

## CARBON MONOXIDE

## FOREST INDUSTRY HEALTH RESEARCH PROGRAM

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The **Forest Industry Health Research Program (FIHRP)** has completed a study of sources and concentrations of carbon monoxide in mill working areas. The report, which is now available to members, is titled “**Carbon Monoxide Emissions from Pulp Processes**”. To request a copy, phone **Agi Lee** at the Pulp and Paper Forum at (604) 777-1533, fax (604) 777-1567, or e-mail [alee@paperforum.com](mailto:alee@paperforum.com). Non-members of the Forum may be charged for the report.

Sixty-nine sites at four BC pulp mills were surveyed in the fall of 1999 for carbon monoxide (CO) emissions using direct-reading, passive badges. Sixteen of the sites were selected at two mills for measurement of CO concentrations using data logging monitors.

Combustion processes, such as vehicle engines and power boilers, are generally known as sources of CO. However, emissions of CO from oxidation processes in pulp mills is less well known. This study focused mainly on processes involving oxidizing agents, such as ClO<sub>2</sub> bleaching, O<sub>2</sub> delignification, and peroxide bleaching. Results of this study showed that CO is emitted from these sources.

One mill carried out a comprehensive survey of processes involving oxidative reactions. Relatively high peak and average CO concentrations were measured at some sites, but none of the measurements exceeded the WCB exposure limits of 25 or 12.5 ppm averaged over an 8-hour or 12-hour shift, respectively, or 100 ppm averaged over 15 minutes.

The highest average concentration was 11 ppm at the top of a peroxide bleaching tower. The highest peak value was 81 ppm at an O<sub>2</sub> delignification blow tube, however, the average concentration at this site was only 1 ppm and the maximum 15-minute value was 12 ppm. Feed lines for peroxide bleaching and O<sub>2</sub> delignification in basements gave average concentrations of 4 to 6 ppm.

On the operating floor, CO levels at washer hoods after addition of ClO<sub>2</sub> or O<sub>2</sub> averaged 2 ppm with little variation in the concentration. The bleach blend tank was identified at one mill as a source of CO into an indoor area. CO concentrations of 50 to 60 ppm were measured in the vent gases. At 3 m from the vent, the CO level was 3 ppm which indicates rapid dispersion of the gases.

During a shutdown at one mill, CO concentrations up to 64 ppm were measured inside a decker hood. This illustrates the importance of measuring CO before workers enter confined or enclosed spaces.