



Left, part of the reduction plant where nine smelting furnaces convert ilmenite ore into titaniferous slag and liquid iron.

New processes, new markets

Pig iron, steel, metal powders, titanium dioxide – Monica Callon looks at Rio Tinto's sophisticated metallurgical processing complex near Montreal in Canada.

Location photos by Anthony Bannister and Simon Ménard

At the narrows of the St Lawrence and Richelieu Rivers, some 80km northeast of Montreal, Quebec in Canada, sits Sorel-Tracy, home to the metallurgical processing hub of Rio Tinto, Fer et Titane (RTFT).

About 100 football fields in area, this one-of-a-kind hub ranks among Rio Tinto's most complex businesses. It transforms sparkling dark grey ilmenite ore into pigment feedstock used to turn virtually everything white, from paint to running shoes. It also converts ilmenite into steel, iron and advanced metal powders that, among other things, keep cars braking and wind turbines spinning.

This vast operation processes sequined ore extracted at RTFT's open pit mine at Lac Tio in Quebec, the largest massive rock ilmenite deposit in the world. From Lac Tio, the ore travels by rail through forests and craggy limestone cliffs inside Mingan Archipelago National Park to

the fresh sea air of RTFT's Havre-Saint-Pierre port. Here it journeys 880km downstream to RTFT's docks at Sorel-Tracy. And that's where the innovation really begins.

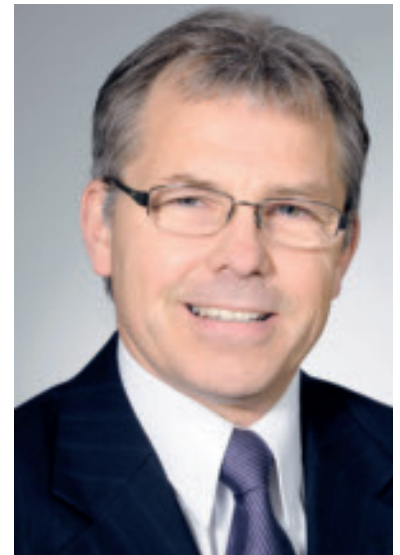
Moving into demanding, high end markets like the windmill industry is just another step forward for RTFT, an innovator since its beginnings in 1948. Only two years after an ambitious start up, the Quebec Iron and Titanium (QIT) Corporation began processing ore. It became the first company to exploit both titanium dioxide (TiO₂) and iron from ilmenite. Today it is the world's leading producer of titaniferous slags.

This ingenuity combined with a series of bold moves continues to drive the business forward in several increasingly competitive industries. From developing an upgraded slag called UGS™ to a new model for just-in-time delivery for the auto industry, RTFT relies on its grey matter to stay ahead of global competitors.

When the bottom fell out of the commodities market following the economic crash of 2009, RTFT faced a year of considerable belt tightening. Not postponing tough decisions paid off as the business emerged stronger than ever.

New RTFT president Dominique Bouchard, who spent the previous three decades immersed in aluminium at Rio Tinto Alcan, says RTFT's growing ability to turn on a dime and meet the evolving demands of its 1,000-plus global customers means it's here to stay. Bouchard and his team are currently shaping a plan to keep RTFT thriving for another 50 years. The plan's

Dominique Bouchard, president of RTFT since March.



vision is twofold: to be the world's highest quality TiO₂ feedstock manufacturer as well as to ramp up production by 50 per cent over the next five years.

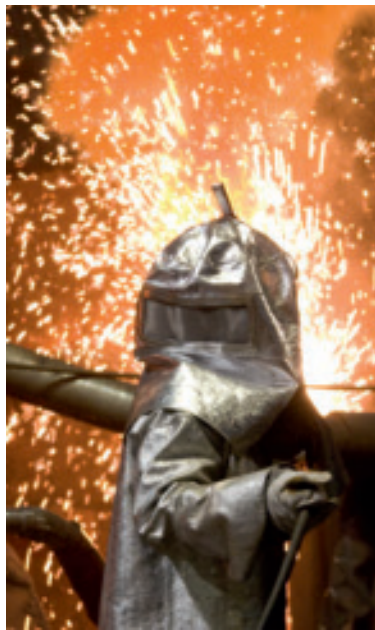
The first glimmer of the viability of this ambitious vision appeared on the shores of Sorel-Tracy on 11 June, 2009 when employees unloaded a vessel carrying 35,000 tonnes of ilmenite extracted from the new QIT Madagascar Minerals (QMM) project at Fort Dauphin, Madagascar. That day RTFT celebrated the culmination of a 20 year joint effort between Rio Tinto and the Madagascan Government to supply up to 2.2 million tonnes of ore so fine it resembles Bali's black sand beaches.

Bouchard says: "Investments made in Madagascar for the QMM project were very important to the growth of RTFT. What's more, because of its complexity, the project has become a model for future projects in Africa

tonnes of liquid iron converted into steel billets, pig iron and metal powders at Sorel-Tracy every year. “Having three different product lines stemming from liquid iron means we can shift our production focus to match customer demand, which makes us a very agile Goliath,” explains Bouchard.

Most years just over half of the liquid iron is cast into square or round steel billets, with over 100 recipes used to make piano wire, nuts, bolts and screws as well as tubes and casings for oil and gas. The remainder is split between pig iron and metal powders. Greg Lavallée, executive director of sales and marketing for metal powders, oversees one of RTFT’s most promising new markets, which

Below, a lanceman in the pig casting section, blows oxygen into the ladle to remove any waste from the molten iron. Right, an operative in the powders plant. Bottom, at Sorel-Tracy, the arrival of a new ship loading tower equipped with silencers on the dust collector outlets has helped reduce noise and dust.



takes the iron-rich by-product beyond its famous role as a fortifier in most breakfast cereals. Powders are worth over double per tonne of pig iron, and their strength and competitive price means they are muscling in on steel's territory in a number of niche markets.

"Twenty years ago, connecting rods in automobiles were only made from forged steel. Today half of them are made from powdered metals," explains Lavallée. With over 500 recipes to meet customer needs, metal powders are one of RTFT's most lucrative and fastest growing segments.

Not content to rest on its laurels, RTFT's pig iron division is also cornering new applications, most recently providing foundries with iron to cast eight tonne hubs for windmills. Winning a client's trust is key, says Jean-Marc Lapointe, vice president of sales and marketing, America, Rio Tinto Iron and Titanium (RTIT). "We're selling to customers with very specific requirements – they can't afford to scrap a huge casting and with our metal they know they won't have to."

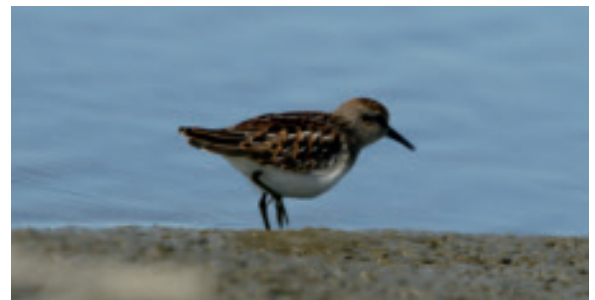
The quest for perfection is equally strong when it comes to employee safety. Although RTFT boasts an admirable safety record including a three fold reduction in total injuries from 71 in 2004 to 24 in 2009, its ultimate goal is zero.

After a number of employees took early retirement packages following the 2009 downturn, RTFT suffered an experience gap. Despite a solid safety record in Havre-Saint-Pierre, several serious near misses occurred within a short while. Bouchard's response was immediate and unequivocal. He shut down the Lac Tio mine not once, but twice, a month after he came on board.

The silence of a closed mine did not fall on deaf ears. Following the shutdowns, the union and management talked at length to agree on priorities and implement an action plan so as to manage risks better.



Some of the 103 islands of the Lac-Saint-Pierre Biosphere Reserve on the outskirts of the Sorel-Tracy facilities. Right, the surrounding areas are rich in wildlife diversity.



Bouchard points out that when your mine is close to a national park and your production facility next door to a UNESCO Biosphere Reserve, working to be more sustainable is non negotiable. Every year outdoor enthusiasts canoe, hike and camp nearby, spying on the region's heron, Atlantic puffins, whales and other 500-plus bird and fish species.

RTFT prides itself on its transparent, open door policy with the community on environmental matters and promptly responds to residents' concerns – which mainly revolve around dust and noise. It monitors both emissions closely and uses domes to cover the piles of fine Madagascar ore in its yards at the Sorel-Tracy complex. Its team of environmental officers is on call around the clock in the event of an incident.

"We're taking the same approach to reducing emissions and waste as we do to identifying operating efficiencies. We examine every aspect of our complex business, from excavation to delivery at the customer's door, looking for ways to streamline our supply chain using continuous improvement tools and to reduce our environmental footprint," says Bouchard.

"Tapping into our technological and process ingenuity is the key to success in both instances as well as to becoming an even more sustainable industry leader. That's our goal – nothing less."

Find out more at www.qit.com

Monica Callon is a freelance business writer based in Montreal, Canada.