



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Foss 10-23/05-123-23440
DECLINATION: 8.29 Degrees
TD AS DRILLED: 7188 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.50301, Longitude: -104.54329
Grid North = True North -0.62 degs (NAD 27)
Grid Convergence Applied = -0.62 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4815 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 9/11/2015 / 12:16

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | **** |
| 100.000 | 0.109 | 213.566 | 100.000 | -0.080 | -0.053 | -0.080 | 0.096 | 213.566 | 0.109 |
| 200.000 | 0.495 | 236.073 | 199.998 | -0.400 | -0.464 | -0.400 | 0.613 | 229.217 | 0.396 |
| 300.000 | 0.194 | 223.345 | 299.996 | -0.764 | -0.938 | -0.764 | 1.210 | 230.834 | 0.308 |
| 400.000 | 0.463 | 211.357 | 399.995 | -1.233 | -1.265 | -1.233 | 1.766 | 225.743 | 0.275 |
| 500.000 | 0.669 | 274.083 | 499.991 | -1.536 | -2.057 | -1.536 | 2.567 | 233.256 | 0.615 |
| 600.000 | 0.923 | 256.701 | 599.981 | -1.679 | -3.423 | -1.679 | 3.813 | 243.864 | 0.347 |
| 700.000 | 0.907 | 264.836 | 699.968 | -1.936 | -4.994 | -1.936 | 5.356 | 248.812 | 0.131 |
| 800.000 | 0.822 | 271.518 | 799.957 | -1.988 | -6.499 | -1.988 | 6.796 | 252.991 | 0.132 |
| 900.000 | 0.859 | 253.726 | 899.946 | -2.179 | -7.936 | -2.179 | 8.229 | 254.645 | 0.263 |
| 1000.000 | 0.905 | 251.565 | 999.935 | -2.639 | -9.405 | -2.639 | 9.768 | 254.326 | 0.057 |
| 1100.000 | 0.638 | 266.790 | 1099.926 | -2.920 | -10.710 | -2.920 | 11.101 | 254.750 | 0.334 |
| 1200.000 | 0.569 | 252.071 | 1199.920 | -3.104 | -11.739 | -3.104 | 12.142 | 255.189 | 0.169 |
| 1300.000 | 0.637 | 256.270 | 1299.915 | -3.389 | -12.750 | -3.389 | 13.193 | 255.117 | 0.081 |
| 1400.000 | 0.773 | 261.698 | 1399.907 | -3.618 | -13.957 | -3.618 | 14.419 | 255.469 | 0.152 |
| 1500.000 | 0.657 | 247.825 | 1499.899 | -3.932 | -15.156 | -3.932 | 15.657 | 255.457 | 0.208 |
| 1600.000 | 0.608 | 258.616 | 1599.893 | -4.253 | -16.207 | -4.253 | 16.755 | 255.297 | 0.128 |
| 1700.000 | 0.584 | 248.153 | 1699.888 | -4.547 | -17.200 | -4.547 | 17.791 | 255.192 | 0.111 |
| 1800.000 | 0.597 | 253.405 | 1799.882 | -4.886 | -18.173 | -4.886 | 18.818 | 254.952 | 0.056 |

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|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 1900.000 | 0.695 | 240.978 | 1899.876 | -5.329 | -19.203 | -5.329 | 19.929 | 254.491 | 0.170 |
| 2000.000 | 0.649 | 242.162 | 1999.869 | -5.887 | -20.234 | -5.887 | 21.073 | 253.777 | 0.048 |
| 2100.000 | 0.592 | 254.312 | 2099.863 | -6.292 | -21.232 | -6.292 | 22.145 | 253.494 | 0.143 |
| 2200.000 | 0.603 | 274.625 | 2199.858 | -6.389 | -22.254 | -6.389 | 23.153 | 253.982 | 0.211 |
| 2300.000 | 0.139 | 191.719 | 2299.856 | -6.465 | -22.803 | -6.465 | 23.702 | 254.171 | 0.602 |
| 2400.000 | 0.384 | 267.098 | 2399.855 | -6.601 | -23.163 | -6.601 | 24.085 | 254.094 | 0.374 |
| 2500.000 | 0.219 | 127.282 | 2499.855 | -6.734 | -23.346 | -6.734 | 24.298 | 253.911 | 0.570 |
| 2600.000 | 0.164 | 92.053 | 2599.854 | -6.855 | -23.051 | -6.855 | 24.048 | 253.439 | 0.127 |
| 2700.000 | 0.095 | 74.516 | 2699.854 | -6.838 | -22.828 | -6.838 | 23.830 | 253.325 | 0.079 |
| 2800.000 | 0.452 | 6.147 | 2799.853 | -6.423 | -22.706 | -6.423 | 23.597 | 254.204 | 0.426 |
| 2900.000 | 0.079 | 99.094 | 2899.852 | -6.042 | -22.595 | -6.042 | 23.389 | 255.029 | 0.463 |
| 3000.000 | 0.515 | 14.250 | 2999.850 | -5.618 | -22.416 | -5.618 | 23.110 | 255.931 | 0.514 |
| 3100.000 | 0.404 | 16.314 | 3099.847 | -4.844 | -22.207 | -4.844 | 22.729 | 257.694 | 0.112 |
| 3200.000 | 0.324 | 50.417 | 3199.845 | -4.326 | -21.890 | -4.326 | 22.313 | 258.820 | 0.226 |
| 3300.000 | 0.128 | 31.197 | 3299.844 | -4.050 | -21.614 | -4.050 | 21.990 | 259.386 | 0.208 |
| 3400.000 | 0.332 | 184.214 | 3399.844 | -4.244 | -21.578 | -4.244 | 21.991 | 258.874 | 0.450 |
| 3500.000 | 1.116 | 191.212 | 3499.835 | -5.488 | -21.788 | -5.488 | 22.469 | 255.862 | 0.788 |
| 3600.000 | 2.024 | 199.014 | 3599.796 | -8.113 | -22.553 | -8.113 | 23.968 | 250.214 | 0.931 |
| 3700.000 | 2.369 | 211.172 | 3699.723 | -11.552 | -24.198 | -11.552 | 26.814 | 244.482 | 0.578 |
| 3800.000 | 2.446 | 218.394 | 3799.635 | -14.992 | -26.593 | -14.992 | 30.528 | 240.587 | 0.313 |
| 3900.000 | 2.267 | 204.226 | 3899.552 | -18.468 | -28.730 | -18.468 | 34.154 | 237.267 | 0.608 |
| 4000.000 | 2.190 | 206.737 | 3999.476 | -21.977 | -30.401 | -21.977 | 37.513 | 234.136 | 0.124 |
| 4100.000 | 2.168 | 203.917 | 4099.404 | -25.413 | -32.027 | -25.413 | 40.884 | 231.569 | 0.109 |
| 4200.000 | 1.877 | 207.886 | 4199.341 | -28.590 | -33.560 | -28.590 | 44.087 | 229.572 | 0.323 |
| 4300.000 | 1.644 | 207.013 | 4299.294 | -31.316 | -34.978 | -31.316 | 46.948 | 228.162 | 0.235 |
| 4400.000 | 1.376 | 191.308 | 4399.260 | -33.771 | -35.865 | -33.771 | 49.262 | 226.722 | 0.490 |
| 4500.000 | 1.552 | 205.219 | 4499.227 | -36.174 | -36.677 | -36.174 | 51.514 | 225.396 | 0.395 |
| 4600.000 | 1.727 | 196.407 | 4599.187 | -38.845 | -37.680 | -38.845 | 54.117 | 224.128 | 0.307 |
| 4700.000 | 1.664 | 186.333 | 4699.143 | -41.733 | -38.266 | -41.733 | 56.621 | 222.518 | 0.304 |
| 4800.000 | 1.405 | 188.213 | 4799.107 | -44.389 | -38.601 | -44.389 | 58.825 | 221.010 | 0.264 |
| 4900.000 | 1.960 | 189.346 | 4899.064 | -47.290 | -39.054 | -47.290 | 61.331 | 219.551 | 0.556 |
| 5000.000 | 2.173 | 203.631 | 4998.999 | -50.714 | -40.091 | -50.714 | 64.647 | 218.328 | 0.555 |
| 5100.000 | 2.215 | 193.432 | 5098.926 | -54.330 | -41.300 | -54.330 | 68.245 | 217.241 | 0.392 |
| 5200.000 | 1.980 | 196.078 | 5198.859 | -57.869 | -42.227 | -57.869 | 71.638 | 216.118 | 0.254 |
| 5300.000 | 1.788 | 205.056 | 5298.805 | -60.942 | -43.366 | -60.942 | 74.796 | 215.436 | 0.351 |
| 5400.000 | 1.595 | 203.922 | 5398.762 | -63.627 | -44.591 | -63.627 | 77.696 | 215.023 | 0.196 |
| 5500.000 | 1.346 | 215.906 | 5498.729 | -65.850 | -45.844 | -65.850 | 80.237 | 214.845 | 0.394 |
| 5600.000 | 1.095 | 227.529 | 5598.706 | -67.447 | -47.238 | -67.447 | 82.344 | 215.006 | 0.352 |
| 5700.000 | 0.640 | 221.767 | 5698.695 | -68.508 | -48.314 | -68.508 | 83.831 | 215.193 | 0.463 |
| 5800.000 | 0.657 | 305.009 | 5798.690 | -68.595 | -49.156 | -68.595 | 84.390 | 215.626 | 0.862 |

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|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 5900.000 | 0.876 | 330.146 | 5898.681 | -67.603 | -50.006 | -67.603 | 84.088 | 216.490 | 0.396 |
| 6000.000 | 0.935 | 315.924 | 5998.669 | -66.354 | -50.954 | -66.354 | 83.661 | 217.521 | 0.232 |
| 6100.000 | 0.949 | 326.758 | 6098.656 | -65.076 | -51.975 | -65.076 | 83.285 | 218.614 | 0.178 |
| 6200.000 | 1.414 | 332.511 | 6198.634 | -63.289 | -52.999 | -63.289 | 82.549 | 219.943 | 0.480 |
| 6300.000 | 1.444 | 327.859 | 6298.603 | -61.127 | -54.239 | -61.127 | 81.721 | 221.583 | 0.120 |
| 6400.000 | 1.173 | 305.730 | 6398.577 | -59.463 | -55.740 | -59.463 | 81.503 | 223.149 | 0.568 |
| 6500.000 | 0.365 | 281.019 | 6498.568 | -58.804 | -56.884 | -58.804 | 81.815 | 224.049 | 0.856 |
| 6600.000 | 0.589 | 140.377 | 6598.566 | -59.139 | -56.869 | -59.139 | 82.045 | 223.879 | 0.901 |
| 6700.000 | 0.541 | 118.851 | 6698.561 | -59.762 | -56.128 | -59.762 | 81.987 | 223.204 | 0.216 |
| 6800.000 | 0.861 | 144.451 | 6798.554 | -60.601 | -55.277 | -60.601 | 82.025 | 222.369 | 0.440 |
| 6900.000 | 1.165 | 183.670 | 6898.540 | -62.227 | -54.906 | -62.227 | 82.987 | 221.423 | 0.738 |