

SILICA MINES IN NW WI AND OTHER LOCATIONS POSE PROBLEMS FOR RESIDENTS AND OTHER LIVING NEAR FRAC SAND FACILITIES



.....keeping watch on the industry

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Individuals and their families and groups are fighting silica sand mines or frac sand mines in Wisconsin, Minnesota, Illinois, Iowa, Arkansas and many other locations around the nation.

Today I had contact with people from Texas besieged with a proliferation of frac sand mining facilities in their area. All are extreme extraction operations designed to carry away hills, ridges, bluffs to obtain silica for use in the hydraulic fracturing industry to obtain more oil and gas.

Doug who lives near Detroit, Michigan, lives very close to a silica mine. He can climb to the top of his pole barn and look directly into a U.S. Silica

pit. Daily he and his family are affected by the clouds of dust given off at the site.

Blasting, trucks moving here and there and workers without respirators.....all are easily observed from the roof of that pole barn. He is living under stress daily wondering what breathing in respirable crystalline silica dust will do to his health and that of his family. Doug settled in the area to build a new home for his family and wonders if and when the property will be worth what he put into it in personal time, labor, and funds.

To alert others to the dilemma he and his neighbors face, Doug has spent time making and posting signs in his neighborhood, getting signatures, and teaching people about the dangers.

Kudos to Doug as he goes about alerting others to how this facility is impacting his neighborhood, the village, the county, and the State of Michigan. It is truly amazing what individuals can do to alert others to the dangers surrounding many who live in the area. Even if he is not fully supported by all who are hearing his story, he truly is making a difference by putting up signs and collecting signatures and talking to many people! Here is

hoping that many others will step up to the plate to make a difference for themselves and others by helping Doug and others like him.

Working with others is critical if we are to mobilize our message. Many groups and individuals have been working with the experts at Public Lab to assist in collecting various forms of data useful to the cause.

Gretchen Gehrke is the Data Quality and Advocacy Manager at Public Lab, an open environmental science community and nonprofit organization. Prior to joining the staff of Public Lab, Gehrke held two postdoctoral positions, in Environmental Engineering at Duke University and as an environmental geochemist at the US Environmental Protection Agency. She earned her doctoral degree in Environmental Geochemistry at the University of Michigan, and a dual bachelors degree in Chemistry and Environmental Earth Sciences at Dartmouth College. Currently Gehrke is Vice Chair of the nature-based leadership development and environmental education organization Schoolhouse of Wonder, and volunteers with organizations involved in

sustainable agriculture. She enjoys outdoor activities.

Here is what she has to say about the dangers of silica:

"When silica is part of industrial processes, airborne silica dust is a significant health concern. Silica does not naturally fracture smaller than 10 micrometers (μm), but in road construction, non-metallic mining, sand-blasting, and other high-pressure activities, it may break down to less than 5 μm , a size at which it becomes "respirable." Respirable dust can travel deep into the lungs' smallest structures, alveoli, where oxygen is exchanged. All respirable particles interfere with breathing and are difficult for the body to remove, but one type of respirable silica — respirable crystalline silica — also cuts and scars the lungs, creating a condition known as silicosis, and is carcinogenic [1].

In occupational settings, respirable crystalline silica dust is regulated by the Occupational Safety and Health Administration (OSHA). Non-occupational exposure to respirable crystalline silica is regulated in just six states, whose ambient exposure limits are based on OSHA's 8-

hour workplace exposure limit. OSHA has set a new limit of 50 micrograms of silica per cubic meter of air ($50 \mu\text{g}/\text{m}^3$), going into effect June 23, 2016. This new limit may affect state non-occupational exposure rules. Converting between occupational and non-occupational exposure requires accounting for both exposure time and exposure risk. Occupational exposure time is assumed to be 40 hours per week, while ambient, chronic exposure time is a full week of 168 hours. Workers, who are protected by the OSHA laws, are also assumed to be healthier than vulnerable segments of the general population, such as children and the elderly. A margin of safety (usually a factor of 30-100) is therefore built into chronic exposure limits to account for risks to these vulnerable populations. An occupational exposure limit of $50 \mu\text{g}/\text{m}^3$ therefore may have a corresponding chronic exposure limit near $0.4 \mu\text{g}/\text{m}^3$. Currently no states routinely measure respirable crystalline silica to assess chronic exposure, and the methods to do so are still debated [2].

The federal Environmental Protection Agency (EPA) does not regulate respirable silica or other respirable particles, but it does set ambient airborne concentration limits on two size

categories of particles, without regard to their chemical composition: particles up to 10 μm diameter (PM₁₀) and particles up to 2.5 μm diameter (PM_{2.5}). PM₁₀ are considered “inhalable” because they travel only into the upper reaches of the respiratory system, while PM_{2.5} is a subset of respirable particle sizes that travel all the way to the alveoli. Respirable silica is one of the components of particulate matter.

Agencies use a rough estimate for the composition of particles they expect to be in any given sample. They estimate that 10% of particulate matter is silica, which includes respirable crystalline silica and other forms of particulate silica. However, it is acknowledged that the percentage of total silica, and the percentage of respirable crystalline silica, varies by location and nearby activities. At sand mining operations, where silica can constitute 95-99% of the mined sand, the percentage of PM₁₀ that is total silica is likely to be higher than the assumed 10%. If the respirable crystalline silica percentage of PM_{2.5} near industrial sand mines is more than 3%, the area could be in compliance with the ambient air limit of 12 $\mu\text{g}/\text{m}^3$ PM_{2.5}, but still exceed a chronic exposure risk level for respirable crystalline silica.”

References:

1. International Agency for Research on Cancer (IARC) report: <http://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C-14.pdf>
2. Read more: <https://publiclab.org/wiki/silica-monitoring>

Thanks, Gretchen, for your research to help us in our understanding of respirable crystalline silica dust and the impact it can have on workers.....and others, too!

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Welcome to the Frac Sand Sentinel, a newsletter highlighting resource links, news media accounts, blog posts, correspondence, observations and opinions gathered regarding local actions on, and impacts of, the developing frac sand mining and processing industries.

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