

A New Era for the Iron Range?



Ernie Lehmann's dream of mining Minnesota's nonferrous metals edges closer to reality.

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For nearly half a century, Ernie Lehmann has been telling people that much more than iron ore and taconite can be found on Minnesota's storied Iron Range. Lehmann argues that substantial deposits of nonferrous metals— copper, nickel, platinum, and others—are also embedded in the region's ancient rocks.

Plenty of people are listening to him now, and shortly before Christmas, they marked a significant milestone in the long and tortuous journey to bring nonferrous mining to the state. The Minnesota Department of Natural Resources (DNR) presented the long-awaited draft of its environmental impact statement (EIS) for the first proposal to dig out these deposits. Lehmann was there, at packed meetings convened by the agency on the Range and in Blaine, flashing a smile that telegraphed his dream: "Let's dig."

The DNR statement has been nearly four years in the making. It examines the \$602 million proposal by PolyMet Mining Corporation (AMEX: PLM) to mine copper, nickel, and other valuable ores at a site near Hoyt Lakes. The EIS draft is one of the most extensive the agency has ever done: 1,800 pages backed up by more than 100 technical studies that consume another 14,000 pages.

The draft's conclusions? The PolyMet mine would affect the quality of surface and ground water, with discharges in some cases exceeding water quality standards; these effects could be mitigated through actions identified by the DNR, however.

Five more mining companies have indicated they could follow Vancouver-based PolyMet with their own nonferrous mines. Exploratory drilling grew explosively in the state in 2007 and 2008. Geologist Dean Peterson says Minnesota is “on the cusp of developing one of the world’s most important mining districts.”

The source of all this buzz is the 1.1-billion-year-old Duluth Complex, a crescent-shaped territory north of Duluth and on the northern end of the Mesabi Iron Range. In 1979, the DNR estimated that the rocky formations of this region hold 4.4 billion tons of crude ore containing copper, nickel, and precious metals. Peterson and others believe it to be much higher today due to additional discoveries made since 1979.

100-Plus Years of Production

Peterson heads exploration activities for Duluth Metals, Ltd. (TSX: DM), which has identified immense nonferrous reserves at its Nokomis Deposit site in the Duluth Complex. Using data from the U.S. Geological Survey and from other mining companies, Peterson estimates that this district contains huge portions of all U.S. reserves for a series of important metals: 99 percent of the country’s nickel, 88 percent of its cobalt, 51 percent of its platinum, 48 percent of its palladium, 34 percent of its copper.

Lehmann puts the value of the state’s copper, nickel, and platinum-group metals (there are several in the group, including palladium and rhodium) at up to \$300 billion.

Both men believe that unearthing these metals will usher in a new era for the Iron Range. While taconite mining continues there, they say nonferrous mining could mean 100-plus years of production, jobs, and tax revenues for the region. Proponents also stress that it could greatly reduce the country’s need to import strategic metals critical to industry and national security. Copper is used widely in construction and electrical materials; nickel for stainless steel and batteries; platinum and palladium in catalytic converters in automobiles.

Nobody is digging yet, though. Backers of nonferrous mining have learned to temper their enthusiasm with patience. Environmental concerns could still stop the PolyMet mine, which the company hopes to be building in the last half of this year.

The DNR set a February 3 deadline for comments on the draft EIS. Making revisions for a final statement could take well into the spring. Ultimately, PolyMet will need about 10 permits from the DNR and the Minnesota Pollution Control Agency, plus approvals from local governments, according to Marty Vadis, director of the DNR’s Lands and Minerals Division. (Speaking prior to February 3, Vadis said it was possible that those things could be wrapped up later this year; since then the DNR has received 3,500 public comments on the EIS draft, which seems likely to slow things down.)

Chris Krueger, an analyst at Northland Securities in Minneapolis, believes PolyMet could begin mining “in mid- to late 2011 at the earliest.”

The “Godfather” of Nonferrous Mining

Whatever happens, many credit Lehmann with keeping alive the prospects for nonferrous mining in Minnesota. “He’s been the glue that kept it together,” Peterson says.

Louis Fors Hill, CEO of Rockwood Capital Management in Arden Hills, has worked with Lehmann on exploration projects since 1995. He calls Lehmann “the godfather” of nonferrous mining in Minnesota.

“I’ve been a believer in the Duluth Complex since the early 1960s,” says Lehmann, a geologist and the president of Mining Minnesota, a trade group that advocates for nonferrous mining.

Lehmann was born in Heidelberg. Though his father’s family had converted from Judaism to Lutheranism, authorities in 1930s Germany viewed them as Jews. “The handwriting was on the wall,” Lehmann says. “It said to get the hell out of Germany.”

The family came to the United States, and Lehmann graduated cum laude with a geology degree from Williams College in Massachusetts. After a brief stint as a miner in Montana, he joined New York’s Kennecott Copper Corporation in 1951. He left the company in 1958 to form his own mining consultancy in Minneapolis.

The size of his firm has varied with the volatility of the mining business. At one point, he had about 40 staffers in a building on Loring Park. Today, Lehmann and three others work out of the Plymouth Building in downtown Minneapolis. His daughter, Kate, handles the finances. Jim Kiehne manages the office. Retired DNR executive Bill Brice uses the office in his work for Franconia Minerals Corporation (TSX: FRA). Lehmann cofounded Franconia, once led it, and remains an investor.

He is still active as a founder and investor in a total of five mining ventures, all in nonferrous metals. Two are for gold in Montana; one is for copper and gold in Nevada; a fourth, Vermillion Gold, LLC, is for gold in north-central Minnesota, and the fifth, Franconia, is for copper, nickel, and platinum group metals in the Duluth Complex.

His office is spilling over with geological reports, even after he has shipped tons of papers off to a nearby storage facility. He is a saver, but for good reason. Kate Lehmann says she has seen projects spring back to life that had been dormant for years—Franconia’s Birch Lake project in the Duluth Complex, for one. Lehmann began exploring for copper, nickel, and platinum group metals there in 1985. Now, Franconia has renewed those explorations.

Over the decades, Lehmann has led mining ventures and done consulting in Europe, Central and South America, Africa, and Southeast Asia. He no longer travels internationally for business, but still visits his Minnesota projects, often with Brice, who

says that he's become Lehmann's chauffeur. (It's a little like Driving Miss Daisy, Brice jokes.)

Kate Lehmann says her father still puts in "a good 40-hour week, and sometimes more."

Economic Impact of Nonferrous Mining

A research report published in March 2009 by the Bureau of Business and Economic Research at the University of Minnesota–Duluth measured the economic impact of nonferrous mining in the state in 2007 and projected its impact in 2013 (based on projects already being planned). The figures shown below represent primarily copper and nickel mining. They were compiled using data provided by these six companies: Duluth Metals, PolyMet, Kennecott/Rio Tinto, Franconia Minerals, Teck Metals, and Encampment Minerals.

Definition of Terms:

Direct Impact—Spending done by the mining companies for mining operations

Value Added—Contribution to the local economy in wages (which account for 80 to 90 percent of value added), rents, interest, and profits

Output—The value of the mining companies' production

Employment—The number of jobs (actual jobs, not full-time equivalents) that the companies provide

	2007 Direct Impact	2013 Direct Impact
Value Added	\$182,172,848	\$1,230,716,672
Output	\$271,453,664	\$1,833,876,696
Employment	531	2,646

Slow to Develop

Explorers first found copper and nickel deposits in Minnesota, near Grand Portage, in the 1920s. In 1949, a U.S. Forest Service road crew discovered chalcopyrite, a copper-iron sulfide, near Ely. Kennecott and International Nickel soon began exploring in the region.

But Lehmann says exploration was limited because the state would lease its land only for iron ore mining, not nonferrous mining. In 1957, Kennecott assigned Lehmann to work on regulatory and land issues involved in the Duluth Complex, but little happened until 1966. Then, Governor Karl Rolvaag directed the DNR to set up a leasing program for nonferrous mining, triggering a wave of new exploration. It ended in 1974, when legislators, concerned about the environment, imposed a moratorium on the leasing of mineral rights on state lands.

The moratorium clicked off in 1980. By 1981, Lehmann had picked up mineral rights options on 1.2 million acres of land in and west of the Duluth Complex. It was a speculative move that drew two global firms, Getty Mining Company and Billiton (then part of Royal Dutch Shell), into a joint venture with Lehmann.

He had lobbied hard at the State Capitol to get the moratorium lifted. Lehmann remembers seeking support from Attorney General Warren Spannaus. Maps of mineral deposits were so big that they had to be laid out on the floor of the attorney general's office, forcing those at the meeting to get on their knees to read them. In the end, Spannaus's backing turned the tide against the moratorium.

"What I like to say is that I had the attorney general of Minnesota down on his hands and knees," Lehmann says.

In June 1985, the DNR disclosed that it had found a seven-foot zone of platinum and palladium near Birch Lake. Four days later, Lehmann and his attorney had a lease to do exploratory drilling at the site, which Franconia now continues.

The Blandin Foundation facilitated a government-industry push in the late 1980s to establish a permitting procedure for nonferrous mining in Minnesota. That led the DNR to write rules governing such mining. Lehmann's firm represented the industry in those discussions.

But the mining companies still needed better technology to make mining cost effective. Lehmann says there was no efficient, environmentally friendly way to separate copper, nickel, and platinum group metals from one another once the ore had been mined. He says a breakthrough came in the late 1990s. Researchers commissioned by PolyMet developed a process that uses a sort of pressure cooker and puts the minerals into solution to precipitate them out.

Lehmann says the process minimizes the environmental impact of the sulfur that's also extracted from the ore by using the sulfur as a fuel for the pressure cooker. The resulting sulfate is neutralized with limestone or lime to form gypsum. The process eliminates the need for conventional smelters and their emissions, he adds.

Convincing Investors that "Minnesota is Not Wisconsin"

Besides PolyMet, Duluth Metals, and Franconia, three other companies are exploring deposits in the Duluth Complex: Vancouver-based Teck Metals, Ltd. (TSX: TCK.B), London-based Kennecott/Rio Tinto (NYSE: RTP), and Denver's Encampment Minerals (privately held). All could propose nonferrous mines by initiating their own environmental-impact processes with the DNR.

Lehmann estimates that together, the six companies have invested about \$150 million so far in their Minnesota projects, and that if all six build mines, it would call for \$4.5 billion in investment over the next decade.

Two advantages have positioned PolyMet as the first mover. In 2004, it acquired the mining assets of the former LTV Steel Mining Company for a bargain price from Ohio's Cliffs Natural Resources. PolyMet plans to modernize the Hoyt Lakes plant, near PolyMet's Northmet deposits of copper, nickel, and platinum group metals. Also, PolyMet has backing from Glencore, a Swiss transnational mining giant. Glencore has provided \$50 million in financing and promised another \$25 million.

In January, Duluth Metals unveiled a deal with another mining juggernaut, Chile's Antofagasta, PLC (LSE: ANTO.GB). The agreement provides financing of up to \$227 million in a joint venture to develop a mine at Duluth Metals' Nokomis site.

Funding remains a hurdle for Franconia, but that firm also announced new financing in January: a \$4.2 million private placement by U.S. and Canadian investors.

In 2006, Franconia said it hoped to be mining in 2010. But Lehmann acknowledges, "Timelines have a habit of slipping."

After the global meltdown in the fall of 2008, lenders shut down, stocks collapsed, and commodities prices cratered. Metals and mining stock prices have improved substantially since then, but they can be notoriously volatile.

Another challenge can be investors' perceptions of the business climate. "Our industry's problem has been to convince the outside investment world that Minnesota is not Wisconsin," Lehmann says.

At Crandon, in northeastern Wisconsin, a major discovery of copper and zinc deposits by Exxon Corporation in 1976 remains undeveloped. In 1997, state legislators slapped a moratorium on metals mining due to environmental concerns.

Lehmann cites rankings by the Fraser Institute, a market-oriented think tank based in Vancouver, to argue that Minnesota is much more hospitable to mining than Wisconsin. The institute's latest annual "policy potential index," a measure of the climate for mining in 71 states, provinces, and countries, ranks Minnesota 37th and Wisconsin 60th.

Over the years, University of Minnesota researchers have been far more supportive of mining than their peers at the University of Wisconsin have, Lehmann says. Mining

lobbies are much more powerful in Minnesota than in Wisconsin. Leaders from both political parties (U.S. Senators Amy Klobuchar and Al Franken, U.S. Representative James Oberstar, Governor Tim Pawlenty) support PolyMet's project.

Beyond that, the role of Iron Range miners—best symbolized by those who dug out the iron ore for the nation's vaunted "Arsenal of Democracy" in World War II—has been stamped into Minnesota's culture since the 1880s.

"Significant Concerns"

Still, staff at the Minnesota Center for Environmental Advocacy in St. Paul have plenty of reservations about nonferrous mining. The center and the Sierra Club commissioned Thomas Power, an economist at the University of Montana, to look at mining in Minnesota. He concluded that even ferrous mining is "a surprisingly small source of jobs and income" in northeastern Minnesota and poses significant environmental risks.

Power says that at full capacity, the PolyMet mine's 470 jobs would add four-tenths of 1 percent to employment in St. Louis County. He says the health care sector and retirement-related income have diversified the region's economy, and that they, not mining, are the area's future.

Mary Marrow, an attorney at the center, says that PolyMet's mine could present serious water quality problems. She worries about acid runoffs and mercury concentrations, other damage to wetlands, and the risk that cleanup costs won't be covered if mining companies go out of business. "The center hasn't taken a position on nonferrous mining," she says, "but at the same time, we have some significant concerns."

Underground mining poses less risk for the environment than open pit mining. PolyMet proposes an open pit; four of the other five mines being considered in the Duluth Complex would be underground, and the fifth would be a combination.

The mining industry retained the Bureau of Business and Economic Research at the University of Minnesota–Duluth to do its own study of metals mining in northeastern Minnesota. In a report issued last March, sharply at odds with Power's study, those researchers found that ferrous mining led all sectors of northeastern Minnesota's economy from 2001 to 2007, with a 34 percent share of gross regional product versus 12 percent for forestry, 11 percent for tourism, and 43 percent for all other sectors. The study also estimated that if all six nonferrous mines were up and running, they would have the effect of adding 5,300 jobs and \$2.2 billion in annual production to the region's economy.

Taxes and royalties to governments from nonferrous mining could be substantial. Two years ago, the DNR estimated that royalties from the mines planned by Duluth Metals,

Franconia, and Teck would produce \$1.4 billion over 25 or 30 years for Minnesota's Permanent School Trust Fund.

In today's economically stressed times, such benefits might ultimately tip the scale to bring this new kind of mining to the state. That would be sweet music for Ernie Lehmann. But even the godfather concedes, "You never really know what you've got until you mine it out."

Would nonferrous Mining Jobs Last?

"Between 1979 and 2005, labor productivity in Minnesota iron mines tripled. Since levels of production did not triple, but declined modestly, employment declined by 73 percent. Even if production had remained constant, employment would have declined by 67 percent. This pattern of significant declines in employment despite stable or increasing levels of production can also be found in almost every mining sector from copper to coal. For adjacent communities that do not have diversified economies and rely heavily on mining, this pattern of labor-displacing technological change means regular layoffs and relatively high unemployment rates, even when high levels of production are maintained."

—From *"The Economic Role of Metal Mining in Minnesota: Past, Present, and Future,"*
a report for the Minnesota Center for Environmental Advocacy and the Sierra Club, by
Thomas Power, University of Montana