

# Sand mining in Wisconsin and Minnesota threatens access to safe water and clean air

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15 September 2014

In the last decade, coincident with the dramatic surge of hydro-fracturing deep in the earth for natural gas and oil, sand mining has soared in the US states of Wisconsin and Minnesota. In Wisconsin alone, the chief resource of silica sand in North America, ten operational mines and processing facilities existed in 2010. As of this summer there are an estimated 137 mines in operation, with dozens more sand mining permits applied for with the state government in Madison.

The fine grained sand, after processing in the Midwest, is shipped via rail to the petroleum fields (mainly owned by a handful of transnational energy conglomerates) around the United States, where it is mixed with billions of gallons of water and an extremely toxic cocktail of known carcinogenic chemical compounds. The resulting slurry, called “slickwater,” is pumped underground as deep as four miles, under many thousands of pounds of pressure into the natural gas and crude oil containing rock to break open the ancient slate seams in long horizontal planes.

The trainloads of sand departing Wisconsin day and night, known in the industry as “proppants,” are used to “prop” and hold open the countless webs of slate rock fractures in order for the gas and oil to be pumped to the surface. Last year, as many as 9,000 truckloads of silica sand are estimated to have departed Wisconsin in a single day from the dozens of existing mining and processing facilities. According to the Wisconsin Center of Investigative Journalism, the state is on track to export some 50 million tons of frac sand annually. A single fracturing of a petroleum well will consume as much as 10,000 tons of silica material.

As geologic history and fate would have it, about 500 million years ago, during the Cambrian and Ordovician periods, much of North America and Wisconsin sat in the tropics, tilted astride its tectonic plate, 10 degrees south of the equator. For about 100 million years, the earth’s seas rose and receded in three periods, depositing in succession the Jordan, Wonewoc, and St. Peter’s layers of today’s central and northwestern Wisconsin and eastern Minnesota’s swath of pre-historic silica sand.

*National Geographic* online article published July 2013, author Sally Younger notes that a United States Treasury Department mineral agent named David Owen and about 100 assistants were dispatched to the Midwest in 1847, one year before Wisconsin was admitted as a state. They reported their findings regarding generous deposits of copper, zinc, lead and “amphitheatres of sand,” the formations of which “are like almost nowhere else on earth.”

The very unique silica sand grains, known in the hydro-fracturing industry as “northern white” for their finest “fracking” quality, were bathed and shaped almost to spherical perfection in the ancient winds and seas, and consists of 99 percent super-hard quartz.

In many locales of Wisconsin and Minnesota, the sand is near enough to the ground surface that the extraction process is straightforward and therefore relatively cheap. Oftentimes the desired product can literally been seen from a roadside, especially in the Mississippi and St. Croix Rivers bluff country and their tributaries.

In localities north of where the last glacier of 10,000 years ago stopped and then receded, glacial debris must be scraped away for access to the pre-historic sand. Consequently, significant portions of the landscape north of the glacial arrest part of northwest Wisconsin are pockmarked with enormous open sand mining pits.

Sand mining processing plants in Wisconsin and Minnesota demand truly extraordinary amounts of water for washing and sorting of the grain sizes of approximately 106 micro meters to 2.65 millimeters (referred to as “mesh” or sieve sizes in fracking parlance) before truck and railway shipping to the several US and Canadian hydro-fracturing regions. These include the Marcellus Formation of Pennsylvania, the Eagle Ford and Barnett Formations in Texas, and the Bakken Formation in western North Dakota, eastern Montana and southern Saskatchewan and Manitoba.

The Department of Natural Resources reports that for only five sand mines in northwestern Wisconsin, the average daily water use ranges from 420,500 to 2 million gallons, an

uncertain amount of which is re-cycled. Multiplied by several dozens of mines presently populating the sand-rich crescent of central and northwestern Wisconsin, and added to those for which dozens more permits are pending, individuals, municipalities and agricultural entities are inevitably going to find themselves in conflict with the mining and petroleum industry for safe potable water.

As magnates of finance capital, focused as they invariably are on maximum return on their investment, the mining concerns do not concern themselves with the public's necessity for access to safe drinking water. The shutoff of water this year to thousands of Detroit, Michigan residents, in preparation for privatizing a historic municipal public utility, is a prime example of this phenomenon.

The sand mining companies are naturally plugged into the financial food chain of the energy conglomerates, with a number of the largest firms having investment houses on Wall Street.

US Silica, one of the planet's prime sand mining players, went public on the New York Stock Exchange (NYSE) in 2012 and touted 2nd quarter 2014 revenues of \$205.8 million, up 59 percent from the same period of 2013. Superior Silica Sands LLC excavates in Wisconsin as a subsidiary of Emerge Energy Services, also traded on the NYSE, which in turn is owned by Insight Equity of Southlake, Texas.

The highest grade silica sands sell for over \$200 a ton. Given the planned annual extraction of some 50 million tons, the sand company owners are helping themselves to truly staggering fortunes in ancient earth materials.

On the petroleum hydro-fracturing end of the industry, in the Pennsylvania region of the Marcellus Formation it is estimated that a single hydro-fracturing well uses about 4 million gallons of water. In 2009 it was estimated that hydro-fracturing had been performed in excess of 1 million times in every petroleum producing region in the United States. Of all the existing wells in the country, more than 70 percent have utilized hydro-fracturing. According to the drilling industry that same year, about 90 percent of the then 493,000 natural gas wells were subjected to high-volume water fracking.

In 2013, the *Wall Street Journal* examined data from 700 counties in 11 natural gas producing states and found that 15.3 million Americans had a gas well within one mile of their home that had been drilled since 2000. By 2012, persons had filed over 1,000 complaints about poisoned water, severe sickness, fish kills, and dead livestock.

Scientists have estimated that by the year 2025, 1.8 billion people worldwide will suffer safe drinking water scarcity, and that fully two-thirds of the earth's inhabitants will be "water stressed."

Much of the rural and even suburban landscape of northwestern Wisconsin and eastern Minnesota comprises dozens of multi-story-high "northern white" dunes, naked without any cover from the ambient air, awaiting shipment to hydro-fracturing destinations.

Consequently, many sand mining workers and rural and community residents have voiced well-founded worries about the effects of inhaled silica particles blown across the countryside from the mines, dunes, trucks, and railcars and into the towns, playgrounds, schools, places of businesses and homes.

Silicosis (previously called "grinder's asthma" and "potter's rot") is the most common occupational illness worldwide, obtained with the inhalation of fine silica dust, the glass-like shard particles of which become embedded deeply in the air exchange sacs (alveoli) of the human lung. The silica particles induce a series of inflammatory and scarring changes in the critical-to-breathing pulmonary beds, which can result in respiratory failure and death.

A fact sheet from World Health Organization estimated in the year 2000 that 1 to 2 million US workers had had occupational exposure to silica dust, and some 59,000 would develop silicosis as a result.

The year 1930 saw the notorious Hawks Nest Tunnel Disaster, known as America's worst industrial catastrophe, in which at least 400 workers constructing a tunnel near Gauley Bridge, West Virginia, died in an epidemic of silicosis. Since workers were fired when they complained of sickness, followed by their departing the area, later studies estimated the death toll was closer to 1,000.

In the late 19th century, the entire community of Delamar, Nevada, later dubbed "The Widowmaker," was rendered uninhabitable in another silicosis epidemic from a gold extraction process called "dry mining," which produced silica dust from the associated quartzite ore.



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