

VOLATILE ORGANIC COMPOUNDS AND DUST IN TMP MILLS

FOREST INDUSTRY HEALTH RESEARCH PROGRAM

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The *Forest Industry Health Research Program (FIHRP)* has completed a study on the presence of volatile organic compounds and wood dust in TMP mills. A report is now available to members titled "**Assessment of Volatile Organic Compounds and Wood Dust in Thermomechanical Pulp Mills**". To request a copy, phone **Agi Lee** at the Pulp and Paper 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.

In a recent study of one interior and one coastal mill, volatile organic compounds were identified and quantified, and wood dust exposure was measured in select areas. The interior mill used spruce, pine and fir (SPF) in the ratio of 45:35:20, while the coastal mill processed 70% hemlock and balsam (Hembal) and 30% SPF.

The results showed that for both mills, the only organic compounds detected were terpenes. These included α -pinene, beta-pinene, camphene, alpha-phellandrene, beta-phellandrene, 3-carene, p-cymene, terpinen-4-ol. In the coastal mill, the concentration of alpha-pinene ranged from 0.02 ppm to 1.09 ppm. The beta-pinene concentration was between <0.01 and 0.33 ppm. The total terpene concentration was between 0.04 ppm and 3.09 ppm. In the interior mill, the alpha-pinene concentrations ranged from <0.01 ppm to 3.41 ppm. The beta-pinene concentration was <0.01 ppm to 2.04 ppm. The highest concentrations for both alpha-pinene (3.41 ppm) and beta-pinene (2.04 ppm) were found on the first day of sampling at the top of the atmospheric pressure system (APS-1). For most of the samples collected, beta-phellandrene was the terpene found to be in the greatest concentration. The overall concentration range was <0.01 ppm to 14.0 ppm. The total terpene concentration was calculated to be between <0.01 ppm and 24.7 ppm.

Aldehydes were also measured in both mills. The coastal mill had formaldehyde concentrations up to 0.04 ppm. In the interior mill, formaldehyde concentration ranged from < 0.005 ppm to 0.12 ppm; acetaldehyde from 0.06 ppm to 2.0 ppm; while acrolein ranged from < 0.003 ppm to 0.27 ppm. Half of the samples collected in the interior mill had acrolein concentrations exceeding the regulatory limit.

Wood dust concentration in the chip silo of the coastal mill ranged from <0.02 mg/m³ to 0.34 mg/m³, and in the interior mill it ranged from 0.07 mg/m³ to 0.23 mg/m³.

The emissions generated during the TMP process may be due to chemical decomposition from the thermal process and the types of wood processed, and the amount of emissions seems to depend, in part, on the type of system used, i.e. atmospheric pressure system showing higher emission rates. Feasible control measures should be therefore be investigated to control airborne emissions (acrolein) from the chip washer and the atmospheric pressure system refiners.