

# Research & Development Profiles



## *ME Elecmetal: Innovation Casts Foundry as a Leader*

When the United States rolls out the next space shuttle for launch at John F. Kennedy Space Center, the gigantic transporters beneath it will feature heavy-duty steel track pads produced at ME Elecmetal in Duluth, Minnesota.



*Scrap metal is melted at ME Elecmetal in Duluth and recast into wear parts.*

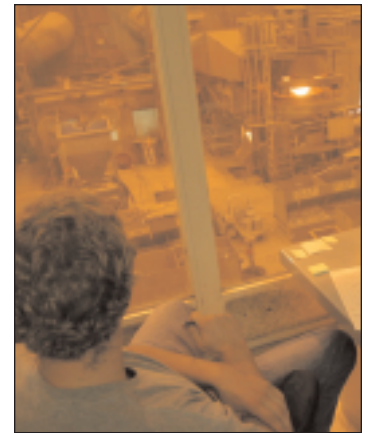
ME Elecmetal's primary business in Duluth involves melting scrap metal and recasting it into high-performance mill and crusher liners, track pads, slurry pump components and other wear parts for the mining industry. Acquired by Chilean-based Elecmetal in 2001, the once small,

regional ME foundry has emerged as a worldwide supplier of impact- and abrasion-resistant steel castings. Its reputation for quality control and innovation attracted the prestigious and lucrative NASA contract.

Plant manager Royce Larson credits research and development (R&D) for keeping ME Elecmetal competitive in the global market and ensuring stable jobs for the company's 125 local workers. Minnesota Power recently provided a \$20,000 R&D grant to help the Duluth foundry acquire, install and test technology that may reduce its energy use, improve productivity and lower costs.

The pilot project is employing gas-injection technology called CoJet®, developed by Praxair, to deliver a supersonic, laser-like jet of oxygen into molten steel during the refinement process. The oxygen removes hydrogen and nitrogen contaminants released during melting. ME's current refinement process adds oxygen

during a window in which furnaces are shut down, and reheating the metal expends a lot of excess energy. CoJet® could potentially improve energy efficiency and speed up production by eliminating this downtime. It has been used successfully in steel mini mills but not on this smaller scale in the production of alloy steel.



*Technology being tested would eliminate furnace downtime, speed production and save energy.*

"The research we're doing has never been done in this type of a foundry before, but it could lead to huge savings if we can make it work," Larson said.

The alloy produced at ME Elecmetal in Duluth is a mixture of iron and carbon with key elements (such as chromium, manganese, molybdenum and vanadium) that create the strength and abrasion-resistant properties needed for wear parts. Early tests of CoJet® have blasted these critical elements out of the molten mixture. This requires that they be added back in through another step. Company officials are exploring whether the time and energy saved by CoJet® during refinement outweigh the additional costs of purchasing and readjusting the alloys. Complicating the issue is the fact that market prices for these ingredients have skyrocketed in recent years.

### *R&D Contact Information*

For more information, please call  
Minnesota Power's Conservation Improvement  
Program toll-free at 800-228-4966 ext. 2902.

## ***"Energizing Our Region" through Conservation Improvement***

Minnesota Power's Conservation Improvement Program (CIP) works with local leaders, businesses, community groups, other energy providers and government entities to help customers reap the economic and environmental benefits of sustainable energy savings. Minnesota Power and its partners accomplish this through research and development (R&D), education, evaluation and direct impact initiatives.

### ***Research and Development***

Minnesota Power collaborates with manufacturers, distributors, customers and community groups to identify R&D projects that solve problems, optimize existing ecosystems or business operations and support the mission of participating organizations.

Project allocations are determined using many criteria. These include the level of innovation in the technology, process or application; commitment of resources from other public and private partners; ability to solve current and future customer and market challenges; energy savings and environmental benefits; project feasibility; and impact on Minnesota Power and its system.

Technologies and processes that may qualify for R&D support include:

- Renewable energy technologies
- Process improvements
- Lighting/controls
- Motors/controls
- Energy management systems
- Refrigeration systems
- HVAC systems
- Market assessment: segment and target market profile
- Pilot studies

### ***Other Minnesota Power Products and Services***

In addition to research and development support, MP CIP offers commercial and industrial customers other energy efficiency products and services. These include energy audits, PowerGrant rebates, dual fuel, storage/off-peak services, outdoor and area lighting and economic development assistance.



*Track pad components like this one will help carry the next U.S. space shuttle to its launching pad.*

## ***Research Could Have Significant Implications***

"R&D is never a slam dunk, it's a process of trying to figure out something new," Larson said. "Researching CoJet® is one of our company's top technology goals, and it could have significant implications."

"Research projects can provide valuable information and establish distribution networks necessary to encourage businesses to invest in new and under-utilized technologies," said Matt Haley, a consultant hired by Minnesota Power to help businesses explore and utilize energy saving technology.

Minnesota Power estimates the energy savings of CoJet® could amount to 1,500,000 kWh per year, which

translates to an annual cost savings of \$53,000(?). Permanently installing the technology would qualify ME Elecmetal for a \$53,000 PowerGrant rebate.

Larson applauded Minnesota Power's interest in helping local companies stay competitive.

"We appreciate Minnesota Power's help and look forward to working out the kinks so we all can benefit," he said.

With high potential technology such as CoJet®, high profile projects such as the NASA space shuttle transporter components, and powerful partners such as Minnesota Power, the sky is the limit for ME Elecmetal.