



**Company:** Noble Energy  
**Rig:** Producton / V.E.S.  
**API #** 05-123-16255  
**Date:** 2/13/2014  
**Surveyor:** Norman Cowan  
**VS:** 0.000  
**Lat :** 40.222  
**Long:** -104.484

**Well:** Karch Blue DD18-03J  
**Location:** Weld County, Colorado  
**North Reference:** GRID  
**Convergence:** Grid north is 0.66 Deg East of Tru  
**Declination:** 8.34 Degrees  
**Depth Reference:** Ground Level  
**Elevation:** 4783 Feet  
**Total Depth as Drilled:** 7450 Feet

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

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  | 0.312 | 347.168 | 0.265  | -0.060  | 100.000  | 0.312 | 0.265  | 0.272  | 347.168 |
| 200.000  | 0.421 | 281.271 | 0.602  | -0.481  | 199.998  | 0.409 | 0.602  | 0.771  | 321.372 |
| 300.000  | 0.498 | 354.520 | 1.107  | -0.883  | 299.995  | 0.552 | 1.107  | 1.416  | 321.412 |
| 400.000  | 0.353 | 303.937 | 1.711  | -1.180  | 399.993  | 0.387 | 1.711  | 2.078  | 325.411 |
| 500.000  | 0.136 | 337.308 | 1.992  | -1.481  | 499.992  | 0.251 | 1.992  | 2.483  | 323.374 |
| 600.000  | 0.267 | 70.410  | 2.180  | -1.307  | 599.992  | 0.306 | 2.180  | 2.542  | 329.054 |
| 700.000  | 0.455 | 113.874 | 2.097  | -0.724  | 699.990  | 0.320 | 2.097  | 2.219  | 340.956 |
| 800.000  | 0.280 | 152.446 | 1.720  | -0.247  | 799.988  | 0.294 | 1.720  | 1.738  | 351.812 |
| 900.000  | 0.241 | 128.607 | 1.372  | 0.030   | 899.987  | 0.114 | 1.372  | 1.372  | 1.248   |
| 1000.000 | 0.107 | 120.110 | 1.194  | 0.275   | 999.986  | 0.136 | 1.194  | 1.225  | 12.966  |
| 1100.000 | 0.481 | 169.215 | 0.734  | 0.434   | 1099.985 | 0.419 | 0.734  | 0.853  | 30.599  |
| 1200.000 | 0.398 | 163.630 | -0.012 | 0.611   | 1199.982 | 0.093 | -0.012 | 0.611  | 91.105  |
| 1300.000 | 0.325 | 226.569 | -0.540 | 0.503   | 1299.980 | 0.383 | -0.540 | 0.738  | 137.061 |
| 1400.000 | 0.094 | 167.005 | -0.816 | 0.315   | 1399.980 | 0.289 | -0.816 | 0.874  | 158.864 |
| 1500.000 | 0.183 | 182.925 | -1.055 | 0.326   | 1499.979 | 0.096 | -1.055 | 1.104  | 162.843 |
| 1600.000 | 0.490 | 179.345 | -1.641 | 0.322   | 1599.977 | 0.308 | -1.641 | 1.673  | 168.886 |
| 1700.000 | 0.232 | 241.172 | -2.166 | 0.150   | 1699.976 | 0.432 | -2.166 | 2.171  | 176.044 |
| 1800.000 | 0.389 | 249.080 | -2.385 | -0.345  | 1799.974 | 0.162 | -2.385 | 2.410  | 188.231 |
| 1900.000 | 0.589 | 226.281 | -2.862 | -1.034  | 1899.971 | 0.275 | -2.862 | 3.043  | 199.864 |
| 2000.000 | 0.669 | 246.393 | -3.451 | -1.940  | 1999.965 | 0.233 | -3.451 | 3.959  | 209.348 |
| 2100.000 | 0.619 | 224.525 | -4.070 | -2.854  | 2099.958 | 0.249 | -4.070 | 4.971  | 215.041 |
| 2200.000 | 0.275 | 209.861 | -4.663 | -3.353  | 2199.955 | 0.360 | -4.663 | 5.743  | 215.713 |
| 2300.000 | 0.418 | 247.476 | -5.011 | -3.809  | 2299.954 | 0.261 | -5.011 | 6.295  | 217.239 |
| 2400.000 | 0.205 | 301.783 | -5.057 | -4.298  | 2399.952 | 0.342 | -5.057 | 6.637  | 220.362 |
| 2500.000 | 0.734 | 329.734 | -4.410 | -4.773  | 2499.949 | 0.561 | -4.410 | 6.498  | 227.264 |
| 2600.000 | 0.563 | 256.425 | -3.972 | -5.573  | 2599.944 | 0.786 | -3.972 | 6.843  | 234.521 |
| 2700.000 | 0.670 | 269.313 | -4.094 | -6.635  | 2699.938 | 0.175 | -4.094 | 7.796  | 238.322 |
| 2800.000 | 0.712 | 266.748 | -4.136 | -7.840  | 2799.931 | 0.052 | -4.136 | 8.864  | 242.183 |
| 2900.000 | 0.791 | 270.042 | -4.171 | -9.151  | 2899.922 | 0.090 | -4.171 | 10.057 | 245.495 |
| 3000.000 | 0.633 | 276.774 | -4.106 | -10.390 | 2999.914 | 0.179 | -4.106 | 11.171 | 248.438 |
| 3100.000 | 0.995 | 262.949 | -4.147 | -11.800 | 3099.904 | 0.410 | -4.147 | 12.507 | 250.636 |
| 3200.000 | 1.022 | 244.911 | -4.632 | -13.469 | 3199.889 | 0.317 | -4.632 | 14.243 | 251.023 |
| 3300.000 | 0.690 | 251.145 | -5.204 | -14.847 | 3299.878 | 0.344 | -5.204 | 15.733 | 250.682 |
| 3400.000 | 0.760 | 283.995 | -5.239 | -16.060 | 3399.870 | 0.415 | -5.239 | 16.893 | 251.934 |
| 3500.000 | 0.935 | 284.238 | -4.878 | -17.494 | 3499.859 | 0.175 | -4.878 | 18.162 | 254.420 |

|          |       |         |        |         |          |       |        |        |         |
|----------|-------|---------|--------|---------|----------|-------|--------|--------|---------|
| 3600.000 | 1.499 | 290.879 | -4.211 | -19.507 | 3599.836 | 0.581 | -4.211 | 19.956 | 257.818 |
| 3700.000 | 2.209 | 277.315 | -3.500 | -22.641 | 3699.784 | 0.830 | -3.500 | 22.910 | 261.213 |
| 3800.000 | 1.765 | 289.687 | -2.735 | -26.002 | 3799.724 | 0.615 | -2.735 | 26.145 | 263.995 |
| 3900.000 | 1.508 | 303.311 | -1.494 | -28.551 | 3899.683 | 0.464 | -1.494 | 28.590 | 267.004 |
| 4000.000 | 1.108 | 297.125 | -0.331 | -30.511 | 3999.657 | 0.423 | -0.331 | 30.513 | 269.379 |
| 4100.000 | 0.843 | 317.669 | 0.654  | -31.867 | 4099.643 | 0.435 | 0.654  | 31.874 | 271.175 |
| 4200.000 | 0.352 | 277.724 | 1.239  | -32.667 | 4199.637 | 0.616 | 1.239  | 32.691 | 272.172 |
| 4300.000 | 0.393 | 308.534 | 1.494  | -33.240 | 4299.635 | 0.202 | 1.494  | 33.274 | 272.573 |
| 4400.000 | 0.358 | 304.902 | 1.886  | -33.765 | 4399.633 | 0.042 | 1.886  | 33.817 | 273.197 |
| 4500.000 | 0.440 | 307.404 | 2.298  | -34.326 | 4499.631 | 0.083 | 2.298  | 34.402 | 273.830 |
| 4600.000 | 0.752 | 322.295 | 3.051  | -35.032 | 4599.625 | 0.346 | 3.051  | 35.165 | 274.977 |
| 4700.000 | 0.519 | 306.187 | 3.838  | -35.799 | 4699.619 | 0.292 | 3.838  | 36.004 | 276.119 |
| 4800.000 | 0.390 | 229.758 | 3.886  | -36.425 | 4799.617 | 0.571 | 3.886  | 36.631 | 276.089 |
| 4900.000 | 0.539 | 238.372 | 3.419  | -37.085 | 4899.613 | 0.165 | 3.419  | 37.242 | 275.267 |
| 5000.000 | 0.497 | 222.275 | 2.851  | -37.778 | 4999.609 | 0.151 | 2.851  | 37.885 | 274.316 |
| 5100.000 | 0.327 | 119.662 | 2.389  | -37.821 | 5099.608 | 0.652 | 2.389  | 37.897 | 273.614 |
| 5200.000 | 0.732 | 82.974  | 2.326  | -36.939 | 5199.604 | 0.509 | 2.326  | 37.012 | 273.603 |
| 5300.000 | 0.582 | 117.316 | 2.171  | -35.854 | 5299.597 | 0.414 | 2.171  | 35.919 | 273.465 |
| 5400.000 | 0.305 | 83.904  | 1.966  | -35.138 | 5399.594 | 0.368 | 1.966  | 35.193 | 273.203 |
| 5500.000 | 0.235 | 86.992  | 2.005  | -34.669 | 5499.593 | 0.071 | 2.005  | 34.727 | 273.310 |
| 5600.000 | 0.517 | 40.369  | 2.360  | -34.172 | 5599.591 | 0.395 | 2.360  | 34.253 | 273.951 |
| 5700.000 | 0.498 | 25.118  | 3.097  | -33.695 | 5699.587 | 0.136 | 3.097  | 33.837 | 275.252 |
| 5800.000 | 0.327 | 313.827 | 3.688  | -33.716 | 5799.585 | 0.500 | 3.688  | 33.917 | 276.243 |
| 5900.000 | 0.348 | 15.345  | 4.178  | -33.842 | 5899.584 | 0.346 | 4.178  | 34.099 | 277.038 |
| 6000.000 | 0.283 | 339.511 | 4.703  | -33.848 | 5999.582 | 0.204 | 4.703  | 34.173 | 277.910 |
| 6100.000 | 0.440 | 250.662 | 4.807  | -34.297 | 6099.581 | 0.519 | 4.807  | 34.632 | 277.978 |
| 6200.000 | 0.083 | 287.377 | 4.701  | -34.729 | 6199.580 | 0.377 | 4.701  | 35.046 | 277.710 |
| 6300.000 | 0.832 | 264.202 | 4.650  | -35.520 | 6299.576 | 0.756 | 4.650  | 35.823 | 277.458 |
| 6400.000 | 0.971 | 240.092 | 4.154  | -36.977 | 6399.564 | 0.400 | 4.154  | 37.209 | 276.410 |
| 6500.000 | 0.527 | 226.096 | 3.413  | -38.043 | 6499.555 | 0.477 | 3.413  | 38.195 | 275.126 |
| 6600.000 | 0.319 | 270.465 | 3.096  | -38.653 | 6599.553 | 0.373 | 3.096  | 38.776 | 274.579 |
| 6700.000 | 0.675 | 271.857 | 3.117  | -39.520 | 6699.549 | 0.356 | 3.117  | 39.643 | 274.510 |

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