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Fowler mine will be only active graphite mining operation in U.S.

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Connor Messler, exploration manager at Empire State Mine, stands next to the graphite deposit he discovered at the company's Fowler operations. Provided photo

FOWLER — Titan Mining will soon begin mining a large graphite deposit discovered on the Empire State Mine grounds in late 2023. It will be the only active graphite mine in the United States.

Titan is in the process of building a "demonstration plant" before going into a full mining operation. The company currently mines zinc.

“We’re building a demonstration plant, really small-scale plant inside our zinc plant, so we’re not building any new buildings,” said Joel Rheault, vice president of operations for Empire State Mine.

He noted that the extracted ore will be sent elsewhere because the site doesn’t have its own processing facility. Rheault said that once the company begins a full graphite mining operation, “we’d be looking at hiring 35 people.” However, that’s 2½ to 3 years down the road. Right now, there are 135 people working at the mine.

“[The demonstration plant] will allow us to mine a very small amount of graphite bearing ore, process it, and produce a graphite concentrate we can send to downstream refiners to basically qualify the product for various uses in the graphite market,” he said. “There’s still a lot of work to do before we get into, or confirm, we’ve got a full-scale operation. It’s certainly every indication it’s headed that way.”

He said a key use is as a component in electric vehicle batteries, to make rechargeable cells. Graphite hasn’t been mined in the U.S. for 50 years. China now controls about 90% of the market, Rheault said.

“There’s been a push over the last six or seven years to identify these critical materials and minerals and get a domestic supply,” he said. “Initial product segments targeted will be lubricants, refractories, drilling fluids and military spec graphite powders. Carbon fiber has been replacing a lot of traditionally metal parts in aerospace and airplanes. It’s a lightweight alternative to metals in a lot of different applications.”

One of the world’s largest graphite deposits is in war-torn Ukraine. Prior to the start of the war, the U.S. Geological Survey counted Ukraine as one of the world’s top 10 graphite producers, the Washington Post reported on Feb. 18.

“At one mine in central Ukraine’s Kirovohrad region, mining firm BGV has forecast the deposit to contain 500 million metric tons of graphite,” the Post reported.

“The Trump administration has floated a deal that would secure U.S. access to half of Ukraine’s mineral resources, amid a broader set of negotiations intended to end Russia’s war and guarantee future U.S. support to Kyiv,” the Post reported. “Although Ukrainian President Volodymyr Zelenskyy rejected the proposal, his officials have continued to mull alternatives, according to Ukrainian officials. Days after the U.S. proposal was introduced, Zelenskyy said he discussed ‘the joint development of critical minerals and rare earth resources’ with U.S. senators in Munich.”

According to a U.S. Geological Survey fact sheet on graphite, around 95 companies, mainly in the Great Lakes and Northeast regions, consumed 76,000 tons in 2023, valued at approximately $180 million.

The primary applications for natural graphite included batteries, brake linings, lubricants, powdered metals, refractory uses, and steelmaking.

“In the same year, U.S. imports of natural graphite were estimated at 84,000 tons, consisting of about 89.3% flake and high-purity graphite, 10.4% amorphous graphite, and 0.3% lump and chip graphite,” according to the USGS.

“Graphite consumption is expected to keep rising, mainly due to the expansion of the lithium-ion battery market,” USGS wrote. “According to Benchmark Mineral Intelligence, global graphite consumption by the battery industry has grown by 200% since 2019. The number of lithium-ion battery manufacturing plants in the United States increased to 10 in 2023, up from just 3 in 2019, with an additional 28 facilities still under development.”

Christian M. Schrader, a geology professor at SUNY Potsdam, said graphite hasn’t been mined in the U.S. because it’s been cheaper to import it from China.

“China has huge graphite resources, began exporting so much in the 1990s that the price went down and so U.S. companies had little reason to produce their own. Demand for graphite is increasing, especially due to the increase in production of lithium ion batteries, of which graphite is a component,” he said.

In December, China announced strict export limits on graphite, and “the U.S. feels it needs its own supply to meet its increasing demand at a reasonable price,” Schrader said. “[W]hat makes a mineral deposit into a profitable ore deposit is often economics rather than discovery. That is to say that there may be other mines that have exploitable graphite if the price increases.”

A commonly known use of graphite is in pencils. Some of the Fowler graphite may end up in pencils, however, "that segment of the graphite market is incredibly small. Lubricants, engineered products from carbon fiber, and battery anodes are the main uses for graphite," Rheault said.

He said so far, geologists have confirmed an ore deposit weighing 22 million tons containing 2.91% graphite at Fowler; however, they know it to be much larger than that.

"We've basically defined a deposit that's about 8,000 feet long, on a full extent we believe is over 25,000 feet," Rheault said.

He said geologists discovered the deposit while doing a routine core drilling examination.

"It was kind of discovered a little bit by accident or by chance, as it is with many discoveries," Rheault said.

The graphite mine will be done with traditional open pit methods. On-site processing will be similar to current processes used to extract zinc from zinc ore.

"It will be accomplished by crushing, flotation, filtering and drying to produce a graphite concentrate," Rheault said. "All our zinc concentrate is exported to Canada for smelting into zinc ingots."

Schrader gave insight into how the Fowler graphite deposit formed.

"The marbles which host the zinc deposits at the Empire State Mine represent marine deposits of limestone, a carbonate rock. These marine environments typically include organic material from dying plankton and other marine life, and that carbon can become graphite with metamorphism (later reheating of the rock during the long period of the formation of the Adirondack rocks about 1 to 1.3 billion years ago). That same metamorphism recrystallized the limestones into the marbles they are today," he said.

The St. Lawrence County Industrial Development Agency at its March meeting voted to approve loaning $1.5 million to Titan Mining to get the demonstration plant up and running.

The money comes from the Local Development Corp., an IDA subsidiary, the St. Lawrence River Valley Redevelopment Agency and the Development Authority of the North Country. Titan Mining is spending $3 million of its own money.

“The proposed project would assist in the retention of 135 jobs at the plant and the creation of five new jobs. We have been working with Empire State Mines on the planning for this project for some time and are pleased to be able to assist with this potential expansion of their operations,” said Patrick J. Kelly, CEO of the Industrial Development Agency.

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