

### Particle-fiber Conversion Issues

The impossibility of estimating asbestos fiber exposures and the irrelevance of particle counts to toxicity has long been known to QAMA. In 1953, the QAMA minutes noted, "The industrial hygiene surveys that have been made in the past, and in which only dust particles were measured, are practically without value." (1953)

QAMA waited 20 years to change to membrane filter measurement after obtaining this information. The QAMA-McGill researchers were left with particle counts, but if the particle counts could not be correlated with fiber counts or were inversely related to fiber levels, then the particle counts were useless as indices of exposure to determine asbestos toxicity. Gibbs and LaChance tested this hypothesis by performing eighty-seven matched pairs of tests utilizing light microscopy and membrane filters to count fibers and comparing these with midget impinger particle counts. (Gibbs and LaChance 1974) They found that overall the relationship between particle counts and fiber counts were 13% better than random number generation. Incredibly, for low fiber count exposures, the particle counts were inversely related to fiber exposures. This inverse relationship occurred in more than one third of the samples (31 out of 87). Therefore, for at least one third of the particle counts, the worker fiber exposures correlated as follows: the higher the count, the lower the worker's exposure to asbestos.

"For thirty-one samples with less than one fiber per field, the linear correlation was very close to zero, - 0.03, and the correlation of log rhythmically transformed data was 0.25. However, these correlations suggest that for all mines the regression lines are unsatisfactory for the prediction of fiber counts from impinger counts, as the improvement and prediction for the best correlation, 0.45, is only 13% better than a