



AT THE CORE William B. Harrison III, WMU professor emeritus of geosciences and director of the Geological Repository for Research and Education, uses a back light to display the layers of potassium and sodium chloride — which is most often used to produce fertilizer — in this core derived from nearly 8,000 feet below the earth's surface.

Subterranean Deposits

The discovery of a large deposit of potash in Michigan, used to produce fertilizers, represents a significant economic boon to the state. **BY DAN CALABRESE**

Natural resources have long been an economic asset to Michigan, but it was only recently that the state discovered an unusually large deposit of potash, one of the most pivotal substances in the world. The new findings could very well signal the start of a new industry in the state, potentially worth \$65 billion.

Potash is a form of salt that's classified as potassium chloride, as opposed to the sodium chloride you have on your dinner table. Although you wouldn't want to sprinkle potash on a plate, it can play a role in the development of table food. Potash is what's used to

get potassium, and every type of agricultural fertilizer includes significant amounts of potassium.

Spread across nearly 20 counties in mid-Michigan, the potash deposits are believed to total tens of millions of metric tons. In a nation that uses 5 million metric tons of the substance a year, and gets 4 million of those tons from Russia and Canada, the discovery could represent a gigantic opportunity for the state — and for those in a position to bring this surprisingly plentiful Michigan resource to market.

Enter the Michigan Potash Co., which is actually headquartered for the moment in Colorado. General Manager Ted Pagano says Michigan Potash is working to put together

the resources and a business plan that will allow it to mine and effectively distribute potash to the global marketplace. He says part of the company's strategy is to be careful about trying to become too big a player.

"Typically, the barrier to entry in the potash (market) requires that you're appealing to large export players, because you have to compete on long-term negotiated contracts with the largest purchasers such as China, India, and Brazil," Pagano says. "Michigan Potash doesn't have to be that at all. You can kick out 50,000 tons, or accelerate that to 500,000 or 600,000 tons a year, based on the capital framework you wanted to deploy. You can't do that in most environments because they're not sitting in a place where they can

MINE SHAFT A small manufacturing plant in Hersey, near Big Rapids, owned by IMC Global, started potash production in the early 1990s. Due to various factors, the plant was closed in 2013. Now Michigan Potash Co. is in the planning stages to open a new plant nearby.



turn around in their backyard and sell it to a purchaser.”

Pagano believes Michigan Potash will be profitable by targeting markets that are accessible geographically, and are ready with the distribution capacity to handle the material. For the most part, that means producers of retail fertilizer as opposed to farmers who might be interested in buying the potassium directly; it’s simply a matter of targeting customers who won’t have issues like truck capacity.

“The world consumes between 55 million and 58 million metric tons of potash, and most of the mines in Russia produce about 2 million tons a year,” Pagano says. “What we’ve designed at 600,000 metric tons a year is a small facility, but it isn’t trivial to the Midwest farmer.”

That kind of strategy, Pagano believes, will allow Michigan Potash to thrive even with a facility where capacity is nowhere near the production batches of Russia or Canada. And it’s not as if the market in question is tiny. According to Pagano, Michigan consumes 300,000 metric tons of potash each year, while the nearby states of Illinois, Ohio, Indiana, and Wisconsin consume 610,000, 540,000, 400,000, and 300,000 tons, respectively. He says effectively serving those markets could unleash the type of production that would result in a doubling of overall U.S. potash production.

Many people believe Michigan’s arrival on the scene as a serious producer of potassium is overdue in some respects.

“In the U.S., there have been only three places where potassium is mined,” says William B. Harrison III, a Western Michigan University professor emeritus of geosciences and director of the Geological Repository for Research and Education, whose department has been tapped by Lansing to study the

of potash in Saskatchewan, and not-always-so-friendly Russia, which has almost as much but can’t get it here nearly as cheaply.

In an effort to reduce its dependency on both nations, the U.S. has tried to exploit the potash deposits it could find.

“We set up a potash reserve in New Mexico, and there are mines out there near Carlsbad Caverns,” Harrison says. “Later on there were deposits found in Utah, as well, but

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state’s deposits. “Michigan is one, but the Michigan mines didn’t come around until the 1990s, so it’s a relevant new component to that picture.”

Potash has always been in demand in the United States, and at one time Germany was the world’s leading supplier. That country hasn’t been a major player for some time now, and America had to look for other sources long before Germany’s production slowed given they cut exports to the U.S. during the world wars. That led the U.S. to Canada, which has hundreds of millions of metric tons

most of the U.S.-mined potash came from New Mexico. In the 1980s, a Canadian company came to Michigan and was involved with drilling some deep wells, looking for potash deposits in the center of Michigan. They were successful and started a pilot plant in Hersey (north of Big Rapids), on the border of Osceola and Mecosta counties. (The pilot plant) began commercial production in the 1990s and was active until last year.”

Harrison says the Hersey mine never came close to its full potential in terms of production capacity. Because the mine is very deep,

extracting the potash required an expensive process with specialized technology. Rather than simply digging a mine and then bringing up the potash, miners have to drill a well, pump water into the well, and then pump it back to the surface where they evaporate the water and collect the potash.

In order to begin full operations, Pagano says Michigan Potash needs to solve various logistical issues. These include working out rail and truck routes to more than 30 destinations, and determining port strategies for bringing some of the potash to the southern U.S.

Pagano believes the nearby port of Hammond, Ind., near Chicago, provides a logistical advantage that other potash producers don't enjoy because it's at what he describes as the "demand center" of the United States.

"The distribution network is an advantage of, I suppose, being in the location we're in — having stepped into an operation that has successfully produced potash for the previous 20 years, and never at the volumes it was supposed to have," Pagano says.

The relatively low cost of distribution to nearby customers is too crucial an advantage to give away by pursuing international markets, but that doesn't mean other parts of the U.S. are out of the question. "Because 600,000 tons is a small amount, you start to lose your advantage if you start turning it into an export play," Pagano says. "But even with that said, the southeast market like Georgia, Florida, Kentucky, and Tennessee are serviced right now by Saskatchewan and Russia, so we're looking at that."

The Florida agricultural season, Pagano notes, is between October and February, which presents an opportunity for the company to shift its production focus there during periods of lower demand in Michigan.

Still, turning the resource into a profit-generator has been a challenge for years. The Hersey mine has been operated by Plymouth, Minn.-based Mosaic Co., which has had success with other mines but struggled to get Hersey to capacity and ultimately stopped production altogether.

That opened up opportunities for Michigan Potash and fellow industry entrant Great Lakes Potash to take over the rights to mine Michigan's deposit. Global economic trends will also come into play, as the price of potash in recent years has been unstable on the

Potash Deposits in Michigan

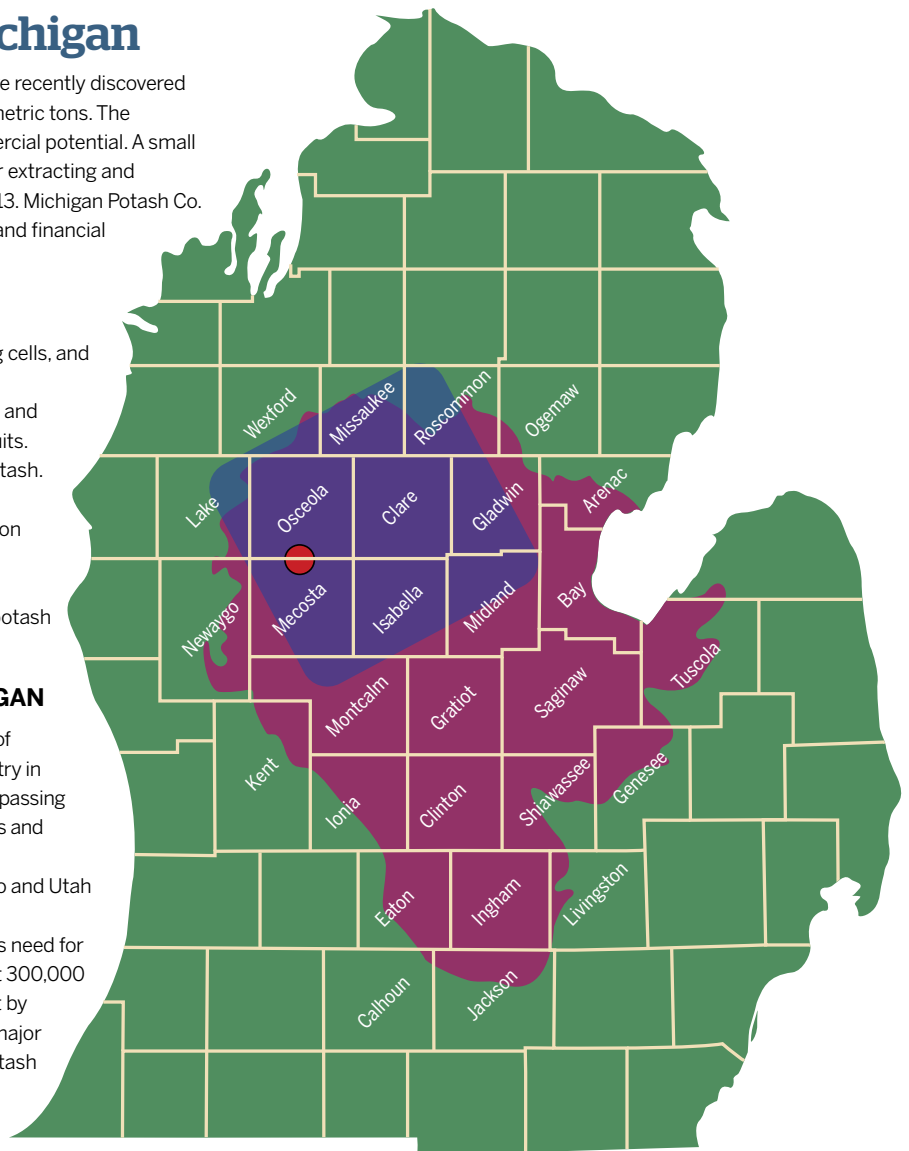
Spread across nearly 20 counties in mid-Michigan are recently discovered potash deposits believed to total tens of millions of metric tons. The rectangle represents the estimated area with commercial potential. A small manufacturing plant in Hersey (red dot) was used for extracting and refining potash in the early 1990s, but it closed in 2013. Michigan Potash Co. has plans to build a new plant once logistical details and financial plans are completed.

WHAT IS POTASH?

- Potassium is necessary for the function of all living cells, and is present in all plant and animal tissues. It is found in especially high concentrations within plant cells, and in a mixed diet, it is most highly concentrated in fruits.
- There is no natural or man-made substitute for potash.
- Potash is mined from ore about 7,000 feet underground or extracted from brine by means of solution mining, and is milled on the surface.
- Potassium chloride is the most widespread kind of potash fertilizers accounting for 95 percent of potash used as a fertilizer.

WHY POTASH IS IMPORTANT TO MICHIGAN

- Geologists believe the recently discovered deposit of high-grade potash could be the start of a new industry in Michigan worth as much as \$65 billion, possibly surpassing the state's historical oil and gas production revenues and triggering explosive job growth in the area.
- Michigan was one of three states, with New Mexico and Utah to have potash operations.
- Operations in Michigan would help fulfill the state's need for potash demand from farmers who consume about 300,000 metric tons each year. The state would also benefit by supplying Illinois, Ohio, Indiana, and Wisconsin — major agricultural states that use fertilizer made from potash — that consume 610,000, 540,000, 400,000, and 300,000 tons, respectively.



SOURCES: MICHIGAN POTASH CO., WESTERN MICHIGAN UNIVERSITY

international market, and producers have to be careful to invest in facilities and production wisely.

That's one of the reasons Pagano puts so much emphasis on a controlled, local market with its limited logistic and distribution costs.

Michigan Potash has leased nearly 14,000 acres in the immediate vicinity of the Hersey mine, but the mine itself is still under Mosaic's control and, at present, Mosaic has no plans to sell it or to attempt to mine any more potash, although it did sell its adjacent salt operation late in 2013.

Although Michigan's potash deposit has been a known entity for some time, it wasn't until 2008 that a Canadian company experienced in the potash industry began to seriously look at development. A happenstance phone call from an intern brought WMU into the picture, and that led to a better understanding of the resources and their potential.

"The mining company that was operating the mine in Hersey called us late in 2008," Harrison says. "They had hired a student intern to do a lot of their paperwork, and she was ready to go back to school. Someone at her company told her she had to do something about these core samples of potash from the earth. They had been involved in a coring program all over the state and had drilled 70 wells in nine counties in the northern part of lower Michigan, so they had that collection sitting there in a warehouse in Hersey, and wanted to

Increased potash production in Michigan also has the potential to boost agriculture in the state.

get rid of it. Well, this girl had enough sense to give us a call and asked if we would be interested in having it donated to the university. I told her I'd be happy to have it, and got in my pickup truck and drove up there the next day."

Pagano first became interested in Michigan's potash deposits in 2010, when he heard about the cores WMU had taken possession of and asked if he could have some of them tested. When the tests came back and indicated they were of exceptionally high quality, Pagano began to see the long-term potential of potash as a natural resource that could not only build a vibrant industry in Michigan, but also boost the state's independence in terms of access to a vital natural resource.

In 2011, the state of Michigan assigned the Michigan Geological Survey to WMU, which means Harrison and his colleagues have now

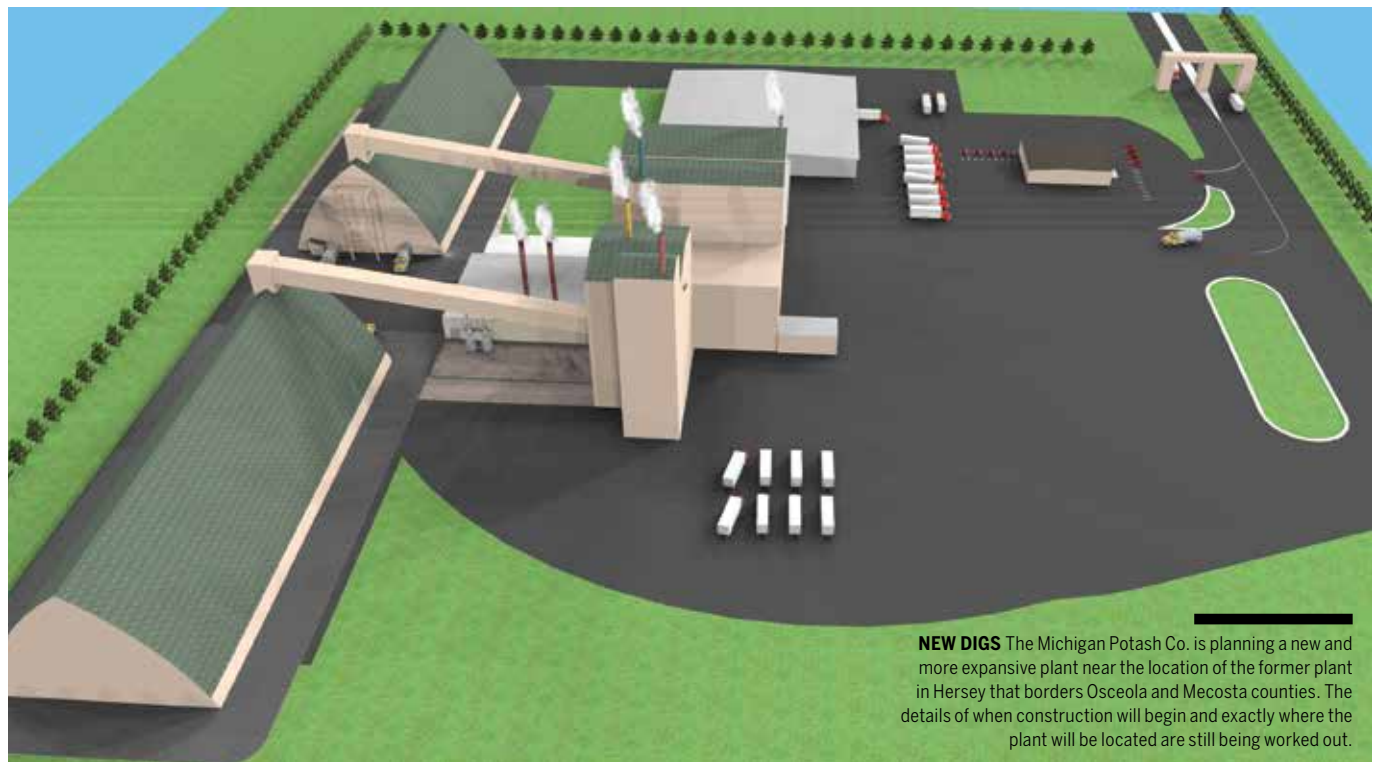
taken charge of studying the state's underground deposits and identifying the real resources that are present.

"It's at least tens of millions of tons," Harrison says. "It's a really good deposit." However, he says if you compare it to the deposits in Russia and Canada, which have hundreds of millions of tons, Michigan's potential market is not as big. "To get it from those places to Michigan, the transportation costs are pretty significant — maybe \$50 a ton extra. The idea would be that we'd have a local supply and, even though it would cost a little more, it would probably still be cheaper than the imported stuff," he adds.

Increased potash production in Michigan also has the potential to boost agriculture in the state, since farmers typically pay a premium on fertilizer because the potassium used to make it has to be sourced from far away. Fertilizer produced and sold here, using potassium sourced from Michigan mines, would be a less expensive alternative when all factors are considered.

Pagano says the next major development will be when Michigan Potash breaks ground on its production facility, but he will offer no prediction as to when that might be — he'll only reveal the checklist necessary to make it happen.

If Michigan's potash deposits act like a gold mine for the state — and it may well be — it's wise to remember what happened to a lot of those who went off to mine for gold. **db**



NEW DIGS The Michigan Potash Co. is planning a new and more expansive plant near the location of the former plant in Hersey that borders Osceola and Mecosta counties. The details of when construction will begin and exactly where the plant will be located are still being worked out.