

Silicosis and Fracking

Fracking is the popular term for the process of hydraulic fracturing which has markedly increased the production of natural gas. Hydraulic fracturing involves drilling a well and injecting millions of gallons of water under high pressure to fracture the rock containing the natural gas. Hundreds of thousands of pounds of sand, which is typically 99% silica, are mixed with the water prior to injection. The silica is used as a “proppant” to hold the fracture open to allow the natural gas to flow. Chemicals are also added to the mixture prior to injection. These chemicals include scale inhibitors, friction reducers, gelling agents, biocides, solvents and acids to protect equipment, reduce pumping requirements and maintain integrity of the gas formation. The mixture pumped underground is 90% water, 9.5% sand and 0.5% chemicals. Concern in the press and on the internet has focused on air pollution, noise and dust from these large scale industrial operations that generate frequent truck deliveries in rural settings. Concern is also directed at the potential for contamination of ground or surface water by natural gas and the chemicals used in the fracking process either during pumping or from the holding ponds dug at the sites. During the fracking process, 30-60% of the water mixture injected in the wells returns to the surface. The chemicals used are classified as trade secrets which has heightened fear among nearby residents. Pictures 1 and 2 help to understand the magnitude of a fracking operation.

PICTURE 1. FRACKING SITE



(source: NIOSH)

PICTURE 2. TRUCKS HOT LOADING WATER MIXTURE AT A FRACKING SITE



(source: NIOSH)

The National Institute for Occupational Safety and Health (NIOSH) released a report this year of 116 silica air levels collected at 11 fracking sites in Arkansas, Colorado, North Dakota, Pennsylvania and Texas (<http://blogs.cdc.gov/niosh-science-blog/2012/05/silica-fracking/>). Sand refill trucks haul sand to the fracking site, which is transferred to “sand movers”. The sand is then transferred to blender hoppers to be mixed with the water and chemicals. Silica is released during all these transfers. Full shift personal air monitoring exceeded the OSHA standard (0.1 mg/m³) for 47% of the samples and the NIOSH recommended exposure limit (0.05 mg/m³) for 79% of the samples. Nine percent of the samples exceeded the OSHA allowable standard and 31% exceeded the NIOSH recommended level more than 10 fold. In Picture 3, the silica air levels were 27 times higher than the OSHA standard. Exposures are high because of releases during transfers and the large quantity of sand being handled. The NIOSH report outlined a number of recommendations for reducing silica exposure including engineering and work process changes and substituting a non-silica product.

Oil and gas drilling sites have previously been recognized as having safety and health hazards with the risk increased by fatigue from working long shifts, poor lighting and working in temperature extremes. Previously recognized risks included noise, exposure to diesel exhaust from the large number of trucks, being struck by a motor vehicle, falls from heights, being caught in or struck by equipment including drilling equipment or high pressure lines, fires or explosions and working inside confined sand storage or frack tanks (http://www.osha.gov/dts/hazardalerts/hydraulic_frac_hazard_alert.html).

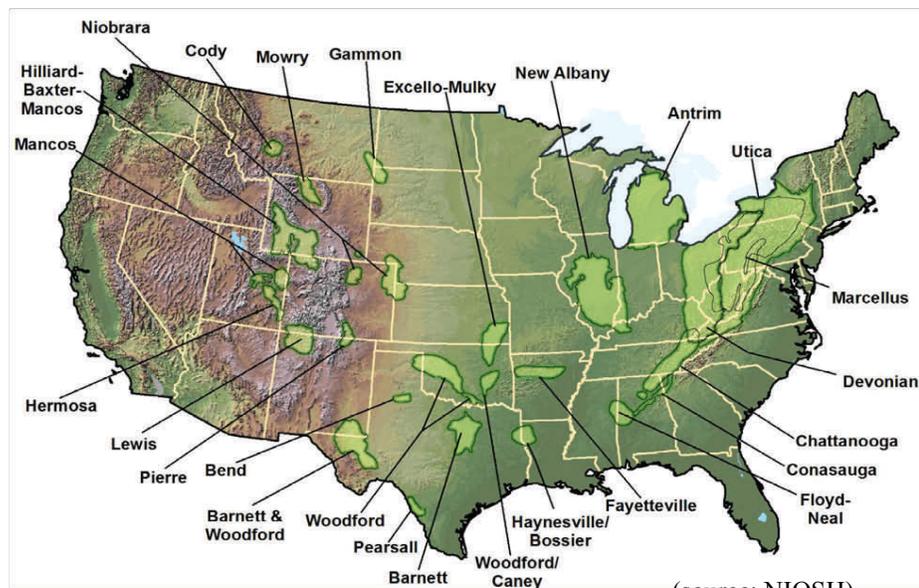
PICTURE 3. CLOUD OF SILICA DUST FROM SAND TRANSFER AT A FRACKING SITE



(source: NIOSH)

Figure 1 shows areas of the United States where shale formation contains natural gas that is recoverable by fracking.

FIGURE 1. SITES IN UNITED STATES FOR NATURAL GAS



(source: NIOSH)

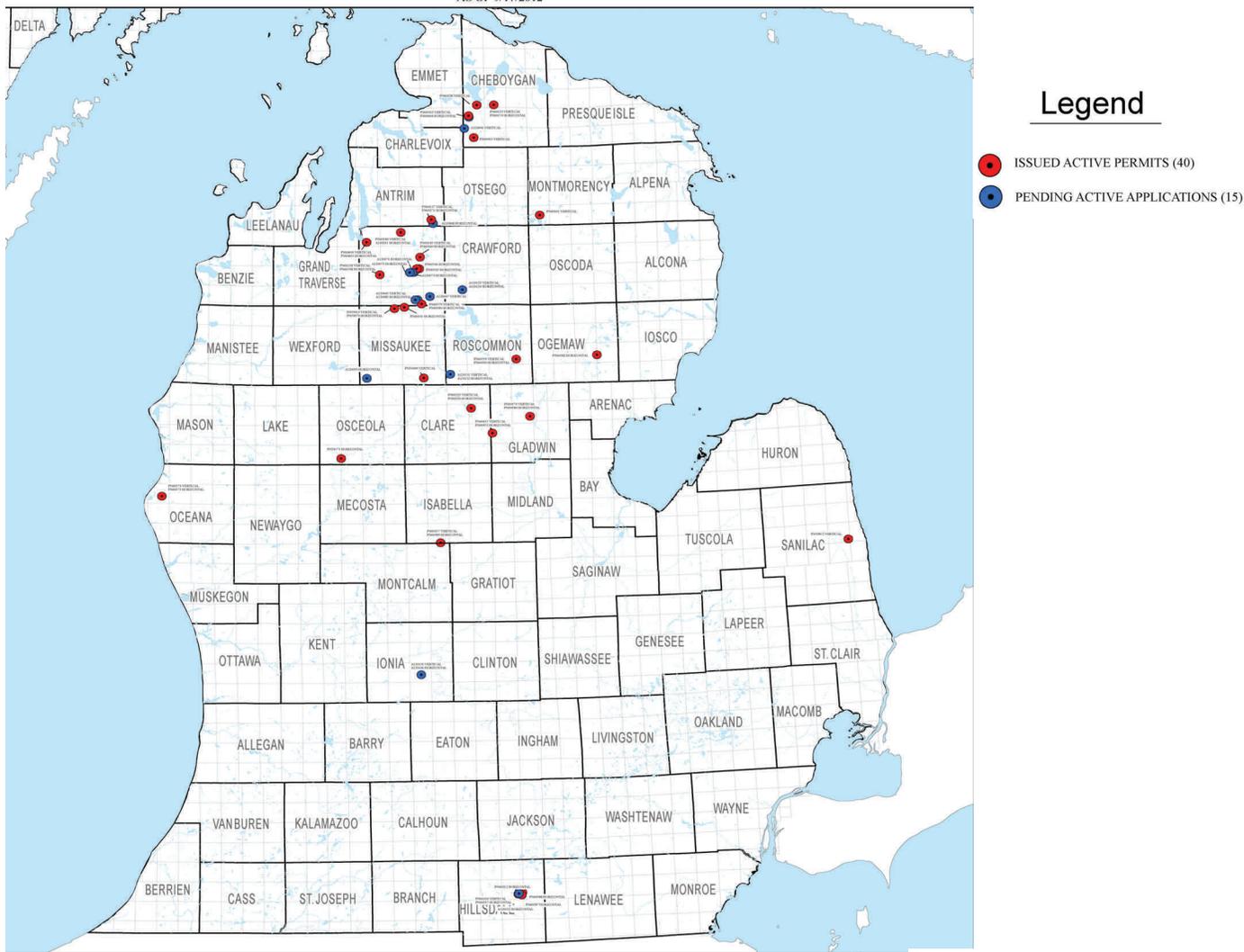


Figure 2 shows a map as of 9/17/12 of the 40 active sites and 15 pending applications for high volume fracking in Michigan. Although fracking is not as common in Michigan as in other parts of the country such as Pennsylvania, fracking in Michigan is becoming more common.

Since silicosis is a disease that typically occurs with 20 or more years of exposure and fracking has been increasing only in the last few years, health care providers are unlikely to diagnose natural gas drillers with silicosis in the near future. However, reported levels of silica are high enough that workers in this industry may be at risk of developing accelerated silicosis after only five to ten years of work. If you have a patient who works in the fracking industry, a chest radiograph is indicated. Additionally, sand mining has increased because of the increased demand for sand by the fracking industry, thereby increasing the risk of silicosis in the sand mining industry.

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 • We are always available to answer questions regarding patient management. If you have ques-
 • tions or concerns about health hazards to natural gas drillers either from silica or the chemical
 • additives, please call Kenneth Rosenman, MD at 1-800-446-7805.
 •

Figure 2. HIGH VOLUME HYDRAULIC FRACTURING
 APPLICATIONS AND PERMITS - SINCE 2008*
 AS OF 9/17/2012



http://www.michigan.gov/documents/deq/utica.collingwood_spreadsheet1_358438_7.pdf



***Project**
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In this issue: v24n1: Silicosis and Fracking

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S Remember to report all cases of occupational disease!

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