

DIMETHYL SULFIDE AND DIMETHYL DISULFIDE

FOREST INDUSTRY HEALTH RESEARCH PROGRAM

c/o Pulp & Paper Forum
#100-620 Royal Avenue
New Westminster, BC
V3L 5A8
Telephone: (604) 777-1533
Facsimile: (604) 777-1567

The *Forest Industry Health Research Program (FIHRP)* has completed a literature review of the health effects and toxicity of dimethyl sulfide (DMS) and dimethyl disulfide (DMDS). A report is now available titled "**DMS/DMDS: Review of Health Effects**". 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.

This bulletin summarizes the findings of a recent review of the health effects of DMS and DMDS. The review looks at toxicological and epidemiological studies in humans and animals; occupational exposure to reduced sulfur gases was also considered.

DMS and DMDS are products of the kraft process. Reduced sulfur gases such as DMS and DMDS originate as digester blow and relief gases, and as recovery boiler exhaust gases.

There is little information on how the human body responds to DMS and DMDS. Inhalation is the most likely route of exposure, but the fate of DMS and DMDS once inside the body is not known.

DMS and DMDS are both mucous membrane irritants. DMDS has been shown to cause severe, and dose-dependent, skin irritation. The dermal toxicity of DMS has not been studied to date.

A study that looked at the effects of DMS and DMDS in human red blood cells found that there were significant increases in iron and the protein transferrin concentrations in the blood, while concentrations of another protein, ferritin, was low. Iron is transported from the small intestine into the blood bound to transferrin. Iron is stored in tissue bound to ferritin.

The possibility that DMS and DMDS pose a significant hazard in the workplace can only be determined by knowing their concentrations. Only three studies have provided information on their concentrations in pulp mills. These studies only measured source emissions and/or ambient air, and no personal samples were taken. As yet, there are no reliable techniques that can be used for personal air sampling.

No epidemiological studies have been conducted on the specific effects of DMS and DMDS. Studies have shown deleterious respiratory health effects among pulp mill workers, but because there was inadequate exposure information, links to DMS or DMDS exposure cannot be investigated. A complicating factor in assessing the risk associated with DMS and DMDS is that neither chemical occurs singly in the occupational setting. They are usually present along with several other sulfur gases.

The current B.C. Workers' Compensation Board Regulations do not have a permissible concentration for either DMS or DMDS. Neither substance is under review for a new exposure limit in the current round of regulation review.

In summary, there is no definitive evidence that exposure to low levels of DMS or DMDS in pulp mills is a significant health hazard to workers. The main conclusion from a Swedish consensus report for occupational standards is that "the critical effect for both sulfides is the discomfort caused by the smell". Workers should be properly protected against exposure by engineering, administrative, or personal protective equipment when working in certain high risk areas (e.g. tank cleaning).