Silica Sand Mining & the Environment

The recent increase of silica sand mining in Minnesota is raising community concerns about possible environmental impacts from silica sand mining. Mining may impact drinking water sources or the air we breathe. The Minnesota Department of Health (MDH) is working to develop public health responses and tools to support citizens and communities as they consider impacts from mining activities.

Water and Silica Sand Mining

Silica sand mining or processing impacts on drinking water sources

Any mine may create a pathway for chemicals and/or bacteria to more easily reach the groundwater.

- The risks to drinking water depend on how close the mining operations are to the water table, the use of heavy equipment, leaks and spills of fuel, engine oil or other chemicals, and runoff from contaminant sources or illegally dumped waste in the mine.
- Some frac sand mines use products called flocculants to remove silt and clay in the sand washing process. These products are generally considered to be environmentally safe; however, they often contain low concentrations of chemicals (acrylamide and DADMAC) which are of potential concern. MDH recommends monitoring of the groundwater at facilities where these chemicals are to be used to ensure safe drinking water levels are not exceeded.
- Groundwater near frac sand mines may become slightly more acidic (lower in pH). This may cause minerals (like iron and manganese) to more easily dissolve, which can cause water to have unpleasant taste and odor and may cause staining. MDH recommends that pH be included in the water monitoring list for groundwater near frac sand mining operations.

Silica sand mining and groundwater

Mining can remove large volumes of groundwater and has the potential to impact nearby wells. Impacts could include the lowering of water levels, possibly even causing a nearby well to go dry.

- The Minnesota DNR reviews large water removal activities to ensure that groundwater use will not harm wells in the area.
- MDH evaluates whether there are any potential risks to community water supply wells.
- MDH recommends a number of actions to prevent or reduce the potential for pollutants to enter the groundwater and water quality monitoring to protect nearby drinking water wells. For more information, visit the MDH website: “Wellhead Protection Issues Related to Mining Activities” (http://www.health.state.mn.us/divs/eh/water/swp/mining.pdf)

Community concerns have been raised about possible health risks for people living near silica sand mining facilities.

For more information about health impacts from silica sand mining, visit the MDH website at http://www.health.state.mn.us/divs/eh/hazardous/topics/silica/index.html

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Air and Silica Sand Mining

Mining activities that break up soil and rock layers by digging or blasting release dust-sized particles (particulate matter) into the air that are invisible to the naked eye. The smallest of these particles that are broken up can become airborne for an extended period of time.

Crystalline silica is a specific kind of particulate matter. The concentration of crystalline silica in air is based on a specific particle size range called PM4 (particulate matter 4 micrograms per meter and smaller). Monitoring particulate matter is important because industrial activities and diesel engines generate these types of particles that can cause adverse human health effects.

People who work in hydraulic fracturing or frac sand mining activities are most at risk for exposure to high levels of respirable crystalline silica. Occupational safety and health officials have long known about the importance of monitoring for airborne crystalline silica – many workers at mines wear personal monitoring devices that record how much exposure to crystalline silica they receive while working. Engineering controls, such as keeping sand wet, can control airborne silica levels at the mine, during processing and when transported. These activities can also lower the exposure to airborne silica for people living downwind of silica sand mining, processing, or hauling operations. Monitoring of airborne crystalline silica with scientific instruments at a mine can show how much silica may be in the air, and if human exposures may be occurring nearby.

Data about crystalline silica in air in the United States is limited. Monitoring is not done regularly and often is measured with different types of instruments. Only recently has the same size fraction of crystalline silica that is used in occupational studies been measured in air. This makes it hard to compare the data directly. Minnesota-specific data on crystalline silica in air are only beginning to be measured. Information is available on the Minnesota Pollution Control Agency Web page - Air monitoring at Minnesota silica sand facilities (http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/air-pollutants/silica-sand-mining/air-monitoring-data-at-minnesota-silica-sand-facilities.html).

Addressing Community Concerns: Health Impact Assessment

Community concerns related to general mining activities include impacts to air quality and non-mining industries (i.e. tourism) and increased traffic, noise, and risk of accidents. Health Impact Assessment (HIA) is a process that could lead to a more complete evaluation of all of the risks associated with silica sand mining and processing.

MDH supports HIA as a tool to ensure that health is considered in these and other important decisions. HIA is a systematic process used by organizations and community groups to provide decision-makers with information about how any policy, program or project may affect the health of people. HIA emphasizes a comprehensive approach to health, which includes economic, political, social, psychological, and environmental factors that influence people’s health.

For more information, see the MDH website at http://www.health.state.mn.us/divs/hia/