

Rediscovery of rare mineral deposit by WMU Geologists and private company could boost Michigan economy



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KALAMAZOO, MI – You've heard of shovel-ready projects?

Western Michigan University's Michigan Geological Repository for Research and Education, working in conjunction with the company Michigan Potash, said that it has rediscovered a mineral deposit in West Michigan potentially worth billions of dollars that could establish Michigan as a leading U.S. supplier of a key fertilizer used by farmers worldwide.

"This is the United States' only shovel-ready potash project," said Theodore Pagano, a potash geologist, engineer and general manager of Michigan Potash Co. LLC, the company that now controls the Borgen Bed, which lies under 14,500 acres in Mecosta and Osceola counties. "What we're looking at is the introduction of an industry that is critical to the economic health of the state. We'll be producing a Michigan product for Michigan farmers that would dramatically reduce the expensive transport costs on the more than 300,000 tons of potash consumed in our state annually."

At current market prices, the deposit is estimated to be worth \$65 billion, said Pagano in a phone interview with MLive/Kalamazoo Gazette. Michigan Potash has been purchasing the mineral rights, which the previous owners had let lapse, for the past three years, as well as making sure it was technically, economically and logistically feasible to put the deposit into production, he said.

Production would not begin until mid-2014 at the soonest, said Pagano, who estimated it would take about three years for a build-out. He estimated that the project would create 300 construction jobs, as well as 110 full-time jobs at the site.

The high quality of the mineral resource has the potential to create a multibillion-dollar industry in Michigan that would surpass the state's historical oil and gas production revenues, as well as create several hundred jobs in Osceola and Mecosta counties, where the deposit is located, said Pagano.



From left, William Harrison, Western Michigan University professor emeritus of geosciences, Theodore Pagano, general manager of Michigan Potash, and Linda Harrison, administrator of the WMU MGRRE.

It also could help the state's agriculture industry, as well as the Midwest as a whole, offering a locally sourced supply of the fertilizer for corn and soybean farmers, said the WMU geologists who worked on the project.

"One of the things that makes this so valuable is that it is an incredibly rich deposit that is in easy reach of the enormous demand from Midwest corn and soybean farmers who operate within a 500-mile radius of this deposit," said William Harrison, professor emeritus of geosciences and director of the geological repository at WMU. "This is an opportunity for new wealth to come from the use of natural resources never tapped before."



A core sample from the Borgen Bed from WMU's Geological Repository for Research and Education. The bed is a deposit of high-quality potash, a mineral used for fertilizer.

Potash, potassium chloride, is found in areas once covered by inland seas. After the seas evaporated, the potassium and sodium chloride deposits crystallized into potash ore and were covered by layers of rock and soil. Potash is mined in 13 countries, including Canada, Russia and Belarus. In the U.S., New Mexico is by far the largest source, with smaller amounts mined in Utah and Michigan. United States domestic potash production has declined by 65 percent since 1962, and the country imports more than 82 percent of its potash fertilizer. U.S. potash prices increased 1000 percent between 1962 and 2012, before dropping this summer.

In the Midwest, most corn and soybean farmers get their potash from New Mexico or Canada and can pay upward of \$400 a ton. Michigan farmers used about 300,000 tons of potash annually. About \$40 to \$60 a ton of that cost is for transportation, said Linda Harrison in a phone interview.

"No one pays more for potash than Midwest farmers," said Harrison. "This locally available deposit is fabulous for Michigan and the Midwest."

Verification of the quality and amount of the potash in the Borgen Bed was done using core samples that are part of the 500,000 feet of cores housed in Western Michigan University's Michigan Geological Repository for Research and Education (MGRRE).

MGRRE acquired the cores in 2008, when Mosaic, the company that owns a potash mine in Hersey, offered to donate them to the university rather than store them any longer. Harrison and his wife, Linda Harrison, an administrator with the repository, drove their pick-up truck up north



"There are probably still hidden treasures in our collection. We're like a rare book archives," said Harrison.

The Borgen Bed deposit, Harrison said, is particularly notable for its quality. He said tests done by an independent laboratory show that it is the purest and highest-grade potash being produced in the world — six times higher than what is being mined in New Mexico's Permian Basin. It is also twice the grade of deposits found in Canada and Russia, the two countries that control more than 80 percent of the world's potash reserve.

"What blew our minds was that there were layers in there that were essentially 100 percent of this potassium chloride," said Harrison.

There is already a potash mine in Hersey, which was part of a pilot project begun by a Canadian company in the 1980s. But it was never fully commercialized, explained Harrison.

"I know they knew there was a deposit there. I don't know if they knew what a gem it was," said Linda Harrison.

To offer a sense of the potential economic impact of the Borgen Bed, Linda Harrison said that, over the past 30 years, the cumulative value of the state's oil and gas production was \$35 billion.

"When you consider this is twice the in-ground value of 30 years of oil and gas production in the state, that's pretty astronomical," she said.

The mine in Hersey, in Osceola County, still possesses the mineral rights for land a half-mile in every direction, said Pagano. Michigan Potash has purchased the rest, he said.

The potash is mined using a well, said Harrison. So there would be far less surface disturbance than strip mining, he explained.

Pagano estimated that, at a rate of 1 million tons a year, the deposit could last for 100 years.

"This wouldn't have been possible without Bill Harrison's lifelong pursuit of providing applied science and a core repository that is for the specific purpose of applying natural resources to the economy in Michigan," said Pagano.