Libby, Montana: Overview of asbestos exposures and health effects

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Widespread asbestos contamination and health effects have been documented in Libby, Montana, associated with one of the world's largest vermiculite mines. Asbestiform amphibole fibers from the Libby area, are predominately comprised of actinolite, tremolite, winchite, and richterite mineral forms of amphibole (Libby Amphibole). About half of the airborne fiber exposures occurring in the Libby area are to asbestifom amphibole fibers that are not commonly included in exposure assessments under the current asbestos analytical protocols and regulatory definitions.

The asbestos-related occupational illnesses associated with exposures to Libby Amphibole among former vermiculite miners are well established in the medical literature, with significantly increased rates of asbestosis, lung cancer, and mesothelioma. Recent mortality studies conducted by federal health officials have also documented markedly elevated rates of asbestosis (40-80 times that of the US population), lung cancers, and mesothelioma in the community. Results of large-scale medical testing conducted on over 7300 individuals who lived or worked in the community prior to 1990, revealed the prevalence of asbestos-related lung abnormalities in about 18% of all participants. The prevalence of such abnormalities increased with increasing number of exposure pathways, ranging from 6.7% for those who reported no apparent exposures to 34.6% for those who reported 12 or more pathways. Pathways of concern include both occupational and non-occupation exposures, many of which still exist in the community today, despite the closure of the mine in 1990.

Various activities involving remediation of contaminated soils, attic insulation, and indoor dust have been completed at over 350 properties to date, and will continue for years to come.

Asbestos from Libby Montana; Compositions and morphologies that don't fit current asbestos definitions

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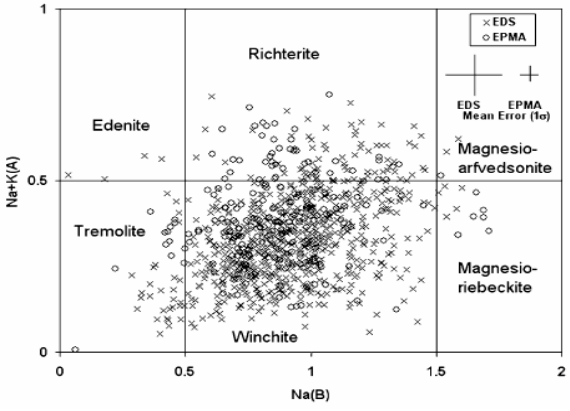
Asbestos is an industrial term that includes chrysotile, and the asbestiform varieties of the amphiboles tremolite, actinolite, anthophyllite, riebeckite, cummingtonite, and grunerite. Most current regulations and approved analytical methods for asbestos exclude other fibrous and asbestiform amphiboles. In early 2000 it became apparent that fibrous amphiboles in a vermiculite deposit near Libby, MT, were responsible for significant illness in the local population. Naming conventions of the mineralogical community classify the Libby amphiboles primarily as winchite, and richterite, species not listed in the regulations (Fig. 1). In addition to chemistry, the morphology of the Libby amphiboles can be quite different from the commercial asbestos varieties. Differences in chemistry and morphology create problems for the health and regulatory communities charged with protecting public health. These problems include difficulties in identification and complications in relating exposures to existing toxicological studies. It will be necessary in the future to resolve these issues and establish definitions that are compatible with mineralogical and health criteria as well as realistic analytical capabilities.

Figure 1. Classification of Libby amphiboles



References

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