

# 2022 Sustainable Development Report

## Rio Tinto Iron and Titanium Quebec Operations

Havre-Saint-Pierre Mining facilities  
Sorel-Tracy Metallurgical and critical minerals complex

# A Word from Management

Hello,

I am very pleased to present a summary of the achievements of Rio Tinto Iron and Titanium (RTIT) Quebec Operations through our 2022 Sustainable Development Report, which gives an overview of our performance in health, safety, environment and hygiene, and outlines our key achievements. It includes highlights from the Havre-Saint-Pierre Mining facilities and the Sorel-Tracy Metallurgical and critical minerals complex.

On 11 October, we held a press conference at which we announced a decarbonisation partnership between Rio Tinto and the government of Canada. This agreement involves an investment of nearly \$733 million over the next eight years aimed at decarbonising operations at the Sorel-Tracy Metallurgical and critical minerals complex, positioning us as a centre of excellence in critical minerals processing. These major investments position RTIT Quebec Operations for future success and strengthen its reputation in Canada and North America.

The year 2022 was also marked by the production of the first kilograms of quality scandium oxide at the scandium demonstration plant, just 16 months after construction began. This is the first scandium plant in North America. Our plant recycles tailings from the UGS plant and offers customers production in a stable geopolitical context.

Another priority for RTIT Quebec Operations is mobilising and engaging our employees. We use various strategies to attract the best talent, develop their skills within our organisation and retain them throughout their career. This involves, notably, discussions with these individuals to understand their reality and identify their needs and expectations. In keeping with this, in September 2022 we held our first networking event with employees celebrating one year of service at RTIT Quebec Operations. It was a great opportunity to converse, exchange ideas and get to know their perspectives.

Do not hesitate to share this report with your network and to send your comments by email: [RTIT.info@riotinto.com](mailto:RTIT.info@riotinto.com).

Enjoy your reading and take care.



**Jean-François Gauthier**  
Executive Director, Rio Tinto Iron  
and Titanium Quebec Operations

## Thank you to our collaborators:

Jean-Sébastien Abran, Richard Boivin, Annie Bourque, Josianne Brousseau, Dre Michelle Cinq-Mars, Howard Cossitt, Maxime Dufour, Victor Duhaime, Kavens Dupuis, Andrée-Anne Drouin, Valérie Fortin, Mathieu Heppell, Amélie Larochelle, Marie-Noël Lebrun, Éric Métayer, Alexandra Millette, Philip Pineault-Jomphe, Julien Solana, Narcisse Takou, Julie Tellier, Rayen Tanabene and Julie Traversy.

**Cover photo:**

Jakob Stausholm, Justin Trudeau, Sophie Bergeron and François-Philippe Champagne  
11 October 2022



# The mission of Rio Tinto Iron and Titanium Quebec Operations

RTIT Quebec Operations continues to position itself around its six priorities to reach its full potential.

During the year, we demonstrated our agility and flexibility by adapting production to meet customer demand.



At the start of 2023, RTIT Quebec Operations updated its vision to position itself for future success. This renewed vision is rooted in the strategic foundations and pillars on which we base our strategy.

## Table of contents

**4** Innovation

**7** Health and safety

**10** Environment and communities

**18** Commitment

**20** Operational excellence



# Innovation

# Decarbonisation partnership between Rio Tinto and the government of Canada

On 11 October, we announced a partnership with the government of Canada to invest up to C\$733 million over the next eight years to decarbonise our Rio Tinto Iron and Titanium Quebec Operations in Sorel-Tracy, Quebec.

With this initiative, we will position our business as a centre of excellence for critical minerals processing.

These major investments position RTIT Quebec Operations for future success and strengthen its reputation in Canada and North America.

The partnership with the government of Canada will support technological innovations that represent a first step toward reducing greenhouse gas emissions from RTIT Quebec Operation's titanium dioxide, steel and metal powders business by up to 70%.

It will also progress initiatives to diversify RTIT's product portfolio, reinforcing Rio Tinto's leadership as a North American supplier of critical minerals for key growth sectors such as electric vehicles, 3D printing and aerospace.

The government of Canada is investing up to C\$222 million over the next eight years to support these initiatives through its Strategic Innovation Fund (SIF), which supports large-scale, transformative and collaborative projects that will help position Canada to prosper in the global knowledge-based economy.

**The partnership will support projects such as:**

## **BlueSmelting™**

The BlueSmelting™ project is an ilmenite smelting technology that could generate 95% less greenhouse gas emissions than RTIT Quebec Operation's current reduction process, enabling the production of high-grade titanium dioxide feedstock, steel and metal powders with a drastically reduced carbon footprint.

A demonstration plant was built in 2022 to test and validate this technology developed by the scientists at the Critical minerals and technology centre.

Construction of the demonstration plant, which will have a capacity to process up to 40,000 tonnes of ilmenite ore per year, is expected to be completed in the first half of 2023.

If fully implemented, the BlueSmelting™ project has the potential to deliver a reduction of up to 70% in RTIT Quebec Operation's overall greenhouse gas emissions, a decrease of approximately

670,000 tCO<sub>2</sub>e based in 2021 emissions or the equivalent to removing 145,000 cars from the road.



## Increasing scandium oxide production

Having become, in 2022, the first North American producer of scandium, a critical mineral used in solid oxide fuel cells and aluminium alloys, Rio Tinto is planning to quadruple its production capacity to reach up to 12 tonnes of scandium oxide per year, from the current nameplate capacity of three tonnes.

New modules will be added to the existing plant, which uses an innovative process to extract high purity scandium oxide from the waste streams of titanium dioxide production, without the need for any additional mining.

The project will cost between C\$30 and C\$35 million, and production of scandium oxide is expected to start in 2024. This is a second phase, and the partnership with the government of Canada will span other phases as well.



## Integrating titanium metal into the portfolio

Rio Tinto is partnering with other players in the titanium industry to advance the development of a new process for extracting and refining titanium metal, a high-performance material used in the medical, aerospace and automotive industries.

A pilot plant is being set up at the Metallurgical and critical minerals complex to validate this low-cost, low-impact technology that does not generate direct greenhouse gas emissions. The plan is scheduled for completion by the end of 2023.

This project has the potential to greatly increase the production of raw titanium metal in North America, while strengthening the security of supply for this critical mineral for Canadian and American manufacturers.

We held a major event to announce the partnership and the investments. People from various areas within the organisation put in a great deal of work over several weeks so that we could present Rio Tinto Iron and Titanium Quebec Operations to high-level dignitaries from the government of Canada and Rio Tinto.



# Health and safety

# Highlights

Safety remains an absolute priority at RTIT Quebec Operations. Our main goal is to provide a healthy and safe working environment.

The actions we have taken favour a collaborative approach, facilitated by the Rio Tinto Safe Production System (RTSPS), which has been integrated in certain sectors, while supporting efforts in risk management.

The quality of interactions between employees and managers in the field is essential to improving our operations and, more importantly, to ensuring that everyone returns home safely.

## Special commendations

### HAVRE-SAINT-PIERRE:

- During the annual convention of the Québec Mining Association, Jacquelin Thériault, Procurement supervisor, and Lucie Jomphe, Drilling and Blasting supervisor, were recognised for reaching the milestones of 150,000 and 50,000 hours, respectively, in 2021 without a lost time incident.

### SOREL-TRACY:

- The Metallurgical and critical minerals complex established its safety credentials with the results of the Safety Maturity Model (SMM) internal audit, conducted on 50 business units. The MSS internal audit is a Rio Tinto process for measuring health, safety and environmental markers in its facilities.
- The year 2022 marks the end of Occupied Building project, which impacted, directly or indirectly, all plant employees. This major project, carried out over almost 10 years, was aimed at reducing hazards related to operational safety.

## Health and safety performance

Indicators as at 31 December 2022



\*Amount of lost time, restricted activities and medical appointments x 200,000 / hours worked



Most injuries are hand-related. RTIT areas are implementing action plans to reduce this type of injury.



# Health and industrial hygiene

## Sorel-Tracy employees exposure samples

- Analysis of 600 samples (for 118 similar exposure groups) to measure employee exposure to noise, dust and gas.
- Thirty-one similar exposure groups are considered more at risk of exceeding dust standards based on their tasks and locations, and 32 groups for noise.
- A few contractors were included in the plan of exposure sampling, with coaching to make improvements.
- Monitoring of carbon monoxide exposure—development of a work plan with reduction furnace managers and employees.
- Dissemination of sampling results to teams from each area and identification of opportunities to reduce exposure.
- Five-year noise mapping and dust mapping for source reduction.

## Havre-Saint-Pierre

- Analysis of 98 samples (for 29 similar exposure groups) to measure employee exposure.
- Two similar exposure groups are considered more at risk of exceeding dust standards based on their tasks and locations, and six groups for noise.

## Employee health risk reduction plan

- Continuous improvement project aimed at reducing exposure to nickel at the powder plant.
- Ergonomic assessments of the steel plant's overhead cranes to improve work postures.
- Campaign to raise awareness about thermal stress and promote healthy lifestyle habits.
- Development of health risk reduction plans for all areas, with concrete actions to be implemented by 2023.
- Development and presentation of a new training course on powered respirators.
- Establishment of a committee for reducing HCL exposure in the UGS plant.

## Highlights

RTIT Quebec Operations must continue to focus on employee well-being, as each survey shows this to be a weak area.

The global pandemic situation is likely to have negatively impacted health and well-being, and we are determined to improve our performance in this area.

We know that we can take concrete actions to improve day-to-day well-being for our employees and allow them to feel that they are working in a healthy, safe environment.

Here are some actions we have taken as part of a mental health and well-being strategy:

- Recruitment campaign for peer supporters; addition and training of human resources in the relevant areas.
- Shuttle service between the Saint-Ignace-de-Loyola Sorel-Tracy ferry and the metallurgical complex.
- Expanded criteria for the wellness programme for CSN unionised employees.
- Training of managers and staff and awareness activities as part of Suicide Prevention Week.



# **Environment and communities**

In 2022, Rio Tinto set ambitious decarbonisation targets at the international level to reduce the company's emissions by 15% by 2025, reduce type-1 emissions (produced by the company) and type-2 emissions (indirectly related to energy consumption) by 50% by 2030 and achieve net zero carbon emissions by 2050.

To accomplish this, RTIT Quebec Operations is focusing on two flagship projects for decarbonisation in the Metallurgical and critical minerals complex: the BlueSmelting™ demonstration plant and the use of biochar.

## Greenhouse Gases (GHG) and decarbonisation

The main sources of GHG emissions are the reduction furnaces in the Sorel-Tracy Metallurgical and critical minerals complex.

When it becomes operational, the BlueSmelting™ demonstration plant will be used to test and validate an ilmenite smelting technology that generates 95% less GHG emissions than the current reduction process.

## What is biochar?

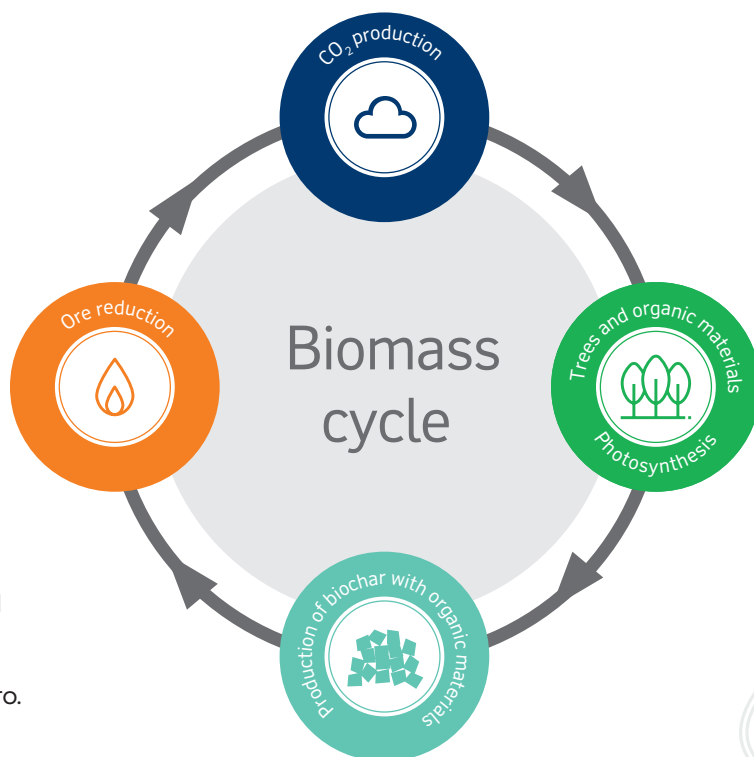
Rich in carbon, biochar is obtained by heating biomass.

The biochar used at RTIT Quebec Operations is made up of wood (making it plant-based) and heated in an environment with little oxygen. When burned, the biochar produces CO<sub>2</sub>, which is absorbed by trees when they are replanted, bringing CO<sub>2</sub> emissions to zero.

## Transitioning to biochar

The process of reducing ore using anthracite is our main source of GHG. The Metallurgical and critical minerals complex consumes 300,000 tonnes of anthracite per year, generating almost 85% of the site's CO<sub>2</sub> emissions.

Many of the organisation's resources are involved in the initiative to replace anthracite (a fossil fuel) with biochar. To make this transition a success, a number of steps will need to be taken over the next few years, from the selection of biochar that is compatible with our process and products at the Critical Minerals and Technology Centre to plant trials piloted by Process Development and, finally, operationalisation.



### Hydrocarbon consumption and GHG emissions at Havre-Saint-Pierre Mining facilities

Indicators as at 31 December 2022

|                                  |                 |
|----------------------------------|-----------------|
| Consumption in litres/tonne      | (4,53 M tonnes) |
| Diesel (litres)                  | 1,825           |
| Gas (litres)                     | 0,015           |
| GHG emissions CO <sub>2</sub> EQ | 25,112          |

### Energy and GHG emissions at the Sorel-Tracy Metallurgical and critical minerals complex

Indicators as at 31 December 2022

|                                  |           |
|----------------------------------|-----------|
| GHG emissions CO <sub>2</sub> EQ | 1 019 150 |
|----------------------------------|-----------|

## Highlights

### CO Gas consumption

A multi-sector team has been set up to maximise CO gas consumption at the Metallurgical and critical minerals complex. This committee will help us achieve continuous improvement by overseeing communication between plants and managing recurring issues affecting CO gas consumption.

Concrete actions have also been taken, including investments to increase CO gas consumption at the UGS plant in ARP units and dryers.

Almost 70% of the CO gas generated in 2022 was useable as fuel in various areas. In 2022, RTIT Quebec Operations signed a renewable natural gas supply agreement with Energir. The consumption of this gas, derived from the recovery of organic waste as a replacement for fossil natural gas, has led to a reduction of GHG of about 1,400 metric tonnes.



# Residual materials management

Generation of residual materials varies according to the operations and work carried out over the course of the year. Significant variation can therefore be observed.

| Residual materials management 2022                      |                                  |               |                     |               |                              |               |
|---|----------------------------------|---------------|---------------------|---------------|------------------------------|---------------|
| Indicators as at 31 December 2022                       |                                  |               |                     |               |                              |               |
|   | Non-hazardous residual materials |               | Refractory material |               | Hazardous residual materials |               |
|   | TONNES/<br>YEAR                  | %<br>RECYCLED | TONNES/<br>YEAR     | %<br>RECYCLED | TONNES/<br>YEAR              | %<br>RECYCLED |
| Sorel-Tracy Metallurgical and critical minerals complex | 13 350                           | 66 %          | 5 445               | 58 %          | 830                          | 40 %          |
| Havre-Saint-Pierre Mining facilities                    | 1 064                            | 35 %          | N/A                 | N/A           | 42                           | 90 %          |

## Valorisation of process residues

We are continually working on residue valorisation projects to reduce our environmental footprint.

In 2022, we revalorised 69% of our process residues.

### Valorisation of refractory material

We found a means for valorising refractories from the refurbishment of rotary kilns at the Ore pretreatment plant.





**450 746-3040**

For information about Rio Tinto Iron and Titanium Quebec Operations and to voice concerns

**RioTinto**

# What is P-84?



TiO<sub>2</sub> is extracted from ilmenite ore. It is used as an opacifier and to give a white colour to a range of products, including paints, plastics, textiles and papers. It is also found in some candy, cosmetics and toothpaste.

RTIT Quebec Operations also produces high-quality steel billets, pig iron and metallic powders enabling cars to brake and wind turbines to spin.

## What is P-84?

It is a tailings facility set up by RTIT Quebec Operations in 1994, following a consultation with citizens.

At the time, RTIT was inaugurating its wastewater treatment plant to treat wastewater at its Metallurgical Complex in Sorel-Tracy. Since the treatment plant was intercepting almost all solid waste, a solution was developed to dispose of the tailings on land, which led to the creation of P-84.

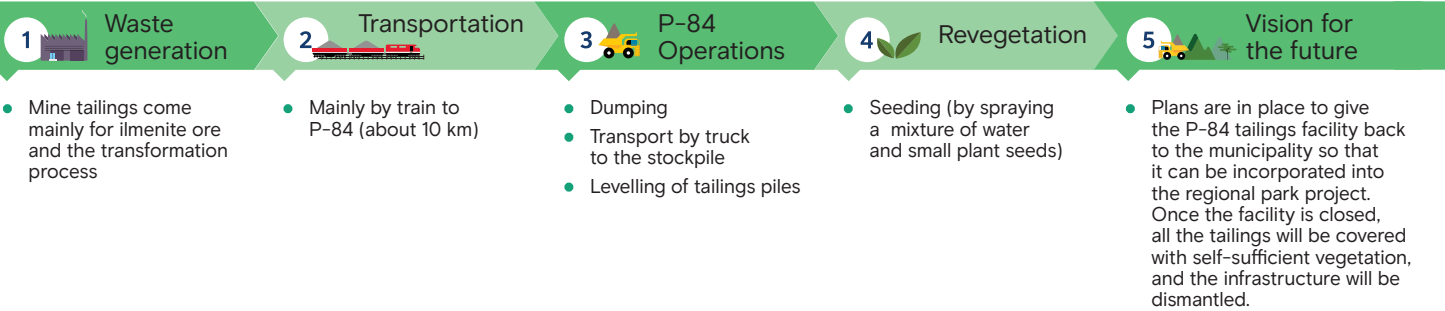
The term P-84 refers to the lot number on which much of the tailings facility is located.

## Monitoring

To measure the possible repercussions resulting from operations at P-84, RTIT implemented an environmental and geotechnical monitoring programme that will remain in place long after it discontinues its use of the facility.

## Mine tailings route

We recycle about 60 % of mine tailings and industrial waste from the metallurgical processes, and another portion is transported to P-84.



RTIT is continually working on residue valorisation projects to reduce its environmental footprint, for example, the use of sludges in the manufacturing of paving stone and residues from its SO<sub>2</sub> recovery plant (CDS) as soil amendment.

## Air emissions management

Managing dust emissions has been a serious challenge in our facilities dating back to 1950. We carry out initiatives to continuously improve emissions control through our operational practices, scrubbing equipment maintenance, investment and the installation of equipment to better monitor our performance at the source and act more proactively.

## Water management

### SOREL-TRACY:

Water is central to RTIT Quebec Operations. Approximately 52 million cubic metres of water were drawn from the St. Lawrence River in 2022. The recirculation rate for this water is nearly 64%. The water treatment plant achieves stable performance, below the 15 mg/L standard.

### HAVRE-SAINT-PIERRE:

The teams have been working to stabilise and optimise the mine's Actilfo water treatment plant. We were able to determine our permanent treatment system and define future needs.

Our research efforts continue to strengthen the hydraulic models, allowing us to position the infrastructure needed to pursue water management at the Tio mine.





# 418 538-3708

Havre-Saint-Pierre comments and suggestions line  
RTIT Quebec Operations encourages the use of this line  
to improve its performance.

**RioTinto**

We foster close relations with citizens and communities through citizens committees, periodic publications (magazine, newsletter for stakeholders) and the RTIT Quebec Operations information and concern line.

| NUMBER OF ENVIRONMENTAL INCIDENTS IN 2022               |                                      |
|---|--------------------------------------|
| Indicators as at 31 December 2022                       |                                      |
| Sorel-Tracy Metallurgical and critical minerals complex | Havre-Saint-Pierre Mining facilities |
| 283   | 80                                   |

This data includes near misses, which are reported and investigated to allow for improvements.

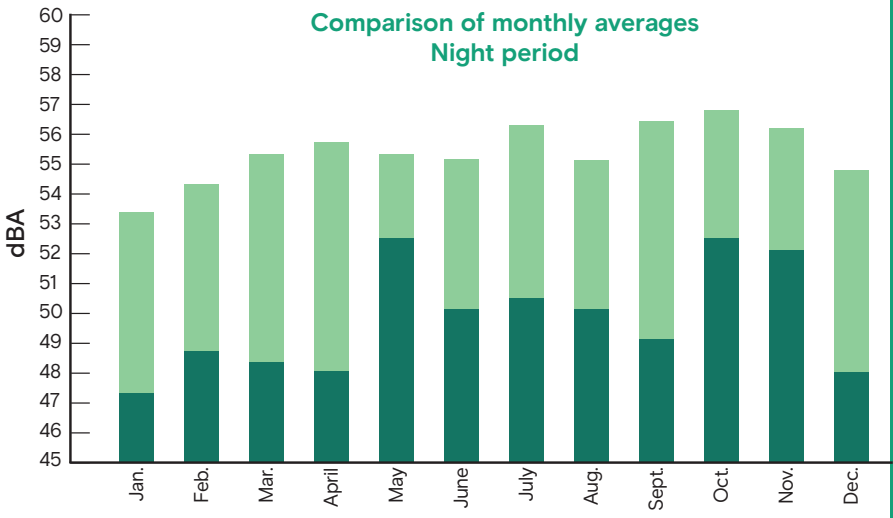
| 2022 RECORD OF COMPLAINTS                               | Number of complaints | Number of houses washed |
|---|----------------------|-------------------------|
| Indicateurs au 31 décembre 2022                         |                      |                         |
| Sorel-Tracy Metallurgical and critical minerals complex | 8                    | 195                     |
| Havre-Saint-Pierre Mining facilities                    | 4                    | 13                      |

Every year, based on the operational impacts in the community, we wash houses in Saint-Joseph-de-Sorel.

## Statistics on community noise

- ▶ Saint-Ignace-de-Loyola
- ▶ Saint-Joseph-de-Sorel

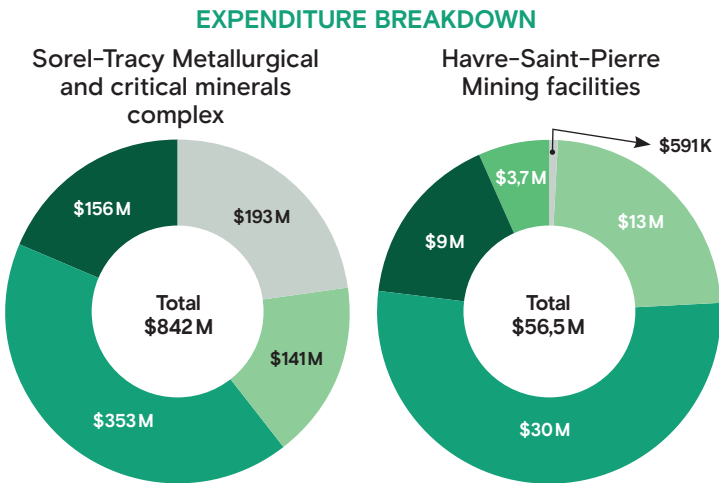
Out of concern for our community, noise levels at night are closely monitored, and operations are carried out during the day whenever possible.



## Regional economic benefits

**Sorel-Tracy**  
■ Local: \$156M | ■ Rest of Quebec: \$353M  
■ Rest of Canada: \$141M | ■ International: \$193M

**Havre-Saint-Pierre**  
■ Local: \$9M | ■ Rest of Quebec: \$30M  
■ Rest of Canada: \$13M | ■ International: \$591K  
■ Innu community: \$3.7M



## Highlights

Most of the construction work on the BlueSmelting™ demonstration plant was carried out by companies in the Sorel-Tracy region, representing 75% of the budget allocated to the project.



# Community involvement

We have maintained our social involvement in the Sorel-Tracy region, contributing over \$240,000. Our commitment to the community is underpinned by strategic development pillars: education, environment, economic diversification and socio-community development.

## Association de la fibromyalgie du Bas-Richelieu

Fundraising golf tournament in which RTIT employees participated

## Powders Plant and RTIT Retirees Association

Annual partnership to support the Association in carrying out its activities for members

## Azimut Diffusion

Partnership to present comedy evenings

## Centre d'action bénévole du Bas-Richelieu (CAB)

Support for food aid

## Chambre de commerce et d'industrie Sorel-Tracy

Support for the region's business community

## Colonie des Grèves

Support for the continued operation of the Colonie and the summer day camps for youth

## Bernard-Gariépy and Fernand-Lefebvre secondary schools

Exterior class, youth race, Galas Méritas, science fair and multipurpose field

## Fondation du Cégep de Sorel-Tracy

Annual partnership focused on academic perseverance: scholarships for improvement and progress, tutoring programme and special financial support (accommodation or other)

## Fondation des CHSLD de Pierre-De Saurel

Annual partnership to offer activities and respite to users

## Fondation Hôtel-Dieu de Sorel

Official presenter for the Generations Challenge, fundraising campaigns and promotion of healthy lifestyle habits

## Groupe d'entraide le G.E.S.T.E

Support for the launch of a community grocery store in Saint-Joseph-de-Sorel

## iO Expérience

Summer shows on Quai Catherine-Legardeur, near the Statera experience

## L'Ardoise, Groupe populaire en alphabétisation à Sorel-Tracy

Read-a-thon to benefit the organisation in partnership with Cégep de Sorel-Tracy

## L'Atelier, centre de travail adapté

Donation of employee procedure masks and safe disposal of masks

## Parc régional des Grèves

Founding partner of the cooperative, the aim of which is the development and maintenance of park activities.

## Ville de Saint-Joseph-de-Sorel

Day camps for youth, annual golf tournament to benefit Fondation Hôtel-Dieu de Sorel et Halte-Soleil

With the **2022 token recognition programme**, we recognised 2,680 good actions by our employees and donated \$22,680 to the following organisations: Groupe d'entraide Le G.E.S.T.E, Halte-Soleil and Maison L'Ancrage.

In Havre-Saint-Pierre, \$835 was donated to L'Espoir de Shelnia and Centre Le Volet des femmes.

## Applying for donations and partnerships

To apply for donations and partnerships at from Rio Tio Iron and Titanium Quebec Operations in Sorel-Tracy, visit [RTFTcarriere.com](https://RTFTcarriere.com) and click on the Actualités page to find the form.

## Special commendations

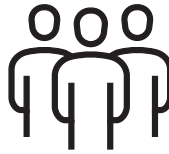
For the third year in a row, as part of the 16 Days of Activism campaign against gender-based violence, Rio Tinto supported organisations across Canada that provide shelters, counselling, education, training, workshops and activities to help women, children and members of the LGBTQ+ community affected by domestic violence to help them rebuild their lives.

Locally, Maison La Source in Sorel-Tracy, Centre Le Volet des Femmes and Centre de santé Mashtishanitsuap de Ekuanitshit in the Minganie region each received a donation of over \$26,000.



# Commitment

## Human resources



Number of employees



Number of hires



Percentage of women hired in 2022

Havre-Saint-Pierre  
Mining facilities:

304

22

12 %

Sorel-Tracy Metallurgical  
Complex:

1482

244

16 %

## Training

Havre-Saint-Pierre  
Mining facilities:



14 079

Number of hours of training



255

Number of employees in training

Sorel-Tracy Metallurgical  
Complex:



108 603

Number of hours of training



1 415

Number of employees in training

## Highlights

- **Rotation program for future superintendents:**

The rotation program for future superintendents has been rolled out, with the aim of creating a pool of operational leaders and developing key competencies.

- **Supervisor development program:**

This program drives the continuous development of supervisors. It is offered in five classroom training modules, along with personalised coaching.

- **Initial implementation of the POKA application:**

POKA, a Quebec-based application developed for companies like ours, allows us to centralise all files related to employee training (standards, SWP, videos, communication channels and skills tracking).

- **Further training for electrotechnicians:**

We have entered into a partnership with Cégep de Sorel-Tracy to offer further training, recognised by the college, for new electrotechnicians.



# Operational excellence



# Implementation of the Rio Tinto Safe Production System (RTSPS)



Since 2021, a team of several people in various areas of the organisation worked together to roll out the LEAN430 Transformation at the reduction plant. This philosophy is derived from Rio Tinto Iron and Titanium's vision of operational excellence.

This transformation is aligned with our aim to continually improve the way we do things in order to be more efficient and productive, using LEAN principles to improve our overall performance and ensure a safe environment for our employees.

A few months later, Rio Tinto deployed a team to build the Rio Tinto Safe Production System (RTSPS), which is also based on the LEAN mindset. After having been tested in a few flagship sites, this initiative is now being rolled out in all Rio Tinto business units, including Rio Tinto Iron and Titanium Quebec Operations.

We are thus furthering our mission to become the best titanium dioxide operator. Our deployment of the RTSPS is helping us to reach our full potential and position ourselves for future success.

## **Our initial vision remains the same:**

- The employee is at the heart of all our decisions, and our aim is to support our teams in the field in a safe and efficient manner.
- We aim to provide a safe working environment in which employees are involved, can contribute their skills and find support.

## **What does it mean to be the best operator?**

With RTSPS, we aim to create a culture of continuous improvement within the organisation, managing stable assets safely and drawing on our values of care, curiosity and courage.



RioTinto