

Rocky stance on serpentine status as state rock

Brandon Schwab, Eureka Times-Standard, 7-17-10

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I am writing to offer some perspective on Senate Bill 624 and the current debate about removing serpentine as the California State Rock. California was the first state to designate a “state rock and lithologic emblem” in 1965 and serpentine was a good choice, given its place in the state's geologic and human history.

In reading the Senate bill, it is clear that there is significant misunderstanding of what serpentine is -- and isn't -- and some of this misunderstanding is intertwined with the emotional issue of human health. I do not want to diminish the tragedy of those individuals that have suffered or died from asbestosis or related diseases, and I appreciate the motivation of victims' family members who started the “drop the rock” campaign. However, there are several subtle issues here that have potentially important implications.

First, serpentine is the name that applies to a group of minerals, primarily lizardite, antigorite, and chrysotile that have similar chemical make-up but vary in their crystalline structure. A rock composed primarily of these minerals is called serpentinite.

The bill states that “serpentine contains the deadly mineral chrysotile asbestos.” Most people have heard of asbestos, likely in association with its impact on human health. Asbestos is a term that generally applies to a group of fibrous minerals that have other properties (like high strength and heat and chemical resistance) that make them useful for numerous industrial and commercial applications. Some serpentine minerals, in particular chrysotile, can occur as fibrous, “asbestos” varieties. Other “asbestiform” minerals can occur in the amphibole group, including the minerals actinolite-tremolite, crocidolite and grunerite. The last two, crocidolite and grunerite (also called amosite), can occur as “blue asbestos” and “brown asbestos,” respectively.

The documentation of deleterious health effects of long-term exposure to airborne asbestos fibers goes back more than 100 years. The principal concern is that airborne fibers can be inhaled and become lodged in lung tissues. Because the fibers are tough and inert, some varieties are not readily absorbed by the body. This can result in the development of scar tissue in the lungs (fibrosis), which leads to breathing problems and other symptoms associated with the disease asbestosis. Lung cancer and a rare form of cancer called mesothelioma, which is associated with the presence of crocidolite and grunerite, can also develop. Exposure to these “blue and brown” asbestos varieties has been shown to be far more dangerous than exposure to other asbestos varieties, like those that sometimes occur with serpentinite. Cigarette smoking has also been shown to greatly increase the risks associated with asbestosis and mesothelioma.

Overexposure to any material, mineral or otherwise, can lead to negative impacts to human health. Quartz (SiO₂) is the most common mineral in the Earth's crust and inhalation of silica dust can lead to the disease silicosis.

The Occupational Safety and Health Administration and other agencies have created regulations that help protect workers (at mines, quarries, and construction sites) who are exposed to mineral dust. In a 1999 National Academy of Sciences (Proc. Natl. Acad. Sci. vol. 96) study on the health effects on miners exposed to grunerite asbestos, the researchers concluded the lifetime risk of death by lung cancer and mesothelioma for the miners

was similar to that of being killed by a lightning strike or by a plane falling from the sky (averaged over the entire U.S.).

For comparison, a person is approximately 1,000 times more likely to die of cancer from living with a smoker or to be killed by a car as a pedestrian. (The risk of death from heavy cigarette smoking is approximately 300,000 times higher than the studied asbestos exposure.)

By proposing to drop “serpentine” as the state rock and the “state rock” category entirely, as the amended bill reads, the legislature is diminishing the importance of geology in our economy and society, demonstrating a lack of scientific understanding and potentially opening up more avenues for litigation by labeling all serpentine as carcinogenic.

Perhaps this indicates a need for increased support for education (the geosciences included) at all levels of the state. Supporting education is something I whole-heartedly encourage the Legislature to put high on their agenda. If the Legislature feels it is important to spend time removing any official state connection to potentially hazardous materials, I would argue that overexposure to the state mammal (Grizzly bear) is more likely to be hazardous than exposure to the state rock.