



COMPANY/RIG: Noble Energy/Production/CoreTech  
WELL/API: Dietrich C07-22D/05-123-34349  
DECLINATION: 8.16 Degrees  
TD AS DRILLED: 7490 Feet  
COUNTY/STATE: Weld/Colorado  
VS-Azi: 0.000 Degrees  
Latitude: 40.33054, Longitude: -104.58886  
Grid North = True North -0.59 degs (NAD 27)  
Grid Correction Applied = -0.59 degs



DEPTH REFERENCE : RKB = GL Elevation = 4817

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 12/5/2016 / 14:46

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS / Dietrich C07-22D

| 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                 | 0.305                | 39.830                    | 100.000   | 0.204       | 0.170       | 0.204                     | 0.266                     | 39.830                      | 0.305                         |
| 200.000                 | 0.352                | 47.895                    | 199.998   | 0.615       | 0.569       | 0.615                     | 0.837                     | 42.783                      | 0.066                         |
| 300.000                 | 0.508                | 43.207                    | 299.995   | 1.144       | 1.100       | 1.144                     | 1.587                     | 43.891                      | 0.159                         |
| 400.000                 | 0.876                | 63.498                    | 399.988   | 1.808       | 2.088       | 1.808                     | 2.762                     | 49.109                      | 0.436                         |
| 500.000                 | 0.986                | 81.664                    | 499.975   | 2.274       | 3.623       | 2.274                     | 4.278                     | 57.890                      | 0.314                         |
| 600.000                 | 1.426                | 116.081                   | 599.954   | 1.851       | 5.593       | 1.851                     | 5.891                     | 71.685                      | 0.828                         |
| 700.000                 | 1.325                | 129.126                   | 699.925   | 0.574       | 7.608       | 0.574                     | 7.629                     | 85.682                      | 0.328                         |
| 800.000                 | 3.690                | 170.415                   | 799.828   | -3.329      | 9.041       | -3.329                    | 9.634                     | 110.213                     | 2.832                         |
| 900.000                 | 5.838                | 192.361                   | 899.485   | -11.471     | 8.488       | -11.471                   | 14.270                    | 143.501                     | 2.780                         |
| 1000.000                | 7.811                | 194.363                   | 998.772   | -23.022     | 5.713       | -23.022                   | 23.721                    | 166.063                     | 1.987                         |
| 1100.000                | 9.547                | 192.328                   | 1097.623  | -37.707     | 2.257       | -37.707                   | 37.775                    | 176.575                     | 1.763                         |
| 1200.000                | 11.779               | 186.019                   | 1195.894  | -55.962     | -0.584      | -55.962                   | 55.965                    | 180.598                     | 2.516                         |
| 1300.000                | 14.241               | 184.516                   | 1293.319  | -78.379     | -2.624      | -78.379                   | 78.423                    | 181.917                     | 2.485                         |
| 1400.000                | 17.126               | 182.014                   | 1389.587  | -105.361    | -4.110      | -105.361                  | 105.441                   | 182.234                     | 2.962                         |
| 1500.000                | 18.609               | 181.572                   | 1484.762  | -136.027    | -5.065      | -136.027                  | 136.121                   | 182.132                     | 1.490                         |
| 1600.000                | 18.961               | 180.161                   | 1579.435  | -168.223    | -5.548      | -168.223                  | 168.314                   | 181.889                     | 0.575                         |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 1700.000                | 18.883               | 179.204                   | 1674.031  | -200.650    | -5.369      | -200.650                  | 200.722                   | 181.533                     | 0.320                         |
| 1800.000                | 19.182               | 180.555                   | 1768.565  | -233.258    | -5.304      | -233.258                  | 233.319                   | 181.303                     | 0.533                         |
| 1900.000                | 19.604               | 180.305                   | 1862.891  | -266.462    | -5.552      | -266.462                  | 266.520                   | 181.194                     | 0.430                         |
| 2000.000                | 19.806               | 180.750                   | 1957.035  | -300.178    | -5.863      | -300.178                  | 300.235                   | 181.119                     | 0.251                         |
| 2100.000                | 19.740               | 179.370                   | 2051.140  | -334.005    | -5.899      | -334.005                  | 334.057                   | 181.012                     | 0.471                         |
| 2200.000                | 19.297               | 179.721                   | 2145.393  | -367.414    | -5.633      | -367.414                  | 367.457                   | 180.878                     | 0.458                         |
| 2300.000                | 18.930               | 178.699                   | 2239.881  | -400.153    | -5.185      | -400.153                  | 400.187                   | 180.742                     | 0.496                         |
| 2400.000                | 18.993               | 180.787                   | 2334.455  | -432.641    | -5.040      | -432.641                  | 432.671                   | 180.667                     | 0.681                         |
| 2500.000                | 19.051               | 182.256                   | 2428.995  | -465.221    | -5.906      | -465.221                  | 465.258                   | 180.727                     | 0.482                         |
| 2600.000                | 19.591               | 183.565                   | 2523.363  | -498.262    | -7.591      | -498.262                  | 498.319                   | 180.873                     | 0.693                         |
| 2700.000                | 19.307               | 183.060                   | 2617.657  | -531.503    | -9.516      | -531.503                  | 531.588                   | 181.026                     | 0.330                         |
| 2800.000                | 19.310               | 182.875                   | 2712.032  | -564.524    | -11.228     | -564.524                  | 564.636                   | 181.139                     | 0.061                         |
| 2900.000                | 21.325               | 180.543                   | 2805.807  | -599.223    | -12.229     | -599.223                  | 599.348                   | 181.169                     | 2.171                         |
| 3000.000                | 21.616               | 180.023                   | 2898.868  | -635.824    | -12.409     | -635.824                  | 635.945                   | 181.118                     | 0.348                         |
| 3100.000                | 21.216               | 179.720                   | 2991.963  | -672.337    | -12.328     | -672.337                  | 672.450                   | 181.050                     | 0.414                         |
| 3200.000                | 20.459               | 180.747                   | 3085.422  | -707.907    | -12.468     | -707.907                  | 708.017                   | 181.009                     | 0.840                         |
| 3300.000                | 21.062               | 182.096                   | 3178.930  | -743.340    | -13.352     | -743.340                  | 743.460                   | 181.029                     | 0.769                         |
| 3400.000                | 20.359               | 181.194                   | 3272.467  | -778.688    | -14.372     | -778.688                  | 778.820                   | 181.057                     | 0.772                         |
| 3500.000                | 20.595               | 180.681                   | 3366.149  | -813.666    | -14.944     | -813.666                  | 813.803                   | 181.052                     | 0.297                         |
| 3600.000                | 20.739               | 181.207                   | 3459.713  | -848.954    | -15.525     | -848.954                  | 849.096                   | 181.048                     | 0.235                         |
| 3700.000                | 21.074               | 178.811                   | 3553.132  | -884.631    | -15.525     | -884.631                  | 884.768                   | 181.005                     | 0.918                         |
| 3800.000                | 21.266               | 177.128                   | 3646.384  | -920.718    | -14.243     | -920.718                  | 920.829                   | 180.886                     | 0.637                         |
| 3900.000                | 19.752               | 174.721                   | 3740.044  | -955.659    | -11.780     | -955.659                  | 955.732                   | 180.706                     | 1.732                         |
| 4000.000                | 18.325               | 176.865                   | 3834.573  | -988.184    | -9.365      | -988.184                  | 988.229                   | 180.543                     | 1.589                         |
| 4100.000                | 20.743               | 175.338                   | 3928.811  | -1021.54    | -7.066      | -1021.54                  | 1021.562                  | 180.396                     | 2.471                         |
| 4200.000                | 21.458               | 174.534                   | 4022.105  | -1057.40    | -3.884      | -1057.40                  | 1057.403                  | 180.210                     | 0.771                         |
| 4300.000                | 20.394               | 177.814                   | 4115.512  | -1093.02    | -1.476      | -1093.02                  | 1093.017                  | 180.077                     | 1.582                         |
| 4400.000                | 20.947               | 176.808                   | 4209.074  | -1128.28    | 0.184       | -1128.28                  | 1128.275                  | 179.991                     | 0.657                         |
| 4500.000                | 21.069               | 174.528                   | 4302.429  | -1164.02    | 2.893       | -1164.02                  | 1164.020                  | 179.858                     | 0.826                         |
| 4600.000                | 21.041               | 172.383                   | 4395.753  | -1199.70    | 6.986       | -1199.70                  | 1199.724                  | 179.666                     | 0.771                         |
| 4700.000                | 21.555               | 171.594                   | 4488.924  | -1235.67    | 12.051      | -1235.67                  | 1235.728                  | 179.441                     | 0.588                         |
| 4800.000                | 20.815               | 172.233                   | 4582.165  | -1271.45    | 17.138      | -1271.45                  | 1271.562                  | 179.228                     | 0.775                         |
| 4900.000                | 17.329               | 172.326                   | 4676.662  | -1303.82    | 21.529      | -1303.82                  | 1303.998                  | 179.054                     | 3.486                         |
| 5000.000                | 15.730               | 172.495                   | 4772.526  | -1332.02    | 25.289      | -1332.02                  | 1332.261                  | 178.912                     | 1.600                         |
| 5100.000                | 13.776               | 173.173                   | 4869.225  | -1357.28    | 28.475      | -1357.28                  | 1357.583                  | 178.798                     | 1.961                         |
| 5200.000                | 11.671               | 174.529                   | 4966.764  | -1379.18    | 30.855      | -1379.18                  | 1379.522                  | 178.718                     | 2.127                         |
| 5300.000                | 10.072               | 174.925                   | 5064.966  | -1397.96    | 32.593      | -1397.96                  | 1398.336                  | 178.664                     | 1.601                         |
| 5400.000                | 7.645                | 178.331                   | 5163.766  | -1413.32    | 33.561      | -1413.32                  | 1413.716                  | 178.640                     | 2.481                         |
| 5500.000                | 5.350                | 177.857                   | 5263.117  | -1424.63    | 33.929      | -1424.63                  | 1425.031                  | 178.636                     | 2.296                         |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 5600.000                | 3.733                | 176.819                   | 5362.800  | -1432.54    | 34.284      | -1432.54                  | 1432.947                  | 178.629                     | 1.619                         |
| 5700.000                | 2.182                | 155.747                   | 5462.667  | -1437.52    | 35.246      | -1437.52                  | 1437.955                  | 178.595                     | 1.870                         |
| 5800.000                | 0.650                | 82.619                    | 5562.638  | -1439.19    | 36.591      | -1439.19                  | 1439.651                  | 178.544                     | 2.088                         |
| 5900.000                | 0.921                | 82.953                    | 5662.629  | -1439.01    | 37.952      | -1439.01                  | 1439.515                  | 178.489                     | 0.271                         |
| 6000.000                | 0.947                | 67.815                    | 5762.616  | -1438.60    | 39.515      | -1438.60                  | 1439.146                  | 178.427                     | 0.247                         |
| 6100.000                | 0.886                | 93.889                    | 5862.603  | -1438.34    | 41.052      | -1438.34                  | 1438.930                  | 178.365                     | 0.418                         |
| 6200.000                | 1.033                | 81.704                    | 5962.589  | -1438.27    | 42.715      | -1438.27                  | 1438.901                  | 178.299                     | 0.250                         |
| 6300.000                | 1.205                | 90.853                    | 6062.570  | -1438.15    | 44.658      | -1438.15                  | 1438.845                  | 178.221                     | 0.247                         |
| 6400.000                | 1.184                | 76.563                    | 6162.549  | -1437.93    | 46.715      | -1437.93                  | 1438.686                  | 178.139                     | 0.298                         |
| 6500.000                | 1.143                | 79.189                    | 6262.528  | -1437.50    | 48.700      | -1437.50                  | 1438.325                  | 178.060                     | 0.067                         |
| 6600.000                | 1.308                | 78.959                    | 6362.505  | -1437.09    | 50.800      | -1437.09                  | 1437.992                  | 177.975                     | 0.164                         |
| 6700.000                | 1.341                | 88.251                    | 6462.479  | -1436.84    | 53.089      | -1436.84                  | 1437.821                  | 177.884                     | 0.217                         |
| 6800.000                | 1.624                | 89.117                    | 6562.445  | -1436.78    | 55.676      | -1436.78                  | 1437.861                  | 177.781                     | 0.284                         |
| 6900.000                | 1.719                | 91.163                    | 6662.402  | -1436.79    | 58.592      | -1436.79                  | 1437.986                  | 177.665                     | 0.112                         |
| 7000.000                | 1.869                | 102.854                   | 6762.354  | -1437.18    | 61.682      | -1437.18                  | 1438.508                  | 177.542                     | 0.395                         |