



**Company:** Noble Energy  
**Rig:** Production/ V.E.S  
**API #** 05-123-25904  
**Date:** 1/4/2014  
**Surveyor:** Jay Hinman  
**VS:** 0.000  
**Lat :** 40.196182  
**Long:** -104.650268

**Well:** Ritchey H27-21  
**Location:** Weld County, Colorado  
**North Reference:** GRID  
**Convergence:** Grid North is 0.55 Deg  
**Declination:** 8.44  
**Depth Reference:** Ground Level  
**Elevation:** 4817'  
**Total Depth as Drilled:** 7728'

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

**HA 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	0.669	6.234	0.580	0.063	99.998	0.669	0.580	0.583
200.000	0.599	2.887	1.682	0.153	199.992	0.079	1.682	1.688
300.000	0.432	23.434	2.549	0.329	299.988	0.246	2.549	2.570
400.000	0.547	20.926	3.341	0.650	399.984	0.116	3.341	3.403
500.000	0.272	340.042	4.010	0.739	499.981	0.384	4.010	4.077
600.000	0.203	351.228	4.408	0.631	599.981	0.083	4.408	4.453
700.000	0.380	144.955	4.311	0.794	699.980	0.569	4.311	4.384
800.000	0.388	172.734	3.704	1.027	799.978	0.185	3.704	3.843
900.000	0.279	171.240	3.127	1.107	899.976	0.110	3.127	3.318
1000.000	0.501	181.673	2.450	1.132	999.974	0.232	2.450	2.699
1100.000	0.771	193.906	1.361	0.957	1099.968	0.301	1.361	1.663
1200.000	0.806	200.176	0.047	0.553	1199.958	0.093	0.047	0.555
1300.000	0.818	188.628	-1.319	0.203	1299.948	0.164	-1.319	1.335
1400.000	0.912	208.704	-2.723	-0.286	1399.937	0.315	-2.723	2.738
1500.000	0.901	205.185	-4.132	-1.003	1499.924	0.057	-4.132	4.252
1600.000	0.972	214.660	-5.542	-1.820	1599.911	0.170	-5.542	5.833
1700.000	0.752	221.749	-6.729	-2.739	1699.900	0.244	-6.729	7.265
1800.000	0.947	213.967	-7.904	-3.638	1799.889	0.226	-7.904	8.702
1900.000	0.758	227.383	-9.038	-4.587	1899.878	0.273	-9.038	10.135
2000.000	0.617	222.240	-9.884	-5.436	1999.871	0.154	-9.884	11.281
2100.000	0.146	174.345	-10.410	-5.785	2099.868	0.530	-10.410	11.909
2200.000	0.399	118.356	-10.702	-5.466	2199.867	0.339	-10.702	12.017
2300.000	0.930	127.470	-11.361	-4.516	2299.860	0.540	-11.361	12.225
2400.000	1.200	106.110	-12.145	-2.866	2399.843	0.476	-12.145	12.479
2500.000	1.545	93.414	-12.516	-0.515	2499.815	0.458	-12.516	12.526
2600.000	2.007	99.468	-12.884	2.557	2599.766	0.498	-12.884	13.135
2700.000	2.279	85.866	-13.028	6.267	2699.697	0.575	-13.028	14.457
2800.000	2.656	95.911	-13.124	10.555	2799.605	0.572	-13.124	16.842
2900.000	2.490	85.960	-13.209	15.027	2899.504	0.476	-13.209	20.007
3000.000	2.513	81.221	-12.722	19.360	2999.409	0.208	-12.722	23.166
3100.000	1.756	64.888	-11.737	22.914	3099.340	0.963	-11.737	25.745
3200.000	1.689	53.352	-10.207	25.484	3199.295	0.353	-10.207	27.452
3300.000	1.622	26.982	-8.066	27.308	3299.255	0.758	-8.066	28.474
3400.000	1.918	18.349	-5.217	28.477	3399.207	0.397	-5.217	28.951
3500.000	2.494	20.901	-1.596	29.780	3499.132	0.585	-1.596	29.823

3600.000	2.575	18.155	2.571	31.256	3599.035	0.146	2.571	31.362
3700.000	2.674	14.861	6.960	32.554	3698.930	0.180	6.960	33.290
3800.000	2.962	10.505	11.755	33.624	3798.809	0.359	11.755	35.619
3900.000	3.280	10.233	17.111	34.603	3898.660	0.319	17.111	38.602
4000.000	3.559	9.112	22.991	35.603	3998.482	0.287	22.991	42.381
4100.000	3.709	11.701	29.223	36.750	4098.281	0.222	29.223	46.952
4200.000	4.135	8.337	35.957	37.929	4198.047	0.485	35.957	52.264
4300.000	4.236	4.422	43.206	38.736	4297.781	0.303	43.206	58.028
4400.000	4.348	11.917	50.598	39.804	4397.501	0.572	50.598	64.377
4500.000	4.201	1.068	57.969	40.655	4497.224	0.821	57.969	70.804
4600.000	3.935	351.517	65.024	40.217	4596.974	0.727	65.024	76.456
4700.000	3.823	1.087	71.751	39.774	4696.745	0.656	71.751	82.038
4800.000	3.561	11.160	78.131	40.438	4796.539	0.698	78.131	87.975
4900.000	3.562	355.763	84.276	40.810	4896.348	0.954	84.276	93.637
5000.000	3.833	7.184	90.691	40.998	4996.141	0.783	90.691	99.527
5100.000	3.372	0.384	96.948	41.436	5095.944	0.628	96.948	105.432
5200.000	3.190	4.093	102.664	41.654	5195.780	0.279	102.664	110.793
5300.000	2.802	3.552	107.880	42.004	5295.643	0.389	107.880	115.769
5400.000	2.224	359.942	112.260	42.154	5395.546	0.600	112.260	119.913
5500.000	1.822	2.344	115.789	42.217	5495.484	0.410	115.789	123.245
5600.000	1.685	2.826	118.846	42.355	5595.437	0.138	118.846	126.167
5700.000	1.300	351.526	121.436	42.260	5695.403	0.483	121.436	128.579
5800.000	1.474	0.021	123.845	42.093	5795.374	0.269	123.845	130.803
5900.000	0.839	352.672	125.857	42.000	5895.353	0.652	125.857	132.680
6000.000	0.805	10.167	127.275	42.031	5995.343	0.252	127.275	134.035
6100.000	1.027	24.758	128.780	42.530	6095.330	0.320	128.780	135.621
6200.000	1.010	20.387	130.420	43.213	6195.314	0.079	130.420	137.393
6300.000	0.936	35.227	131.914	43.991	6295.300	0.262	131.914	139.055
6400.000	1.064	33.396	133.356	44.973	6395.285	0.132	133.356	140.735
6500.000	1.006	29.258	134.897	45.913	6495.269	0.094	134.897	142.496
6600.000	1.311	43.998	136.485	47.136	6595.248	0.424	136.485	144.396
6700.000	1.556	38.956	138.364	48.785	6695.217	0.275	138.364	146.712
6800.000	1.628	35.535	140.575	50.464	6795.178	0.119	140.575	149.359
6900.000	2.246	27.944	143.462	52.207	6895.121	0.668	143.462	152.666
7000.000	1.688	8.174	146.651	53.335	6995.063	0.871	146.651	156.049
7100.000	1.252	337.594	149.119	53.128	7095.031	0.882	149.119	158.300
7200.000	1.500	305.243	150.884	51.643	7195.004	0.803	150.884	159.477
7300.000	1.253	299.075	152.171	49.618	7294.975	0.287	152.171	160.056
7400.000	0.593	338.449	153.184	48.472	7394.962	0.880	153.184	160.670
7475.000	1.086	1.624	154.255	48.350	7469.954	0.785	154.255	161.655

0

rees East of True North

**Cbrg**

0.000  
6.234  
5.199  
7.360  
11.004  
10.441  
8.144  
10.439  
15.505  
19.498  
24.788  
35.126  
85.121  
171.245  
186.000  
193.642  
198.181  
202.152  
204.717  
206.910  
208.809  
209.063  
207.057  
201.679  
193.280  
182.357  
168.775  
154.311  
141.191  
131.317  
123.310  
117.122  
111.828  
106.456  
100.381  
93.067

85.297  
77.931  
70.729  
63.687  
57.147  
51.509  
46.529  
41.878  
38.191  
35.043  
31.736  
29.001  
27.365  
25.838  
24.326  
23.142  
22.084  
21.274  
20.581  
20.032  
19.615  
19.188  
18.772  
18.455  
18.275  
18.276  
18.332  
18.443  
18.636  
18.796  
19.053  
19.422  
19.747  
19.997  
19.986  
19.610  
18.894  
18.059  
17.559  
17.403