



Company/Rig: Noble Energy Inc/Production  
WELL/API#: UPRC 23-5A/05-123-16776  
DECLINATION: 8.18 Degrees  
TD AS DRILLED: 6823'  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.38715, Longitude: -104.52387  
Grid North = True North -0.63 degs (NAD 27)  
Grid Correction Applied = -0.63 degs



DEPTH REFERENCE : RKB=GL/Elevation=4573'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro\_run01-01-de\_01.ut

Minimum Curvature Method

Report Date/Time: 7/19/2016 / 16:00

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / UPRC 23-5A

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.000                   | 0.000                | 0.000                     | 0.000     | 0.000       | 0.000       | 0.000                     | 0.000                     | 0.000                       | ****                          |
| 100.000                 | 0.074                | 57.193                    | 100.000   | 0.035       | 0.054       | 0.035                     | 0.064                     | 57.193                      | 0.074                         |
| 200.000                 | 0.269                | 129.193                   | 200.000   | -0.079      | 0.290       | -0.079                    | 0.300                     | 105.190                     | 0.256                         |
| 300.000                 | 0.317                | 153.556                   | 299.998   | -0.474      | 0.594       | -0.474                    | 0.761                     | 128.594                     | 0.132                         |
| 400.000                 | 0.067                | 222.596                   | 399.998   | -0.765      | 0.678       | -0.765                    | 1.022                     | 138.466                     | 0.300                         |
| 500.000                 | 0.082                | 71.190                    | 499.998   | -0.785      | 0.706       | -0.785                    | 1.056                     | 138.042                     | 0.145                         |
| 600.000                 | 0.197                | 37.365                    | 599.997   | -0.626      | 0.878       | -0.626                    | 1.078                     | 125.458                     | 0.137                         |
| 700.000                 | 0.123                | 305.109                   | 699.997   | -0.427      | 0.895       | -0.427                    | 0.992                     | 115.520                     | 0.236                         |
| 800.000                 | 0.325                | 348.076                   | 799.996   | -0.088      | 0.749       | -0.088                    | 0.754                     | 96.711                      | 0.250                         |
| 900.000                 | 0.167                | 336.492                   | 899.995   | 0.323       | 0.632       | 0.323                     | 0.710                     | 62.925                      | 0.165                         |
| 1000.000                | 0.151                | 261.985                   | 999.995   | 0.438       | 0.444       | 0.438                     | 0.624                     | 45.349                      | 0.193                         |
| 1100.000                | 0.193                | 15.991                    | 1099.995  | 0.582       | 0.360       | 0.582                     | 0.684                     | 31.739                      | 0.289                         |
| 1200.000                | 0.144                | 211.772                   | 1199.995  | 0.637       | 0.340       | 0.637                     | 0.722                     | 28.107                      | 0.333                         |
| 1300.000                | 0.281                | 199.945                   | 1299.994  | 0.300       | 0.191       | 0.300                     | 0.356                     | 32.418                      | 0.143                         |
| 1400.000                | 0.253                | 354.468                   | 1399.994  | 0.290       | 0.086       | 0.290                     | 0.302                     | 16.529                      | 0.520                         |
| 1500.000                | 0.219                | 264.352                   | 1499.993  | 0.491       | -0.125      | 0.491                     | 0.506                     | 345.657                     | 0.335                         |
| 1600.000                | 0.392                | 250.527                   | 1599.992  | 0.358       | -0.638      | 0.358                     | 0.731                     | 299.288                     | 0.187                         |
| 1700.000                | 0.533                | 275.927                   | 1699.988  | 0.292       | -1.423      | 0.292                     | 1.452                     | 281.592                     | 0.246                         |
| 1800.000                | 0.499                | 295.094                   | 1799.984  | 0.524       | -2.280      | 0.524                     | 2.339                     | 282.957                     | 0.175                         |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 1900.000                | 0.473                | 314.878                   | 1899.981  | 1.001       | -2.967      | 1.001                     | 3.131                     | 288.639                     | 0.169                         |
| 2000.000                | 0.769                | 326.451                   | 1999.975  | 1.851       | -3.630      | 1.851                     | 4.075                     | 297.019                     | 0.319                         |
| 2100.000                | 0.676                | 316.020                   | 2099.967  | 2.835       | -4.410      | 2.835                     | 5.243                     | 302.730                     | 0.160                         |
| 2200.000                | 0.536                | 311.433                   | 2199.961  | 3.569       | -5.171      | 3.569                     | 6.283                     | 304.613                     | 0.149                         |
| 2300.000                | 0.290                | 329.285                   | 2299.959  | 4.096       | -5.650      | 4.096                     | 6.979                     | 305.935                     | 0.275                         |
| 2400.000                | 0.395                | 288.461                   | 2399.957  | 4.422       | -6.106      | 4.422                     | 7.539                     | 305.911                     | 0.258                         |
| 2500.000                | 0.283                | 243.441                   | 2499.956  | 4.421       | -6.654      | 4.421                     | 7.989                     | 303.599                     | 0.279                         |
| 2600.000                | 0.016                | 334.259                   | 2599.955  | 4.323       | -6.881      | 4.323                     | 8.126                     | 302.141                     | 0.284                         |
| 2700.000                | 0.354                | 350.037                   | 2699.954  | 4.641       | -6.941      | 4.641                     | 8.349                     | 303.767                     | 0.338                         |
| 2800.000                | 0.166                | 358.443                   | 2799.953  | 5.090       | -6.998      | 5.090                     | 8.653                     | 306.028                     | 0.192                         |
| 2900.000                | 0.322                | 12.088                    | 2899.952  | 5.509       | -6.943      | 5.509                     | 8.863                     | 308.430                     | 0.166                         |
| 3000.000                | 0.250                | 349.820                   | 2999.951  | 5.999       | -6.923      | 5.999                     | 9.160                     | 310.910                     | 0.131                         |
| 3100.000                | 0.324                | 196.331                   | 3099.951  | 5.943       | -7.041      | 5.943                     | 9.214                     | 310.165                     | 0.559                         |
| 3200.000                | 0.520                | 194.197                   | 3199.948  | 5.232       | -7.232      | 5.232                     | 8.926                     | 305.883                     | 0.197                         |
| 3300.000                | 0.282                | 185.044                   | 3299.945  | 4.546       | -7.365      | 4.546                     | 8.655                     | 301.689                     | 0.246                         |
| 3400.000                | 0.280                | 218.217                   | 3399.944  | 4.109       | -7.538      | 4.109                     | 8.585                     | 298.597                     | 0.161                         |
| 3500.000                | 0.386                | 248.744                   | 3499.943  | 3.795       | -8.003      | 3.795                     | 8.857                     | 295.371                     | 0.203                         |
| 3600.000                | 0.493                | 233.877                   | 3599.940  | 3.419       | -8.664      | 3.419                     | 9.314                     | 291.535                     | 0.156                         |
| 3700.000                | 0.522                | 222.222                   | 3699.936  | 2.828       | -9.318      | 2.828                     | 9.738                     | 286.881                     | 0.107                         |
| 3800.000                | 0.587                | 220.441                   | 3799.931  | 2.100       | -9.957      | 2.100                     | 10.176                    | 281.912                     | 0.067                         |
| 3900.000                | 0.917                | 222.351                   | 3899.922  | 1.119       | -10.828     | 1.119                     | 10.886                    | 275.900                     | 0.331                         |
| 4000.000                | 1.551                | 217.064                   | 3999.899  | -0.553      | -12.184     | -0.553                    | 12.196                    | 267.401                     | 0.643                         |
| 4100.000                | 1.837                | 223.110                   | 4099.855  | -2.804      | -14.095     | -2.804                    | 14.371                    | 258.750                     | 0.337                         |
| 4200.000                | 1.792                | 228.987                   | 4199.805  | -5.000      | -16.370     | -5.000                    | 17.117                    | 253.016                     | 0.192                         |
| 4300.000                | 2.052                | 228.161                   | 4299.749  | -7.220      | -18.884     | -7.220                    | 20.217                    | 249.076                     | 0.261                         |
| 4400.000                | 1.841                | 229.803                   | 4399.691  | -9.451      | -21.444     | -9.451                    | 23.434                    | 246.217                     | 0.218                         |
| 4500.000                | 1.371                | 221.272                   | 4499.651  | -11.386     | -23.460     | -11.386                   | 26.077                    | 244.110                     | 0.526                         |
| 4600.000                | 1.016                | 258.027                   | 4599.631  | -12.469     | -25.117     | -12.469                   | 28.042                    | 243.597                     | 0.825                         |
| 4700.000                | 1.265                | 273.042                   | 4699.611  | -12.595     | -27.086     | -12.595                   | 29.871                    | 245.062                     | 0.387                         |
| 4800.000                | 1.314                | 275.228                   | 4799.586  | -12.432     | -29.331     | -12.432                   | 31.856                    | 247.030                     | 0.069                         |
| 4900.000                | 1.085                | 296.874                   | 4899.565  | -11.899     | -31.317     | -11.899                   | 33.502                    | 249.196                     | 0.504                         |
| 5000.000                | 1.037                | 302.926                   | 4999.547  | -10.979     | -32.921     | -10.979                   | 34.704                    | 251.556                     | 0.122                         |
| 5100.000                | 0.687                | 301.781                   | 5099.536  | -10.172     | -34.190     | -10.172                   | 35.671                    | 253.432                     | 0.350                         |
| 5200.000                | 0.550                | 40.343                    | 5199.532  | -9.490      | -34.389     | -9.490                    | 35.674                    | 254.572                     | 0.942                         |
| 5300.000                | 0.714                | 61.203                    | 5299.526  | -8.824      | -33.532     | -8.824                    | 34.674                    | 255.256                     | 0.280                         |
| 5400.000                | 0.878                | 56.237                    | 5399.517  | -8.099      | -32.350     | -8.099                    | 33.348                    | 255.945                     | 0.178                         |
| 5500.000                | 0.680                | 80.099                    | 5499.508  | -7.571      | -31.129     | -7.571                    | 32.036                    | 256.330                     | 0.376                         |
| 5600.000                | 0.899                | 56.975                    | 5599.498  | -7.042      | -29.887     | -7.042                    | 30.705                    | 256.742                     | 0.382                         |
| 5700.000                | 0.872                | 63.823                    | 5699.486  | -6.279      | -28.547     | -6.279                    | 29.229                    | 257.595                     | 0.109                         |
| 5800.000                | 0.827                | 67.005                    | 5799.475  | -5.661      | -27.200     | -5.661                    | 27.783                    | 258.243                     | 0.065                         |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 5900.000                | 0.955                | 55.682                    | 5899.463  | -4.909      | -25.847     | -4.909                    | 26.309                    | 259.245                     | 0.217                         |
| 6000.000                | 0.864                | 52.001                    | 5999.451  | -3.975      | -24.564     | -3.975                    | 24.884                    | 260.808                     | 0.109                         |
| 6100.000                | 0.987                | 61.546                    | 6099.438  | -3.100      | -23.213     | -3.100                    | 23.419                    | 262.392                     | 0.197                         |
| 6200.000                | 0.467                | 68.722                    | 6199.429  | -2.542      | -22.076     | -2.542                    | 22.221                    | 263.431                     | 0.527                         |
| 6300.000                | 1.093                | 54.197                    | 6299.420  | -1.837      | -20.923     | -1.837                    | 21.003                    | 264.984                     | 0.652                         |
| 6400.000                | 1.314                | 67.163                    | 6399.398  | -0.834      | -19.092     | -0.834                    | 19.110                    | 267.500                     | 0.350                         |
| 6500.000                | 1.159                | 69.635                    | 6499.374  | -0.037      | -17.088     | -0.037                    | 17.088                    | 269.877                     | 0.165                         |
| 6600.000                | 1.484                | 84.062                    | 6599.348  | 0.449       | -14.852     | 0.449                     | 14.859                    | 271.732                     | 0.463                         |