

The **Forest Industry Health Research Program (FIHRP)** has completed a feasibility study of a statistically-based exposure assessment strategy, which included an investigation of chlorine dioxide and carbon monoxide levels in a kraft mill bleach plant. A report is now available titled **"Evaluating an Exposure Assessment Strategy: Chlorine Dioxide and Carbon Monoxide in a Kraft Mill Bleach Plant"**. To request a copy, contact **Agi Lee** at the Pulp and Paper Employee Relations Forum at (604) 777-1533, send a fax to (604) 777-1567 or email alee@paperforum.com. Non-members of the Forum may be charged for the reports.

This study had two primary objectives: (1) to investigate the effectiveness of a statistically-based exposure assessment strategy in a pulp mill setting; and (2) to use the evaluation process to perform an exposure assessment on 2 common pulp mills gases.

The strategy being reviewed was based on the 1991 American Industrial Hygiene Association book by Hawkins, Norwood and Rock. It is a multi-phase approach which results in a comprehensive analysis of occupational exposures throughout a work site. In the feasibility study only two groups of workers (the bleach plant operators, and the bleach plant maintenance crew), and two potential exposures (chlorine dioxide and carbon monoxide), were investigated.

The assessment was based on long-term and short-term personal samples from both groups over a six month period during the spring and summer of 1995. Shifts were chosen at random for sampling. A total of 48 shifts were eventually sampled from the bleach plant operators group, and 17 from the maintenance crew. The sampling devices selected for the exposure assessment were easy to use passive monitoring devices, and were self-administered by the participants.

Full-shift personal exposure data collected for chlorine dioxide revealed very low exposure levels. Only 7 samples out of 446 were above the limit of detection, and these were in the range of 0.01 ppm to 0.2 ppm. Short-term exposure monitoring data for chlorine dioxide confirmed the low background levels. However, for some job-titles sampled, there were short-term exposure peaks during shifts lasting on average 21 minutes, and which had concentrations ranging from 0.2 ppm to 8.8 ppm.

The personal exposure monitoring data for carbon monoxide had many more samples above the limit of detection, and was analyzed statistically to illustrate Hawkins' methodology. It was shown that even though some individual samples exceeded regulatory limits, and therefore may have been non-compliant using a "worst-case" testing criteria, the long-term average exposure for both groups was a small fraction of the limit (4.2 ppm and 1.9 ppm for the maintenance and operations crews, respectively) and was acceptable from a toxicological point of view.

Overall the study was successful in demonstrating the feasibility of implementing a large scale random-sample exposure assessment. Participation was excellent, and useful exposure data was collected for both contaminants, permitting an illustration of Hawkins' statistical strategy.

EXPOSURE ASSESSMENT STRATEGY EVALUATION

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