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PLAINTIFF'S EXHIBIT AIA-70

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration
WASHINGTON, D.C. 20210

10 FEB 1977

MEMORANDUM FOR: REGIONAL ADMINISTRATORS AND AREA DIRECTORS

FROM: Donald E. MacKenzie, Acting Director, Office of Field Coordination and Experimental Programs

SUBJECT: **Asbestos sampling of vermiculite processing**

On February 1, 1977 OSHA received the enclosed report which indicates that **asbestos fibers have been detected in samples of vermiculite ore.** When vermiculite is subjected to strong heat in industrial processing, it exfoliates or separates into thin sheets. It is suspected that **asbestos fibers may be released** by this process and be **present in a fine dust** with the final **product.** Although the enclosed **study does not indicate the degree of hazard** since fiber counts were not performed, the **potential** for employee exposure to **asbestos** can be inferred. Therefore, **future inspections of exfoliation processing of vermiculite ore** shall include an evaluation of employee exposure to asbestos fibers.

01-0205994

54 Mineralogical analysis of ore from a major U.S. vermiculite deposit: preliminary investigation.

Problem:

Vermiculite is a mica that exfoliates under strong heat into very thin sheets. The resulting lightweight expanded form makes it useful as insulation, among its many applications.

A sample of raw vermiculite ore from the major producing mine in Montana was analyzed by x-ray diffraction and electron microscopy. The major uses of vermiculite include concrete, plaster and cement aggregates; loose fill, block, pipe covering and packing insulation; soil conditioning and horticulture, fertilizer carrier and litter. The U. S. production in 1971 was 301,000 tons, and output is increasing at a rate of 6% annually.

Geological considerations suggest that the ore might contain chrysotile and/or tremolite asbestos. If this be found to be so, the many industrial and consumer applications of vermiculite raise the question of whether there exists possible occupational or environmental hazards as a result of exposure to asbestos-containing dust.

Materials and methods:

We have examined ore samples from a major U. S. vermiculite source. Our preliminary results indicate that a broad spectrum of vermiculite ores from domestic and imported foreign sources should be analyzed for their asbestos content, both qualitatively and quantitatively. A representative number of vermiculite products, especially consumer products such as potting soils and litter, should also be examined. These can be expected to release respirable dust during use. The methods of analysis for asbestos are x-ray diffraction in the step-scanning mode and electron microscopy. Prior to analysis, the sample should be slurried and subjected to ultrasonic energy (e.g., in a sonifier cell disrupter) for about one minute in order to liberate chrysotile and other asbestos fibers which grow between structural layers of vermiculite mica sheets.

01-0205995

Results to date:

Tremolite and chrysotile asbestos have been found in vermiculite ore samples. (Figures 1-3) The amounts of fiber have not yet been measured.

Significance:

The results indicate that, as a result of the lightweight expanded form that makes vermiculite a valuable material in many industrial and consumer applications, potentially hazardous concentrations of asbestos may be contained in the dust produced by the essential stage of expansion.

Publications:

To be published.

Investigator:

A. Rohl, Ph.D.

Support:

Health Research Council, U-1272

Period:

1973-

01-0205[illegible]

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Figure 1. (upper left) Electron photomicrograph of raw vermiculite ore, showing large and small fibers of tremolite. 3200x magnification.

Figure 2. (upper right) Electron photomicrograph of raw vermiculite ore, showing a fiber bundle of chrysotile asbestos. 5000x magnification.

Figure 3. (lower left) Electron photomicrograph of raw vermiculite ore. A large bundle of chrysotile protrudes from a vermiculite mica flake. 10,000x magnification.

Figure 4. (lower right) Electron photomicrograph of raw vermiculite ore. A fiber of tremolite asbestos is at bottom center. 10,000x magnification.

31-020500

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