1.3 Airborne Asbestos Levels in Buildings and the Potential Health Risk

Although quantitative estimates of the health risk from exposure to asbestos in buildings are not reliable, a general sense of the risk can be obtained by comparing levels of airborne asbestos measured in buildings with those observed outdoors and in asbestos workplaces. Historical workplace data will be used, since much of the evidence linking asbestos exposure with specific diseases is based on industrial exposure before 1970.

Most investigations of airborne asbestos are designed to measure prevalent concentrations, that is, air levels observed under normal conditions. Higher ("peak") levels that may result from damage to asbestos-containing materials in buildings typically are not reflected in these measurements. Figure 1 provides a graphic summary of data on prevalent concentrations of airborne asbestos in three types of settings: asbestos manufacturing or application facilities before imposition of the OSHA standard in 1972, schools where asbestos-containing materials are present, and outdoor locations in urban areas. In order to facilitate comparison, all data are expressed in nanograms per cubic meter (ng/m^3) units.* The range of values within each category reflects differences in the location and strength of asbestos sources as well as variability in asbestos measurements. Concentrations above the upper limits of these ranges may occur for short periods if, for example, manufacturing equipment malfunctions, insulating material is pierced with a sharp object, or asbestos-coated surfaces are disturbed by the impact of a projectile (for example, a ball bounced against a ceiling).

Comparing the values in Figure 1, one can see that airborne asbestos levels in buildings with asbestos-containing materials can be substantially higher than outdoor levels, but significantly lower than concentrations to which asbestos workers have been exposed. Prevalent concentrations of airborne asbestos found in a sample of schools are approximately 100 times higher than outdoor concentrations. Compared with historic levels of asbestos in workplaces, airborne asbestos in these schools is lower by a factor of between 1,000 and 10,000. However, short-term peak levels in buildings may be elevated considerably, perhaps approaching dustrial levels.

Comparison of the data in Figure 1 should be made with some caution. The estimates of concentrations in asbestos workplaces are based on measurements of airborne fibers using the measurement method specified by OSHA (phase contrast microscopy), while the levels in schools and outdoors were measured by a different method (electron microscopy). Comparisons of measurements obtained by the two methods are based on certain assumptions presented in the footnote to Figure 1. The measurement of airborne asbestos fibers is a complex subject and is discussed in more detail in Section 3.2.2.

Questions of measurement comparability notwithstanding, the presence of significant levels of airborne asbestos in buildings with asbestos-containing materials has been clearly established. The potential for exposure to asbestos by building occupants cannot be ignored. Even though exposure levels are likely to be low in comparison with industrial levels, any additional exposure above background (outdoor) levels should be avoided if possible. A prudent response by building owners requires recognition of the potential hazards and serious consideration of appropriate abatement actions.

*Concentrations of asbestos fibers in the air are measured in terms of either the number of fibers per unit volume (typically, a cubic centimeter) or the mass per unit volume (typically, nanograms per cubic meter). A nanogram is one-billionth of a gram. See Appendix A for a simple discussion of measurement units used for airborne asbestos concentrations.