

Characterization of Airborne Amphibole Particles in Libby, MT

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Key Words

Asbestos · Amphibole · Libby · Airborne Particles ·
Morphology · Characteristics

Abstract

A detailed evaluation of 122 air samples collected in and around Libby, Montana and previously analyzed by EPA has been performed. Photographic records of each analyzed particle were collected and archived in a searchable database. The results of the study indicate that the EPA's failure to follow generally accepted procedures overestimated the concentration of regulated asbestos fibers by 10 times and by 3 times for all asbestiform fibers. These results are applicable to the analysis of naturally occurring asbestos in all parts of the country. The results demonstrate the need for detailed morphological and chemical analyses to reliably determine potential exposures and associated risks when evaluating mixed asbestos/non-asbestos environments.

Introduction

Several miles outside of the town of Libby, MT is the location of a closed vermiculite mine formerly operated by

WR Grace & Co and predecessors. During the mine's operation from the early 1900s until 1990, it was one of the world's largest, producing several hundred thousand metric tons of concentrate. The mine is located in northwest Montana, within the Kootenai National Forest, ~10 km northeast of the town of Libby.

The geology of the Rainy Creek deposit has been described by Boettcher [1,2] and Larsen and Pardee [3,4] who describe the mountain as a laccolith (an igneous intrusion with a dike-like feeder). The mountain has a core of biotite surrounded by mixture of biotite and pyroxenite. An outer ring of magnetite and pyroxenite complete the main structure. A large pluton of syenite and associated alkaline syenite dikes are in the southwestern part of the complex. The mountain top is ~700 m above the Kootenai River which flows past the base of the mountain. The deposit is drained by the Fleetwood Creek (north) and Carney Creek (south), both of which flow into the Rainy Creek (west) and then into the Kootenai River.

Mining began in early 1923 [5] with the development of open pits in the east end of the quarry by the Zonolite Company. Production in the west end of the property by the Vermiculite and Asbestos Company (later named Universal Insulation Company) began several years later [6]. Within their respective claims, both companies began mining the highest grade ore available [6,7]. The firms merged in 1939; the new entity was later named the Zonolite Company.