

Company: Noble Energy

Lease/Well: UPRC / 23-13 I7

API: 05-123-18309

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld

Latitude: 40.296, Longitude: -104.865

GRID North is 0.410 Degrees East of True North

VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01_ed.ut

Minimum Curvature Method

Report Date/Time: 9/26/2012 / 19:48

Vaughn Energy Services

Henderson Colorado

866-835-8333

Norman Cowan

| 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 | 0.433 | 181.739 | 99.999 | -0.378 | -0.011 | -0.378 | 0.378 | 181.739 | 0.433 |
| 200.000 | 0.131 | 129.540 | 199.998 | -0.828 | 0.065 | -0.828 | 0.831 | 175.502 | 0.368 |
| 300.000 | 0.313 | 219.605 | 299.997 | -1.111 | -0.021 | -1.111 | 1.111 | 181.065 | 0.339 |
| 400.000 | 0.091 | 316.196 | 399.997 | -1.264 | -0.250 | -1.264 | 1.288 | 191.176 | 0.335 |
| 500.000 | 0.923 | 94.859 | 499.993 | -1.274 | 0.498 | -1.274 | 1.368 | 158.668 | 0.993 |
| 600.000 | 1.875 | 108.139 | 599.962 | -1.852 | 2.854 | -1.852 | 3.402 | 122.972 | 0.999 |
| 700.000 | 2.619 | 123.215 | 699.885 | -3.612 | 6.320 | -3.612 | 7.280 | 119.751 | 0.944 |
| 800.000 | 3.640 | 125.601 | 799.735 | -6.712 | 10.813 | -6.712 | 12.726 | 121.829 | 1.029 |
| 900.000 | 4.634 | 124.247 | 899.473 | -10.833 | 16.733 | -10.833 | 19.933 | 122.919 | 0.999 |
| 1000.000 | 6.103 | 128.126 | 999.032 | -16.388 | 24.254 | -16.388 | 29.271 | 124.047 | 1.512 |
| 1100.000 | 7.819 | 124.786 | 1098.292 | -23.551 | 34.023 | -23.551 | 41.379 | 124.692 | 1.763 |
| 1200.000 | 8.121 | 127.110 | 1197.326 | -31.694 | 45.242 | -31.694 | 55.239 | 125.013 | 0.441 |
| 1300.000 | 8.258 | 127.809 | 1296.306 | -40.358 | 56.549 | -40.358 | 69.474 | 125.515 | 0.170 |
| 1400.000 | 7.096 | 124.598 | 1395.408 | -48.268 | 67.308 | -48.268 | 82.826 | 125.645 | 1.239 |
| 1500.000 | 6.047 | 126.764 | 1494.750 | -54.928 | 76.612 | -54.928 | 94.268 | 125.639 | 1.078 |
| 1600.000 | 5.808 | 126.367 | 1594.216 | -61.081 | 84.906 | -61.081 | 104.594 | 125.731 | 0.242 |
| 1700.000 | 5.271 | 129.952 | 1693.748 | -67.031 | 92.501 | -67.031 | 114.235 | 125.929 | 0.639 |
| 1800.000 | 4.910 | 134.533 | 1793.354 | -72.982 | 99.074 | -72.982 | 123.053 | 126.377 | 0.543 |
| 1900.000 | 4.797 | 145.261 | 1892.998 | -79.419 | 104.507 | -79.419 | 131.260 | 127.233 | 0.913 |
| 2000.000 | 4.356 | 154.289 | 1992.680 | -86.277 | 108.537 | -86.277 | 138.651 | 128.481 | 0.843 |
| 2100.000 | 3.909 | 159.889 | 2092.420 | -92.899 | 111.357 | -92.899 | 145.019 | 129.836 | 0.602 |
| 2200.000 | 3.589 | 163.711 | 2192.206 | -99.104 | 113.406 | -99.104 | 150.607 | 131.150 | 0.405 |
| 2300.000 | 3.354 | 169.699 | 2292.023 | -104.986 | 114.807 | -104.986 | 155.573 | 132.441 | 0.432 |
| 2400.000 | 2.576 | 188.121 | 2391.891 | -110.089 | 115.013 | -110.089 | 159.209 | 133.747 | 1.220 |
| 2500.000 | 2.456 | 198.935 | 2491.795 | -114.340 | 114.000 | -114.340 | 161.461 | 135.085 | 0.489 |
| 2600.000 | 2.618 | 195.991 | 2591.697 | -118.562 | 112.676 | -118.562 | 163.563 | 136.458 | 0.208 |
| 2700.000 | 2.553 | 194.518 | 2691.595 | -122.913 | 111.489 | -122.913 | 165.944 | 137.790 | 0.093 |
| 2800.000 | 2.623 | 196.988 | 2791.493 | -127.258 | 110.262 | -127.258 | 168.381 | 139.093 | 0.132 |
| 2900.000 | 2.370 | 198.712 | 2891.398 | -131.405 | 108.930 | -131.405 | 170.684 | 140.343 | 0.264 |
| 3000.000 | 2.378 | 208.495 | 2991.313 | -135.187 | 107.277 | -135.187 | 172.580 | 141.566 | 0.405 |
| 3100.000 | 2.315 | 216.372 | 3091.229 | -138.636 | 105.089 | -138.636 | 173.965 | 142.837 | 0.328 |
| 3200.000 | 2.312 | 238.051 | 3191.149 | -141.330 | 102.180 | -141.330 | 174.399 | 144.134 | 0.870 |
| 3300.000 | 2.317 | 241.261 | 3291.068 | -143.369 | 98.696 | -143.369 | 174.056 | 145.456 | 0.130 |
| 3400.000 | 2.327 | 255.273 | 3390.987 | -144.857 | 94.960 | -144.857 | 173.208 | 146.754 | 0.566 |

| 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 |
|--|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 3500.000 | 2.349 | 265.179 | 3490.904 | -145.546 | 90.954 | -145.546 | 171.628 | 147.998 | 0.404 |
| 3600.000 | 2.886 | 272.849 | 3590.799 | -145.593 | 86.397 | -145.593 | 169.298 | 149.314 | 0.640 |
| 3700.000 | 2.926 | 276.105 | 3690.671 | -145.196 | 81.345 | -145.196 | 166.430 | 150.741 | 0.170 |
| 3800.000 | 4.177 | 236.433 | 3790.491 | -146.939 | 75.772 | -146.939 | 165.325 | 152.721 | 2.681 |
| 3900.000 | 6.723 | 205.400 | 3890.051 | -154.242 | 70.225 | -154.242 | 169.476 | 155.521 | 3.808 |
| 4000.000 | 7.663 | 187.728 | 3989.275 | -166.139 | 66.817 | -166.139 | 179.071 | 158.091 | 2.392 |
| 4100.000 | 9.472 | 183.375 | 4088.156 | -180.961 | 65.436 | -180.961 | 192.429 | 160.120 | 1.920 |
| 4200.000 | 10.832 | 190.935 | 4186.593 | -198.403 | 63.169 | -198.403 | 208.216 | 162.339 | 1.901 |
| 4300.000 | 12.511 | 188.476 | 4284.522 | -218.344 | 59.789 | -218.344 | 226.382 | 164.686 | 1.750 |
| 4400.000 | 15.052 | 184.665 | 4381.637 | -242.002 | 57.136 | -242.002 | 248.656 | 166.716 | 2.697 |
| 4500.000 | 17.209 | 186.143 | 4477.695 | -269.655 | 54.497 | -269.655 | 275.107 | 168.574 | 2.196 |
| 4600.000 | 19.456 | 185.859 | 4572.614 | -300.935 | 51.213 | -300.935 | 305.262 | 170.342 | 2.249 |
| 4700.000 | 22.714 | 184.626 | 4665.906 | -336.756 | 47.955 | -336.756 | 340.153 | 171.895 | 3.287 |
| 4800.000 | 25.080 | 182.383 | 4757.329 | -377.182 | 45.517 | -377.182 | 379.918 | 173.119 | 2.535 |
| 4900.000 | 24.204 | 179.506 | 4848.225 | -418.858 | 44.812 | -418.858 | 421.248 | 173.893 | 1.486 |
| 5000.000 | 23.182 | 175.931 | 4939.800 | -458.992 | 46.386 | -458.992 | 461.330 | 174.229 | 1.762 |
| 5100.000 | 21.374 | 174.582 | 5032.332 | -496.770 | 49.503 | -496.770 | 499.230 | 174.309 | 1.878 |
| 5200.000 | 20.926 | 172.257 | 5125.598 | -532.607 | 53.629 | -532.607 | 535.300 | 174.250 | 0.951 |
| 5300.000 | 21.868 | 170.179 | 5218.706 | -568.654 | 59.212 | -568.654 | 571.729 | 174.055 | 1.209 |
| 5400.000 | 20.903 | 166.987 | 5311.823 | -604.388 | 66.406 | -604.388 | 608.025 | 173.730 | 1.512 |
| 5500.000 | 21.740 | 168.209 | 5404.978 | -639.899 | 74.208 | -639.899 | 644.187 | 173.385 | 0.948 |
| 5600.000 | 22.085 | 167.596 | 5497.753 | -676.389 | 82.030 | -676.389 | 681.345 | 173.085 | 0.414 |
| 5700.000 | 21.753 | 170.334 | 5590.526 | -713.018 | 89.180 | -713.018 | 718.573 | 172.871 | 1.075 |
| 5800.000 | 22.362 | 171.912 | 5683.208 | -750.119 | 94.968 | -750.119 | 756.107 | 172.785 | 0.850 |
| 5900.000 | 21.922 | 175.104 | 5775.836 | -787.553 | 99.238 | -787.553 | 793.781 | 172.818 | 1.281 |
| 6000.000 | 21.972 | 177.629 | 5868.591 | -824.845 | 101.605 | -824.845 | 831.079 | 172.978 | 0.945 |
| 6100.000 | 20.189 | 180.121 | 5961.897 | -860.795 | 102.342 | -860.795 | 866.858 | 173.220 | 1.995 |
| 6200.000 | 21.394 | 180.987 | 6055.384 | -896.289 | 101.991 | -896.289 | 902.073 | 173.508 | 1.244 |
| 6300.000 | 23.224 | 181.805 | 6147.895 | -934.235 | 101.056 | -934.235 | 939.685 | 173.826 | 1.856 |
| 6400.000 | 24.759 | 181.877 | 6239.252 | -974.873 | 99.749 | -974.873 | 979.963 | 174.158 | 1.535 |
| 6500.000 | 25.220 | 182.637 | 6329.891 | -1017.08 | 98.083 | -1017.08 | 1021.803 | 174.492 | 0.562 |
| 6600.000 | 22.225 | 185.333 | 6421.434 | -1057.21 | 95.345 | -1057.21 | 1061.499 | 174.847 | 3.184 |
| 6700.000 | 18.325 | 185.116 | 6515.219 | -1091.71 | 92.184 | -1091.71 | 1095.595 | 175.173 | 3.901 |
| 6800.000 | 13.334 | 187.848 | 6611.398 | -1118.81 | 89.206 | -1118.81 | 1122.360 | 175.441 | 5.046 |
| 6900.000 | 8.816 | 188.783 | 6709.510 | -1137.81 | 86.460 | -1137.81 | 1141.095 | 175.655 | 4.521 |
| 7000.000 | 6.172 | 182.526 | 6808.649 | -1150.76 | 85.052 | -1150.76 | 1153.900 | 175.773 | 2.763 |
| 7100.000 | 4.054 | 209.281 | 6908.259 | -1159.22 | 83.086 | -1159.22 | 1162.190 | 175.900 | 3.136 |
| 7200.000 | 3.266 | 213.371 | 7008.054 | -1164.68 | 79.790 | -1164.68 | 1167.409 | 176.081 | 0.829 |
| 7300.000 | 1.822 | 172.914 | 7107.960 | -1168.64 | 78.419 | -1168.64 | 1171.265 | 176.161 | 2.221 |
| 7400.000 | 1.327 | 189.084 | 7207.923 | -1171.36 | 78.432 | -1171.36 | 1173.980 | 176.169 | 0.661 |
| 7450.000 | 1.297 | 239.416 | 7257.911 | -1172.22 | 77.854 | -1172.22 | 1174.800 | 176.200 | 2.232 |
| HORIZONTAL DISPLACEMENT IS 1174.800 FEET AT 176.200 DEGREES | | | | | | | | | |