



Company/Rig: NOBLE ENERGY / PRODUCTION  
WELL/API#: WEISS 03-34 / 05-123-10896  
DECLINATION: 8.47 DEGREES  
TD AS DRILLED: 7320 FEET  
COUNTY/STATE: WELD COUNTY / COLORADO  
Latitude: 40.271, Longitude: -104.884  
GRID North is 0.400 Degrees East of True North  
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=SURFACE ELEVATION=4842 FEET

DRILLOG MS GYRO SURVEY CALCULATIONS

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

Minimum Curvature Method

Report Date/Time: 11/17/2014 / 10:25

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

SURVEYOR: NORMAN COWAN

| 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                 | 0.306                | 281.710                   | 100.000   | 0.054       | -0.262      | 0.054                     | 0.267                     | 281.710                     | 0.306                         |
| 200.000                 | 0.196                | 306.530                   | 199.999   | 0.210       | -0.661      | 0.210                     | 0.694                     | 287.655                     | 0.152                         |
| 300.000                 | 0.088                | 43.160                    | 299.998   | 0.368       | -0.746      | 0.368                     | 0.832                     | 296.260                     | 0.224                         |
| 400.000                 | 0.322                | 77.541                    | 399.998   | 0.485       | -0.419      | 0.485                     | 0.641                     | 319.147                     | 0.255                         |
| 500.000                 | 0.248                | 81.123                    | 499.996   | 0.579       | 0.069       | 0.579                     | 0.583                     | 6.795                       | 0.077                         |
| 600.000                 | 0.435                | 71.900                    | 599.995   | 0.730       | 0.643       | 0.730                     | 0.973                     | 41.385                      | 0.195                         |
| 700.000                 | 0.284                | 94.821                    | 699.993   | 0.827       | 1.251       | 0.827                     | 1.500                     | 56.525                      | 0.206                         |
| 800.000                 | 0.325                | 128.587                   | 799.991   | 0.629       | 1.720       | 0.629                     | 1.831                     | 69.900                      | 0.181                         |
| 900.000                 | 0.398                | 137.719                   | 899.989   | 0.195       | 2.175       | 0.195                     | 2.184                     | 84.870                      | 0.092                         |
| 1000.000                | 0.337                | 151.597                   | 999.987   | -0.320      | 2.549       | -0.320                    | 2.569                     | 97.159                      | 0.108                         |
| 1100.000                | 0.461                | 175.425                   | 1099.985  | -0.979      | 2.721       | -0.979                    | 2.891                     | 109.796                     | 0.204                         |
| 1200.000                | 0.468                | 204.105                   | 1199.982  | -1.753      | 2.586       | -1.753                    | 3.124                     | 124.132                     | 0.230                         |
| 1300.000                | 0.447                | 190.400                   | 1299.979  | -2.509      | 2.349       | -2.509                    | 3.437                     | 136.892                     | 0.111                         |
| 1400.000                | 0.574                | 198.331                   | 1399.975  | -3.368      | 2.121       | -3.368                    | 3.980                     | 147.805                     | 0.146                         |
| 1500.000                | 0.585                | 204.026                   | 1499.970  | -4.310      | 1.755       | -4.310                    | 4.654                     | 157.847                     | 0.059                         |
| 1600.000                | 0.455                | 212.286                   | 1599.965  | -5.112      | 1.335       | -5.112                    | 5.284                     | 165.364                     | 0.150                         |
| 1700.000                | 0.580                | 224.577                   | 1699.961  | -5.808      | 0.768       | -5.808                    | 5.859                     | 172.469                     | 0.167                         |
| 1800.000                | 0.682                | 218.190                   | 1799.955  | -6.637      | 0.045       | -6.637                    | 6.637                     | 179.613                     | 0.124                         |
| 1900.000                | 0.870                | 233.264                   | 1899.946  | -7.558      | -0.932      | -7.558                    | 7.616                     | 187.027                     | 0.276                         |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 2000.000                | 1.027                | 239.788                   | 1999.932  | -8.464      | -2.315      | -8.464                    | 8.775                     | 195.297                     | 0.190                         |
| 2100.000                | 0.903                | 244.664                   | 2099.918  | -9.252      | -3.802      | -9.252                    | 10.003                    | 202.338                     | 0.149                         |
| 2200.000                | 1.020                | 248.398                   | 2199.904  | -9.917      | -5.341      | -9.917                    | 11.264                    | 208.307                     | 0.133                         |
| 2300.000                | 1.137                | 242.055                   | 2299.886  | -10.709     | -7.045      | -10.709                   | 12.819                    | 213.339                     | 0.167                         |
| 2400.000                | 1.142                | 245.313                   | 2399.867  | -11.591     | -8.827      | -11.591                   | 14.569                    | 217.293                     | 0.065                         |
| 2500.000                | 1.158                | 244.274                   | 2499.847  | -12.445     | -10.643     | -12.445                   | 16.376                    | 220.536                     | 0.026                         |
| 2600.000                | 1.168                | 253.197                   | 2599.826  | -13.179     | -12.529     | -13.179                   | 18.184                    | 223.552                     | 0.181                         |
| 2700.000                | 1.164                | 251.640                   | 2699.805  | -13.793     | -14.469     | -13.793                   | 19.990                    | 226.369                     | 0.032                         |
| 2800.000                | 1.033                | 233.380                   | 2799.787  | -14.651     | -16.156     | -14.651                   | 21.809                    | 227.797                     | 0.372                         |
| 2900.000                | 0.966                | 237.909                   | 2899.772  | -15.636     | -17.593     | -15.636                   | 23.537                    | 228.371                     | 0.103                         |
| 3000.000                | 1.147                | 240.199                   | 2999.755  | -16.581     | -19.176     | -16.581                   | 25.350                    | 229.150                     | 0.186                         |
| 3100.000                | 1.204                | 226.967                   | 3099.734  | -17.796     | -20.812     | -17.796                   | 27.383                    | 229.468                     | 0.277                         |
| 3200.000                | 1.121                | 221.713                   | 3199.714  | -19.242     | -22.231     | -19.242                   | 29.402                    | 229.121                     | 0.135                         |
| 3300.000                | 1.134                | 209.897                   | 3299.694  | -20.830     | -23.375     | -20.830                   | 31.309                    | 228.295                     | 0.232                         |
| 3400.000                | 1.301                | 221.553                   | 3399.672  | -22.537     | -24.621     | -22.537                   | 33.378                    | 227.530                     | 0.298                         |
| 3500.000                | 1.399                | 202.577                   | 3499.645  | -24.513     | -25.842     | -24.513                   | 35.619                    | 226.512                     | 0.455                         |
| 3600.000                | 1.282                | 215.155                   | 3599.618  | -26.555     | -26.955     | -26.555                   | 37.838                    | 225.428                     | 0.316                         |
| 3700.000                | 1.349                | 216.879                   | 3699.591  | -28.411     | -28.305     | -28.411                   | 40.105                    | 224.893                     | 0.078                         |
| 3800.000                | 1.095                | 233.157                   | 3799.569  | -29.926     | -29.777     | -29.926                   | 42.216                    | 224.857                     | 0.428                         |
| 3900.000                | 0.933                | 237.234                   | 3899.553  | -30.939     | -31.226     | -30.939                   | 43.958                    | 225.264                     | 0.177                         |
| 4000.000                | 0.702                | 209.324                   | 3999.543  | -31.914     | -32.210     | -31.914                   | 45.343                    | 225.265                     | 0.453                         |
| 4100.000                | 0.733                | 237.301                   | 4099.536  | -32.794     | -33.048     | -32.794                   | 46.558                    | 225.222                     | 0.348                         |
| 4200.000                | 1.048                | 223.342                   | 4199.523  | -33.804     | -34.214     | -33.804                   | 48.097                    | 225.345                     | 0.381                         |
| 4300.000                | 1.208                | 236.882                   | 4299.504  | -35.045     | -35.725     | -35.045                   | 50.044                    | 225.550                     | 0.309                         |
| 4400.000                | 1.336                | 238.407                   | 4399.480  | -36.232     | -37.600     | -36.232                   | 52.216                    | 226.062                     | 0.133                         |
| 4500.000                | 1.160                | 240.723                   | 4499.456  | -37.337     | -39.476     | -37.337                   | 54.336                    | 226.595                     | 0.183                         |
| 4600.000                | 0.947                | 246.101                   | 4599.439  | -38.167     | -41.114     | -38.167                   | 56.099                    | 227.129                     | 0.234                         |
| 4700.000                | 0.871                | 244.476                   | 4699.426  | -38.829     | -42.556     | -38.829                   | 57.608                    | 227.621                     | 0.080                         |
| 4800.000                | 0.934                | 243.551                   | 4799.414  | -39.520     | -43.971     | -39.520                   | 59.121                    | 228.052                     | 0.064                         |
| 4900.000                | 0.847                | 259.815                   | 4899.402  | -40.014     | -45.428     | -40.014                   | 60.538                    | 228.626                     | 0.266                         |
| 5000.000                | 1.048                | 236.170                   | 4999.389  | -40.654     | -46.916     | -40.654                   | 62.079                    | 229.091                     | 0.435                         |
| 5100.000                | 0.929                | 244.608                   | 5099.374  | -41.511     | -48.409     | -41.511                   | 63.769                    | 229.387                     | 0.188                         |
| 5200.000                | 0.834                | 270.712                   | 5199.362  | -41.849     | -49.869     | -41.849                   | 65.102                    | 229.997                     | 0.409                         |
| 5300.000                | 0.390                | 232.142                   | 5299.357  | -42.049     | -50.866     | -42.049                   | 65.996                    | 230.421                     | 0.582                         |
| 5400.000                | 0.567                | 191.939                   | 5399.353  | -42.742     | -51.237     | -42.742                   | 66.724                    | 230.165                     | 0.368                         |
| 5500.000                | 0.847                | 193.125                   | 5499.346  | -43.945     | -51.507     | -43.945                   | 67.706                    | 229.529                     | 0.280                         |
| 5600.000                | 0.724                | 228.117                   | 5599.337  | -45.087     | -52.145     | -45.087                   | 68.934                    | 229.152                     | 0.486                         |
| 5700.000                | 1.107                | 196.757                   | 5699.325  | -46.433     | -52.893     | -46.433                   | 70.383                    | 228.722                     | 0.617                         |
| 5800.000                | 0.359                | 236.072                   | 5799.316  | -47.532     | -53.432     | -47.532                   | 71.514                    | 228.344                     | 0.859                         |
| 5900.000                | 0.216                | 178.030                   | 5899.315  | -47.896     | -53.685     | -47.896                   | 71.945                    | 228.262                     | 0.306                         |

| 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 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 6000.000                | 0.155                | 264.098                   | 5999.315  | -48.098     | -53.813     | -48.098                   | 72.175                    | 228.209                     | 0.257                         |
| 6100.000                | 0.389                | 240.843                   | 6099.314  | -48.278     | -54.244     | -48.278                   | 72.616                    | 228.330                     | 0.254                         |
| 6200.000                | 0.709                | 268.168                   | 6199.309  | -48.463     | -55.158     | -48.463                   | 73.424                    | 228.697                     | 0.405                         |
| 6300.000                | 0.526                | 238.879                   | 6299.303  | -48.720     | -56.170     | -48.720                   | 74.355                    | 229.063                     | 0.359                         |
| 6400.000                | 0.788                | 259.432                   | 6399.297  | -49.083     | -57.240     | -49.083                   | 75.403                    | 229.387                     | 0.349                         |
| 6500.000                | 0.695                | 295.963                   | 6499.289  | -48.944     | -58.461     | -48.944                   | 76.244                    | 230.064                     | 0.473                         |
| 6600.000                | 0.526                | 267.943                   | 6599.283  | -48.695     | -59.465     | -48.695                   | 76.859                    | 230.687                     | 0.338                         |
| 6700.000                | 0.776                | 306.165                   | 6699.277  | -48.312     | -60.471     | -48.312                   | 77.400                    | 231.378                     | 0.487                         |
| 6800.000                | 0.989                | 321.050                   | 6799.266  | -47.241     | -61.560     | -47.241                   | 77.597                    | 232.497                     | 0.311                         |
| 6900.000                | 0.819                | 316.202                   | 6899.253  | -46.055     | -62.596     | -46.055                   | 77.713                    | 233.657                     | 0.186                         |
| 7000.000                | 0.848                | 329.256                   | 6999.243  | -44.903     | -63.470     | -44.903                   | 77.747                    | 234.722                     | 0.192                         |
| 7100.000                | 0.714                | 344.250                   | 7099.233  | -43.667     | -64.017     | -43.667                   | 77.492                    | 235.702                     | 0.244                         |