Standing Strong
2013/2014 Annual Update on Vale in Manitoba

About the Artist

Born Jasyn Bighetty of the Mathias Colomb Cree First Nation, Jasyn was adopted into the Lucas family of Thompson, Manitoba before his first birthday. His father, Jack Lucas, worked at Vale and retired in 2010. Jasyn grew up in Thompson and graduated from R.D. Parker Collegiate. He moved to North Vancouver in 1999 where he graduated from Capilano College with a Diploma in Studio Art.

In 2007, Jasyn returned to Thompson and decided to dedicate his time to a career as a visual artist and painter. He works mainly with acrylic on canvas, both hand-painted applications and airbrush, finding a balance in both traditional and contemporary applications. Jasyn paints animals and landscapes, but has also worked in a variety of areas such as abstract expressionism, surrealism and sculpture. He is known in Thompson for painting murals on buildings. In 2005, he painted a mural on the side of the Surface Dry building at Vale’s Thompson Operations to help commemorate the 50th anniversary of the year of discovery of the Thompson ore body.

Although he was a featured artist at the 2010 Winter Olympics in Vancouver and has sold his works around the world, Jasyn continues to work out of Thompson, Manitoba. He travels, putting on art shows across the country, but his main goal is to further develop his skills and use technology to have a stronger international presence.

For further information visit www.jasynlucas.ca.

For more detailed information, please visit our website www.vale.com/canada or contact Ryan Land, Manager, Corporate Affairs and Organizational Development, Manitoba Operations at ryan.land@vale.com or 204-778-2326.
Every day, Vale’s Manitoba Operations strives to live by our values. We do this through the distinctive actions of SafeProduction: plan, accept, care, lead. This year Vale has placed specific emphasis on the action of caring and the difference that seconds and inches can make in reducing risk to as low as reasonably achievable. I would encourage you, especially those of you with children and youth in your lives, to have risk management conversations regularly and to take the time to apply some of the tools of SafeProduction. One of our most important tools is to conduct a SLAM — prior to participating in a high-risk activity or situation, we Stop, Look, Assess (hazards), and Manage (risk). Together, we can move ever-closer to achieving zero harm at work, at home, and at play.

There are many reasons to be both optimistic and proud with regards to our Manitoba Operations as we begin to emerge from one of the more challenging market cycles in our recent history. Not only did we surpass the $100 million cost reduction challenge, which resulted in the continuing operation of our Birchtree Mine, but we did so while moving closer to achieving zero harm. Notably, our Total Recordable Injury Frequency realized a 40% reduction compared with 2012, and in 2013, our T-1 Mine surpassed the milestone of 3,000,000 hours without a Lost Time Injury. We were also recognized by the Towards Sustainable Mining program in the areas of tailings management and Aboriginal and community outreach. And we celebrated the long-standing commitment of Fred Houston, our operation’s first 50-year employee.

As for our ongoing transition to a long-term mining and milling future, we must continue to reduce costs, while improving productivity and production in order to sustain investment in the resource. This will ensure the competitiveness of our operations. Vale has moved the “Footwall Deep” portion of the 1-D resource into the next feasibility stage, and we will continue to invest in order to prove the remainder of the resource. We will soon begin to advance the study for a concentrate load-out facility adjacent to the mill.

Our retention and regional employment rates have continued to improve, as we continue to implement our Northern Employment Strategy. And we successfully concluded the Thompson Economic Diversification Working Group process, which resulted in several ready-to-implement economic action plans for Thompson and the region.

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.

Sincerely,

Lovro Paulic
Vice-President Manitoba Operations
Vale Canada Limited
SafeProduction

Ten years of SafeProduction results in 40% reduction in Total Recordable Injury Frequency rates

The push toward zero harm is a journey that is well represented by the historic trend for Disabling Injury Frequency. The accompanying bar chart shows Disabling Injury Frequency rates since 1998, as well as SafeProduction milestones.

SafeProduction, as a culture, is committed to managing risk to As Low As Reasonably Achievable (ALARA). It uses specific tools and processes to identify hazards, the risk associated with the hazards and to manage and reduce those risks to ALARA both at work and at home.

Vale Manitoba Operations has won the national award on a number of occasions, including the National Award for Metal Mining in 2004 and 2010; and the Regional Award in 2005, 2006, 2007, 2008, 2009 and 2012.

The culture of SafeProduction has grown beyond the borders of Manitoba Operations. It is now being adopted by Vale worldwide. Of great significance, is that the City of Thompson adopted the culture and developed its own SafeOperations initiative. In 2013, Vale continued to support the City with its initiative and will provide continued support as its initiative evolves.

Employees at Birchtree Mine (photo top left) and T-1 Mine (top right) have earned recognition for safety on both a national and regional level by the Canadian Institute of Mining and Metallurgy’s John T. Ryan award program. The award is a symbol of premier safety in mining in Canada.

While Vale Manitoba Operations continued to face significant challenges in 2013, employees never lost sight of the combined actions of SafeProduction — Plan, Accept, Care and Lead — and the business goals — Profit, Cost, Margin and Compete. In fact, while employees worked to reduce the operation’s costs by $100 million, they also lowered the Total Recordable Injury Frequency rate by 40%. In addition, since SafeProduction’s inception, we have also seen the disabling injury frequency rate drop by 80% (see accompanying chart).

Each year, Vale audits itself in 19 key areas to determine how well it is moving toward the goal of zero harm. The blue portion of the spider chart represents results from 2012. The yellow portion represents the results from 2013. The more the words ‘zero harm’ become visible, the better the progress towards zero harm.
In October 2013, the Mining Association of Canada (MAC), through the Towards Sustainable Mining (TSM) initiative, recognized Vale Manitoba Operations in two areas of achievement — tailings management, and Aboriginal and community outreach. This is a significant achievement, as TSM maintains high standards for best practices in the Canadian mining industry.

“TSM is a valuable program for improving the mining industry’s performance in a number of areas,” said Robyn Millar, Environment Coordinator.

“We are assessed for our tailings management, energy use, greenhouse gas emissions, Aboriginal and community outreach, crisis management planning, biodiversity and conservation management, and safety and health. While we have been making continual improvement in almost all of these protocols, it is particularly gratifying for our Operation to be recognized for achievement in tailings management and Aboriginal and community outreach.”

Tailings management
MAC recognizes that tailings impoundments are not only necessary components of mining activity, but it is crucial they are managed to protect human safety and the environment. The TSM protocol for tailings management goes beyond adhering to technical standards.

Aboriginal and community outreach
MAC believes that strong relationships with communities of interest are fundamental to sustainable mining. TSM looks for meaningful dialogue with communities, whether or not their feedback is considered in decision-making, and whether or not the operation has a clear mechanism for receiving and acting upon complaints and concerns.

Of special significance is Vale’s contribution to the Thompson region through the Thompson Economic Diversification Working Group (TEDWG). Vale funded and co-launched this working group which created action plans to help diversify the economy of the region. TEDWG saw unprecedented collaboration between Aboriginal communities, government, business and other organizations. As a result, Vale was selected as a finalist for a new award — the 2014 TSM Award for Community Engagement.

“TSM is a valuable program for improving the mining industry’s performance in a number of areas.”
The Footwall Deep FEL 3 scope includes a potential 11 million tons of nickel-bearing ore located in the footwall and mid-band zones at the north end of Thompson Mine between 4250 and 5750 Levels. It includes all the associated infrastructure required to produce ore from this area through 2028. Infrastructure includes driving a ramp down to 5800 Level, establishing working levels at 100-foot intervals on the way down, along with ventilation, backfill, dewatering and material handling upgrades throughout the Thompson Mine material handling system. The FEL 3 Study involves the detailed design, planning and scheduling of this work, suitable for the actual execution of the project. The FEL 3 Study will carry on through 2014 and into 2015.

“If the FEL 3 Study goes well and all the pieces come together, we hope to submit the project for approval by early 2016,” said Mark. “While we are optimistic, there are many variables involved in a project of this scope, all of which need to be accounted for in the FEL 3 Study. One thing is certain, though, if the Footwall Deep Project is approved for execution, it will form the heart of our mining operations in Manitoba for the next 15 years.”

The north end of Thompson Mine has been under study for several years — geologists have studied core samples taken from thousands of feet below surface; mine engineers have studied various ways to access the potential ore; and, accountants and analysts have researched costs and returns on investment. That study took an even more positive turn in 2014 when the Footwall Deep Project FEL 3 Study was launched.

There are four stages in Vale’s Project Development System (PDS). FEL stands for ‘Front End Loaded’, meaning the risk associated with a project is managed responsibly by front end loading the technical and financial work that goes into a particular project. FEL 3 is the feasibility study stage which immediately precedes the project execution phase. “If the FEL 3 Study is successful and the required approvals are put in place, we would move into the project execution phase,” said Mark Scott, General Manager, Mining & Milling.

“But I have to stress the ‘if’, as there is a lot more work required. The technical and financial dimensions of the FEL 3 study need to be solid in order for final approval to be gained from the Vale Board of Directors.”

“One thing is certain, if the Footwall Deep Project is approved for execution, it will form the heart of our mining operations in Manitoba for the next 15 years.”

Vale begins feasibility study for what could extend the ‘life of mine’ to 2028

The Footwall Deep Project continues underground on the 3600-foot level. Drill core from approximately 6,000 feet below surface is brought to surface for analysis.
Tailings Management

Vale expands the capacity of the Tailings Management Area to accommodate future production

The Tailings Management Area (TMA) is a collection and settling area for mine discharge and mill tailings. It comprises approximately 58 square kilometers. It was designed in 1960, at a time when tailings deposition was 6,000 to 8,000 tons per day and mine closure was expected to be 2013. The current mine forecast is for tailings to peak at 7,000 to 11,000 tons per day and mine cessation sometime after 2028.

A plan was needed to expand the capacity of the management area without increasing the size of the footprint. Work on that plan began in 2011 and continued through 2013. Several initiatives to upgrade the TMA that were started prior to 2013 were completed last year. They include completion of upgrades to the CN Dam, raising of Dam A1 and A, as well as continued work on the Dam B coffer dam. The total effect of this and other work completed the previous year was to raise water levels by approximately one foot in areas 1, 2 and 3 of the TMA.

“We want to eventually raise the water level by approximately four to five feet,” explained Dennis Pilon, Tailings Coordinator. “We want to cover the exposed tailings in Areas 1 to 3 to reduce the nickel load to the basins. Raising the level of the water will allow us to deposit the required tailings to maintain the planned mine production. We still have to finish Dam B in order to raise levels in other areas of the TMA.”

Operations continue during construction, which requires ongoing monitoring and management practices to ensure Vale is protecting its downstream water courses, as well as maintaining compliance with environmental permitting. These practices include annual bathymetric surveys that determine the contours of the bottom of the TMA. These surveys help determine where to safely deposit tailings. The addition of lime to suppress nickel load is also employed during specific times of the year.

“Several earth and rock-fill dams form the TMA, which is divided into five sub-basins referred to as Areas 1 to 5. There is also a control structure called the Discharge Weir. The TMA is fed by the Grass River water system via marshy creeks at the south end of the Vale property. Water travels northeast to discharge at the Weir and eventually into the Burntwood River system through marshy creeks at the northeast end of the basin.”

Flow leaving the catchment area at the control structure known as the Weir (top photo) is sampled and analyzed weekly with reports sent to provincial and federal governments. Another control structure is the Narrows flow gate and coffer dam, which were completed this year (photo left). The merganser standing on a log by the CN dam (bottom right) is an example of the abundant wildlife found in the TMA.
Vale is a working partner with several organizations in monitoring air, water and wildlife to ensure our operations are meeting the SafeProduction principles of working toward zero harm to the environment.

The most recent partnership began in 2012 when Vale Manitoba Operations started helping the Nickel Producers Environmental Research Association (NiPERA) in the collection of high-nickel sediment for ongoing sediment toxicity studies. This research will help generate higher quality and more realistic sediment quality standards, which is important both to the environment and to the industry. Collection of sediment continued through 2014.

In 2008, Manitoba Conservation invited Vale Manitoba Operations to participate on an advisory committee for the management of woodland caribou in the Wabowden and Wapisu caribou ranges. Studies of migration patterns and other aspects of caribou habits and habitat have been ongoing. In 2014, Manitoba Conservation will release the updated draft of the Boreal Woodland Caribou Conservation and Recovery Strategy for Manitoba.

Ozone concentration analysis in the atmosphere was added in 2013 to an air quality monitoring partnership that started some 10 years ago. The partnership is with Manitoba Conservation and involves an ambient air quality monitoring network within the city of Thompson that monitors sulphur dioxide, particulate matter and heavy metals. Data collected has contributed to pollution abatement activities locally, as well as to Canada-wide strategies.

In addition to these partnerships, Vale continues daily, weekly and monthly sampling of water at various locations within its operations and at its Tailings Management Area. Results are reported to both provincial and federal levels of government. Air quality is continuously monitored at its four stations located throughout the city of Thompson.

Vale continues to employ the Voluntary Emissions Reduction Program (VERP) whenever wind currents blow the plume from the stack towards the city, helping to reduce levels of sulphur dioxide to acceptable limits. And it continues to operate its 24-hour Environmental Hotline. Anyone can call 204-778-8888 to report sulphur dioxide in the air or any other environmental concern.

Caribou Strategy

“Vale will be involved in the development of management action plans, along with Aboriginal organizations, government, non-government organizations, industry and the public. The goal of the strategy is to ensure the needs of caribou are met and human developments and actions are sustainable.”

A variety of wildlife thrives in the region of the Vale Manitoba Operations site. A red fox rests beside a cache of pipe for the Tailings Management Area (photo left), while a family of moose crosses an open space in the area of Birchtree Mine (right).
Northern Employment Strategy

Vale invests in tomorrow’s workforce by creating awareness among youth

At Vale, careers in mining do not begin with a job application. They begin in elementary schools. “Our priority has been to develop a robust pipeline for our future workforce,” said Ryan Land, Manager for Corporate Affairs and Organizational Development. “We begin that pipeline by creating awareness of mining in general to students starting in elementary school.”

One of the most exciting initiatives for creating awareness in 2013 was the delivery of Mining Matters to approximately 550 youth in Thompson and Nisichawayasihk Cree Nation (NCN), as well as to educators. Vale has been a sponsor of Mining Matters, an initiative of the Prospectors and Developers Association of Canada (PDAC), since 2010 at the national level, but the 2013 program in northern Manitoba was the largest delivered to date. The program uses hands-on activities and games to teach the full life cycle of mining — from finding resources to refining those resources for market.

Vale has found that one of the most critical times to reach students is when they are in Grade 8, as they will be making course selections for Grade 9 that will help advance their career choices. In 2013, Vale continued several initiatives to reach these students. A Vale-initiated program is a tour of its operations tailored for Grade 8 students from Thompson and NCN.

Vale also supports Skills Manitoba-Canada with several of its northern programs. These include the Northern In-School Liaison program for Grade 8 students, the Northern Young Women’s conference and, new in 2013, a northern young men’s conference, aimed at introducing them to careers in trades and technologies.

Vale continued to sponsor the Mineral Sciences Program at R. D. Parker Collegiate in 2013. This program offers students in Grades 9 through 12 courses in mining-related matters ranging from geology to rock mechanics. Vale also partnered with Keewatin Tribal Council in 2013 to produce a Community Employment Pathways Aboriginal Job Seekers Resource Guide that will be distributed in 2014.

Vale supports post-secondary education programs, including the Aboriginal Engineering Access Program (ENGAP) at the University of Manitoba. Vale allocates funds to assist northern Aboriginal students in the program.

Not all Vale sponsorships and partnerships are directly related to mining. The company supported the Earth Rangers program, bringing it to the School District of Mystery Lake in 2013. Earth Rangers delivers a message of conservation and how our actions affect wildlife.

“We also attend as many career events as possible,” said Ryan. “We focus on what we call our TEDWG* region, but also include other northern communities such as Cranberry Portage and The Pas. It was only a few years ago that we did not have enough applications from this region to fill jobs. That is no longer the case.”

Creating awareness is a large part of Vale’s Northern Employment Strategy. Just as important is ensuring potential employees understand an industrial work environment and are prepared to work safely within that environment. The Process Operators in Training program was initiated, in part, to help achieve this goal. (See next page.)

*TEDWG stands for Thompson Economic Diversification Working Group. It identified a ‘catchment’ area for communities using Thompson as a service and economic hub.)
“When I applied to Vale, I was nervous. I had no experience in industry. But after the POinT program and a few months of actually working at Vale, I feel I could be a spokesperson for women to get into the industry!” exclaimed Holly Martin, Skid Steer Operator in the Thompson Smelter.

Holly is one of 37 people to graduate from Vale’s Process Operator in Training (POinT) program. Vale Manitoba Operations launched POinT in June 2012 as part of its Northern Employment Strategy.

Prior to implementation of POinT, 80% of new hires came from outside the Thompson region. As of 2012, approximately 50% of all new hires would leave the company within the first two years. In another two years, 75% of new hires were gone. This resulted in labour shortages, increased costs and the inability to meet production targets.

In the meantime, Vale was aware of the large, untapped labour market available in surrounding Aboriginal and northern communities. It also realized that most people in these communities were unaware of the potential for developing a career within industry. So, it developed the POinT program — to both educate northern people about careers in industry, and to provide a pathway to jobs.

“POinT program — to both educate northern people about careers in industry, and to provide a pathway to jobs. Today, approximately 90% of the 37 graduates are still employed at Vale's Thompson operations.

“We started in a classroom setting, which is good,” said Holly, who lives in Thompson, “because everyone is familiar with a classroom. We learned theoretical knowledge, toured areas and were provided with information that many long-term employees would have learned. I felt prepared in that I understood the big picture, the terminology and the principles of risk management. I didn’t have to start from scratch.”

Malcolm Hunter lives on the Nisichawayasihk Cree Nation (NCN) and commutes the hour to Thompson. The five-days-on, four-days-off cycle works well for Malcolm, a Plating Tankman in the Thompson Refinery. He was raised by his grandparents and has a close connection to the outdoors. He particularly loves hunting and providing for his family.

“Growing Our Own
Meet the graduates of the POinT program — they are Vale employees

Participants in the POinT program spend some time in the classroom, but they also tour all areas of Vale’s Manitoba Operations to get a better understanding of mining and processing (top photo). Malcolm Hunter of the Refinery (bottom right) says the work cycle, which provides four consecutive days off, provides time for family and outdoor activities. Upon graduation from the POinT program, Holly Martin of the Smelter (bottom left) said she felt prepared to enter an industrial work environment.

“When you go out on the land all the stress disappears. Then you come back into work, and you can work as hard as you want. It’s a good combination. It’s a stepping stone to a new career,” he said.

The program is comprised of four modules: Industry Awareness, Safety, Smelter Operations and Refinery Operations. The program includes guest speakers and tours of various areas. As well, the classroom instructor becomes a mentor to the students as they transition to the workplace.

“When I started working in September 2013, I was the single new hire laborer in the Smelter,” recalled Holly. “But I still felt confident. Everyone was supportive — from my supervisor to my co-workers. The information I learned in POinT transferred well to the actual work. I feel I have come a long way from not knowing what a mine shaft and smelter are to operating equipment in the smelter.”
One Procurement

If you supply Vale in Thompson with products or services, you will appreciate the move in July 2013 to re-establish a local procurement team. Four Procurement Analysts are now available to help vendors address concerns and to help Vale improve its local purchasing processes.

“The big benefit to this action is that our vendors and suppliers now have a local contact point — someone who is on site and who understands our procurement systems,” explained Donna Patterson, Manager of Operation Support & Procurement. “If a vendor is having a problem, we can cut through barriers to help them.”

Other benefits come in the form of expediting emergency purchases, informing local businesses of potential service or procurement contracts and providing the assurance that concerns are being heard and addressed.

“Having a local point of contact is tremendously important to our vendors,” said Donna. “They now have a person to phone locally, who will call them back or answer their emails in a timely manner. It could even be their neighbour, so the confidence that concerns will be addressed is greatly improved.”

Most of Vale’s purchasing is still handled through the procurement offices in Toronto or Rio de Janeiro. Some goods or services, however, are more regional or site specific in nature. The local procurement analysts are an especially valuable resource to the procurement process when Thompson-specific purchases or services are required.

“One of our needs is more unique in nature,” explained Donna, “such as our cathode boxes from Norwest Manufacturing or our one-of-a-kind items such as the lime slaker in the Mill. Or, we may have a special project, such as testing anode bags. We become the point of contact or the conduit to ensure that we are getting the best value. We are aware of freight charges, distances and so on, so we are also a valued asset to the regional and global purchasing team.”

Thompson’s Procurement Analysts are Denise Horton, Sherri Hohl, Beth Ann Coombs and Heather Thompson.

SLAM Dunk

Vale is turning garbage into a resource

In 2013 we changed our view on garbage. Instead of seeing it as waste, we began to think of it as a potential resource. SLAM Dunk, a new waste management program, provided tools to help separate the waste into streams that could be recycled. This keeps waste out of the landfill, thereby extending the life of the landfill without increasing the size of its environmental footprint. It also helps offset the costs of recycling.

“Our commitment to the environment goes beyond simply complying with regulations,” said Toni Paulic, Senior Engineer. “It reflects our corporate values of thinking, reducing and recycling, and requires a commitment from everyone on Vale’s operations property — employees, contractors and visitors.”

Toni said the plantwide objective is to continually increase the amount of waste that is diverted from the landfill. The company decided in 2013 to take its learnings and successes and share them with others in the community. Its first step in this direction was in March 2014 with Grade 8 students in Thompson during a Learning for a Sustainable Future youth forum.

“Three sessions were held where we shared what goes into making good choices to help Reduce, Reuse and Recycle,” explained Toni. “In 2013 saw a total of 48% of Vale’s waste diverted from landfill (with a peak of 62% in August) and at the end of June 2014, 58% has been diverted, bringing us closer to our goal of extending the life of our new landfill.

“As a potential resource, our new way of thinking resulted in more than $20,000 from new rebates which included pallets, recycling and wet cell batteries. Any way you look at it, SLAM Dunk can be considered a success!” concluded Toni.

“Employees, contractors and visitors are able to sort recyclables according to colour-coded bins at their work sites. Since the inception of SLAM Dunk, 144 bales of recyclable material, adding up to 32 metric tonnes have been shipped for processing.”