



Company: Noble Energy
Rig: Production/VES
API # 05-123-25902

Date: 1/4/2014
Surveyor: Nick Kula

VS: 0.000
Lat : 40.189
Long: -104.654

Well: Ritchey H-34-29
Location: Weld County, Colorado
North Reference: GRID
Convergence: GRID North is 0.550 Degrees East
Declination: 8.45

Depth Reference: Ground Level
Elevation: 4833'

Total Depth as Drilled: 7762'

Lat & Long obtained by handheld GPS at wellhead

HA 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 | 0.074 | 167.742 | -0.063 | 0.014 | 100.000 | 0.074 | -0.063 | 0.064 | 167.742 |
| 200.000 | 0.169 | 169.763 | -0.270 | 0.053 | 200.000 | 0.096 | -0.270 | 0.276 | 168.823 |
| 300.000 | 0.220 | 163.656 | -0.600 | 0.134 | 299.999 | 0.055 | -0.600 | 0.614 | 167.438 |
| 400.000 | 0.202 | 186.353 | -0.959 | 0.168 | 399.998 | 0.085 | -0.959 | 0.973 | 170.056 |
| 500.000 | 0.174 | 197.179 | -1.279 | 0.104 | 499.998 | 0.045 | -1.279 | 1.283 | 175.369 |
| 600.000 | 0.421 | 183.552 | -1.792 | 0.036 | 599.997 | 0.255 | -1.792 | 1.792 | 178.853 |
| 700.000 | 0.691 | 226.734 | -2.572 | -0.426 | 699.992 | 0.480 | -2.572 | 2.607 | 189.410 |
| 800.000 | 0.712 | 254.552 | -3.151 | -1.465 | 799.985 | 0.338 | -3.151 | 3.475 | 204.931 |
| 900.000 | 1.028 | 243.832 | -3.712 | -2.869 | 899.973 | 0.354 | -3.712 | 4.692 | 217.700 |
| 1000.000 | 1.026 | 247.876 | -4.445 | -4.504 | 999.957 | 0.073 | -4.445 | 6.328 | 225.375 |
| 1100.000 | 1.195 | 252.829 | -5.090 | -6.329 | 1099.938 | 0.194 | -5.090 | 8.122 | 231.193 |
| 1200.000 | 1.191 | 259.841 | -5.581 | -8.348 | 1199.917 | 0.146 | -5.581 | 10.042 | 236.236 |
| 1300.000 | 1.267 | 253.579 | -6.077 | -10.432 | 1299.894 | 0.154 | -6.077 | 12.073 | 239.777 |
| 1400.000 | 1.409 | 259.140 | -6.621 | -12.700 | 1399.867 | 0.192 | -6.621 | 14.323 | 242.464 |
| 1500.000 | 1.541 | 266.034 | -6.946 | -15.250 | 1499.834 | 0.221 | -6.946 | 16.757 | 245.511 |
| 1600.000 | 1.569 | 263.557 | -7.193 | -17.951 | 1599.797 | 0.073 | -7.193 | 19.339 | 248.165 |
| 1700.000 | 1.560 | 269.421 | -7.360 | -20.672 | 1699.760 | 0.160 | -7.360 | 21.944 | 250.403 |
| 1800.000 | 1.396 | 271.247 | -7.347 | -23.251 | 1799.726 | 0.170 | -7.347 | 24.385 | 252.464 |
| 1900.000 | 1.224 | 273.881 | -7.249 | -25.535 | 1899.700 | 0.183 | -7.249 | 26.544 | 254.152 |
| 2000.000 | 1.203 | 293.853 | -6.752 | -27.561 | 1999.678 | 0.421 | -6.752 | 28.376 | 256.235 |
| 2100.000 | 1.181 | 301.691 | -5.786 | -29.398 | 2099.657 | 0.164 | -5.786 | 29.962 | 258.866 |
| 2200.000 | 1.110 | 313.277 | -4.580 | -30.980 | 2199.637 | 0.242 | -4.580 | 31.317 | 261.591 |
| 2300.000 | 1.051 | 327.216 | -3.145 | -32.182 | 2299.619 | 0.269 | -3.145 | 32.335 | 264.418 |
| 2400.000 | 1.350 | 319.089 | -1.484 | -33.450 | 2399.597 | 0.344 | -1.484 | 33.483 | 267.460 |
| 2500.000 | 1.405 | 319.947 | 0.345 | -35.011 | 2499.568 | 0.059 | 0.345 | 35.012 | 270.565 |
| 2600.000 | 1.461 | 322.465 | 2.294 | -36.576 | 2599.537 | 0.084 | 2.294 | 36.648 | 273.589 |
| 2700.000 | 1.642 | 318.492 | 4.378 | -38.302 | 2699.500 | 0.210 | 4.378 | 38.552 | 276.521 |
| 2800.000 | 1.831 | 321.363 | 6.699 | -40.249 | 2799.454 | 0.208 | 6.699 | 40.803 | 279.449 |
| 2900.000 | 2.167 | 323.822 | 9.473 | -42.363 | 2899.393 | 0.347 | 9.473 | 43.409 | 282.605 |
| 3000.000 | 2.392 | 330.858 | 12.822 | -44.495 | 2999.314 | 0.359 | 12.822 | 46.306 | 286.075 |
| 3100.000 | 2.380 | 338.756 | 16.580 | -46.264 | 3099.228 | 0.329 | 16.580 | 49.145 | 289.717 |
| 3200.000 | 2.052 | 345.518 | 20.249 | -47.464 | 3199.153 | 0.419 | 20.249 | 51.603 | 293.104 |
| 3300.000 | 1.812 | 349.747 | 23.539 | -48.193 | 3299.096 | 0.279 | 23.539 | 53.635 | 296.032 |
| 3400.000 | 1.359 | 347.432 | 26.252 | -48.733 | 3399.058 | 0.457 | 26.252 | 55.354 | 298.311 |
| 3500.000 | 1.174 | 344.141 | 28.395 | -49.271 | 3499.033 | 0.199 | 28.395 | 56.867 | 299.955 |

| | | | | | | | | | |
|----------|-------|---------|---------|----------|----------|-------|---------|---------|---------|
| 3600.000 | 1.043 | 329.998 | 30.169 | -50.006 | 3599.015 | 0.302 | 30.169 | 58.402 | 301.103 |
| 3700.000 | 1.317 | 313.047 | 31.742 | -51.301 | 3698.994 | 0.441 | 31.742 | 60.327 | 301.746 |
| 3800.000 | 1.559 | 305.971 | 33.325 | -53.242 | 3798.962 | 0.300 | 33.325 | 62.811 | 302.043 |
| 3900.000 | 1.735 | 309.346 | 35.083 | -55.513 | 3898.921 | 0.201 | 35.083 | 65.670 | 302.292 |
| 4000.000 | 2.140 | 302.907 | 37.057 | -58.251 | 3998.864 | 0.460 | 37.057 | 69.039 | 302.463 |
| 4100.000 | 2.257 | 321.210 | 39.606 | -61.052 | 4098.791 | 0.708 | 39.606 | 72.773 | 302.973 |
| 4200.000 | 2.475 | 331.825 | 43.044 | -63.305 | 4198.706 | 0.489 | 43.044 | 76.552 | 304.214 |
| 4300.000 | 2.667 | 329.801 | 46.958 | -65.494 | 4298.606 | 0.212 | 46.958 | 80.589 | 305.640 |
| 4400.000 | 3.068 | 336.562 | 51.423 | -67.729 | 4398.481 | 0.524 | 51.423 | 85.038 | 307.208 |
| 4500.000 | 3.705 | 337.315 | 56.859 | -70.039 | 4498.306 | 0.639 | 56.859 | 90.213 | 309.071 |
| 4600.000 | 4.472 | 332.633 | 63.303 | -73.077 | 4598.051 | 0.836 | 63.303 | 96.683 | 310.901 |
| 4700.000 | 4.870 | 331.025 | 70.479 | -76.926 | 4697.718 | 0.419 | 70.479 | 104.330 | 312.496 |
| 4800.000 | 5.001 | 339.530 | 78.276 | -80.507 | 4797.349 | 0.743 | 78.276 | 112.287 | 314.195 |
| 4900.000 | 5.053 | 332.457 | 86.264 | -84.067 | 4896.965 | 0.622 | 86.264 | 120.453 | 315.739 |
| 5000.000 | 4.619 | 325.351 | 93.482 | -88.393 | 4996.610 | 0.739 | 93.482 | 128.655 | 316.603 |
| 5100.000 | 3.836 | 328.070 | 99.633 | -92.452 | 5096.337 | 0.808 | 99.633 | 135.920 | 317.141 |
| 5200.000 | 3.487 | 326.446 | 105.006 | -95.902 | 5196.133 | 0.365 | 105.006 | 142.209 | 317.595 |
| 5300.000 | 3.068 | 333.090 | 109.927 | -98.793 | 5295.969 | 0.565 | 109.927 | 147.797 | 318.053 |
| 5400.000 | 2.688 | 336.322 | 114.460 | -100.946 | 5395.843 | 0.413 | 114.460 | 152.615 | 318.590 |
| 5500.000 | 1.826 | 345.292 | 118.149 | -102.292 | 5495.765 | 0.929 | 118.149 | 156.278 | 319.114 |
| 5600.000 | 1.239 | 346.084 | 120.740 | -102.957 | 5595.729 | 0.587 | 120.740 | 158.676 | 319.545 |
| 5700.000 | 0.872 | 342.802 | 122.517 | -103.442 | 5695.712 | 0.372 | 122.517 | 160.345 | 319.825 |
| 5800.000 | 0.918 | 327.813 | 123.922 | -104.094 | 5795.699 | 0.238 | 123.922 | 161.840 | 319.970 |
| 5900.000 | 0.954 | 320.700 | 125.244 | -105.048 | 5895.686 | 0.122 | 125.244 | 163.466 | 320.012 |
| 6000.000 | 1.260 | 334.002 | 126.877 | -106.058 | 5995.668 | 0.398 | 126.877 | 165.366 | 320.107 |
| 6100.000 | 1.349 | 320.127 | 128.769 | -107.294 | 6095.642 | 0.327 | 128.769 | 167.611 | 320.198 |
| 6200.000 | 1.422 | 326.879 | 130.712 | -108.727 | 6195.613 | 0.179 | 130.712 | 170.022 | 320.246 |
| 6300.000 | 1.506 | 347.768 | 133.036 | -109.684 | 6295.581 | 0.537 | 133.036 | 172.421 | 320.495 |
| 6400.000 | 1.798 | 353.824 | 135.880 | -110.131 | 6395.539 | 0.340 | 135.880 | 174.906 | 320.975 |
| 6500.000 | 2.008 | 4.807 | 139.186 | -110.153 | 6495.484 | 0.419 | 139.186 | 177.500 | 321.641 |
| 6600.000 | 2.237 | 358.280 | 142.882 | -110.065 | 6595.416 | 0.333 | 142.882 | 180.360 | 322.392 |
| 6700.000 | 2.245 | 6.482 | 146.779 | -109.902 | 6695.339 | 0.321 | 146.779 | 183.365 | 323.176 |
| 6800.000 | 2.373 | 4.182 | 150.790 | -109.530 | 6795.258 | 0.158 | 150.790 | 186.372 | 324.006 |
| 6900.000 | 2.439 | 4.128 | 154.976 | -109.226 | 6895.170 | 0.066 | 154.976 | 189.600 | 324.824 |
| 7000.000 | 3.103 | 11.439 | 159.751 | -108.536 | 6995.053 | 0.751 | 159.751 | 193.133 | 325.807 |
| 7100.000 | 3.275 | 10.626 | 165.211 | -107.473 | 7094.898 | 0.178 | 165.211 | 197.092 | 326.955 |
| 7200.000 | 2.876 | 5.310 | 170.517 | -106.714 | 7194.754 | 0.490 | 170.517 | 201.156 | 327.961 |
| 7300.000 | 2.449 | 2.168 | 175.150 | -106.401 | 7294.646 | 0.452 | 175.150 | 204.936 | 328.722 |
| 7400.000 | 1.790 | 1.933 | 178.846 | -106.267 | 7394.577 | 0.659 | 178.846 | 208.035 | 329.282 |
| 7500.000 | 1.790 | 6.093 | 181.959 | -106.049 | 7494.528 | 0.130 | 181.959 | 210.608 | 329.766 |

of True North