



Company/Rig: Noble Energy/CoreTech
WELL: Jurgens 8-2
DECLINATION: 8.32
TD AS DRILLED: 6798'
COUNTY/STATE: Weld/Colorado
Latitude: 40.408, Longitude: -104.572
GRID North is 0.600 Degrees East of True North
VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB=Surface Elevation=4599'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/2/2014 / 14:29

Lat & Long Obtained By Handheld GPS At Wellhead

North Reference: Grid

Henderson, Co.

303-853-4976

Surveyor: Mark Simmons

| 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 | 0.266 | 311.234 | 100.000 | 0.153 | -0.175 | 0.153 | 0.232 | 311.234 | 0.266 |
| 200.000 | 0.119 | 81.628 | 199.999 | 0.321 | -0.247 | 0.321 | 0.405 | 322.488 | 0.355 |
| 300.000 | 0.069 | 140.061 | 299.999 | 0.290 | -0.105 | 0.290 | 0.309 | 340.061 | 0.102 |
| 400.000 | 0.006 | 21.526 | 399.999 | 0.249 | -0.065 | 0.249 | 0.257 | 345.450 | 0.072 |
| 500.000 | 0.218 | 38.641 | 499.999 | 0.403 | 0.056 | 0.403 | 0.407 | 7.943 | 0.212 |
| 600.000 | 0.148 | 108.020 | 599.999 | 0.511 | 0.298 | 0.511 | 0.592 | 30.214 | 0.216 |
| 700.000 | 0.187 | 43.610 | 699.998 | 0.590 | 0.533 | 0.590 | 0.795 | 42.121 | 0.182 |
| 800.000 | 0.052 | 337.000 | 799.998 | 0.750 | 0.628 | 0.750 | 0.978 | 39.939 | 0.173 |
| 900.000 | 0.103 | 189.966 | 899.998 | 0.703 | 0.594 | 0.703 | 0.921 | 40.212 | 0.150 |
| 1000.000 | 0.029 | 322.417 | 999.998 | 0.634 | 0.563 | 0.634 | 0.848 | 41.632 | 0.125 |
| 1100.000 | 0.240 | 163.445 | 1099.998 | 0.453 | 0.608 | 0.453 | 0.758 | 53.279 | 0.267 |
| 1200.000 | 0.279 | 197.561 | 1199.997 | 0.021 | 0.594 | 0.021 | 0.594 | 87.993 | 0.157 |
| 1300.000 | 0.267 | 192.650 | 1299.995 | -0.438 | 0.469 | -0.438 | 0.642 | 133.044 | 0.026 |
| 1400.000 | 0.200 | 107.846 | 1399.995 | -0.719 | 0.585 | -0.719 | 0.927 | 140.889 | 0.318 |
| 1500.000 | 0.235 | 135.476 | 1499.994 | -0.919 | 0.894 | -0.919 | 1.282 | 135.767 | 0.109 |
| 1600.000 | 0.172 | 97.253 | 1599.994 | -1.084 | 1.187 | -1.084 | 1.607 | 132.391 | 0.146 |
| 1700.000 | 0.208 | 130.415 | 1699.993 | -1.221 | 1.475 | -1.221 | 1.914 | 129.612 | 0.114 |
| 1800.000 | 0.289 | 180.963 | 1799.992 | -1.591 | 1.609 | -1.591 | 2.263 | 134.676 | 0.225 |
| 1900.000 | 0.592 | 223.864 | 1899.989 | -2.216 | 1.247 | -2.216 | 2.543 | 150.629 | 0.428 |

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|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 2000.000 | 0.828 | 239.184 | 1999.982 | -2.958 | 0.268 | -2.958 | 2.971 | 174.815 | 0.301 |
| 2100.000 | 0.904 | 237.914 | 2099.970 | -3.748 | -1.021 | -3.748 | 3.884 | 195.237 | 0.078 |
| 2200.000 | 0.877 | 252.711 | 2199.958 | -4.394 | -2.420 | -4.394 | 5.016 | 208.839 | 0.231 |
| 2300.000 | 0.860 | 255.210 | 2299.947 | -4.813 | -3.876 | -4.813 | 6.180 | 218.843 | 0.041 |
| 2400.000 | 1.021 | 249.846 | 2399.933 | -5.312 | -5.438 | -5.312 | 7.602 | 225.672 | 0.183 |
| 2500.000 | 0.851 | 254.672 | 2499.920 | -5.815 | -6.990 | -5.815 | 9.093 | 230.245 | 0.187 |
| 2600.000 | 0.847 | 237.984 | 2599.909 | -6.403 | -8.334 | -6.403 | 10.509 | 232.462 | 0.246 |
| 2700.000 | 0.796 | 237.512 | 2699.899 | -7.168 | -9.546 | -7.168 | 11.938 | 233.097 | 0.051 |
| 2800.000 | 0.720 | 235.291 | 2799.890 | -7.899 | -10.649 | -7.899 | 13.259 | 233.432 | 0.082 |
| 2900.000 | 0.579 | 242.787 | 2899.884 | -8.488 | -11.614 | -8.488 | 14.385 | 233.841 | 0.164 |
| 3000.000 | 0.446 | 234.883 | 2999.880 | -8.943 | -12.382 | -8.943 | 15.274 | 234.162 | 0.150 |
| 3100.000 | 0.465 | 228.237 | 3099.877 | -9.437 | -13.004 | -9.437 | 16.067 | 234.030 | 0.056 |
| 3200.000 | 0.299 | 228.190 | 3199.874 | -9.881 | -13.501 | -9.881 | 16.730 | 233.799 | 0.166 |
| 3300.000 | 0.188 | 255.758 | 3299.873 | -10.096 | -13.854 | -10.096 | 17.142 | 233.919 | 0.158 |
| 3400.000 | 0.283 | 307.461 | 3399.873 | -9.986 | -14.209 | -9.986 | 17.367 | 234.901 | 0.222 |
| 3500.000 | 0.291 | 259.671 | 3499.872 | -9.881 | -14.655 | -9.881 | 17.675 | 236.010 | 0.233 |
| 3600.000 | 0.459 | 297.852 | 3599.870 | -9.740 | -15.260 | -9.740 | 18.103 | 237.451 | 0.293 |
| 3700.000 | 0.360 | 245.622 | 3699.867 | -9.682 | -15.900 | -9.682 | 18.616 | 238.662 | 0.372 |
| 3800.000 | 0.246 | 203.677 | 3799.866 | -10.008 | -16.272 | -10.008 | 19.104 | 238.407 | 0.242 |
| 3900.000 | 0.550 | 220.054 | 3899.863 | -10.572 | -16.668 | -10.572 | 19.738 | 237.613 | 0.322 |
| 4000.000 | 0.655 | 211.579 | 3999.858 | -11.427 | -17.276 | -11.427 | 20.713 | 236.518 | 0.137 |
| 4100.000 | 0.629 | 220.497 | 4099.852 | -12.331 | -17.932 | -12.331 | 21.763 | 235.485 | 0.103 |
| 4200.000 | 0.445 | 208.634 | 4199.847 | -13.089 | -18.474 | -13.089 | 22.642 | 234.682 | 0.214 |
| 4300.000 | 0.437 | 203.135 | 4299.844 | -13.781 | -18.810 | -13.781 | 23.318 | 233.772 | 0.043 |
| 4400.000 | 0.547 | 223.493 | 4399.841 | -14.479 | -19.289 | -14.479 | 24.118 | 233.108 | 0.205 |
| 4500.000 | 0.461 | 208.278 | 4499.837 | -15.179 | -19.808 | -15.179 | 24.956 | 232.537 | 0.159 |
| 4600.000 | 0.255 | 166.403 | 4599.835 | -15.750 | -19.947 | -15.750 | 25.415 | 231.706 | 0.320 |
| 4700.000 | 0.508 | 159.553 | 4699.833 | -16.381 | -19.740 | -16.381 | 25.651 | 230.313 | 0.257 |
| 4800.000 | 0.231 | 171.149 | 4799.831 | -16.995 | -19.554 | -16.995 | 25.907 | 229.005 | 0.285 |
| 4900.000 | 0.762 | 141.339 | 4899.827 | -17.713 | -19.108 | -17.713 | 26.055 | 227.168 | 0.573 |
| 5000.000 | 0.648 | 134.627 | 4999.819 | -18.630 | -18.290 | -18.630 | 26.107 | 224.472 | 0.140 |
| 5100.000 | 0.583 | 126.598 | 5099.813 | -19.331 | -17.478 | -19.331 | 26.061 | 222.119 | 0.108 |
| 5200.000 | 0.464 | 132.402 | 5199.809 | -19.907 | -16.771 | -19.907 | 26.030 | 220.113 | 0.130 |
| 5300.000 | 0.742 | 146.066 | 5299.803 | -20.717 | -16.111 | -20.717 | 26.244 | 217.871 | 0.311 |
| 5400.000 | 0.895 | 143.719 | 5399.793 | -21.884 | -15.287 | -21.884 | 26.694 | 214.937 | 0.157 |
| 5500.000 | 1.270 | 170.333 | 5499.776 | -23.606 | -14.639 | -23.606 | 27.776 | 211.805 | 0.617 |
| 5600.000 | 1.179 | 190.228 | 5599.753 | -25.710 | -14.636 | -25.710 | 29.584 | 209.651 | 0.432 |
| 5700.000 | 0.548 | 191.346 | 5699.742 | -27.191 | -14.912 | -27.191 | 31.012 | 208.741 | 0.632 |
| 5800.000 | 0.658 | 207.883 | 5799.736 | -28.167 | -15.275 | -28.167 | 32.042 | 208.471 | 0.205 |
| 5900.000 | 0.956 | 197.762 | 5899.726 | -29.469 | -15.798 | -29.469 | 33.436 | 208.195 | 0.329 |

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|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 6000.000 | 0.877 | 191.490 | 5999.713 | -31.013 | -16.205 | -31.013 | 34.991 | 207.588 | 0.127 |
| 6100.000 | 1.005 | 230.002 | 6099.701 | -32.326 | -17.029 | -32.326 | 36.537 | 207.779 | 0.632 |
| 6200.000 | 0.766 | 234.318 | 6199.689 | -33.280 | -18.244 | -33.280 | 37.953 | 208.731 | 0.248 |
| 6300.000 | 0.704 | 254.877 | 6299.681 | -33.831 | -19.380 | -33.831 | 38.988 | 209.806 | 0.269 |
| 6400.000 | 0.786 | 241.480 | 6399.672 | -34.318 | -20.575 | -34.318 | 40.013 | 210.945 | 0.192 |
| 6500.000 | 0.766 | 253.692 | 6499.663 | -34.833 | -21.819 | -34.833 | 41.102 | 212.063 | 0.166 |
| 6600.000 | 0.415 | 262.638 | 6599.658 | -35.067 | -22.819 | -35.067 | 41.838 | 213.054 | 0.362 |
| 6700.000 | 0.522 | 325.261 | 6699.655 | -34.739 | -23.438 | -34.739 | 41.906 | 214.007 | 0.496 |