



Vale is Looking North Manitoba Operations Update 2021-2022



Acknowledgement

We acknowledge that our Manitoba Operations are located on Treaty Five, the traditional Territory of Nisichawayasihk Cree Nation and the traditional homeland of the Metis people.



Purpose

Vale exists to improve life and transform the future. Together.

We believe mining is essential to the world's development. We only serve society when we generate prosperity for all and take care of the planet.

This is our purpose.

Values — What do we believe in?

Life matters most.

We believe that life is more important than material results and goods, and we incorporate this vision in our business decisions.

Act with integrity.

We build relationships of trust and we promote open and transparent communication, acting with respect and integrity.

Value the people who build our company.

We trust people, and together we build a work environment admired by all. We seek lifelong learning and personal growth.

Make it happen.

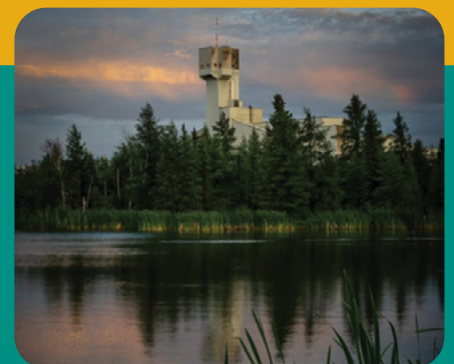
We are engaged, responsible and disciplined about generating results and overcoming challenges. We act in the pursuit of excellence, being sustainable and reliable.

Respect our planet and communities.

We are committed to economic, social, and environmental development in our business decisions.

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A message from Alfredo Santana

Vale's North Atlantic Operations are in the midst of an exciting transformation that encompasses everything from the way we operate to the configuration of our asset portfolio to the culture that underpins our business. It is driving us towards realizing our goal to be a great company recognized for our safety performance, operational excellence, and leadership in sustainable mining.

As part of our transformation, we are revitalizing our asset portfolio. This includes advancing the Voisey's Bay Mine Expansion Project, which will transition the operation from open pit to underground mining, extending mine life to at least 2035. We are also investing \$150 million to extend our mining activities in Thompson, Manitoba, by 10 years, and we have invested approximately \$950 million in our Copper Cliff South Mine Project in Sudbury, which began operations in August.

As we accelerate our transformation, one thing that will not change is our obsession with safety. At Vale, Life Matters Most, and we continue to introduce new safety initiatives to mitigate risk and ensure we live up to this core value. This includes our recently launched Leadership in the Field, which, as its name suggests, ensures our leaders spend more time supporting and mentoring frontline employees in their work areas.

Our transformation reflects the fact that the world itself is changing — and that we need to change with it. Global adoption of electric vehicles (EVs) and renewable energy is rising, and demand for our metals is rising in tandem. But it is not enough to mine critical minerals like nickel, copper, and cobalt, we must mine them in innovative ways, ensuring we meet our emission targets and help our customers meet their targets. That is why we are transitioning to low-carbon alternatives to power our operations wherever possible.

Leveraging new technologies is not only critical to our ability to adapt to a low-carbon world, it is vital to our

future. As our mines go deeper and we operate in increasingly remote areas, it is incumbent upon us to maintain and increase efficiency and productivity while ensuring we always mine safely and responsibly.

Our transformation also encompasses who we are and who we aspire to be as a business. This includes establishing a work environment that is diverse, inclusive, and respectful of all. Over the past year, we have advanced workstreams focused on language, facilities, recruitment, training, and education of our employees to build a more diverse and inclusive culture.

In all my years in mining, I have never seen a deeper commitment to diversity, equity, and inclusion. We are making significant progress but there is still much to do. Building a diverse and inclusive culture is similar to building a strong safety and health culture: it requires constant diligence, continuous learning, regular communication, and leadership by example.


Transformation is vital to the future of our business. And I believe that future is extremely bright. Our business is underpinned by outstanding assets, people, and community relationships. We are transforming Base Metals as the world itself transforms in pursuit of a low-carbon future in which our metals will play a central role. While we are in the early stages of our transformation, we are all on the same page at Vale, striving to achieve our purpose to improve life and transform the future, together.

Alfredo Santana

Chief Operating Officer, North Atlantic Operations and Asian Refineries



Vale's 2030 Global Sustainability Commitments:

 **33%**
Reduce greenhouse gas emissions by 33%

 **100%**
self-generation of clean energy

 **10%**
Reduce new water collection by 10%

 **x2**
Double female participation in our workforce

A message from Gary Annett

I want to begin by acknowledging that our Manitoba Operations is located on Treaty 5 land, the traditional territory of the Nisichawayasihk Cree Nation, and homeland to the Métis people. Vale is honoured to support the Thompson Aboriginal Accord and Thompson Urban Aboriginal Strategy. Our Manitoba Operations is committed to building strong relationships with local communities and improving our own understanding of local Indigenous People and their cultures.



Vale's Manitoba Operations strives to live by its purpose and values — especially that Life Matters Most. The most important work we do is getting everyone home safely, every day. In our industry, managing risk is a critical part of our daily lives. The tools we use to manage risk come to us from the Vale Production System (VPS), our system for managing. It is the application of our risk management tools, enacted through the distinctive actions to plan all work with risk assessment, accept boundaries, care for each other and lead by example that will continue to guide us in managing risk to our people, the community, our business and the environment. Safety must be our top priority and the foundation of everything we do.

With more than 20 years of experience at Vale leading operations in Sudbury, Manitoba and Newfoundland and Labrador, I was excited to come back to Thompson in June, 2021 as Head of Manitoba Operations to be part of \$150 M announcement for Phase 1 of the Thompson Mine Extension Project. This investment will extend our current mining activities in Thompson by 10 years and the aggressive exploration drilling currently underway holds the promise of mining well past 2040. The total two-phase investment is projected to be more than \$1B. The Phase 1 investment is a testament to the patience, fortitude and professionalism of the Thompson workforce and the Thompson community and I am thrilled to be a part of it.

As I look back on what we have accomplished to date, there are many reasons to be both optimistic and proud with regards to our Manitoba Operations. As you will see throughout this report, many milestones were reached all while we continued to meet the COVID-19 challenge with discipline and determination.

Notably, having no Lost Time Injuries (LTI) in 2021 and that our Total Recordable Injury Frequency realized a 65% reduction compared with 2020. Employees have managed to improve safety, reduce unit costs and achieve positive production results. They have truly lived our Company value of 'Life Matters Most'.

Our business in Thompson continues to utilize operational excellence and continuous improvement in order to ensure that we will be prosperous and sustainable well into the future — our future. We know that we would not have made it this far, and will not realize a long-term future, without the contributions of our employees and their families, and the people in Thompson and the regional communities. We must continue to work together and care for one another while doing so.

Gary Annett
Head of Manitoba Operations

**Congratulations
Manitoba Operations!**

2021 – One full year Lost Time Injury Free
Zero lives lost, zero lives changed

UMW LOCAL 6166 HOME SAFE VALE

HomeSafe is more than just going home safe

HomeSafe is a call to action that supports our culture that Life Matters Most. It incorporates four distinctive actions of planning all work, accepting boundaries, caring for each other and leading by example. Every employee has a role to play, and they are all the same:

- Be aware of my surroundings and risks around me. Apply good work practices and knowledge, skills, and experiences to safely complete tasks assigned to me. Ask for help when needed. Stop and correct unsafe situations when required. Follow policies and procedures designed to reduce risk. Follow rules and regulations established to achieve the ultimate goal of Zero lives lost, Zero lives changed, thatd are either legislated or internal to Vale.
- The HomeSafe culture says, 'We will only get there if we all work together.'



Other milestones in achieving zero harm

Hazard Identification and Risk Assessment (HIRA): This was completed in 2021 and is part one of a two-part risk management strategy. HIRA was a robust assessment of Manitoba Operations to identify possible risks and hazards including what we call 'major material unwanted events'. Part 2 will focus on Critical Risk Management & Critical Control Verification.

BWise

This new global risk management system was implemented in 2021 and involves identifying risk, assessing and treating risk, monitoring and communication and reporting.

Mental Health

Telus Health Virtual Care. Vale offers 24/7/365 mental health support through Telus Health Virtual Care, a wellness service available to all employees, spouses, and dependents. This service allows for secure mental health



consultations by phone, computer, text, or video chat. We believe mental health is as important as physical health. That is why we continue to be a national sponsor for Mood Disorders Society of Canada, which manages the Defeat Depression Campaign.

Emergency response

Vale is working to help employees set up for success in every type of emergency response. Mine Rescue saw significant growth with trained members increasing from 20 to 40. Three of the new responders are females. Confined space training was provided leading the way to formation of a Contained Space Concentrator Emergency Team. Fire Rescue members are working towards certification in Level I and Level II fire fighting training. They also have new turn-out gear to

help improve their safety. High Angle Rope Rescue training was expanded with new top-of-the-line equipment added to the program.

Results

Our employee's efforts are making improvements. The Total Recordable Injury Frequency rate was drastically reduced, and there were zero Lost-Time injuries in 2021. This is due, in part, to an increase of employees reporting potential fatal or life-changing events. But mostly, it is due to employees adopting the calls to action to be HomeSafe.



Members of Vale emergency services Team.

Vale's Management Model — We are doing it together!

We have 100,000 employees in approximately 30 countries. And although we work in such diverse businesses and cultures, we have one focus as a company: To ensure safe operations that place people at the core. For this, we have implemented the VPS — Vale Production System — as our management model.

The VPS is the path that will take us to become a safe and reliable company. The model outlines practices that all employees are adopting daily. The practices are based on three dimensions: leadership, technical and management.

It is a model that is in constant evolution that continuously improves and consolidates its approach, methods, techniques and tools used in accordance with lessons learned.



T1 Mine Development Warehouse on 4700 Level underwent a major transformation in 2021 — a 5S award winning area! (See 5S Contest Finalist next page.)

In 2020:

Vale spent:

\$110M

in capital investments, and

\$230M

in operating expenditures to support its operations in Manitoba.

Overall economic contribution to the provincial economy in Manitoba:

\$370M

of GDP to the economy of Manitoba, of which \$220 M was contribution to labour income.



Creation or maintenance of

2,000

jobs across Manitoba.



\$40M

in government revenues to the provincial and municipal governments in Manitoba.



Another 5S benchmark — the 4850 Level refuge station at T1 mine became the standard for all stations in the mines.



VPS in Manitoba

Employees reacted positively to the Thompson Mine Extension Project Phase 1 announcement with increased engagement and commitment to learning and implementing VPS tools and routines. Increasing our knowledge of VPS is an ongoing progress. We have a lot to be proud of and to build upon.

Key examples of VPS results in 2021

1. Kaizen targets.

Manitoba set a goal of 518 employee-led improvements for 2021 and achieved 623 kaizens (a Japanese term meaning 'change for the better'). Employees surpassed the 2021 goal by 122%!

2. 5S.

Employees achieved a Manitoba Operations goal by transforming 132 work areas through 5S (five practices that make the work environment safer, more efficient, and more organized). Employees made our work areas safer and more efficient, eliminating waste, and properly setting up work areas to ensure the right tools and needed supplies are in the right place. The practice of 5S (sort, set in order, shine, standardize, sustain) makes the normal and abnormal conditions of a work area clear so problems become visible. It also standardizes the efforts and behaviour of all employees which contributes to more consistent and predictable results.

3. 5S Contest Finalist.

Employees at T1 Mine transformed the underground 4700-level development storage area making it safer and more efficient. The project was selected as a Base Metals finalist in a 5S contest and was published in the 5S Magazine shared across Vale.

4. Floor Management Development System (FMDS).

A key priority for 2021 was to improve management routines. FMDS was implemented to give visibility, through visual management, to help expose problems, align priorities and allow for quick corrective actions on a daily basis.

Vale invests \$150 million to extend Manitoba Operations

The dedication and commitment of Vale employees is making the extension of Manitoba Operations happen. Their efforts are making it possible for Vale to invest \$150M to extend current mining activities by 10 years through the Thompson Mine Expansion Project (TMEP). This initial investment represents Phase 1 and includes critical infrastructure such as new ventilation raises, booster fans, a new sandfill plant, increased power distribution and an underground garage that will enable us to mine at lower depths and help strengthen the business case for Phase 2 investment.

The raise bore machine being used in the TMEP is the largest in the Americas, and third largest in the world. Completion of the first raise is forecast for the end of 2022. The second raise should be complete in 2023.

Phase 2 will include developing two new orebodies: Hangingwall High Grade and Hangingwall Deep. Our aggressive exploration drilling holds the promise of mining well past 2040 and a total investment projected at more than \$1B.

The investment is about more than dollars. It is an indicator of Vale's confidence in Thompson's future, as well as the collaboration between the design teams, technical services, USW Local 6166 and the entire Thompson workforce to deliver a safe, efficient and fit-for-purpose plan.



Vale expects to invest \$236M in their exploration drill program in the next five years.



Vale's announcement of the TMEP investment included (from left) Warren Luky, President USW Local 6166, Colleen Smook, Mayor of Thompson and Gary Annett, Head of Manitoba Operations.





Reviewing drill core sample results with Vale leadership.

Exploration continues to pave the way for the future

The Thompson Mine Extension Project (TMEP) investment announcement is not the end of a successful journey. It is actually part of the journey which started with exploration. And coupled with the announcement of the TMEP is an ongoing and extensive underground and surface drilling program to further define known orebodies and search for new mineralization. There are eight diamond drills — five on surface and three underground — working to identify and add new tons to the Phase 2 business case.

In addition to exploration to support Phase 2 of the TMEP, there is significant regional exploration throughout the Thompson Nickel Belt. Electro-magnetic and gravity surveys, artificial intelligence programs and diamond drilling continue to be used in the search for new orebodies. The regional drill program includes diamond drilling of approximately 30,000 meters in 40 holes, which includes ice drilling and helicopter drilling. Vale expects to invest \$236 million in exploration in the next five years.



Surface exploration drill site.



\$236M

Invested in exploration in the next five years.



30,000 meters, 40 holes

Included in the regional drill program.

Our efforts focus on respect for our planet

Our goal is to lessen our impact on air and water and the land that supports a diversity of habitats, plants, and animals. Our people are making great progress in these areas.



Test plot tree planting in the Tailings Storage Facility.



1,800

Tailings Storage Facility (TSF)

We planted some 1,800 spruce and pine trees, hydro-seeded a variety of plant species, added peat moss, and 'nurse logs' to separate plots in order to remediate areas of exposed tailings. Areas are being monitored to determine which methods work best.



Wildlife

The TSF is home to diverse animals including otters, beaver, marmots, bears, lynx, eagles and fox, with all signs indicating healthy food supply. There are fish in every part of the TSF. And we added two bee hives to other parts of the property for a total of nine.



Slag pile remediation.

Water consumption

We have reduced our water consumption by 50% by making changes in our river pumphouse.

Air quality in the workplace

We have replaced seven diesel-powered pieces of equipment underground with electric-powered equipment, thereby reducing emissions and improving air quality in the workplace.

Slag pile

We reseeded the slag pile to help rejuvenate growth following a dry summer. We also started conversations with the City of Thompson to compost the city's lagoon and add it to the slag pile as compost (Photo above).

Noise

Residents on the eastern side of the city voiced concerns about noise coming from the T3 mine area. We are assessing a number of options, which we will begin to implement in 2022.

Beyond plant site borders

We started a perimeter water study of ground and surface water outside the plant site's boundaries. We want full knowledge of water leaving the property and determine if it is in our treatment capacity. This study will take several years and is one of the biggest studies we've undertaken in decades.

There are a number of other special projects that were assessed or designed in 2021 and will be rolled out and reported on in future Manitoba Operations updates.

#4 Copper Pond

Quite simply, it no longer exists! This was a containment area for copper residue that was a by-product of former refining processes. The fluid was pumped out of the pond, solids treated and sold, liner removed, and the area backfilled and contoured.

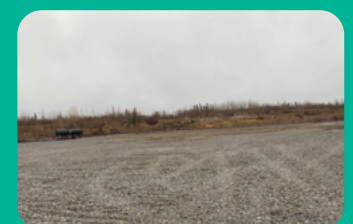
↓ #4 Copper Pond at start of project



↓ Excavating #4 Copper Pond



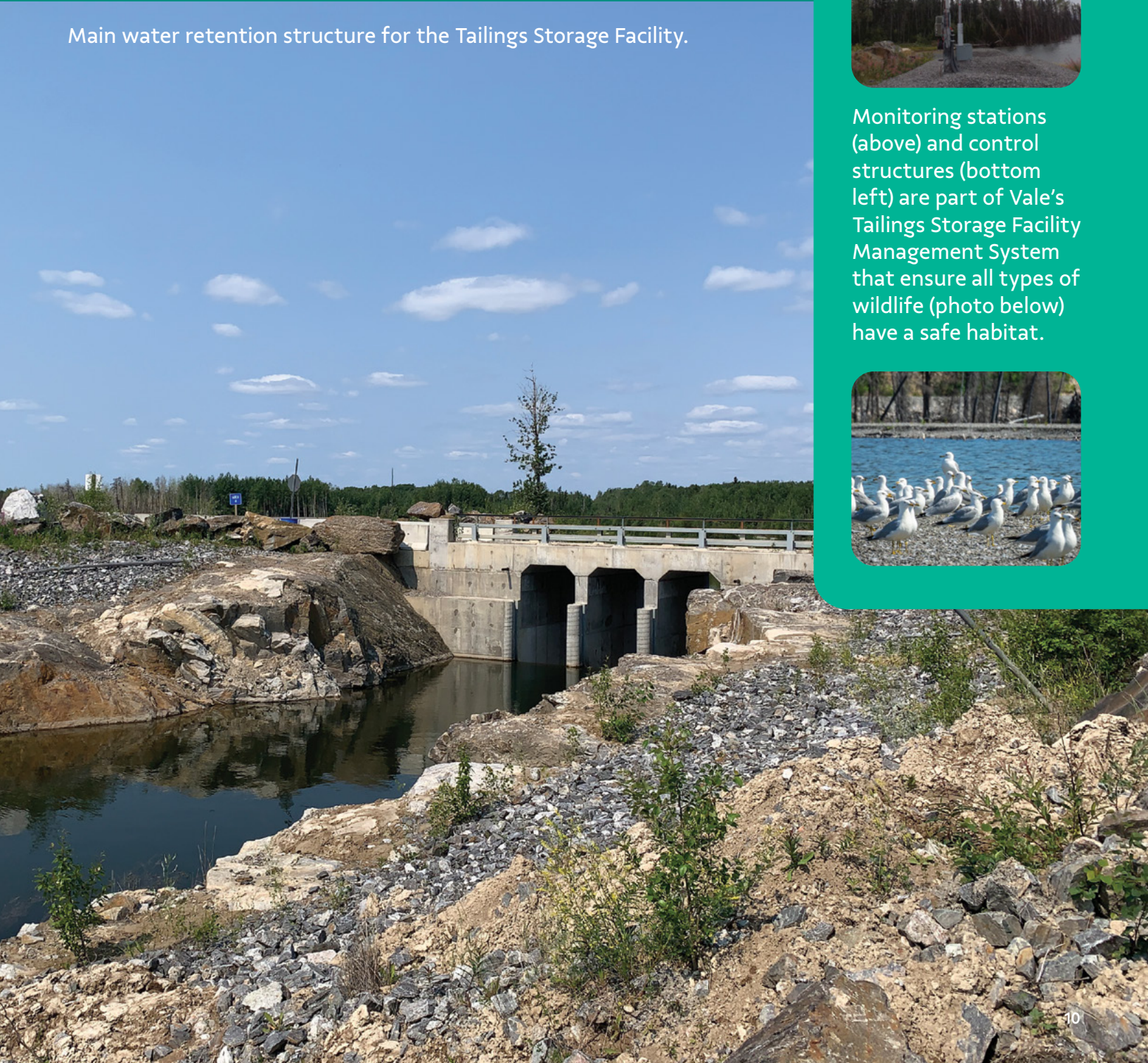
↓ #4 Copper Pond decommissioning



Tailings management — we continually seek improvements!

Tailings are effluent created by the mining and processing of ore. They are delivered into a specially designed area, called the Tailings Storage Facility (TSF) that comprises 58 square kilometers. Here the tailings settle, and clean water is discharged back into the environment.

Main water retention structure for the Tailings Storage Facility.



Monitoring stations (above) and control structures (bottom left) are part of Vale's Tailings Storage Facility Management System that ensure all types of wildlife (photo below) have a safe habitat.





The fish barrier as seen at the weir final discharge point.

Much work has been done in recent years to raise the water level of the TSF to accommodate future mining requirements while protecting the environment. In 2021, the TSF team began implementing Vale's Tailings Storage Facility Management System. This is a governance model that consists of normative standards, routines and behaviors. It was developed and implemented by Vale to manage Tailings Storage Facilities in all their global operations for their entire life cycle.

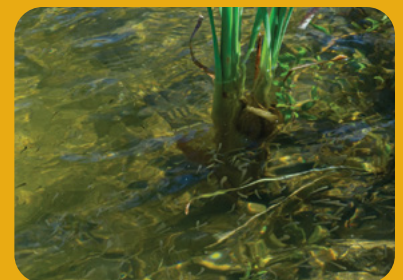
As a result, several improvements have already been made to build on past improvements and successes and to further minimize risk.

Also in 2021, the team installed a remote monitoring system. This measures pressures inside the dams, water levels, flow rates and other environmental information. Since commissioning, Vale can see all the measured parameters from anywhere in real time.

Vale has in place a Tailings Storage Facility Emergency Preparedness and Response Plan. The plan provides guidance to ensure a prompt and coordinated response to all dam-related emergencies that may occur at the facility. This plan was expanded this year and we hope to engage our stakeholders in further planning over the coming months.



Collecting a water quality sample for the Weir final discharge point.



Fish fingerlings gather near the shore at the CN dam water quality sampling location.



Vale employees pitch in to help with the annual community clean up.

We connect with our communities because we value people

Inspired by the 94 recommended calls to action contained in the Truth and Reconciliation Commission of Canada, we consider land acknowledgements a first step toward honouring the original occupants of an area. But our reconciliation journey goes beyond that.

Also in keeping with the spirit of reconciliation, Vale proudly supports the Annual Indigenous Languages Manitoba conference, National Indigenous People's Day, Honouring the Gifts (MKO youth cultural celebration) and Orange Shirt Day. Vale's formal

reconciliation journey started in September 2021 with the launch of our online Indigenous Foundations training program across our Canadian operations. Its purpose is to engage with leaders and employees in a meaningful way to deepen their understanding, increase cultural competence, and develop actionable ideas to respond to the Truth and Reconciliation Commission of Canada's Calls to Action. Vale also offered a Canada-wide donation matching opportunity for all employees who wished to donate to a cause benefitting Indigenous people in Canada.



\$250,000

donation to the new homeless shelter and Shelter in Place Program.



\$125,000

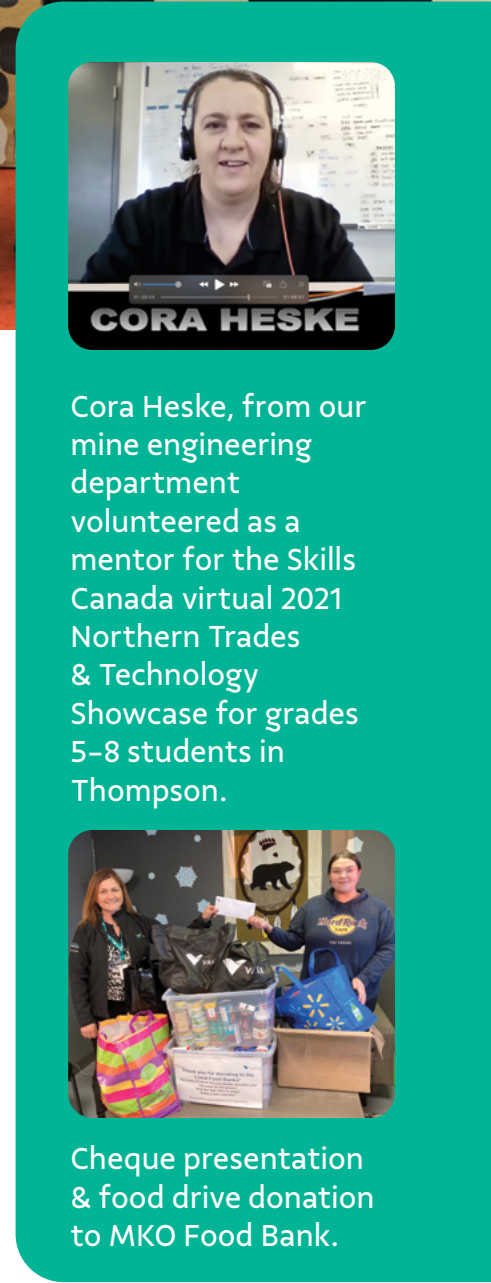
donated to City of Thompson for new asset management program.



Vale is proud to be a major sponsor for the annual National Indigenous People's Day event in Thompson.



Vale donated \$250,000 CDN to the Thompson Community Wellness and Public Safety Committee. This was to directly assist the new Shelter In Place Program.



Cora Heske, from our mine engineering department volunteered as a mentor for the Skills Canada virtual 2021 Northern Trades & Technology Showcase for grades 5-8 students in Thompson.



Cheque presentation & food drive donation to MKO Food Bank.

We sit on a number of boards and committees that serve Thompson and region. These include the Thompson Urban Aboriginal Strategy, Manitoba Association of Mining's Indigenous Relations committee, Thompson Chamber of Commerce, Thompson Community Wellness and Public Safety Advisory Committee and the Thompson Aboriginal Accord with a shared commitment on the journey toward reconciliation.

Our Community Liaison Committee (CLC) connects Vale, the community of Thompson and neighbouring communities by holding quarterly stakeholders' meetings on sustainable mining matters: environmental monitoring, economic development, careers and training and more. If interested in attending our next CLC meeting, please call our community line at 204 778 2888.

Recognizing the need for better mental health supports, Vale sponsored Mood Disorders of Canada and the local Canadian Mental Health 'Ride Don't Hide' event that helped support the launch of the Canadian Mental Health Association's Northern Well-being Learning Centre in Thompson. Food security was a concern for many

during COVID restrictions and Vale contributed \$35,000 to the Salvation Army Food Bank.

In 2021, Vale's investment in the community was ~\$600,000.

Support ranged from those mentioned to: Skills Canada, WISE Kid-netic Energy camps, Thompson Boys and Girls Club, YWCA, Boreal Discovery Centre, Manitoba Theatre for Young People, Wapanohk School Achimowan Akamik (story lodge) Thompson Ski Club, and many more local initiatives.



Vale commissioned a painting by Jasyn Lucas, a local Thompson artist for internal Vale communications to commemorate the first National Day of Truth & Reconciliation September 30, 2021. Here is one example of a poster shared across our Canadian operations.



A training instructor demonstrating the Working from Heights training station.

Health and Safety Dojo

In 2021, we launched our new Health and Safety Dojo training facility onsite at the Manitoba Operations Vale Education Centre.

Its purpose is to educate employees, through specific knowledge, techniques, and interactive activities, to develop appropriate skills

and behaviors. The desired outcome of the training is to teach and reinforce a wide range of safety related topics that employees face in their daily work experiences. This milestone is one step closer to reaching our goal of becoming a benchmark company in safety performance.



Ribbon cutting for new Dojo training centre.



Did you know?

We recently invested \$7.2 million in a new technology mine air heating system for T3 mine in Thompson that produces near zero emissions of nitrogen dioxide and carbon monoxide, significantly reducing our greenhouse gas emissions. This system is a first in Canada for a mine air heater — putting us in the history books!

You brought forward concerns about noise from our operation. Please see pages 9/10. You also asked questions about animals on the plant site and about exploration. Please see pages 8, 9/10. If you have any questions after reading this report, please contact our Community Concerns Line at 204-778-2888.