

BLOOM LAKE MINE RESTART

BBA

CANADIAN CONSULTING
ENGINEERING AWARDS 2021



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RE-OPENING THE BLOOM LAKE MINE IS ONE OF THE GREATEST RECENT SUCCESS STORIES IN QUÉBEC'S MINING INDUSTRY.

INNOVATION

Bloom Lake mine, the first major iron ore project in eastern Canada since the 1970s, is located 13 km north of Fermont. Re-opening the site, which had been abandoned by the former owner, is one of the greatest recent success stories in Québec's mining industry.

A FLAGSHIP PROJECT FOR QUÉBEC, REQUIRING MAJOR INVESTMENTS

At the request of the new owner, Quebec Iron Ore (QIO), BBA was retained as a key partner of the integrated restart team. The project involved numerous detailed engineering, procurement and plant optimization mandates, as well as preparation for commissioning. BBA played a leading role, applying creative solutions to the many structural changes required to restart the mine, such as commissioning a new 3.5 km conveyor linking the mine to the mill and upgrading the concentrator.

THINKING OUTSIDE THE BOX TO OPTIMIZE RESULTS

As an active and committed partner, BBA went beyond expectations in carrying out these mandates, using its field experience to surpass objectives targeted in the feasibility study. BBA's proposal for a low-cost solution to optimize the tailings pumping system made it possible to prevent the planned construction of a second booster pumphouse, significantly reducing the investment required. Adding variable speed drives on the recovery circuit pumps—considered critical to operations—was another innovative solution used to better control the process and increase plant efficiency. Similarly, optimizing the concentrator process resulted in gains by correcting various weaknesses, and contributed to a faster increase in production than that anticipated in the feasibility study.

A VISUAL AND INNOVATIVE COMMISSIONING STRATEGY

To maximize the client's autonomy during the various phases, our experts developed a detailed implementation plan based on an innovative visual approach. A key element of the strategy was creating a block diagram, representing the entire plant, illustrating each phase and standardizing stakeholder language. These accurate reference tools enabled the client to quickly complete most of the phases with minimum work by BBA specialists.

COMPLEXITY

BBA drew on its teams' creativity to redesign engineering solutions to make them compatible with existing facilities, while staying on budget.

THE CHALLENGE OF UNITING MULTIPLE PARTNERSHIPS

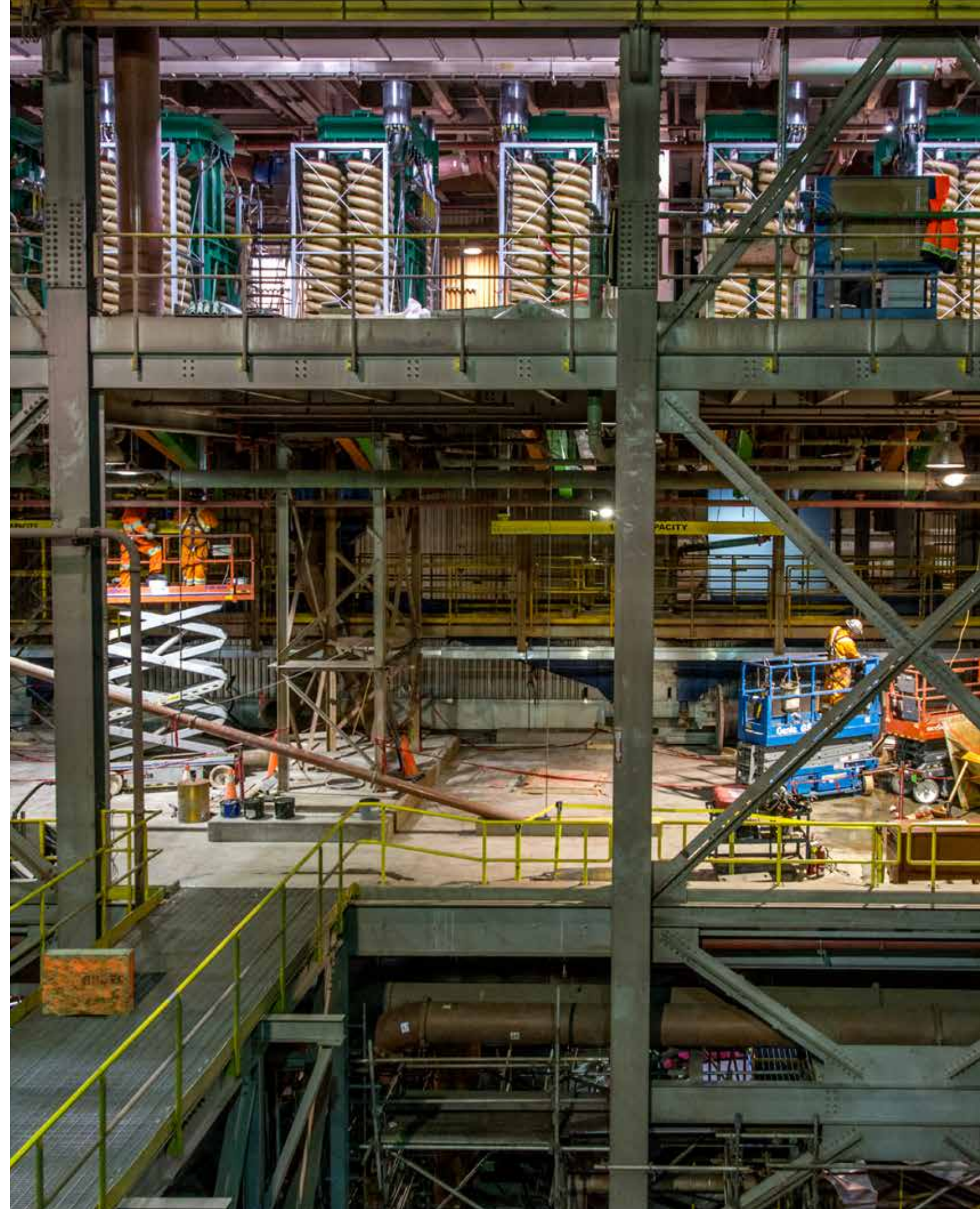
Given the project's scope, BBA's expertise proved to be a major asset in ensuring simultaneous management of various construction contracts, particularly with respect to meeting the commissioning deadline (February 2018), cost control and procurement issues. For example, BBA had to react quickly to find an alternative solution when a U.S. supplier was affected by Hurricane Irma and could not deliver some of the piping for the mine's tailings in the fall of 2017.

REDEFINING PRIORITIES IN REAL TIME

With the facilities having been left idle for a long time, BBA adapted and reprioritized as needed to successfully deal with many unforeseen situations, without compromising safety, performance and efficiency. Notably, it drew on its teams' creativity to redesign engineering solutions to make them compatible with the existing facilities, while staying on budget.

REACTING QUICKLY TO MAJOR UNEXPECTED ISSUES

Three months before the final deadline, an inspection of the facilities revealed that an ore chute more than 30 metres high was obsolete and that the mine's restart hinged on replacing it. Once again, BBA demonstrated its responsiveness in completing this work, which involved reinforcing structures and coordinating mechanical, electrical and manufacturing work.



SOCIAL AND ECONOMIC BENEFITS

A MAJOR INVESTMENT OUTSIDE MAJOR CENTRES

This flagship project involved investments on a rare scale for all of Québec and the North Shore, representing nearly \$5 billion in 100% Québec-supplied infrastructure. It capitalized on all the engineering expertise developed in the province, including that of BBA, which, through its innovative solutions, helped limit capital expenditures to ensure project viability.

Competitive on a global scale, the Bloom Lake Mine received awards at the 2018 Prix Créateurs d'emplois du Québec and the 2019 S&P Global Platts Global Metal Awards.

A STRONG PRESENCE AT THE HEART OF THE COMMUNITY

Local communities are benefitting the most from this project. Committed to its policy of inclusion of different cultures and of diversity, BBA also entrusted a significant role to companies from the Indigenous community, like Shetush Ondel in Sept-Îles, which was selected for the electrical work. A long-term agreement with the Mani-Utenam Band Council (ITUM) also helps the Innu benefit from the project in many ways, while respecting their traditions.

Strongly established in the region, Quebec Iron Ore is a major employer, owning 29 residences, two hotels and a high-end entertainment centre.

580 jobs

for people from all over Québec (*fly-in/fly-out*)

\$65.8 million

in salaries and benefits

\$5 million

in community investments

\$196 million

to local suppliers

*

* Source: 2019 Sustainability Report, Quebec Iron Ore



ENVIRONMENTAL BENEFITS

ENVIRONMENTALLY COST-EFFECTIVE APPROACHES

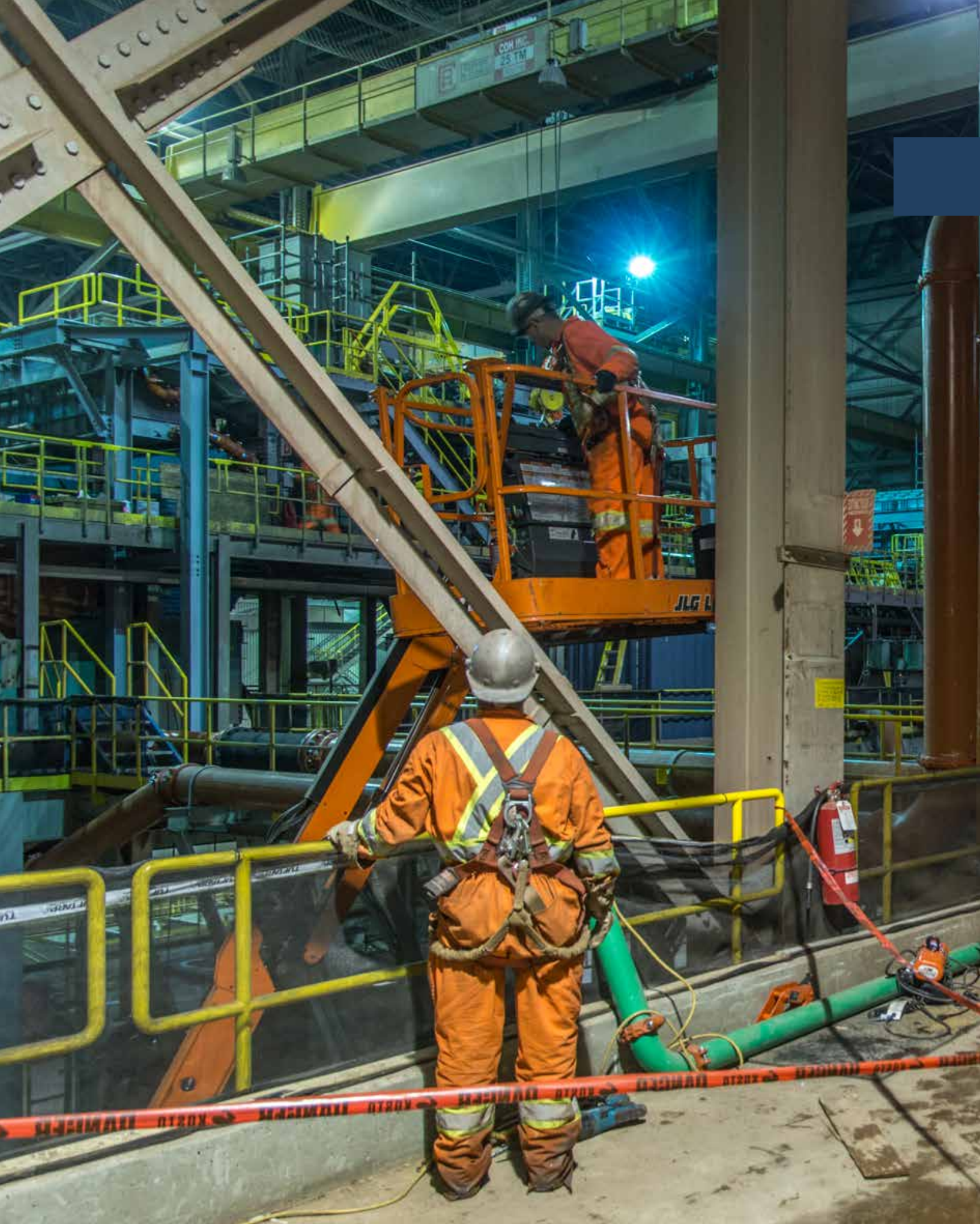
The Bloom Lake project, which rehabilitated existing unused facilities, was designed to maximize the life of the facilities while minimizing environmental impacts, with a view to sustainable development and preserving ecosystems. Initiatives included replanting 22 hectares and reusing 5% of mining wastewater. This environmental prevention approach was deployed and continues to be rigorously applied.

ADDED-VALUE ENVIRONMENTAL SUPPORT

Several tens of millions of dollars were spent to prevent contaminating the lakes surrounding the site, because the water has been in contact with the ore and the tailings must be isolated. BBA's teams were closely involved in planning, installing and optimizing the numerous surface water pumping stations. A seasoned contract administrator was also brought in to help manage the construction of the new dams, which were essential to the tailings deposition plan.

LOWERING EMISSIONS

BBA was actively involved in several key operations to reduce CO₂ emissions: replacing the fuel oil boiler with an electric one, commissioning an overhead conveyor, greatly reducing truck traffic and upgrading the concentrator and suppression pumping plant. These actions and many others have served to eliminate nearly 24,000 tonnes of annual emissions.



MEETING CLIENT NEEDS



BBA made a good number of improvements to optimize our plant's performance and significantly reduce our operating costs. Using BBA's procedures and detailed block diagrams, our team easily carried out the commissioning activities according to the planned sequence, and entirely on its own. All these efforts made it possible for us to restart mine operations on time and on budget."

- Alexandre Belleau,
Chief Operating Officer of Quebec Iron Ore

A FLEXIBLE AND INNOVATIVE APPROACH

The client had high expectations for the Bloom Lake project, as this major mining site had to be fully commissioned within a tight timeframe, with many unknown factors and technical challenges. True to its corporate values, BBA was proactive and demonstrated its flexibility with creative and high-performance solutions. BBA's constant onsite presence positions it to find new approaches for achieving results that go beyond the initial mandate and create added value for the client. The firm's philosophy is based on three essential pillars: creation of adapted processes, team commitment and innovation to foster better performance and sustainability.

GOOD PREPARATION FOR INCREASED PRODUCTIVITY

BBA's extensive project management expertise, particularly in the area of commissioning mining facilities, led to smooth and flexible cost planning and management.

ABOUT BBA

BROADER THINKING. ON-POINT ENGINEERING.

BBA has been providing a wide range of consulting engineering services for over 40 years. Engineering, environment and commissioning experts team up to quickly and accurately pinpoint the needs of industrial and institutional clients. Recognized for its innovative, sustainable and reliable solutions, the firm stands out for its expertise in the fields of energy, mining and metals, biofuels, and oil and gas. BBA has 12 offices across Canada to provide local support and offer clients increased onsite presence.



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