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HEALTH EFFECTS FROM ASBESTOS*

Asbestos is a commercial, or economic, term that applies to a number of naturally occuring hydrated mineral silicates, incombustible in air, and readily separable into fibers. The minerals which form asbestos silicates can crystallize in either an asbestiform (fibrous) or a non-asbestiform (non-fibrous) formation. Asbestos minerals belong either to the serpentine group or the amphibole group. In the fibrous variety, the serpentine group consists of chrysotile, while the amphibole group includes crocidolite, amosite, anthophyllite, tremolite, and actinolite. Over 90 percent of the domestically consumed asbestos is the serpentine variety chrysotile. The fibrous amphiboles are generally used as chrysotile extenders.

Asbestos has been listed as a hazardous air pollutant under Section 112 of the Clean Air Act. Numerous studies have shown that asbestos is toxic to both man and animal, manifesting itself in the form of respiratory illness, bronchiogenic carcinoma, cancer of the pleura and peritoneum (mesothelioma) and other types of body malfunctions.

From currently available data, the different varieties of asbestos cannot be graded as to relative risk and all must be considered equally hazardous. Although several studies have indicated that different health hazards are related to different types of asbestos, epidemiologic studies do not conclusively report such differences.

Most of the information presently available on exposure to asbestos has been collected in industrial environments. In general, the exposure concentrations greatly exceed those which will be encountered by the general population, and results cannot readily be extrapolated to ambient levels. There have been, however, post-mortum studies which have shown that most urban dwellers have some form of fibrous bodies in their lungs. This raises

The question as to whether the general public [as well as persons working near occupational sources, living in the households of asbestos plant workers, or having occasional random exposures] has a significant detectable risk of malignancy or other disease because of airborne asbestos.

Epidemiologic studies have indicated neoplasms occurring for all of the above groups.

Newhouse and Thompson in a London hospital's study, have cited instances of domestic exposure, in which the only exposure was an indirect result by a family member. Studies in Hamburg, Germany [29], have cited mesotheliomas in persons living in the neighborhood of an asbestos factory, Wagner [70], in his South African study indicated mesotheliomas caused by occasional random exposures. Lieben and Pispawka [71] in a Pennsylvania study found mesotheliomas in individuals who lived or worked close to an asbestos plant.

Since the majority of present knowledge about the carcinogenic effects of asbestos is a result of retrospective epidemiological studies with their inherent inaccuracies, we have an inconclusive picture of the dose-response relationships for mesothelioma, cancer, and asbestos.

CONCLUSION

Asbestos and asbestiform materials pose a carcinogenic risk to those persons exposed to airborne fibers. There appears to be a dose-response relationship between asbestos induced neoplasms and the concentration of asbestos and the fiber characteristics, although it is difficult to quantity. Due to insufficient health studies, it is not possible to set a numerical standard for ambient levels at this time. Therefore it is recommended that all emissions resulting from the use of asbestos or asbestos containing materials be reduced to their best technologically available control levels. In those

cases where control equipment or procedures cannot be applied, the use of the materials should be reduced to an absolute minimum.

*Note: Excerpts from "Health Effects from Asbestos" by Steven P. Aust, Bureau of Air Quality Control.