

Erionite: Occurrence and Potential Health Risks in Southwestern North Dakota

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Abstract

Erionite is a naturally occurring, microscopic, fibrous material found in weathered volcanic ash deposits throughout southwestern North Dakota. While erionite has properties similar to asbestos, erionite fibers are not currently one of the six asbestos fibers regulated by the United States Environmental Protection Agency (EPA). However, an epidemic of malignant mesothelioma associated with erionite exposure was studied in the 1970's and 1980's in rural villages of Cappadocia (Türkiye) where roads, homes, and other buildings were built into or made of material containing erionite. This research along with other studies (such as animal carcinogenicity studies with erionite from Oregon) was used to classify erionite as a Group 1 carcinogen (considered carcinogenic to humans) by the International Agency for Research on Cancer. In 2006, the North Dakota Department of Health's Environmental Health Section (now the North Dakota Department of Environmental Quality or NDDEQ) learned of both the potential health risks of erionite and its occurrence in the state. The NDDEQ immediately began investigating the situation along with the North Dakota Geological Survey. The initial investigation was to test rock faces and gravel deposits for the presence of erionite, as well as determining the mineral chemistry for comparison with the erionite fibers studied in Cappadocia. Based on the findings of the initial geological investigation, a subsequent public health investigation was launched. It involved partnering with EPA and the University of Cincinnati's Department of Environmental Health to conduct a medical study involving individuals with the highest risk of exposure. These investigations led the NDDEQ to restrict further use of gravel containing erionite and the North Dakota Department of Transportation to prohibit its use in NDDOT projects. This presentation covers the background on erionite formation in North Dakota, the history and methodology of the erionite investigations in North Dakota, and the findings to date.