

New report maps remaining asbestos deposits in Calaveras

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Salt Spring Valley doesn't find its way into the news very often these days, but in the late 1800s, it was the site of one of the earliest California discoveries of "asbestos," as it was then known.

A new report from the U.S. Geological Survey and the California Geological Survey shows that deposits of the heat-resistant fiber still remain in Calaveras County. The best known is the Jefferson Lake mine southeast of Copperopolis. The mine closed in 1987 and now serves as an asbestos disposal site, but it's just one of several sites either reported to have some asbestos, or show conditions making asbestos likely.

"Asbestos occurrences in California range widely in character and size, from thin veins only millimeters in thickness to some of the largest chrysotile (a type of asbestos) deposits known in the world, covering several tens of square miles," the report read.

More than 1.65 million short tons of asbestos came out of California, nearly all between 1960 and 2002, when U.S. mining was halted. Commercial use of asbestos is now tightly regulated because of the associated health risks.

Asbestos-related illness

Likely the most well-known and serious disease resulting from asbestos exposure is a type of cancer called mesothelioma. Between 70 and 80 percent of malignant mesothelioma cases are the result of asbestos exposure, according to the National Institutes of Health. It's an uncommon, cancerous tumor of the lining of the lungs and chest cavity, or pleura, or the lining of the abdomen, or peritoneum.

Symptoms may not appear until 20 to 50 years after exposure, sometimes longer. They can include abdominal bloating and pain, chest pain, cough, fatigue, shortness of breath and weight loss. It is a difficult cancer to treat, and is often diagnosed too late for surgery.

Without treatment, the average survival is nine months. About 75 percent die within one year. Chemotherapy or radiation can be used to reduce symptoms.

Asbestosis, also known as pulmonary fibrosis, can also result from exposure. Inhaling asbestos fibers can cause scarring of the lung tissue, and scarred tissue cannot expand and contract normally. Symptoms include chest pain, cough, shortness of breath and tightness in the chest. Other symptoms can include "clubbing" of fingers or nail abnormalities.

There is no cure for asbestosis. Symptoms can be treated by draining fluid buildup, inhaling aerosol medications or receiving oxygen through a mask. Some patients may need a lung transplant. The lower the exposure period, the less severe the disease is likely to become.

Other disorders of the pleura, like pleural effusion, are generally less serious but need medical attention. A pleural effusion is the buildup of fluid in the lining of the lungs and chest cavity. Symptoms include chest pain (usually sharp pain that worsens with coughing or deep breaths), cough, fever, hiccups, rapid breathing and shortness of breath.

Depending on the cause, the fluid may be removed via thoracentesis. A cannula, or hollow needle, is inserted to remove the fluid into a bag or syringe. Prompt treatment is important: If the fluid has been allowed to build up

for a long time, it may damage the surrounding lung tissue.

How asbestos causes disease

The effects of inhalation of airborne asbestos are well documented, but their cause is not.

“It is noteworthy that, while decades of research have yielded significant insights into the epidemiology of asbestos-related diseases and asbestos toxicity, many uncertainties and debates remain about the specific characteristics of asbestos minerals that are most responsible for inducing disease,” the USGS report read.

Studies have failed to find any chemically carcinogenic component in asbestos fibers, meaning the cancer-causing element is likely some physical characteristic. Once scientists understand how asbestos causes cancer, they may be better able to help people who have been exposed to asbestos avoid developing the disease.

There are three main theories, as summed up in a 2009 article published in the Nagoya Journal of Medical Science:

1. Oxidative stress theory: Cells that engulf the fibers can't digest them and produce large amounts of free radicals, which have been linked to increased risk of cancer.
2. Chromosome tangling theory: Fibers damage chromosomes when cells divide.
3. Theory of absorption of many specific proteins as well as carcinogenic molecules: Fibers in the body concentrate proteins or chemicals, including cigarette smoke.

Other theories indicate that different sizes of fibers might have different mechanisms causing cancer.

Regulation

Some industries still use asbestos and are subject to strict government regulation, including shipping, building demolition and remodeling and repair and replacement of commercial asbestos-based products, like some vehicle brake components.

“Less straightforward is the regulation and management of noncommercial, natural occurrences of asbestos, often referred to as 'naturally occurring asbestos.' These natural 'in-the-ground' asbestos occurrences have gained the attention of regulatory agencies, health departments and citizen groups. NOA includes minerals described as asbestos that are found in place in their natural state, such as in bedrock or soils,” the report stated.

The natural occurrences are documented on its map.

“Natural occurrences of asbestos are of concern due to potential exposures to microscopic fibers that can become airborne if asbestos-bearing rocks are disturbed by natural erosion or human activities (road building, urban excavations, agriculture and mining are just a few examples).”

Controversy erupted in the late 1990s in El Dorado County over development in areas potentially containing natural asbestos.

CGS collaborated to provide recommendations on mitigation and mapping of areas likely to contain asbestos, and has done so with other counties since. It also collaborated with the USGS on a remote-sensing tool called Airborne Visible/Infra-Red Imaging Spectrometer, “a potential tool for mapping the occurrence and distribution of asbestos-bearing rocks.”

For more information on naturally occurring asbestos, including the full state map, visit pubs.usgs.gov/of/2011/1188.