.605	5797.705	0.584	77.272	86.379	333.453
5900.000	1.889	17.626	80.699	-37.418	5897.639	0.391	80.699	88.952	335.124
6000.000	1.484	4.792	83.560	-36.811	5997.596	0.552	83.560	91.309	336.225
6100.000	1.338	346.301	85.985	-36.979	6097.566	0.476	85.985	93.599	336.729
6200.000	1.776	344.620	88.612	-37.666	6197.529	0.440	88.612	96.285	336.971
6300.000	2.666	347.489	92.376	-38.581	6297.453	0.897	92.376	100.109	337.332
6400.000	3.568	346.788	97.677	-39.796	6397.304	0.903	97.677	105.472	337.833
6500.000	3.771	332.571	103.625	-42.022	6497.101	0.929	103.625	111.821	337.926
6600.000	1.910	304.125	107.479	-44.917	6596.978	2.280	107.479	116.487	337.319
6700.000	1.860	285.517	108.848	-47.861	6696.925	0.611	108.848	118.906	336.265
6800.000	1.182	260.795	109.118	-50.442	6796.890	0.929	109.118	120.213	335.190
6900.000	1.372	258.926	108.723	-52.635	6896.865	0.195	108.723	120.794	334.167
7000.000	1.498	232.058	107.689	-54.841	6996.835	0.678	107.689	120.849	333.013
7100.000	1.812	250.311	106.353	-57.360	7096.794	0.610	106.353	120.835	331.661

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