



Company: Anadarko
 Lease/Well: Nelson Harold/Unit A 1
 API: 05-123-07947
 Rig Name: Production/Warrior
 State/County: Colorado/Weld County
 Latitude: 40.185, Longitude: -104.928
 Directions are relative to True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: eline-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 2/18/2014 / 15:52

VAUGHN ENERGY SERVICES
 DICKINSON, NORTH DAKOTA
 701-483-0674
 SURVEYOR: DUSTIN CRANE

| 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 | 0.233 | 257.121 | 100.000 | -0.045 | -0.198 | -0.045 | 0.203 | 257.121 | 0.233 |
| 200.000 | 0.213 | 246.426 | 199.999 | -0.165 | -0.567 | -0.165 | 0.590 | 253.768 | 0.046 |
| 300.000 | 0.450 | 231.903 | 299.997 | -0.481 | -1.046 | -0.481 | 1.151 | 245.282 | 0.249 |
| 400.000 | 0.702 | 181.851 | 399.993 | -1.335 | -1.374 | -1.335 | 1.916 | 225.822 | 0.538 |
| 500.000 | 0.429 | 195.389 | 499.988 | -2.308 | -1.493 | -2.308 | 2.749 | 212.902 | 0.302 |
| 600.000 | 0.316 | 201.728 | 599.986 | -2.926 | -1.695 | -2.926 | 3.381 | 210.086 | 0.120 |
| 700.000 | 0.595 | 230.485 | 699.983 | -3.512 | -2.197 | -3.512 | 4.143 | 212.033 | 0.352 |
| 800.000 | 0.850 | 223.446 | 799.974 | -4.380 | -3.108 | -4.380 | 5.371 | 215.353 | 0.270 |
| 900.000 | 0.476 | 198.617 | 899.968 | -5.312 | -3.750 | -5.312 | 6.503 | 215.220 | 0.463 |
| 1000.000 | 0.606 | 230.266 | 999.964 | -6.044 | -4.289 | -6.044 | 7.411 | 215.364 | 0.320 |
| 1100.000 | 0.747 | 240.451 | 1099.957 | -6.703 | -5.263 | -6.703 | 8.522 | 218.137 | 0.185 |
| 1200.000 | 1.088 | 249.986 | 1199.944 | -7.349 | -6.722 | -7.349 | 9.960 | 222.446 | 0.372 |
| 1300.000 | 1.206 | 254.001 | 1299.924 | -7.964 | -8.625 | -7.964 | 11.740 | 227.282 | 0.143 |
| 1400.000 | 1.222 | 252.362 | 1399.901 | -8.577 | -10.653 | -8.577 | 13.677 | 231.160 | 0.038 |
| 1500.000 | 1.266 | 260.615 | 1499.878 | -9.081 | -12.759 | -9.081 | 15.661 | 234.561 | 0.184 |
| 1600.000 | 1.180 | 262.191 | 1599.855 | -9.401 | -14.869 | -9.401 | 17.592 | 237.698 | 0.093 |
| 1700.000 | 1.102 | 270.232 | 1699.835 | -9.537 | -16.850 | -9.537 | 19.362 | 240.492 | 0.178 |
| 1800.000 | 1.015 | 270.767 | 1799.818 | -9.521 | -18.698 | -9.521 | 20.982 | 243.015 | 0.087 |
| 1900.000 | 0.743 | 285.254 | 1899.806 | -9.339 | -20.209 | -9.339 | 22.263 | 245.199 | 0.350 |
| 2000.000 | 0.684 | 271.291 | 1999.799 | -9.155 | -21.432 | -9.155 | 23.305 | 246.870 | 0.183 |
| 2100.000 | 0.499 | 262.340 | 2099.793 | -9.199 | -22.460 | -9.199 | 24.271 | 247.727 | 0.207 |
| 2200.000 | 0.457 | 220.506 | 2199.790 | -9.560 | -23.151 | -9.560 | 25.047 | 247.562 | 0.344 |
| 2300.000 | 0.146 | 240.188 | 2299.789 | -9.926 | -23.520 | -9.926 | 25.529 | 247.118 | 0.323 |
| 2400.000 | 0.481 | 279.367 | 2399.787 | -9.922 | -24.045 | -9.922 | 26.012 | 247.577 | 0.379 |
| 2500.000 | 0.264 | 237.121 | 2499.785 | -9.979 | -24.653 | -9.979 | 26.596 | 247.963 | 0.336 |
| 2600.000 | 0.309 | 271.216 | 2599.784 | -10.098 | -25.116 | -10.098 | 27.070 | 248.097 | 0.173 |
| 2700.000 | 0.761 | 241.100 | 2699.779 | -10.414 | -25.967 | -10.414 | 27.977 | 248.147 | 0.518 |
| 2800.000 | 0.400 | 266.095 | 2799.774 | -10.759 | -26.897 | -10.759 | 28.969 | 248.199 | 0.433 |
| 2900.000 | 0.785 | 249.576 | 2899.769 | -11.021 | -27.887 | -11.021 | 29.986 | 248.435 | 0.417 |
| 3000.000 | 0.437 | 234.110 | 2999.763 | -11.484 | -28.838 | -11.484 | 31.040 | 248.286 | 0.382 |
| 3100.000 | 0.233 | 257.476 | 3099.761 | -11.752 | -29.345 | -11.752 | 31.611 | 248.176 | 0.242 |
| 3200.000 | 0.179 | 277.806 | 3199.761 | -11.775 | -29.698 | -11.775 | 31.947 | 248.373 | 0.090 |
| 3300.000 | 0.245 | 297.308 | 3299.760 | -11.655 | -30.042 | -11.655 | 32.224 | 248.795 | 0.097 |
| 3400.000 | 0.192 | 245.053 | 3399.759 | -11.628 | -30.384 | -11.628 | 32.533 | 249.058 | 0.198 |

| 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 | 0.190 | 238.824 | 3499.759 | -11.785 | -30.678 | -11.785 | 32.863 | 248.986 | 0.021 |
| 3600.000 | 0.242 | 271.413 | 3599.758 | -11.865 | -31.030 | -11.865 | 33.221 | 249.074 | 0.131 |
| 3700.000 | 0.324 | 214.802 | 3699.757 | -12.092 | -31.402 | -12.092 | 33.650 | 248.940 | 0.278 |
| 3800.000 | 0.316 | 204.989 | 3799.756 | -12.575 | -31.680 | -12.575 | 34.085 | 248.351 | 0.055 |
| 3900.000 | 0.174 | 301.420 | 3899.755 | -12.745 | -31.926 | -12.745 | 34.376 | 248.237 | 0.378 |
| 4000.000 | 0.246 | 301.679 | 3999.754 | -12.554 | -32.239 | -12.554 | 34.597 | 248.724 | 0.072 |
| 4100.000 | 0.357 | 10.347 | 4099.753 | -12.134 | -32.365 | -12.134 | 34.565 | 249.448 | 0.352 |
| 4200.000 | 0.335 | 14.145 | 4199.751 | -11.544 | -32.238 | -11.544 | 34.243 | 250.298 | 0.032 |
| 4300.000 | 0.435 | 340.582 | 4299.749 | -10.904 | -32.293 | -10.904 | 34.084 | 251.343 | 0.242 |
| 4400.000 | 0.262 | 199.398 | 4399.748 | -10.761 | -32.495 | -10.761 | 34.230 | 251.677 | 0.659 |
| 4500.000 | 0.419 | 151.134 | 4499.747 | -11.297 | -32.394 | -11.297 | 34.308 | 250.775 | 0.313 |
| 4600.000 | 0.911 | 213.646 | 4599.741 | -12.279 | -32.658 | -12.279 | 34.890 | 249.395 | 0.808 |
| 4700.000 | 0.747 | 212.489 | 4699.730 | -13.491 | -33.449 | -13.491 | 36.067 | 248.035 | 0.164 |
| 4800.000 | 0.690 | 186.357 | 4799.723 | -14.640 | -33.866 | -14.640 | 36.895 | 246.622 | 0.330 |
| 4900.000 | 0.553 | 190.483 | 4899.717 | -15.713 | -34.021 | -15.713 | 37.474 | 245.209 | 0.144 |
| 5000.000 | 0.682 | 184.376 | 4999.711 | -16.781 | -34.154 | -16.781 | 38.053 | 243.834 | 0.144 |
| 5100.000 | 0.551 | 212.000 | 5099.705 | -17.781 | -34.454 | -17.781 | 38.772 | 242.702 | 0.321 |
| 5200.000 | 0.598 | 214.115 | 5199.700 | -18.621 | -35.001 | -18.621 | 39.646 | 241.986 | 0.052 |
| 5300.000 | 0.539 | 243.396 | 5299.696 | -19.264 | -35.714 | -19.264 | 40.578 | 241.658 | 0.293 |
| 5400.000 | 0.526 | 256.678 | 5399.691 | -19.580 | -36.581 | -19.580 | 41.492 | 241.842 | 0.124 |
| 5500.000 | 0.670 | 315.610 | 5499.687 | -19.268 | -37.437 | -19.268 | 42.104 | 242.766 | 0.601 |
| 5600.000 | 1.212 | 323.676 | 5599.673 | -17.998 | -38.472 | -17.998 | 42.474 | 244.929 | 0.557 |
| 5700.000 | 1.606 | 315.574 | 5699.642 | -16.145 | -40.080 | -16.145 | 43.210 | 248.060 | 0.441 |
| 5800.000 | 1.169 | 335.868 | 5799.613 | -14.213 | -41.478 | -14.213 | 43.846 | 251.086 | 0.651 |
| 5900.000 | 0.927 | 349.317 | 5899.597 | -12.487 | -42.046 | -12.487 | 43.861 | 253.460 | 0.344 |
| 6000.000 | 0.740 | 359.927 | 5999.586 | -11.046 | -42.196 | -11.046 | 43.618 | 255.330 | 0.242 |
| 6100.000 | 0.937 | 18.592 | 6099.576 | -9.626 | -41.936 | -9.626 | 43.027 | 257.073 | 0.334 |
| 6200.000 | 1.030 | 10.282 | 6199.561 | -7.966 | -41.515 | -7.966 | 42.273 | 259.138 | 0.170 |
| 6300.000 | 0.879 | 358.789 | 6299.547 | -6.315 | -41.371 | -6.315 | 41.850 | 261.321 | 0.244 |
| 6400.000 | 0.828 | 23.927 | 6399.536 | -4.888 | -41.094 | -4.888 | 41.384 | 263.217 | 0.375 |
| 6500.000 | 0.253 | 5.595 | 6499.532 | -4.008 | -40.780 | -4.008 | 40.976 | 264.387 | 0.593 |
| 6600.000 | 0.725 | 357.298 | 6599.528 | -3.156 | -40.788 | -3.156 | 40.910 | 265.575 | 0.476 |
| 6700.000 | 0.188 | 49.056 | 6699.524 | -2.416 | -40.694 | -2.416 | 40.765 | 266.602 | 0.626 |
| 6800.000 | 0.152 | 31.260 | 6799.524 | -2.195 | -40.500 | -2.195 | 40.560 | 266.898 | 0.064 |
| 6900.000 | 0.689 | 355.291 | 6899.521 | -1.482 | -40.481 | -1.482 | 40.508 | 267.903 | 0.573 |
| 7000.000 | 0.827 | 11.714 | 6999.512 | -0.176 | -40.384 | -0.176 | 40.384 | 269.750 | 0.256 |
| 7100.000 | 0.752 | 23.710 | 7099.503 | 1.130 | -39.973 | 1.130 | 39.989 | 271.620 | 0.181 |
| 7200.000 | 0.662 | 36.436 | 7199.495 | 2.195 | -39.367 | 2.195 | 39.428 | 273.192 | 0.180 |
| 7300.000 | 0.781 | 25.432 | 7299.488 | 3.275 | -38.731 | 3.275 | 38.870 | 274.833 | 0.182 |
| 7400.000 | 0.757 | 36.404 | 7399.479 | 4.422 | -38.047 | 4.422 | 38.303 | 276.630 | 0.149 |
| 7500.000 | 0.785 | 56.784 | 7499.470 | 5.329 | -37.082 | 5.329 | 37.462 | 278.178 | 0.274 |
| 7560.000 | 0.598 | 52.777 | 7559.465 | 5.743 | -36.489 | 5.743 | 36.938 | 278.945 | 0.322 |

HORIZONTAL DISPLACEMENT IS
36.938 FEET AT 278.945 DEGREES