

## **EXPOSURE TO AIRBORNE ASBESTOS DURING REMOVAL AND INSTALLATION OF GASKETS AND PACKINGS: A REVIEW OF PUBLISHED AND UNPUBLISHED STUDIES**

Amy K. Madl, Katherine Clark, Dennis J. Paustenbach

ChemRisk, Inc., San Francisco, California, USA

In recent years, questions have been raised about the health risks to persons who have been occupationally exposed to asbestos-containing gaskets and packing materials used in pipes, valves, and machinery (pumps, autos, etc.). Up until the late 1970s, these materials were widely used throughout industrial and maritime operations, refineries, chemical plants, naval ships, and energy plants. Seven simulation studies and four work-site industrial hygiene studies of industrial and maritime settings involving the collection of more than 300 air samples were evaluated to determine the likely airborne fiber concentrations to which a worker may have been exposed while working with encapsulated asbestos-containing gaskets and packing materials. Each study was evaluated for the representativeness of work practices, analytical methods, sample size, and potential for asbestos contamination (e.g., insulation on valves or pipes used in the study). Specific activities evaluated included the removal and installation of gaskets and packings, flange cleaning, and gasket formation. In all but one of the studies relating to the replacement of gaskets and packing using hand-held tools, the short-term average exposures were less than the current 30-min OSHA excursion limit of 1 fiber per cubic centimeter (*f/cc*) and all of the long-term average exposures were less than the current 8-h permissible exposure limit time-weighted average (PEL-TWA) of 0.1 *f/cc*. The weight of evidence indicates that the use of hand tools and hand-operated power tools to remove or install gaskets or packing as performed by pipefitters or other tradesmen in nearly all plausible situations would not have produced airborne concentrations in excess of contemporaneous regulatory levels.