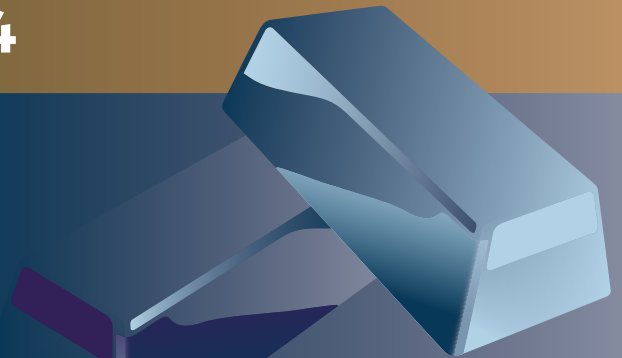
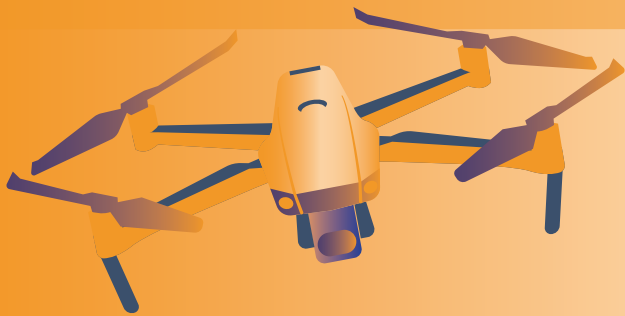


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ONTARIO MINING AND TORONTO'S GLOBAL REACH 2024



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Engineering & Consulting - Critical Minerals - Equipment & Innovation

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Dear Readers,

The geopolitical nature of the energy transition, where access to various minerals has become of strategic importance, and the continuing post-pandemic reshoring trend have led Ontario to identify the opportunity for developing a home-grown electric vehicle supply chain. Global events in 2023, such as the coup in Niger and a slew of sanctions against Russia, only reinforce Ontario's already strong hand: Ontario offers stable government, a rich ecosystem of service providers, and an abundance of renewable hydropower – all of which make it stand out as one of the world's top mining destinations.

The last year has been transformational for the mining industry in Ontario, with the passing of the Building More Mines Act, 2023, a proposed amendment to the alternative minimum tax (AMT), and the Supreme Court ruling that federal impact assessments are unconstitutional. These changes are likely to shape Ontario's mining sector for the coming decades in ways that are not yet fully clear.

Gold, the backbone of Ontario's mining sector, has continued its bull run to reach all-time highs, just as Ontario has seen new major mines pour their first gold, and with more to come online throughout 2024. However, Ontario's prospectors and miners have faced challenges, some self-imposed and others due to the cyclical nature of mining. The mining sector's persistent labor shortages continue, hindering Ontario's efforts to pursue its Critical Minerals strategy. Additionally, juniors in particular have been squeezed by escalating costs and dwindling investor appetite, despite many minerals commanding high prices.

GBR's *Ontario Mining and Toronto's Global Reach 2024* report offers a comprehensive analysis, encompassing more than 100 interviews with mining leaders. We provide a voice to the key players as they share their insights and thoughts on the challenges and opportunities that the industry is undergoing, as well as outlining their projects and ambitions.

We would like to thank all those who contributed to this report, and express particular gratitude to our partners at the Toronto Stock Exchange and TSX Venture Exchange (TMX Group), the Ontario Mining Association (OMA) and Prospectors & Developers Association of Canada (PDAC) for their support.



Alfonso Tejerina
Director and General Manager
GLOBAL BUSINESS REPORTS



ONTARIO MINING AND TORONTO'S GLOBAL REACH 2024

GBR SERIES

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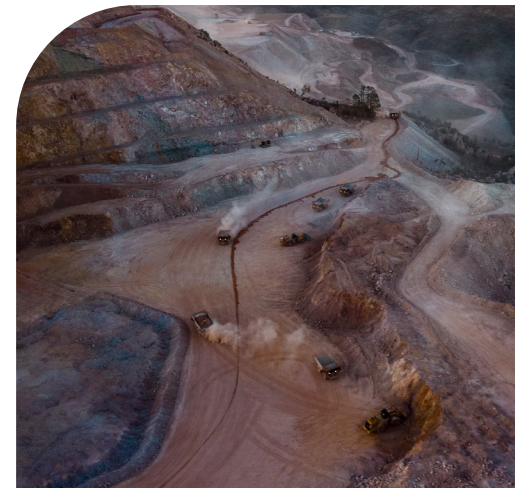
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Introduction

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Ontario needs decisive action on creating an enabling regulatory environment. We are encouraged to see momentum building on modernizing regulations, with the government signaling strong support for the mining sector, a willingness to accelerate projects, and by extension, the transition to a green economy.

”

Chris Hodgson
President
ONTARIO MINING ASSOCIATION (OMA)

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TORONTO'S GLOBAL REACH 2024

Image by Phill at Adobe Stock



Introduction to Mining in Ontario

Legislation and labor in Canada's heartland province

In 2023, Ontario passed a series of important regulations that may pave the way to a brighter future for its mining industry. 2023 has also seen high prices for certain metals, boosting the margins of producers. On the other hand, the troublesome macro-economic situation has meant that financing, particularly for juniors, has been problematic. All the while,

Ontario's miners and explorers have had to adapt to changing regulations in Ontario and abroad, attract talent in a shrinking labor pool, and manage their ESG credentials in the face of an ever-growing climate crisis.

2023 has seen new legislation and amendments to bolster Ontario's mining industry. At the federal level, the Ministry of Energy and Natural

Resources announced a C\$1.5 billion Critical Minerals Infrastructure Fund (CMIF) in October 2023. The CMIF is a key component of the Canadian Critical Minerals Strategy and will address key infrastructure gaps to enable sustainable critical minerals production and connect resources to markets. Eligible recipients include provinces and territorial governments, private businesses, not-for-profit organizations, and Indigenous groups. The maximum funding available per project under the first call for proposal will be C\$50 million for most applicants, but provincial and territorial governments may apply for up to C\$100 million for public projects.

At the provincial level, the Ontario government continues to subsidize its local mining sector. The Ontario Junior Exploration Program (OJEP), for example, helps junior mining companies finance early exploration projects, with eligible juniors receiving up to C\$200,000 to cover costs. George Pirie, Ontario's Minister of Mines, shared updates on the program: "The OJEP launched in 2021 and is having initial success. Companies are eager to leverage the available funding and find the mine sites of the future. Our government is investing an additional C\$6 million over the next two years in OJEP, bringing the government's total investment in the program to C\$35 million."

Aimed to increase Ontario's competitiveness in mineral exploration and development, the Building More Mines Act received royal assent in May 2023. This Act made amendments to the Mining Act, aiming to

Ontario's mining industry by the numbers

C\$13.5 B

Value of mineral production in 2022

C\$989 M

Spent in 2022 on approximately 300 mineral exploration projects

31,000

Direct mining jobs, plus another 47,000 indirect jobs have been created

over 376,000

Active mining claims in good standing (as of April 30, 2023)

Largest producer

in Canada of gold, platinum group elements and nickel, and the 2nd largest producer of copper

Source: Invest Ontario

reduce the administrative burden, clarify requirements for rehabilitation, and create regulatory efficiencies by eliminating overly complicated, duplicative and unnecessary rules. Most of the interviewees featured in this report were enthusiastic about the new Act; Chris Hodgson, president of the Ontario Mining Association (OMA), said: "We were very impressed with how the government conducted the consultation process when developing the Act and regulations; they considered a broad array of perspectives and incorporated valuable input from expert practitioners."

Mining-related environmental regulations in particular are a hot topic. Finding an equilibrium between the need to develop the critical minerals mines needed for the green energy transition, while taking the time to consider the environmental impacts requires a fine balancing act. Mary-Jane Piggott, vice president, mining environmental group at Klohn Crippen Berger, a consultancy focused on tailing-related designs and assessments, shared her thoughts on how such regulations should be handled in her field: "I support keeping regulation and governance responsibilities for tailings management within the industry and its professional organizations. Most industry professionals are passionate about environmental responsibility and are motivated to operate sustainably."

Ontario's 2023 spree of new regulations, deals and initiatives extended beyond its borders. The premier of Ontario, Doug Ford, sat down with the governor of the state of Nevada to sign an Economic Cooperation Memorandum of Understanding

(MoU) to increase collaboration on electric vehicles, advanced manufacturing, mining, critical minerals, and related supply chains, among others. In 2022, total trade between Ontario and Nevada exceeded C\$2 billion, with exports to Nevada totaling C\$1.1 billion. "This agreement is based on our regions' strong mining sectors," said Nevada Governor Lombardo.

Setting the stage for the MoU, MineConnect, Ontario's mining supply and services association, has partnered with the Nevada Governor's Office of Economic Development (GOED) and the Northeastern Nevada Regional Development Authority (NNRDA) for many years. This has allowed MineConnect members to make connections and secure contracts in Nevada. "The 10-year relationship we had with the GOED and the NNRDA paved the way for the recent MoU signed between Nevada and Ontario," said Marla Tremblay, executive director, MineConnect. ■



Spanning over 4 decades, Bedford Transearch is one of Canada's leading privately-held executive search firms. As the Canadian partner to Transearch International, we have representation in The Americas, Asia Pacific, Europe, Middle East and Africa. Our global presence allows us to service companies around the world – covering all major industry sectors.

Bedford's talent strategy goes beyond traditional executive search, partnering with clients on executive compensation, business transformation, benchmarking and coaching, as well as organizational team and culture diagnostics.



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“ The Building More Mines Act, 2023 is an important piece of legislation that will allow us to build more mines faster across the province. ”

George Pirie

Minister of Mines
GOVERNMENT OF ONTARIO

What are the highlights of the last year in the Ontario mining sector?

The Ontario Critical Minerals Strategy was released in March 2022, and it resulted in a 41% year-on-year increase in critical mineral production in 2022. Critical minerals exploration expenditures in Ontario amounted to C\$328 million in 2022, and accounted for 33% of all exploration expenditures in the province. The Ontario Junior Exploration Program (OJEP) was launched in 2021, and is having initial success; companies are eager to leverage the available funding to find the mine sites of the future. Our government is investing an additional C\$6 million over the next two years in OJEP, bringing the government's total investment in the program to C\$35 million. Ontario is now the number one mining jurisdiction for exploration in Canada. Our strategy around critical minerals is clearly working and exploration is at the heart of it.

The mine producers in Ontario have had a busy year, spending millions on expansion projects. Agnico Eagle recently commissioned a new shaft at their Macassa mine, Agnico's Detour Lake mine has a huge expansion program, McEwen Mining is expanding its Black Fox gold mine, and Alamos Gold has been expanding its Island gold mine underground. Finally, Newmont is getting ready to re-develop its old open pit Porcupine mine.

In terms of new developments, IAMGOLD's Côté gold project is being developed after a lengthy permitting process and is employing 1,600 people in the construction phase. They are using autonomous haulage vehi-

cles that will eventually be electrified. There are other exciting ongoing projects like Equinox Gold's Greenstone project and KGHM's copper and nickel Victoria project.

What was the strategy behind the Building More Mines Act, 2023?

The Building More Mines Act, 2023 is an important piece of legislation that will allow us to build more mines faster across the province. Our government is improving the Mining Act to create the conditions for companies to build more mines efficiently, because it cannot take 15 years to build a mine. The changes are designed to cut red tape, improve Ontario's competitiveness, and attract investment to the province. We are currently developing regulations that we hope will be completed by the end of 2023. These adjustments will help companies build critical mineral mines, securing the supply chain for electric vehicle manufacturing in Ontario.

How does the Ministry of Mines intend to address the skilled labor shortage in mining?

Arrangements are being made with colleges and universities to ensure that the trades are emphasized. We have several existing programs to attract and retain talent, namely, the Ontario Immigrant Nominee Program and the Indigenous Workplace Development Program are making a difference. I was pleased to see 150 Indigenous community members receive training to support the construction of the new Equinox Gold operation.

I am enthusiastic about immigra-

tion because we need more people to build the workforce of the future. Our immigration programs are focused so individuals with the necessary skills start work immediately.

How is the development in the Ring of Fire progressing?

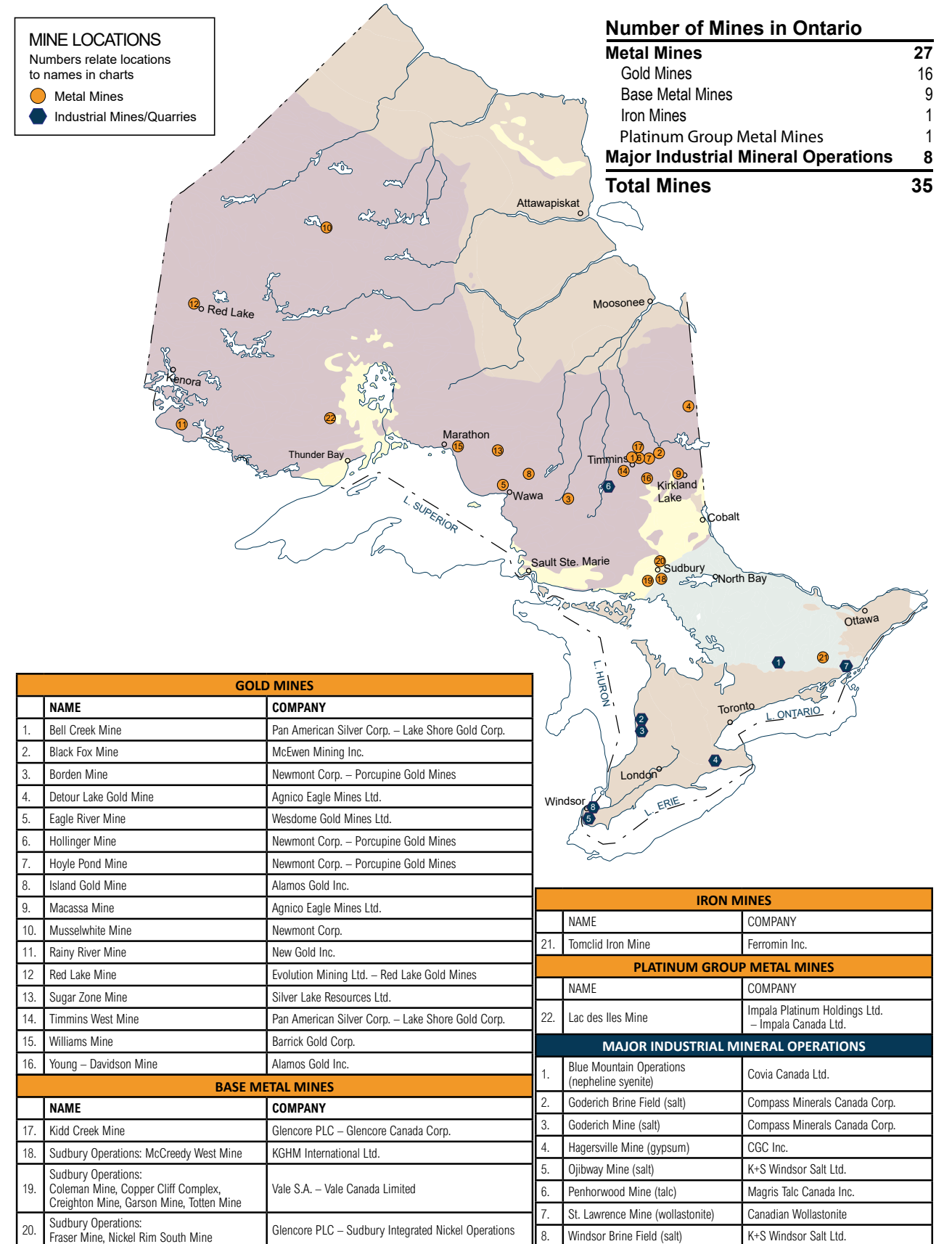
We recently had an exciting ruling from the Supreme Court of Canada in relation to federal impact assessments. We hope it will solve many of the problems we have with duplication of federal and provincial regulations, and that it will boost the development of the Ring of Fire.

The Ring of Fire area is immense. Due to the effects of climate change, ice roads are unlikely to be viable, and some First Nations have been trying to raise the alarm about this. As such, the Northern Road Link project will need to be completed so surrounding communities will have all-season roads, access to health and education services, and a connection to the province's highway network.

Chief Bruce Achneepineskum of Marten Falls and Chief Cornelius Wabasse of Webequie First Nation are extraordinary leaders in their communities who are working on the environmental assessments for roads in the region.

I am also extremely proud of entities like Ontario Power Generation and Hydro One, who announced that First Nations communities will get a 50% equity stake in all new, future large-scale capital transmission line projects. Initiatives like these would have been unthinkable just a decade ago. ■

Ontario Mining Operations in 2023



Source: 2023 Ontario Mining and Exploration Directory and Resource Guide



Chris Hodgson

President
ONTARIO MINING ASSOCIATION (OMA)

What are some of the key topics of discussion for the Ontario Mining Association (OMA) and its members so far in 2023?

As always, we are focused on areas that have the potential to improve the competitiveness of Ontario's mining industry, while promoting safety, environmental stewardship and sustainability. This includes addressing energy capacity shortfalls in the province by developing a cost-sharing model with the government and seeking ways to ensure a competitive, predictable cost of energy. Another focal point for our members is advancing reconciliation and continuing to build strong, respectful relationships with Indigenous peoples.

The path to success involves aligning interests and enabling economic benefits to accrue in all communities, but especially in remote Indigenous communities, where mining can have an outsized impact on the local economy and people's lives. As demand for responsibly mined minerals continues to grow, we find ourselves with a once-in-a-lifetime opportunity to develop our abundant natural resources in a way that is environmentally sustainable and economically viable, becoming the global supplier of choice for critical minerals and clean technology. Ontario needs decisive action on creating an enabling regulatory environment, and we are encouraged to see momentum building on modernizing regulations, with the government signaling strong support

“

As demand for responsibly mined minerals grows, we have a once-in-a-lifetime opportunity to develop our abundant natural resources in a way that is environmentally sustainable and economically viable.

”

for the mining sector, a willingness to accelerate projects, and by extension, the transition to a green economy.

Finally, we have been focused on the one thing without which we cannot possibly capitalize on the current opportunities, and that is: people. We are facing a talent crunch and have been devising ways to support a future-ready workforce and boost labor market participation in the mining sector.

What impact do you see the 'Building More Mines Act' having?

The 'Building More Mines Act', which amended Ontario's Mining Act, represents continued steps by the government to improve and streamline the mineral permitting process and regulatory oversight, consistent with the province's Critical Minerals Strategy, which sets out our ambition to seize the economic and environmental opportunities that can be unlocked by locally sourcing critical minerals required to manufacture environmentally friendly technologies, such as electric vehicles. We were very impressed with how the government conducted the consultation process when developing the Act and regulations – they considered a broad array of perspectives and incorporated valuable input from expert practitioners.

The Ministry of Environment, Conservation and Parks' proposal of a permit-by-rule system holds great promise as an innovative approach

to shorten timelines without compromising environmental protection. We also see potential in a one-window approach, where the Ministry of Mines would be the environmental regulator for mining, with the closure plan as the key regulatory instrument that oversees mining activities.

How has the "This is Mining" campaign developed and what additional efforts are needed to help address the challenge of labor shortages in the industry?

To encourage more young people to consider a career in mining, we have transitioned 'This Is Mining' to 'This Is Mine Life', a campaign that lets youth discover how mine life aligns with their personal purpose, abilities and lifestyle goals. As with all our outreach efforts, the campaign is data-driven, and we are grateful to the Ontario Labor Market Partnerships program for supporting a Labor Assessment Study, which is helping us understand the most urgent skills gaps, and ensure we are communicating to the right audience about the right career opportunities in Ontario's mining industry. We envision 'This is Mine Life' as a multi-year, multi-stage, multi-partner collaborative effort.

Why is the Ring of Fire an advantageous region to explore and develop?

Crucially, responsible mining development in the area aligns with the values and goals of Indigenous leaders, who support being active participants in facilitating climate solutions, while working towards economic reconciliation.

What are the OMA's main objectives for the remainder of 2023, and 2024?

We will build on our ongoing efforts to identify health and safety solutions, address the mining sector's ESG priorities, improve Ontario's competitiveness, support stronger supply chains, and drive innovation. We will also maintain our focus on people, who are instrumental to continual improvement in every aspect of mining, and without whom we cannot create a strong, secure, and resilient mining supply ecosystem. ■



Marla Tremblay

Executive Director
MINECONNECT

Can you update the audience on recent developments at MineConnect?

MineConnect grew significantly over the past five years not only as it relates to membership, which has increased by 225%, but also in terms of programming and activities. We made a concerted effort to increase our presence throughout Northern Ontario.

What has MineConnect done to address the skilled labor shortage?

As a representative for MineConnect, I have made presentations in high schools about careers in mining to help change perceptions and demonstrate that mining is not just about putting on overalls and working in a dirty environment for long hours. I show students what a mine looks like, the growing diversity in the industry, and the possibilities in non-traditional mining jobs— in drones, technology, and community engagement, for example. The Goodman School of Mines created and hosted a mine opportunity challenge for high school students to get them excited

about mining. We are helping deliver the program throughout Northern Ontario, and scheduled sessions for North Bay, Timmins, and Thunder Bay. We are also hosting a panel for post-secondary students in North Bay with panelists all under 30 to tell their career stories and the diverse paths that led them to mining.

What challenges are your members currently facing?

The biggest challenge is attracting and retaining labor. We are trying to get our members to change the way they think about retention; it is not just about money. It is also about valuing employee contributions, giving them room and opportunities to grow, and providing training to allow them to envision a path for upward mobility.

Do you have a final message for our audience?

MineConnect provides a source of legitimate and reputable suppliers that can meet nearly any product or service need you may have at any stage of the game. ■

Can you highlight some recent developments at PDAC?

PDAC recently held a strategic planning session at Niagara Falls, where we developed our 5-year plan. We reaffirmed PDAC's purpose: To work with its stakeholders to access the land, capital and skills required to responsibly discover and develop minerals and metals.

Our foundational strategy is to connect with the hearts and minds of people outside our industry. To them, we aim to emphasize the inherent links of mineral exploration and mining to everyday life and to our transition to a low-carbon future. We are encouraged that governments and people around the world have a growing awareness of these links.

How is PDAC addressing the current talent shortage?

Enhancing the competitiveness of Canada's mineral industry hinges on cultivating a workforce that is inclusive, diverse and highly skilled. PDAC Convention addresses this priority through the Student and Early Career program, which offers individuals the

chance to learn about careers in the industry, attend engaging presentations, and connect with industry professionals from around the world.

Another pivotal PDAC program is the Student-Industry Mineral Exploration Workshop (S-IMEW). S-IMEW gives geoscience students a unique opportunity to put their education into practice before entering the workforce.

What are the main challenges facing the industry?

A paucity of capital available in the market for junior explorers is the central issue that our members are facing right now. Recognizing this fact, we have put a lot of effort into making sure our government understands how important incentives are for junior explorers and that the Mineral Exploration Tax Credit (METC) must be renewed before it expires in March 2024, and its new addition, the Critical Metal Exploration Tax Credit, must be retained. PDAC is also calling for Finance Canada to change the tax treatment of flow-through shares to appeal and spur investment from a broader base of Canadians. ■



Raymond Goldie

President
PROSPECTORS &
DEVELOPERS ASSOCIATION
OF CANADA (PDAC)



Ontario's Talent Drought

Staying afloat in a shallow labor pool

In September 2023, the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Toronto branch held a panel discussing how Canada could achieve the enormous increase in critical mineral production required for the green energy transition. One major question remained unanswered: Who is going to build these critical minerals mines?

The number of mining and mineral engineering graduates dropped by a third between 2016 and 2020 in Canada, according to Statistics Canada. Many other jurisdictions, like the UK and Colorado, reported similar drops in enrollment in mining-related degrees. This waning interest in mining and earth sciences from students poses a serious threat to the success of Ontario's Critical Mineral Strategy, and by extension, to Canada's net-zero

plans. "The youth of today are not as interested in mining as a profession, which is truly unfortunate as there are great opportunities," said Frank Galati, managing partner at the Bedford Group TRANSEARCH, an executive search and professional services firm catering to the Canadian mining sector.

Firms like Bedford Group TRANSEARCH have been hard at work trying to fill the glut of vacant positions in the mining sector. Since the pandemic, the percentage of job openings that remain unfilled has doubled. By the third quarter of 2022, there was only one job-seeker for every five job openings in mining and quarrying, according to the Canadian Mining Industry Human Resources Council.

The talent shortage extends beyond just university graduates: "Besides specialized skills, there is a shortage of

truck drivers and general laborers. Surprisingly, masons and bricklayers are very sought after, with a notable gap in apprenticeships for this crucial trade," said Steve Gravel, manager, Centre for Smart Mining at Cambrian College.

Unlike most North American universities and colleges, Cambrian has been experiencing record-high enrollment in many of its mining-related courses, due in part to the college's ambition to look far from home for fresh talent: "Immigration is a key element in our comprehensive solution, tapping into students from existing mining jurisdictions abroad. This targeted approach ensures our graduates, even if new to Canada, bring valuable industry context, reducing the learning curve."

Recruitment strategies like Cambrian's are made possible by the Ontario government's pro-immigration stance. The province welcomed 45% of all new permanent residents in Canada from 2016-2021, with Toronto seeing the most settlers of any Canadian city by far. "We have several existing programs to attract and retain talent. Namely, the Ontario Immigrant Nominee Program and the Indigenous Workplace Development Program are making a difference," said George Pirie, Ontario's Minister of Mines.

Market volatility, mining's reputation as a 'dirty' industry, and the remoteness and tough living conditions at many mining camps are just some of the factors driving young graduates away from the industry. "Improving fa-

cilities on site, improving rotation, and labeling mining companies as innovators will help to lessen the labor shortage in the years to come," continued Galati.

A recent survey of young people by the Canadian Mining Industry Human Resources Council found that 70% said they "definitely" or "probably would not" work in the mining sector, making it even less popular than the Oil & Gas sector at 67%. In addition to this, the Covid pandemic substantially increased work from home in Canada and many industrialized countries. In January 2021, 32% of Canadians worked most of their hours from home, compared with 4% in 2016, according to Statistics Canada. Attracting young people to Ontario's northern mining towns and away from the southern population centers in and around the Greater Toronto Area (GTA) continues to be a challenge. This has impacted firms like TBT Engineering, an engineering consultancy based in Thunder Bay, to the point where they have had to take significant measures to address the issue: "The difficulty in recruiting skilled professionals, especially from major urban centers in Canada, is compounded by the remote nature of our region. To overcome this hurdle, we are strategically opening an office in southern Ontario, in Collingwood," shared Liana Frenette, CEO of TBT Engineering.

For skills that overlap with other industries, such as electrical engineering, the problem is exacerbated by young talent being drawn into Crown corporations. In some fields, it is notoriously difficult to draw talent back into the private sector. "Competition for talent extends to government entities actively recruiting individuals with engineering expertise, creating a situation where the industry competes with the government for the same limited pool. This challenge permeates every aspect of the industry, affecting operators who draw personnel from consultancies to address staffing needs," said Chris Dougherty, president and chairman, Nordmin Engineering.

The shortage of talent within Ontario's mining industry extends beyond engineers and geologists to the tradespeople employed by service providers and contractors. Ryan Whissell, general operations manager at Patrick Sprack Limited (PSL), a Northern Ontario-based HVAC service company, shared how this has impacted PSL: "We have had to turn down work in the past year due to the lack of skilled trades. Particularly in the last 18 months, it has been difficult to find talent in the wide range of skilled trades we are hiring for. This is a problem being felt across our entire industry."

Making the industry more inclusive to attract a more diverse range of people might alleviate the ongoing labor shortage. "Companies should push themselves in the small things that can signal that they want their mine to be a comfortable place for a wide range of people and their families," suggested Heather Cheeseman, partner and national mining leader at KPMG in Canada.

Industry figures often comment on mining and the earth sciences being underrepresented in Canada's school curriculums, which they believe is contributing to the talent crunch. "The challenge we face is to attract youth into Earth Sciences, and we can only do this by dispelling misconceptions about the mining industry. Despite being a high-tech and clean sector with excellent employment prospects, there is a persistent belief that the industry

is low-tech and polluting," said Ross Sherlock, director of MERC and Metal Earth, chair in exploration targeting, Laurentian University.

Cognizant of this, industry organizations like MineConnect have been engaging with Ontario's youth to elevate mining in schools across the province. "I show students what a mine looks like, the growing diversity in the industry, and the possibilities in non-traditional mining jobs—in drones, technology, and community engagement, for example," said Marla Tremblay, executive director, MineConnect.

In approaching school-aged pupils, Ontario's mining industry has an opportunity to showcase the role it will play in the energy transition through the development of the critical minerals needed for EVs, batteries, and renewables. Charlotte Gibson, associate head of the Robert M. Buchan department of mining at Queen's University shared her observations of her recent cohorts: "An emerging theme among students is their interest in the energy transition and critical minerals. The increased awareness of environmental issues and the importance of critical minerals in the energy transition has influenced some students to see that mining can positively contribute to global challenges."

With mine development taking upwards of 15 years in some cases, and an ever-dwindling supply of skilled professionals, the clock is ticking for Ontario's mining sector to deliver the minerals the world needs to decarbonize. ■



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Frank Galati

Managing Partner
THE BEDFORD GROUP TRANSEARCH

Can you introduce The Bedford Group TRANSEARCH and outline the services you offer the Ontario mining industry?

The Bedford Group was conceived in 1979 and is the largest executive search and professional services firm catering to the Canadian mining sector, so large in fact that we formed Bedford Resources Inc. in 1983 to better serve the needs of the Resources sector, mining especially. We provide retained executive search, board services, recruitment, and a compensation practice, which includes executive and mine site compensation, to mining companies. In recent years, we have helped Canadian miners diversify their boards by increasing gender diversification.

Have you observed any recent trends in the industry, particularly pertaining to recruitment?

The world has become much more globalized. The youth of today are not as interested in mining as a profession, which is truly unfortunate as there are great opportunities. Green, carbon-neutral and sustainable mining is increasingly becoming a big deal. Many companies are exploring ways to invest, grow and transform with the energy transition. The gray tsunami is coming; around half of the industry will retire in the coming years, leaving a huge gap that needs to be filled. We are working with our clients to bridge that gap; this means rethinking the organization charts and bringing in peo-

“ We help mining companies become more diversified, but the number of graduates from mining schools is shrinking, and the number of women entering mining is tiny. ”

ple from different industries, those with transferrable skills and experience. We are shifting with the industry.

A survey published by McKinsey & Company found that 42% of youth aged 15-30 'definitely would not' work in mining. How can mining companies rectify this issue and attract young talent?

Mining must be more environmentally friendly. We are just starting to see this as many companies are transitioning to carbon-neutral projects. Additionally, technology must replace the laborious tasks that people used to do. Finally, camp conditions must be improved as young people increasingly prioritize living conditions, including their surroundings and nutrition.

As an example, at our client McEwen Mining's project in Los Azules, Argentina, significant efforts have been made to enhance the comfort of the camps. Everyone has their own room, advanced technology is extensively integrated, and rotation times have been extended. The focus is on innovation and technology, rather than just grinding out the ore. When you take this approach, of looking through the lens of being a technology company, mining becomes more attractive to young talent. The volatility in the sector scares off a lot of young people too. Improving facilities on site, improving rotation, and labeling mining companies as innovators will help to lessen the labor shortage for the years to come.

Education is needed. We must inform young people that mining is not a dirty industry; it is advancing with AI, autonomous vehicles and automation, and that is exciting and rewarding. There will always be a need for mining. The next generation must understand that mining has a bright future and with them onboard, mining can become a clean industry.

Only 17% percent of Canada's mining executives are female. Can you describe how the industry has embraced the shift towards greater female representation?

There are two components reinforcing the shift. On one hand, there is the regulation component. In 2012, the Ontario Securities Commission (OSC) mandated 40% of all boards to be gender diversified by 2020. Shareholder groups require gender diversification, as boards with a diverse gender composition tend to be more effective.

We help mining companies become more diversified, but the number of graduates from mining schools is shrinking, and the number of women entering mining is tiny. Diversification does not mean looking for a diverse version of the same type of candidate that is typically hired, but rather finding a candidate from, perhaps, a completely different background. Many companies fail to recognize that finding a diverse candidate entails providing an opportunity to someone they might not typically consider. It requires thinking outside of the box: bringing women in from forestry, clean tech, power, energy, or engineering onto the board.

Does The Bedford Group TRANSEARCH have a final message for our audience?

The Bedford Group TRANSEARCH provides a full suite of holistic services to our clients including executive search, board diversity, compensation and evaluation metrics, talent scouting, as well as talent advisory.

We will continue our long-standing commitment to ensuring companies thrive with world-class talent, whether that is through board diversity, compensation analytics, or securing top talent through our vast and evolving network. ■



Ross Sherlock

Director of MERC and Metal Earth, Chair in Exploration Targeting
LAURENTIAN UNIVERSITY

“ The challenge we face is to attract youth into Earth Sciences, and we can only do this by dispelling misconceptions about the mining industry. ”

Can you provide an overview of the key developments at MERC in 2023?

The Mineral Exploration Research Centre (MERC), is the principal research entity within Laurentian University's Harquail School of Sciences. Currently, our primary responsibility is managing the Metal Earth Project, funded by the Canada First Research Excellence Fund (CFREF), which is now entering its eighth year.

Metal Earth's overarching objective revolves around unraveling the factors that control differential metal endowment. This involves completing crustal architecture studies in areas with high metal endowment and comparing to areas with lower metal endowment, despite similar geological attributes.

Laurentian University encountered financial challenges in the last couple of years, which had an impact on MERC and the Metal Earth Project. In addition, the Covid pandemic further disrupted activities. To offset these obstacles, we have been granted a four-year no-cost extension from CFREF. This extension allows us to fulfill the original vision of the Metal Earth project, with the completion date now set for August 2027.

In terms of the ongoing work, we have transitioned into a phase of data analytics. Although fieldwork is still ongoing in some areas, it is notably reduced. With comprehensive data at our disposal and a solid geoscience framework, we aim to understand the disparities in crustal architecture, geochemistry, and timing of different geologic events between the areas of focus. Utilizing emerging data science tools, we have engaged a number of graduate students, vis-

iting scientists, and research associates. Their collective efforts are directed towards determining what controls metal endowment in different regions.

A noteworthy development in 2023 involves a collaborative project with Agnico Eagle, focusing on the Hope Bay belt in Nunavut. This greenstone belt is in the Slave Craton, in contrast to our previous work in the Superior, serving as a proof of concept, to determine the applicability of features mapped in the Superior to other cratons which have different geologic histories.

What are the main technical challenges in completing the Metal Earth project?

The key challenge is compiling and integrating the datasets collected by the various subprojects. MERC has partnered with five other universities to deliver Metal Earth, and each of our partners has contributed according to their expertise. The challenge now lies in combining and integrating these data to produce models on what geologic aspects control metal endowment and how to be predictive in this assessment.

What were the highlights of the recent annual MERC report?

The highlights of the annual report are the successes of our students. This shows a face to the research and illustrates the dedication of individuals spending years on their research topics. The report demonstrates MERC's contributions to science by compiling 54 peer-reviewed publications and 89 abstracts from Metal Earth this year alone. Over the course

of the project, we have supported 41 MSc and 36 Ph.D. students, as well as 29 research associates at six different universities. This represents a significant number of highly qualified professionals entering the minerals industry, government, and academia. Additionally, we have released all of our geoscience framework data to the public.

Have Canadian universities observed a notable change in enrolment figures for earth science courses?

A report released by the Council of Chairs of Canadian Earth Science Departments suggests that undergraduate enrolment continues to be cyclic and is currently declining. The graduate student landscape appears more stable but is also experiencing a gradual decline. The challenge we face is to attract youth into Earth Sciences, and we can only do this by dispelling misconceptions about the mining industry. Despite being a high-tech and clean sector with excellent employment prospects, there is a persistent belief that the industry is low-tech and polluting. Although Laurentian is actively addressing this through outreach efforts, it needs a larger concerted and ongoing effort by universities, government, and industry to educate the public on the realities of the mining industry and highlight the opportunities it represents. Earth sciences should be taught in every high school to highlight the need for sciences and commodities in society. This will ensure that youth understand the importance of the industry and the opportunities it represents. ■



Charlotte Gibson

Associate Head of the Robert M. Buchan Department of Mining
QUEEN'S UNIVERSITY

Can you provide an update on the key developments at the Robert M. Buchan Department of Mining?

Over the past five years, our Mining Department has undergone a significant transformation with a substantial faculty renewal. This transition allowed for a refreshed perspective on mining education, emphasizing a modernized approach to teaching and research.

Enrollment in the undergraduate program experienced a noteworthy increase, making Queen's University (Queen's) one of the few mining schools in Canada with a growing undergraduate enrollment. The program saw a rise from the previous average of 30 students per year to 45 students in the 2023-2024 academic year.

A pivotal development for Queen's Engineering (now Smith Engineering) overall was the substantial C\$100 million donation from Stephen Smith in November 2023. This generous contribution aims to reshape engineering education at Queen's, incorporating a multidisciplinary and human-centric approach.

How can universities and companies attract underrepresented groups to the mining industry?

One effective strategy is the promotion of diversity in leadership positions. By showcasing successful role models, universities and the mining industry can create a more inclusive environment. The emphasis should be on creating an environment that

“The substantial C\$100 million donation to Smith Engineering elevates the department's standing, integrating mining into a forward-thinking, multidisciplinary approach to engineering education.”

values diversity and ensures equal opportunities.

Have you noticed common themes among the new generation of students entering the mining sector?

Students are attracted to studying mining for several reasons. Firstly, the anticipation of substantial job opportunities in the coming decades, driven by the industry's current phase of retirements and expected growth, is a major factor.

An emerging theme among students is their interest in the energy transition and critical minerals. The increased awareness of environmental issues and the importance of critical minerals in the energy transition has influenced some students to see that mining can positively contribute to global challenges.

Can you share details about notable ongoing research at the Department of Mining?

Dr. Qian Zhang's research is focused on sustainability in mining, including life-cycle assessment and the circular economy. Dr. Asli Sari is leading research initiatives focused on AI applications for mining and automation. Our newest faculty member, Dr. Mahoud Alzhoubi's research aims to improve energy efficiency in mining. We also have several researchers looking at the concentration and extraction of critical minerals. Overall, our research activities align well with industry priorities, creating considerable oppor-

tunity for collaboration with mining companies.

Have you noticed an appetite among companies for transferring AI tools from academia to industry?

Currently, major industrial players have shown fluctuating levels of interest in AI applications in different aspects of their operations. Success stories primarily involve isolated projects focusing on specific areas of processing plants or mining operations.

The industry's future direction appears to be moving toward broader AI models that can represent and predict the performance of the entire mining value chain. The industry is likely to witness a more widespread adoption of AI as it continues to demonstrate its value in improving operational efficiency and outcomes. However, AI depends on high-quality data as an input – we have lots of data in mining, but the quality isn't always there.

Is there sufficient emphasis on data collection in the mining industry to support AI development?

To ensure high-quality data, additional efforts such as preventative maintenance on sensors are necessary. However, the decision to prioritize production over maintenance often complicates these efforts. The rugged industrial environment and the need for reliable, accurate data further highlight the challenges the mining industry faces in maintaining the necessary infrastructure for effective data collection and AI development.

What message do you have for our audience regarding the future of Queen's Department of Mining?

Queen's Department of Mining is on the brink of a transformative period. Ongoing faculty renewal is injecting new energy and perspectives, to reshape mining education over the next 5 to 7 years. The substantial C\$100 million donation to Smith Engineering elevates the department's standing, integrating mining into a forward-thinking, multidisciplinary approach to engineering education. As we step into 2024, the early stages of faculty renewal and collaboration with Smith Engineering promise an exciting decade ahead for the department. ■



MC

SG

Mike Commito and Stephen Gravel

MC: Director of Research & Innovation

SG: Manager, Centre for Smart Mining
CAMBRIAN COLLEGE

Can you provide an update on the recent developments at the Centre for Smart Mining?

SG: We have made significant strides in the development of our Electric Vehicle (EV) lab. The 5600-square-foot space now houses advanced equipment for on-vehicle technology development and serves as our EV power train testing facility. Scheduled to open in Q1 2024, it will provide valuable data on the performance and duty cycle of electrified power trains from mining equipment manufacturers. Additionally, we are actively involved in lithium extraction projects and battery recycling research through our chemical analytical facility. On the community front, we are addressing labor shortages by engaging with a local all-girls high school and offering workshops on mechatronics and the IoT to showcase the diverse work opportunities in the mining industry.

How would you characterize the health of the Sudbury mining ecosystem in 2023?

MC: The Sudbury mining ecosystem remains vibrant and innovative, fos-

tering collaboration within the industry. Our close partnership with CEMI and NORCAT has strengthened our position as a hub for mining innovation. Through the Center for Smart Mining, we play a crucial role in nurturing an innovation culture, offering expertise, students, faculty, and research infrastructure to address practical challenges in the mining industry. Our collaboration has intensified over the past year, and initiatives like OVIN's northern Regional Technology Development Site further showcase our commitment to bridging gaps between industries.

How has the labor shortage in the mining industry evolved and what is Cambrian College doing to address it?

SG: Cambrian addresses the skills shortage with record-high enrollment. Immigration is a key element in our comprehensive solution, tapping into students from existing mining jurisdictions abroad. This targeted approach ensures our graduates, even if new to Canada, bring valuable industry context, reducing the learning curve. ■

Business Insights on Talent



Steve McNeil, General Manager, **WORKFORCE INC.**

“The historic perception surrounding pursuing a career in trades as being less beneficial or rewarding than a university education has created a major talent shortage.”



Ryan Whissell, General Operations Manager, **PATRICK SPRACK LIMITED**

“Particularly in the last 18 months, it has been difficult to find talent in the wide range of skilled trades we are hiring for. This is a problem being felt across our entire industry.”



André Tessier, President and CEO, **DELTA RESOURCES**

“Attracting millennials and younger investors to the mining sector has been difficult. In the long term, this could become a significant issue for our industry. It is crucial to attract and educate younger investors about the opportunities and benefits of mining.”



Production, Development and Exploration

“

Our government is improving the Mining Act to create the conditions for companies to build more mines efficiently, because it cannot take 15 years to build a mine.

”

George Pirie
Minister of Mines
GOVERNMENT OF ONTARIO

GBR Series • ONTARIO MINING AND
TORONTO'S GLOBAL REACH 2024

Image courtesy of Alamos Gold



Production

Digging into Ontario's riches

Ontario managed to maintain its status as a top mineral producer, generating C\$13.5 billion worth of minerals in 2022 – representing 22% of Canada's total mineral production value. In 2022, the Ontario Mining Association (OMA) reported that Ontario expects C\$13.7 billion worth of mineral production in 2025. Should the current levels of growth continue, that forecast may be reached sooner than anticipated.

The passing of the Building More Mines Act is expected to make it easier for companies to get a permit to recover minerals from mine tailings and waste, allow more flexibility in the techniques used to rehabilitate closed mines, and improve closure planning by having more qualified professionals available, among other things.

The Act and the MoU between Ontario and Nevada are just some of the major developments of 2023. However, it is not just government officials that have been busy; industry players have been raising capital, expanding mines and staking new claims. The exceptional Canadian mining M&A activity seen in 2021/2022 continued into early 2023, with Agnico Eagle announcing the completion of its acquisition of Yamana Gold's Canadian assets, including Yamana's properties in Ontario.

Mergers & acquisitions

Despite having slowed down towards the end of 2023, consolidation may continue to be an attractive prospect for

some players in 2024, as resources can be pooled together to weather market challenges. "Financial and human capital is scarce. Companies are consolidating to strengthen their management teams, secure funding, and explore synergies between complementary projects," said Alexander Pizale, partner, Cassels Brock & Blackwell LLP.

As market volatility continues to make investors more risk-averse, mining companies will need to have a clear, defined set of projects and a clear focus to attract investment. M&As can also help on this front: "There are many pressures on the industry that could cause people to re-evaluate a company's plans, and consider combining projects with those of other companies, or moving certain projects into different or new companies so as to promote a more coherent plan," said Denis Frawley, partner, Ormston List Frawley LLP.

Always looking to extract the most value from M&As, some of Ontario's companies have taken a different approach: "We are seeing more 'syndicated acquisitions', being acquisitions where multiple companies approach an acquisition jointly and find creative ways to extract value from the transaction. For example, one company may acquire one specific asset, while the rest of the package is divided between other companies, according to their needs," shared Ian Mitchell, partner, head of mining, Gowling WLG.

Mitchell observed that this practice appears to have trickled down from the big players, and is now being increasingly observed in mid-market.

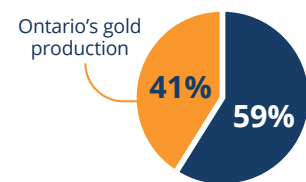
Gold production in Ontario



3.9 million troy ounces
of gold produced in Ontario in 2022, valued at C\$5.4 billion

*One icon represents 1 million troy ounces of gold produced.

Gold production in Canada (by value)



In 2022, 41% of Canada's total gold production value came from Ontario.

Source: Natural Resources Canada and the Ministry of Mines



Andrew Guiducci
President
DOMITE WEAR TECHNOLOGY

“As mines have been getting deeper and larger, mine operators increasingly want to increase the interval between maintenance.”

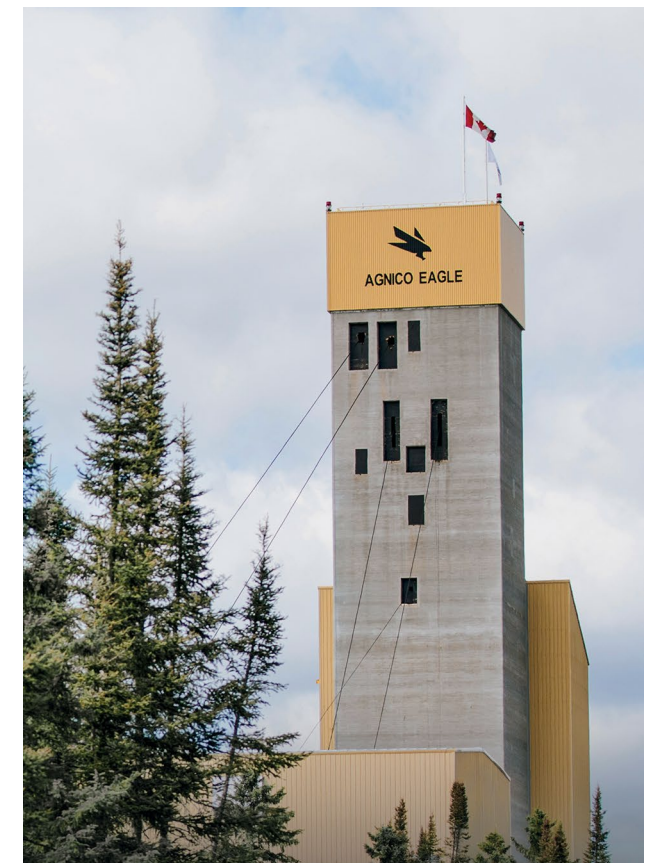
Gold production

Gold continues to be the backbone of Ontario's mineral production, with 21 out of the 41 operating mines in Ontario being gold mines. Ontario's annual gold production in 2022 amounted to 121,304 kg, an almost 22% increase from 2021, maintaining its position as Canada's top gold-producing province. The strong gold price and increased production levels have resulted in a good year for Ontario's gold producers. This comes as Ontario's miners are busy exploring northern Ontario for new deposits and spending billions of dollars expanding their existing mines.

Ontario's Minister of Mines George Pirie recently commissioned shaft #4 at Agnico Eagle's Macassa mine, the 9th largest gold mine in Canada, and listed other ongoing developments, during his interview with GBR: "Agnico's Detour Lake mine has a huge expansion program, McEwen Mining is expanding its Black Fox gold mine, and Alamos Gold has also been expanding its Island Gold mine underground. Finally, Newmont is getting ready to re-develop its old open pit Porcupine mine," Pirie explained.

In March 2023 Agnico Eagle acquired the remaining half of Canadian Malartic, thus consolidating two major gold-producing assets in the Abitibi belt – Detour Lake and Canadian Malartic's Odyssey mine. This comes in addition to Agnico's acquisition of the Upper Beaver deposit a few kilometers away from Macassa. Agnico Eagle is very bullish on the prospects of the Abitibi belt across Ontario and Québec. "We continue to look for synergies and opportunities in the Abitibi region, including the opportunity to process Upper Beaver and AK ore in our processing facilities in Québec," said Andre Leite, vice president – Ontario operations, Agnico Eagle.

Alamos Gold's phase 3+ expansion at the Island Gold mine is due to be completed in 2026. Alamos' president and CEO John McCluskey takes a long-term view: "The earthworks associated with these types of tailings expansions have been responsible for problems in previous Ontario project developments, so we decided that the best way to de-risk the whole project was to focus



Building for the future.

Strengthening our competitive position to deliver more value to all of our stakeholders for decades to come.



AGNICO EAGLE

We make mining work.

AEM (NYSE and TSX)

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“

If there is one thing that sets Barrick apart, it has been our ability to deliver sustained and significant growth in our reserves.

”

Mark Bristow

President and CEO
BARRICK GOLD

How would you assess Barrick's performance in 2023?

As we disclosed at the time of our Q3 results, we expect our annual gold production to be marginally below the 4.2 to 4.6 million oz/y guidance range we announced at the start of 2023. This is primarily due to the delay in receiving the "Record of Decision" from the United States Bureau of Land Management in relation to the permitting of the Goldrush project, changes in the Crossroads open pit model and some process interruptions to address long term maintenance requirements (all in Nevada).

Furthermore, in the LATAM region, equipment issues hindered the ramp-up of our expansion project at our Pueblo Viejo gold mine in the Dominican Republic.

The "Record of Decision" at Goldrush was eventually received in late December 2023 and we are expecting to complete the ramp up at Pueblo Viejo by the end of Q1 2024 meaning these issues are largely behind us.

In Africa, we have had another steady performance with attribution production at the 1.5 million oz/y mark, consistent with prior years and with all mines in the region expected to deliver on their guidance for the 2023 year.

As previously communicated, our 2023 copper production is expected to be within guidance albeit at the low end of the 420 to 470 million pounds range.

Can you discuss the importance that copper is poised to play in Barrick's strategy?

We plan to double our copper production by the end of the decade and continue to increase it to an estimated 1 billion pounds or 450,000 t/y by 2031. This will assist Barrick in delivering on its mission to build and operate world-class assets but at the same time continue to diversify our earnings as well as add to the global drive for a more sustainable, green economy. We believe that there remains significant upside potential in the gold industry and the copper operations are strategic and additive to that.

Reko Diq in Pakistan is positioned to rank as one the world's top 10 copper mines when it reaches full production and the pre-feasibility study on the Lumwana Super Pit Expansion is projected to deliver a potential of 240,000 t/y of copper production over a 36-year LOM.

The accelerated Lumwana work program is scheduled to deliver a full feasibility study by the end of 2024, and

following construction we are expecting production from the Super Pit to start in 2028. The Reko Diq project also remains on track to deliver an updated feasibility study by the end of 2024.

With ongoing operations and established programs in Mali, the DRC, Tanzania, Cote d'Ivoire, Zambia, and Egypt which areas of Africa does Barrick forecast growth to come from in 2024?

We believe Africa remains largely untapped despite the natural resource riches it is endowed with. As a multinational organization with a long history of discovering, building and operating big mines successfully in Africa, we remain best placed to unlock the vast potential of the continent.

As such we still see great potential for world-class discoveries around our operations and further afield in the Africa and Middle East region, from Zambia in the south to Saudi Arabia in the north. With its wealth of resources and our strong partnerships there, Tanzania is a particularly promising candidate for our next multi-million ounce discovery.

What makes an attractive target for M&A or JVs for Barrick?

Any M&A target or JV opportunity needs to be more appealing and additive to us on a holistic organizational basis compared to what we can deliver through our own geologically focused and proven track-record of organic growth through exploration. If there is one thing that sets Barrick apart, it has been our ability to deliver sustained and significant growth in our reserves. Since the merger with Randgold in 2019, we've replaced 125% of our reserves.

Looking to the future, we expect reserve replacement and our organic growth projects to increase production by some 30% gold equivalent ounces by the end of the decade. We are a global business and we pride ourselves on our ability to operate in most places in the world where we can find quality assets, bar a few limited exceptions. We have built and are still operating some of the largest and most successful mines in Africa which remains a highly prospective region for us. ■



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We believe there is substantial potential, that if realized, could position Detour Lake as a unique 1-million-ounce producer with combined parallel open pit and underground operations.

”

Andre Leite

Vice President - Ontario Operations
AGNICO EAGLE

Can you provide a brief overview of Agnico Eagle's performance and developments in 2023?

In 2023, we acquired the remaining half of Canadian Malartic, consolidating the two major gold-producing assets in the Abitibi belt – Detour Lake and Canadian Malartic mines. At Macassa, we completed a number of key projects in 2023 including the #4 Shaft. At Detour Lake, we continue to ramp up mill production targeting to achieve 28 million tons per year, and continue exploring the underground potential at the operation and the potential to further increase mill capacity – with the vision of potentially reaching one million ounces of production. We also continue to look for synergies and opportunities in the Abitibi region, including the opportunity to process Upper Beaver and AK ore in our processing facilities in Québec.

What will the new shaft #4 at Macassa unlock for Agnico Eagle?

At Macassa, the construction of the #4 Shaft was the first step in building a whole new mine. The completion of construction and commissioning along with the associated ventilation projects was a significant milestone for the operation. The operational conditions and temperatures at the mine were limiting factors in certain areas, and now those limitations have been removed.

What is Agnico's stance on Ontario's current regulatory landscape?

Ontario minister of mines, the Hon. George Pirie, has been a strong advocate for our industry, and we appreciate his efforts. From a regulatory standpoint, we aim to maintain high standards, while ensuring agility in the process of permitting a mine. We value effective consultations with First Nations and adherence to environmental standards. Streamlining the process is crucial for developing Northern Ontario's mineral resources.

Can you provide the highlights of Agnico Eagle's 2023 field season in Ontario and shed light on your plans for the 2024 field season?

In the 2023 exploration campaign, we focused on Detour Lake to better understand the orebody, successfully extending it to the west. Positive results from test holes along

that trend indicate the potential for further expansion. This year, our goal is to define the ore body more precisely. Currently, we are mainly focusing on better delineating the known mineralization to support the evaluation of potential underground operations. We believe there is substantial potential, that if realized, could position Detour Lake as a unique 1-million-ounce producer with combined parallel open pit and underground operations.

How is Agnico Eagle progressing towards its target of a 30% emissions reduction by 2030?

Operating in Ontario and Québec, a significant portion of our power is sourced from clean hydroelectric power. Our footprint, on an intensity basis, is favorable compared to our peers. Macassa has been a pioneer in adopting BEV technology, and our team has put in a lot of hard work to make it successful. Moving forward, we are focused on emissions related to the open pit operations we have in Ontario. We are exploring projects involving trolleys and keeping an eye on technology developments by OEMs. While our starting point is good, we recognize the need for continuous improvement and are actively seeking opportunities to reduce emission levels.

Are there plans to expand into critical minerals?

Agnico Eagle has successfully been mining gold for several decades. The investment in Canada Nickel was an opportunity for an early stage investment in this growing sector, and an emerging nickel belt, right in our backyard. It's aligned with Agnico Eagle's well-established strategy of early-stage project investments and will allow us to monitor both the project's progress and emerging technologies relevant to its development. Currently, there is no intent to deviate from our gold focus materially.

What are Agnico Eagle's priorities for 2024?

In 2024, we will continue optimizing our assets with a focus on organic growth from our regional platforms. At Detour Lake, we are expecting to reach 28 million tons per year through the mill and pursue mill optimization beyond that. We are also advancing an underground mining study which we expect to be completed in the first half of the year. ■

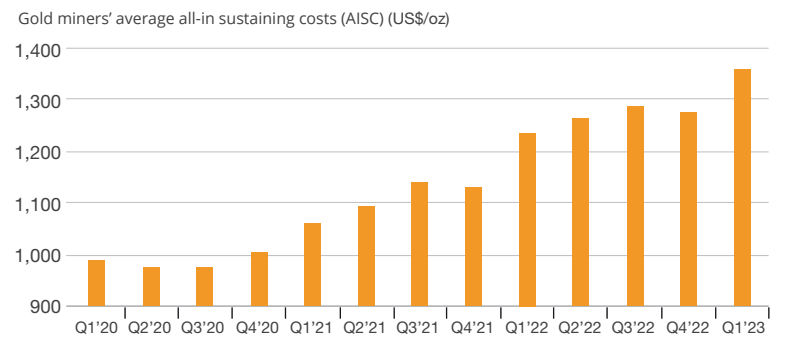
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on that first. We ensured this was underway before we announced phase 3+ of the study.”

Alamos Gold performed well in 2023, having increased its 2023 guidance with record annual production guidance by 5%. “The success we are enjoying today is a product of a strategy that we have pursued for 10 years based on accretive acquisitions and investment in organic growth through exploration, expansion and development of our various projects,” said McCluskey.

Argonaut Gold’s past-producing Magino mine achieved commercial production on November 1st 2023. Despite the slower-than-planned ramp-up of Magino, the mine is still expected to become Argonaut Gold’s largest and lowest-cost mine. Argonaut Gold’s president and CEO, Richard Young, shared the next steps for the mine: “As we look towards 2024, Magino remains a focal point, with plans to complete the current infill drill program and finalize a comprehensive feasibility study for the project. This study will outline the path forward, potentially including mill expansion and increased production.”

Global average AISC (gold) reached a quarterly record high in Q1'23



Source: Metals Focus Gold Mine Cost Service

Like many mine operators in the province, Argonaut had to grapple with the scarcity of labor plaguing Ontario. Although the company has overcome these hurdles, they were likely a contributor to the delay in

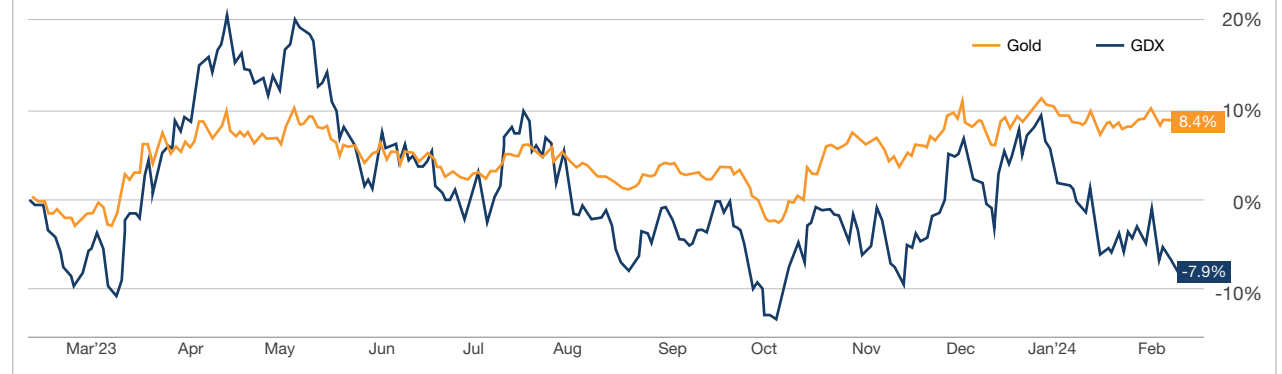
Magino’s first gold pour. “A notable challenge we encountered was recruiting personnel, particularly in Ontario. The scarcity of qualified individuals has posed difficulties, significantly impacting the ramp-up process both in the mine and the mill at Magino,” continued Young.

In Ontario’s far west, Australian producer Evolution Mining spent FY2023 commissioning the underground Upper Campbell mine in the Red Lake complex. Acquired in 2020 from Newmont, Evolution hopes to eventually ramp up production to 1.1 million t/y and restore Red Lake to a premier Canadian gold mine. Evolution brings the expertise it gained operating four producing mines in Australia to its new Canadian asset. “Australia is very good at bulk mining and achieving high productivity levels. These are things we are trying to embed into our Red Lake operations. It is much easier to make money when your mine has 30-50+ g/t Au (previously at Red Lake), where you can go underground and easily see the gold. When you drop down to 5-7 g/t, as we are, productivity becomes much more important,” said Lawrie Conway, managing director and CEO, Evolution Mining.

Rising costs

As the gold spot price climbs to new highs over US\$2,000/oz, all eyes will be on Ontario’s miners to see if they can capitalize on the current bull run. However, despite the all-time high gold prices, gold miners are trading well below their 2011 record highs.

Gold vs \$GDX 1Y returns



Source: portfolioslab.com

Many producers reported a sharp increase in the cost of mining in recent years. Whether it is energy, raw materials, machinery, wages, permitting, exploration costs, etc. – most cost factors have increased. “Inflation rates around the world have accelerated in the last two years, which has put pressure on the cost of inputs,” shared Conway.

The labor crunch has forced many mine owners to increasingly rely on contractors, further pushing up costs. “We have witnessed a significant rise in cost inputs, particularly in labor, which typically constitutes over 50% of our revenue. Additionally, raw material costs have increased, although there is a recent tapering off from the high rates observed post-

Covid,” shared Eric Smith, managing director at Cementation Americas, a large underground mine contracting and engineering company.

With a tense geopolitical situation and global government debt poised to hit a 40% increase since 2019 levels, the price of gold may climb even higher, perhaps offsetting the high cost of mining. “Unlike

Delivering safe, reliable, long-life, margin focused operations at Red Lake



evolutionmining.com



Alamos Gold, a leading Canadian-based gold producer, with long-term annual production potential of ~800,000 oz. This success stems from developing quality assets that fuel our growth while achieving strong free cash flow generation at our low-cost, long-life operations.

Gain insights into our operations and future projects, scan the QR code or visit alamosgold.com





Eric Smith
Managing Director
CEMENTATION
AMERICAS

“Pricing variability has made mining companies somewhat hesitant to invest in capital projects, despite favorable commodity prices.”



traditional commodities like oil and copper, every ounce of gold mined throughout history is essentially available as above-ground supply. What determines the gold price is its relative value to financial assets like stocks, bonds and fiat currencies. We believe the price of gold is poised to go significantly higher over the next several years due to an upcoming global sovereign debt crisis,” said Rudi Fronk, chairman and CEO, Seabridge Gold.

These challenges are not exclusive to Ontario’s miners, the problem appears to be impacting many gold producers worldwide. The \$GDX, a popular exchange-traded fund that tracks the performance of over 50 major gold mining companies globally, has failed to keep up with the performance of gold recently, with 5-year returns of under 20% while gold prices have increased over 50% in the same period. Dwindling reserves, ill-timed acquisitions, and declining mine grades are perhaps some other factors contributing to this underperformance.

The increasing cost of mining is, on its own, a problem. However, the uncertainty that accompanies it complicates matters even more. “Despite recent signs of moderation, the persistence of inflation has resulted in cost escalations on mining projects. With project studies experiencing significant inflationary pressures, it has made it even harder for producing companies to attract investors,” said Shaun Usmar, founder and CEO, Triple Flag Precious Metals Corp.

As cost increases continue to bite, the industry may be forced to change course, instead working on smaller, more affordable projects. “The industry’s focus has moved from billion-dollar mega projects to smaller endeavors ranging from C\$300-600 million, offering less risk, quicker paybacks, and higher returns. This change, emphasizing rate of return and capital expenditure over net present value, is particularly notable among emerging producers and mid-tier companies,” said Eugene Puritch, president and principal mining engineer, P&E Mining Consultants. ■

Image courtesy of Greenstone Gold Mines



John McCluskey
President and CEO
ALAMOS GOLD

“Island Gold made tremendous progress over the past 18 months. We remain on pace, and within budget, for completion by 2026.”

Can you discuss Alamos Gold’s highlights from 2023?

We expected it would be one of the best years for production, hitting 500,000 oz of gold, which is a cause for celebration. Despite being a tough year for the sector, the company had great momentum, and our share price reflected that; we were up 40% in 2022 and continued with a strong performance in 2023. Along with our strong Q3 results, we increased our annual production guidance for the year by about 5%, so we are now forecasting up to 530,000 oz/y of gold production. It has been a banner year for Alamos.

How has Alamos Gold managed to maintain its success?

Our strategy is based on accretive acquisitions and an investment in organic growth through exploration, expansion and development of our various projects.

In 2015, we had only one mine: Mulatos. We then decided to focus on Canadian assets, resulting in the acquisition of Young-Davidson, Island Gold and Lynn Lake. Between those three, we made huge progress, but we never put Mulatos in the rear-view mirror. We discovered and developed the La Yaqui and La Yaqui Grande deposits, which, even during this last quarter, allowed us to beat forecasts. While La Yaqui is the main source of production, we have been working on a new discovery at Puerto Del Aire, which runs off the main Mulatos pit. We delineated over a million oz Au, and it is still growing at good grades. Unlike the oxide heap leach resources originally developed at Mulatos, we now have higher-grade sulfides that will

require milling. We are preparing for a new phase of development for the Mulatos project.

How is the expansion of Island Gold progressing?

Island Gold made tremendous progress over the past 18 months. Prior to announcing the results from our Phase 3+ expansion study, we worked on a significant tailings expansion. The earthworks associated with these types of tailings expansions have been responsible for problems in previous Ontario project developments, so we decided the best way to de-risk the whole project was to focus on that first. We ensured this was underway before we announced phase 3+ of the study.

During 2023 the focus has been on completion of the shaft site surface infrastructure. We expect to start sinking the shaft in earnest during Q4. It will take 18 months to get to target depth. We remain on pace, and within budget, for completion by 2026. There are major steps ahead of us, including mill expansion, the construction of the paste backfill plant, and the building of the hoist and hoist house. In 2020, we completed a set of similar tasks at Young-Davidson, where we installed an 8,000-tpd mill, a paste backfill plant, and sunk two 1,500-meter shafts. We have performed these tasks for the past 7 years, so the team, consultants, and contractors are experienced and work well together.

Have the recent regulatory changes in Mexico impacted operations?

The regulatory changes have not impacted our operations at the Mulatos mine. There was no effort to change

the rules and regulations under which we initially established operations.

In terms of new projects, I do not see us doing much outside of the Mulatos area until there is clarity as to the associated risks of doing business there. If you raise taxes and the treatment of certain costs, you are sending a signal to the market you do not want further investment in the sector. The market will respond to those signals, which is what we are seeing right now.

How will Alamos Gold maintain its trajectory?

It boils down to continuity and delivering on objectives. We have consistently delivered our guidance for years, which has garnered us a lot of trust among investors. For us, it is ‘steady as she goes’ – many of our projects cannot be completed in a fiscal year but are multi-year in scope. The full expansion of Island Gold will be completed in 2026, for example, but we have worked on it since 2021. We will operate the mine and increase production between now and the completion of the shaft and mill expansion. Young-Davidson will remain a steady producer. We will have a strong annual exploration budget; it was over US\$50 million in 2023 and will likely remain at this level in 2024. Exploration is a part of the DNA of this company, and it has brought much success.

We love driving value for all our stakeholders; including shareholders, employees, and the communities and countries we operate in. We want to be a force for good in the world, which we will achieve by remaining dedicated to our vision and sense of purpose as a company. ■

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EQUINOX GOLD

Equinox Gold is a growth-focused Canadian mining company operating entirely in the Americas. The Company has seven operating gold mines in the USA, Mexico and Brazil, will have production from an eighth mine in Ontario, Canada in 2024, and has a path to achieve more than one million ounces of annual gold production by advancing a pipeline of expansion projects.

Creating the Premier Americas Gold Producer



“ Our strategy is focused on tier-one jurisdictions like Australia and Canada, and I think both these jurisdictions can learn from each other. ”

Lawrie Conway

Managing Director and CEO
EVOLUTION MINING

What are the recent updates and milestones at Evolution Mining?

The financial year ending June 2023 has been a transitional year for Evolution Mining (Evolution). We commissioned two new underground mines, Upper Campbell at our Red Lake Operations in Ontario, and one at our Cowal operation in New South Wales. We also commenced a feasibility study focused on transforming our Mt Rawdon open pit in Queensland into a pumped hydro power station at the end of the mine's life.

What was the strategy behind the recent JV with Northern Superior Resources?

The acquisition of Red Lake facilitated our entry into Canada, but we always knew that we would embark on new projects in the country. We look to have up to eight assets in tier-one jurisdictions. We saw an opportunity and signed an earn-in JV agreement for Northern Superior Resources' October Gold property in Ontario. This property resembles the Kalgoorlie region in Australia in that it is untapped and still has a lot of potential. Over the next few years, we will manage a drilling program at October Gold to earn into this JV. We will fund an aggressive drill program to quickly work out whether this asset will be a fit for our portfolio in the long term.

What obstacles do you face in bringing Red Lake up to a 1.1 million t/y run-rate?

It is a question of increasing the mining rate, as we already have two pro-

cessing plants that can operate at 1.1 million t/y. We will ramp up the mining rate over the next year and over the next three to five years we will start to see more ore sourced from the higher grade Upper Campbell mining center, which will underpin production at Red Lake to 1.1 million t/y and deliver a profitable operation.

What are the main challenges currently facing producers in Ontario?

For juniors, accessing the markets has been harder. From our perspective, we have a private rating on our credit which was renewed in 2023 as an investment grade rating. This provided us with the opportunity to access the capital markets, and in June we took money out of the US private placement market, giving us a very low cost of debt.

What is Evolution Mining's approach to ESG?

Our public commitment is to have a 30% reduction in GHG emissions by 2030. From our efforts in FY2023, we have achieved an over 11% net reduction in emissions compared to 2020 levels, so we are well on our way to achieving our 2030 goal. In Ontario, there is hydropower at Red Lake, so our emissions there are significantly lower than our Australian open-pit operations.

What can Canada and Australia learn from each other as mining jurisdictions?

Our strategy is focused on tier-one jurisdictions like Australia and Canada,

and I think both these jurisdictions can learn from each other. Ontario is blessed to have a mining minister who has worked in the industry and wants to be involved as much as possible. The Minister's Mining Industry Council is a great initiative that brings companies and the government together to tackle issues and find ways to streamline processes.

Australia is very good at bulk mining and achieving high productivity levels. These are things we are trying to embed into our Red Lake operations. It is much easier to make money when your mine has 30-50+ g/t Au (previously at Red Lake), where you can go underground and easily see the gold. When you drop down to 5-7 g/t, as we are, productivity becomes much more important. We are trying to bring the expertise we gained from our Australian mines to our operations at Red Lake.

What are Evolution's plans going into 2024?

We are fortunate that all five of our operating assets have large organic growth opportunities. The next two to three years will be about executing these opportunities. We have a great pipeline of expansions, mine life extensions and projects.

We are also looking at adding more assets to our portfolio, at the right time and at the right price, to bring more value to our shareholders. The gold industry is in great shape and has a great future ahead; we must continue to manage it well and balance our social responsibilities. ■



“ Our ongoing operations in Mexico and at Florida Canyon have surpassed budget expectations and exceeded the upper range of our guidance, resulting in the generation of free cash flow. ”

Richard Young

President and CEO
ARGONAUT GOLD

Can you highlight the significant developments at Argonaut Gold in 2023?

The primary highlight for 2023 has been the completion of construction at Magino and the subsequent ramp-up. The success of the drill program in 2022 positively impacted reserves and resources within the main pit at Magino. Building on this success, we initiated an infill drill program at Magino and concurrently explored the expansion of the mill, potentially doubling its size. This expansion could increase throughput at Magino to 200,000-250,000 oz/y.

The second noteworthy development is Florida Canyon. Initially facing discussions about potential closure due to financial challenges, the new management team undertook a strategic review, resulting in its best quarter in nearly two decades. A profitable long-range plan, including both oxides and a significant sulfide resource, is now in place. We are awaiting assay results from a proof-of-concept drill program, exploring the possibility of developing sulfides alongside oxides to further enhance Florida Canyon's status as a gold producer.

How has Argonaut Gold performed in 2023, and what challenges have you faced ramping up production at Magino?

Our ongoing operations in Mexico and at Florida Canyon have surpassed budget expectations and ex-

ceeded the upper range of our guidance, resulting in the generation of free cash flow, showcasing a strong operational performance this year. As for Magino, we successfully adhered to the revised estimate for construction capital cost, and the overall operating and sustaining costs align closely with our initial projections at the beginning of the year. However, a notable challenge we encountered was recruiting personnel, particularly in Ontario, significantly impacting the ramp-up process both in the mine and the mill. While we believe we have largely overcome this hurdle, the hiring process proved to be more challenging than anticipated.

Have inflation and rising costs affected the Magino ramp-up?

While it likely impacted Magino during its construction phase, the situation has evolved. Since May 2022, the company disclosed an updated cost of C\$920 million. After a 45-day delay and incorporating some modifications, the revised figures came in at C\$980 million. Despite these adjustments, it is crucial to note that inflation has not emerged as a significant concern from that point onward. Although there may have been some inflation earlier in the process, a broad analysis of our operations reveals recent increases in diesel prices, cyanide, consumables, and power costs. This trend extends to Mexico, where the stronger peso has also influenced costs. However, inflation no longer

poses the same level of challenge in the mining industry as it did two years ago.

With the recent proposed changes to the Mexican mining code, do you foresee any impact on your operations in Mexico?

The proposed changes to the Mexican mining code are unfortunate. Mexico has a rich mining culture, and we hope that any modifications to the code will support the industry's significant contribution to jobs and government revenues. Presently, the proposed changes have not impacted our two current operating mines, and the state government continues to be supportive. We believe there are still avenues to obtain permits and approvals from the federal government, especially if jobs are at stake.

How do you plan to allocate the C\$80 million you raised in December 2023?

Our focus will be to efficiently deploy this capital into projects with the highest returns. Our Mexico operations have been a pivotal element of our company for over a decade. At present, these assets necessitate further investment. However, upon comparing the return on capital between Mexico and the potential opportunities at Magino, including the mill expansion, and Florida Canyon with the sulfides redevelopment, Mexico appears to offer a comparatively lower return. Given our recent completion of a significant project, our balance sheet is not currently positioned to advance in that direction.

Consequently, we are exploring avenues to optimize value for our shareholders while preserving jobs for our Mexican team. Various options for our Mexican asset base are being considered. Looking beyond this, the capital raise is instrumental in enhancing the company's liquidity, aiding us in the forthcoming refinancing of our existing debt facility. The objective is to align the new facility with our organic growth prospects, encompassing both Magino and Florida Canyon. This capital will facilitate the execution of our vision to establish a low-cost, mid-tier North American gold producer. ■



Development

How Ontario is building the mines of the future

New mine construction is underway at four projects in Ontario. These projects include IAMGOLD's Côté Gold project near Gogama, Gowest's C\$27 million Bradshaw gold project near Timmins, Greenstone Gold's C\$1.5 billion Greenstone gold project near Geraldton, and Glencore's C\$1.3 billion Onaping Depth nickel-copper project in Sudbury.

After Magino, the Côté Gold project, a JV between IAMGOLD and Sumitomo Metal Mining, is likely to be Cana-

da's third-largest gold mine, with a mine life of over 18 years. Conveniently located between Timmins and Sudbury, construction is now 95% complete and production is expected to commence in early 2024. In 2023, the Côté Gold project made headlines for being the first to deploy a fully autonomous fleet of Epiroc's Pit Viper rigs on Canadian soil. "The deployment addresses labor intensity challenges in open-pit mining, and by eliminating some human factors we significantly reduce non-operating delays. Over time, we anticipate achieving higher overall efficiencies," shared Renaud Adams, president and CEO, IAMGOLD.

With great uncertainty in the equity markets and a relatively high cost-of-debt, financing large-scale projects such as Côté Gold is no easy feat as the economic climate can change rapidly within a mine's lifespan. Adams explains how IAMGOLD's financing strategy overcomes these challenges: "While we have taken a US\$400 million



Theo Yameogo
EY Canada & EY Americas Mining and Metals Leader
ERNST & YOUNG

“Increased costs of goods and services, coupled with adjustments in workforce compensation, are leading companies to proactively pursue cost reduction and optimization strategies. The rise in cost profile is also impacting the profitability levels of upcoming projects.”

Image courtesy of IAMGOLD



Bruce Achneepineskum
Chief
MARTEN FALLS FIRST NATION

“With over 600 First Nation communities across Canada, no two partnerships will be the same.”

term loan with a higher interest rate, it is replaceable as we strengthen the company's position. Our confidence lies in the ability to improve our balance sheet, credit ratings, and cash flow, offering opportunities for debt reduction and growth. The goal is to avoid being stuck with a permanent financial structure.”

Hot on the heels of the Côté Gold project, the Greenstone Gold project, located 275 km northeast of Thunder Bay, is being developed by Equinox Gold in partnership with Orion Mine Finance Group. Construction is on track to pour first gold in the first half of 2024. The US\$1.23 billion mine is already 90% complete and will become Equinox Gold's largest mine and its only mine in Canada once in production. Being located in the traditional territories of four First Nations, Equinox Gold has a number of agreements and commitments in place around environmental management, employment and training, among others. "I was pleased to see 150 Indigenous community members receive training to support the construction of the new Greenstone Gold operation," commented Pirie.

Good communication, dialogue and close partnerships were particularly important for Greenstone, due to its proximity to population centers: "What sets the Greenstone project apart is the complexity of relocations required to accommodate development of the mine within the town limits of Geraldton. We needed to relocate 65 families due to the open-pit footprint being close to a neighborhood, and we also relocated a substation, a police station, and a 4.5 km section of the Trans-Canada highway," shared Eric Lamontagne, general manager, Greenstone Gold Mines.

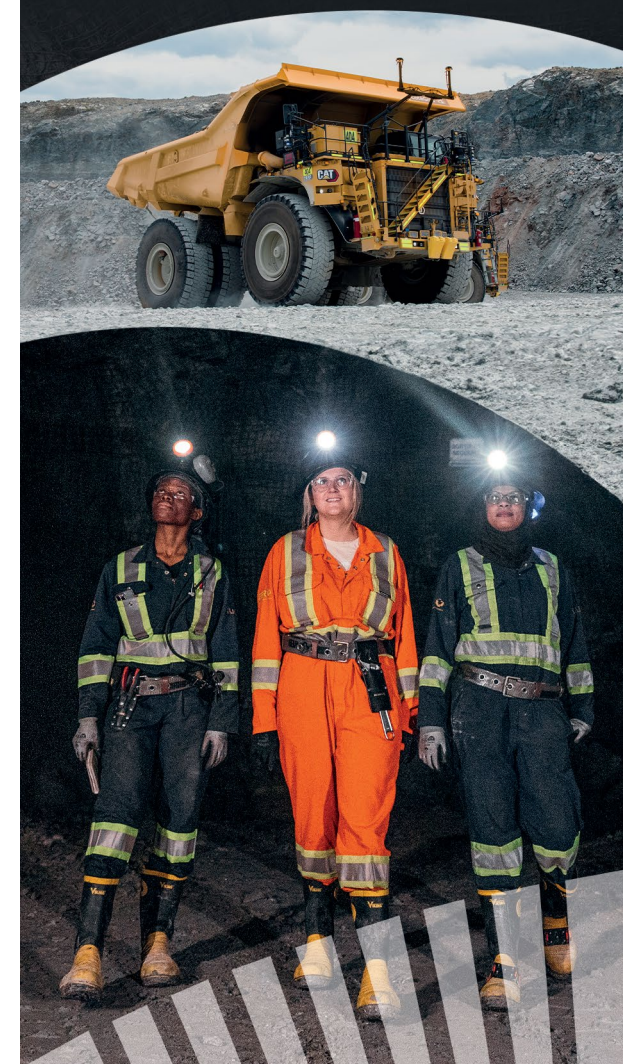
Greenstone Gold mines are currently focused on pouring first gold on schedule and within budget. Lamontagne shared the company's long-term plans for the mine: "Beyond first gold pour, the crucial step is to ramp up the project to its full nameplate capacity. Ultimately, we aim to generate long-term cashflow for our shareholders and benefit the region and Indigenous communities through employment, training and business opportunities.”

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All eyes are on Côté Gold, which is positioned to become the third-largest gold mine in Canada with a mine life of over 18 years and considerable potential for further growth.

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Renaud Adams

President and CEO
IAMGOLD

Can you provide an overview of IAMGOLD's performance in 2023?

Last year marked a significant transformation for IAMGOLD, with a strategic focusing of the company on our primary operating jurisdictions, an improved balance sheet, and significant progress at our Côté Gold project located between Timmins and Sudbury, Ontario. All eyes are on Côté Gold, which is positioned to become the third-largest gold mine in Canada with a mine life of over 18 years and considerable potential for further growth.

One of the major highlights was reaching the 95% completion mark for the Côté Gold project by the end of 2023, with pre-commissioning now underway towards first gold early this year. This achievement positions IAMGOLD as a leading Canadian-focused gold producer at the leading edge of modern open-pit operations. More importantly, IAMGOLD continued its focus on achieving zero harm, with a notable achievement in Burkina Faso where the Total Recordable Incident Frequency Rate (TRIFR) was below 0.2%, well below North American averages.

The Westwood underground mine, which had faced seismic challenges in the past, saw substantial improvements in 2023. A new approach to mining and seismic controls resulted in successful testing and performance that exceeded guidance. This demonstrated the company's ability to operate safely and efficiently in the long term.

Can you discuss the deployment of autonomous vehicles and rigs at Côté Gold?

Initiating open-pit gold operations with autonomous trucks at Côté Gold was a pioneering move. Despite initial doubts, it has proven to be a resounding success. The deployment addresses labor intensity challenges in open-pit mining, and by eliminating some human factors, we significantly reduce non-operating delays. Over time, we anticipate achieving higher overall efficiencies. We have also embarked on automating our drills, which improves safety at the site.

The trend toward autonomous technology in mining is exciting, and I anticipate a growing number of developers and producers embracing it. At Côté Gold, we have led the way by implementing autonomous operations from day one, achieving impressive precision in all haulage tasks. This success signals a promising future for widespread adoption across the industry.

Can you outline the ramp-up plan for the Côté Gold project, and share your perspective on how the current inflationary environment and high gold prices may impact the project?

In 2024, we have outlined four significant milestones for Côté Gold. The first milestone is the goal for initial production before the end of the first quarter, this is crucial for validating the engineering aspects and project systems. We are on target for this milestone. The second milestone involves achieving consistent commercial production, maintaining 60% capacity for 30 consecutive days. The third milestone will be achieving 90% nameplate capacity by the end of the year. The fourth milestone involves

unlocking the potential of the Goselin deposit, contributing to a global resource base that has the potential to exceed 20 million oz Au and extend the mine life well beyond 20 years, making it one of Canada's largest gold mines.

Regarding inflation and cost-of-debt, we have strategically approached financing with flexibility in mind. While we have taken a US\$400 million term loan with a higher interest rate, it is replaceable as we strengthen the company's position. Our confidence lies in the ability to improve our balance sheet, credit ratings, and cash flow, offering opportunities for debt reduction and growth. The goal is to avoid being stuck with a permanent financial structure. As for the impact of gold prices and inflation, the gold mining sector has seen increased costs over the last decade. However, with a current gold price exceeding US\$2,000/oz and the benefit of a favorable currency exchange, coupled with our integration of technology, we remain optimistic about the project's future.

Could you discuss your inaugural climate action report and share a final message?

Our first climate report showcased our unwavering commitment to sustainability, aligning with our core value of zero harm. We set a clear target of a 30% reduction in emissions by 2030, with a focus on continuous improvement and technology integration.

We extend our gratitude to all our stakeholders. Our strategic shift towards becoming a major player in Canada reflects our dedication to excellence in mining. ■



Eric Lamontagne

General Manager
GREENSTONE GOLD MINES

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The Greenstone mine is a world-class project with over 5 million oz in gold reserves and production estimated at around 400,000 oz/y.

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Can you introduce Greenstone Gold Mines?

The Greenstone gold mine is located in Ontario, Canada, and was originally called the Hardrock Project. Gold was discovered in the area in 1916 and the Hardrock Project was mined as three small underground mines from 1938 to 1970, producing approximately 2.5 million oz of gold. Premier Gold acquired the property in 2008 and undertook significant exploration and technical analysis, drilling over 300,000 m between 2007 and 2012, and ultimately completing a feasibility study in 2020. In April 2021, Equinox Gold and Orion Mine Finance acquired the project and formed a 60/40 partnership to advance the project to production.

The original project team was from Premier Gold, and since 2015 our mandate has been to develop the Greenstone Mine project into a producing open-pit mine. The project progressed through various studies, and upon confirmation of positive economics with the feasibility study, detailed engineering and construction preparations commenced. This involved conducting technical studies, engaging in community consultation, obtaining environmental assessments and permits for the mine, preparing for construction, building infrastructure, and ultimately hiring and preparing to operate the mine. The team includes experienced individuals with backgrounds in operations, construction, and project development, many of whom have been with the project since the feasibility study.

Can you provide more details about the Greenstone project?

The Greenstone Mine is a world-class project with over 5 million oz in gold reserves and production estimated at around 400,000 oz/y. The initial mine life is estimated at 14.5 years from an open pit that will measure two km by one km and be approximately 600 m deep as currently designed, but there is potential to increase the mine life by expanding the open pit to the west and east. In addition, more than 4 million oz of gold resource remains in the underground deposit that could further extend the mine life, and numerous deposits in the area within trucking distance of the mine provide further upside potential.

Could you highlight some unique aspects of the project?

What sets the Greenstone project apart is the complexity of relocations required to accommodate the development of the mine within the town limits of Geraldton. We needed to relocate 65 families due to the open-pit footprint being close to a neighborhood, and we also relocated a substation, a police station, and a 4.5km section of the Trans-Canada highway. All of this required significant dialogue and engagement with the community and regulators. We also have partnership agreements with four First Nations and the Métis Nation of Ontario and have developed strong relationships with our Indigenous partners.

Could you share the most challenging aspects of bringing the Greenstone mine into production?

A key challenge in mine development is the uncertainty of timelines for factors like environmental assessments and permitting. Community support is also crucial for efficient project development and operations. In our experience, successful consultation involves becoming true partners with the community. We are collaborating with the community of Geraldton and also five Indigenous communities, and worked hard to understand the unique concerns and interests of each group to tailor our partnership. Ensuring the consultation process moves beyond box-checking to genuine engagement and partnership is essential.

The pandemic certainly presented challenges as well. Our previous extensive use of virtual meetings allowed us to seamlessly continue work. Despite the challenges posed by the pandemic, our team efficiently managed the ordering, fabrication, and transportation of equipment crucial for our project between 2020 and 2022. Navigating supply chain issues and transportation difficulties during this period required constant adaptation. The team's ability to seamlessly and efficiently shift plans, from A to B and even C, was instrumental to our success. We encountered some delays and construction schedule changes, and inflation and labor shortages also made ordering, receiving, and fabricating equipment a complex task. However, our team's agility and dedication ensured we overcame these hurdles and kept the project on track. ■



Denis Laviolette
Executive Chair
and CEO
EARTHLABS

“It cannot and should not take 15 years to build a mine. The red tape and bureaucracy must be cut down to speed up mine development.”

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With so many major projects completing within a short space of time, there will be a large range of service providers who will soon be seeking new projects. Luckily, there are still many projects in Ontario to provide them with a pipeline of work. This will bring some relief for companies like Generation Mining, who is due to embark on a mine construction journey of its own: “Many contractors and suppliers who were busy working on the Côté Gold, Magino and Greenstone projects are now becoming available

again. We hope this new increase in supply in the region will reduce costs compared to our previous estimates,” said Jamie Levy, president and CEO, Generation Mining.

In 2023, annual global jewelry consumption held steady at 2,093 t/y, even in the very high gold price environment, and central bank buying maintained a breakneck pace, with annual net purchases of 1,037 t falling only 45 t/y from the 2022 record. In the ‘Gold Outlook 2024 report’ the World Gold Council forecast heightened geopolitical tensions in a key election year for many major economies, combined with continued central bank buying being some of the main factors supporting gold prices. If gold prices continue their upward trajectory, Ontario’s newest mines may be in for a spectacular year.

Permitting

A major part of building a mine is navigating the permitting process, which is constantly evolving. Ontario’s miners have to grapple with a complex web of regulation when embarking on a construction or expansion project. “In Canada, navigating through various authorities like Provincial Governments, the Federal Government and First Nations can be challenging, with unexpected obstacles emerging even after obtaining permits. In contrast, Australia’s permitting process seems more structured,” said Zimi Meka, co-founder and CEO, Ausenco.

In 2023, Canada’s Supreme Court declared certain provisions of Canada’s Impact Assessment Act (IAA) unconstitutional. The court found the IAA’s provisions related to the assessment of designated projects to be outside the jurisdiction of the federal parliament and, therefore, unconstitutional. “One of the foremost challenges in the Ontario mining industry centers around the permitting process, particularly for emerging projects transitioning into development and production phases. Environmental permitting has been a persistent difficulty, often resulting in lengthy delays lasting years. Additionally, concerns over the level of federal involvement in the permitting process, as highlighted by recent Supreme Court rulings, have exacerbated these issues,” said Eugene Puritch.

It is not just lengthy permitting timelines that are challenging. For developers, uncertainty in timelines is just as much of an issue, as uncertainty can mean losing out on crucial funding or result in cost overruns. “A key challenge in mine development is the uncertainty of timelines. It is hard to predict exactly the timeline for factors like environmental assessments and permitting,” said Lamontagne.

The Supreme Court’s decision may result in significant revisions to the IAA, thus causing great uncertainty for the 20 or so mining projects in Canada currently undergoing federal assessment. However, the govern-

ment has taken a long-term view: “We hope [the ruling] will solve many of the problems we have with duplication of federal and provincial regulations and that it will boost the development of the Ring of Fire,” said minister Pirie.

Ontario’s Ministry of the Environment, Conservation and Parks is also keen to modernize and speed up permitting times, proposing an expanded permit-by-rule framework in August 2023. “The proposal of a permit-by-rule system holds great promise as an innovative approach to shorten timelines without compromising environmental protection,” shared Chris Hodgson, president, Ontario Mining Association (OMA).

Part of the appeal of Canada, and therefore Ontario, as a top destination for developers from all around the world, is the fact that it is a stable democracy. This, however, also means that changes to legislation must go through the democratic process, which can slow things down. Despite this, there are other ways

Ontario can boost its sector without changing laws: “Stimulating the mining sector with tax incentives like the CMETC and METC provides an immediate, tangible boost to the industry. I think taking this direct route of providing targeted financial support to the industry will help the sector in the short-term, rather than the longer approach of legislative changes – which require many consultations and a lot of bureaucracy before they come to fruition,” said Denis Laviolette, executive chair and CEO, EarthLabs.

Reform is needed if Canada is to streamline its permitting processes and reduce mine development times from the 15 or more years they are currently at. “There is a tremendous amount of support for developers at the highest levels of government, but we would like to see this support extend further down the chain of command to the various authorities. At the moment we have to deal with a huge number of departments and branches,” said Jamie Levy. ■



Eugene Puritch
President and
Principal Mining
Engineer
**P&E MINING
CONSULTANTS**

“One of the foremost challenges in the Ontario mining industry is the permitting process, particularly for emerging projects transitioning into development and production phases.”

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Exploration

Unearthing new treasures

Since 2020, spending by Canadian junior exploration companies has far outpaced that of senior companies. While senior companies tend to invest exploration dollars near existing mine sites, junior companies generally search for new deposits in less developed regions. According to Statistics Canada, gold accounted for 67% of Ontario's exploration spending in 2022, and with more than 30 mineral deposits each having more than 500,000 troy ounces of gold (measured and indicated resources inclusive of reserves), Ontario has plenty of resources for the future.

2023 saw some exciting discoveries made by Ontario's juniors. Delta Resources was awarded the 2022 Bernie Schnieders Discovery of the Year Award by the Northwestern Ontario Prospectors Association for its Delta-1 gold project, 50 km west of Thunder Bay. Although many juniors have struggled to secure financing this year, for those that have the cash, Ontario's land still holds riches that are yet to be unearthed. "In April/May of 2023, we hit Bonanza-grade gold, including an intersection of 1.6 kg/t over 1 m. In summary, we have uncovered very wide intercepts of gold ranging from 1.2-1.5 g/t with some sweet spots of Bonanza-grade gold mineralization," shared André Tessier, president and CEO, Delta Resources.

High-grade discoveries like these are thanks in part to the Ontario government's continued efforts to incentivize exploration: "Ontario has some great programs, like the Ontario Junior Exploration Program (OJEP), which

granted us C\$200,000 for exploration two years in a row," Tessier explained.

Similarly, in Ontario's northwest, newly listed Dryden Gold has also been using Ontario's OJEP, METC and charitable flow-through incentives to fund the 2024 field season. "The OJEP and METC highlight the supportive mining culture in Ontario. We find Ontario to be an excellent jurisdiction, possibly surpassing Nevada, where I have spent a significant part of my career in the gold mining business," said Trey Wasser, CEO, Dryden Gold.

Backed by renowned investors including Alamos Gold and Eric Sprott, Dryden are playing to their strengths by focusing on conducting the early-stage meticulous groundwork that often eludes larger players. "The possibility of a JV, especially for our grassroots properties, is on the table. However, we aim to take a similar approach to companies like Great Bear Resources—developing high-grade zones ourselves, with a potential exit strategy involving a sale to a major down the line," continued Wasser.

Further west, McFarlane Lake Mining concluded a 10,000 m drill program in 2023 at its flagship High Lake property by the Ontario-Manitoba border. McFarlane Lake managed to successfully navigate the tricky funding environment for juniors by leaning on Canadian industry veterans and doubled its market cap after a successful financing round. "Despite our marketing efforts in major financial hubs like New York and Toronto, the initial market response was lackluster. However, a pivotal turning point came when we had the opportunity to present to industry veterans like Rob McEwen and Frank Giustra later in the year. Their subsequent investment played a transformative role," shared Mark Trevisiol, president and CEO, McFarlane Lake Mining.

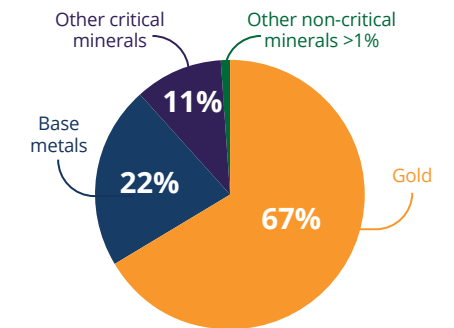
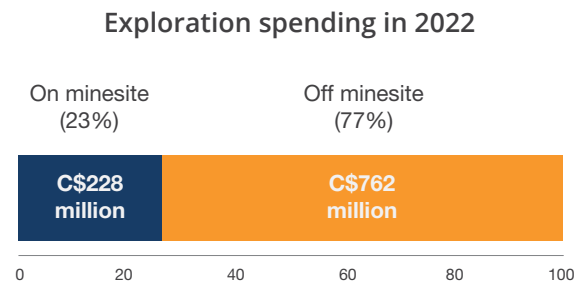
Frank Giustra also holds a 10% stake in West Red Lake Gold Mines (WRLG), which recently acquired the Madsen mine for C\$6.5 million. WRLG is hoping to learn from the previous owners' mistakes and capitalize on the C\$350 million worth of existing infrastructure. Shane Williams, president and CEO of WRLG, shared: "We strategically chose this region for its government support and successful mining track record. With major players like Evolution Mining and Kinross, there is an opportunity for growth, and we are exploring JVs or partnerships with Madsen to align with our long-term vision of building a successful mid-tier producer in Red Lake."

Image courtesy of Delta Resources

Exploration spending in Ontario

Ontario is well-positioned to be a global supplier of critical minerals with its vast supply of minerals, processing capabilities and world class mining supply and services sector.

Exploration spending by mineral, including critical minerals



Source: Natural Resources Canada and the Ontario Ministry of Mines

Madsen mine operated for 18 months, before its previous owners Pure Gold faced difficulties and were forced to sell the mine. Having recently raised nearly C\$50 million through a private placement, WRLG are confident they can succeed where Pure Gold failed. "By intensifying underground drilling and development over the next 12 months, we aim to address historical setbacks, including issues arising from the Covid pandemic and debt-related pressures. Our goal is to capitalize on the existing infrastructure, eliminate challenges associated with greenfield development, and position the Madsen Mine for success," continued Williams.

Globally, the focus on minerals and metals for the energy transition has seen an increase in exploration, particularly in nickel and lithium. Canada surged ahead to take the first spot in gold exploration spending with US\$1.38 billion spent in 2023, with Ontario being among the top 10 jurisdictions in the world for mineral exploration spending. In 2022, gold was the most sought-after mineral in Ontario, with exploration spending of C\$659 million totaling 67% of the province's total exploration spending.

Despite this, most juniors interviewed for this report stated that 2023 was a particularly difficult year for raising funds, indicating that much of the vast exploration spending in Ontario was thanks to funds raised in 2022 or earlier. "Miners face challenges due to investor apathy towards the sector. There is frustration, especially for Canadian juniors, about stock market responses not aligning with high commodity prices like gold and uranium. Despite interesting drill results, there is minimal response in the marketplace. Mining constitutes a small part of portfolios, and higher prices are needed to generate excitement," said Rob McEwen, chairman and chief owner, McEwen Mining.

Capital climbed eight spots to reach 2nd place in EY's 'Top 10 business risks and opportunities for mining and metals 2024' report, highlighting the severity of the situation. As the 2024 field season ramps up, Ontario's juniors will have to balance minimizing their stock dilution and securing the necessary funds to finance ambitious drill programs. "Financing is currently the most significant

challenge for junior mining companies. Many juniors have been unable to secure adequate financing and have been forced to release shares into the market," shared Tessier.

Many of these issues are not exclusive to Ontario, as some factors such as inflation are present in many jurisdictions globally. Luckily for Ontario's juniors, they are just a stone's throw away from the mining finance capital of the world - Toronto. ■

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“ Our long-term vision is to emulate the success of mid-tier producers like Gold Corp and Kirkland Lake. ”

Shane Williams

President and CEO
WEST RED LAKE GOLD MINES

Can you introduce West Red Lake Gold Mines?

West Red Lake Gold Mines (West Red Lake) is a developer located in the Red Lake region of Ontario. Our recent acquisitions include the renowned Madsen mine, and our origins trace back to the purchase of the Rowan project, also in the Red Lake area. We capitalized on the opportunity presented by the bankruptcy of Pure Gold Mining, the former operator of the Madsen mine that allowed us to procure the mine for a mere C\$6.5 million, an exceptional deal considering the project's extensive history and the substantial C\$350 million invested in it. Our mission is to revitalize and advance these projects, setting the stage for West Red Lake to become a key player in the mining industry.

What are the highlights of West Red Lake's activities in 2023?

We initiated the year by acquiring the Rowan property and promptly commenced drilling in April, yielding exceptional results. The success did not stop there, as we swiftly closed the acquisition of the Madsen property in June. Despite challenging market conditions, we demonstrated our resilience by raising nearly C\$50 million through a private placement.

Can you provide insights into West Red Lake's capital structure?

West Red Lake's capital structure is robust and supported by key stakeholders. Frank Giustra, holding over 10% of the company, stands as our largest shareholder. Sprott Resource Lending, the main lender to Pure Gold, converted their debt into equity, securing a substantial 24% stake in West Red Lake. Our recent financing activities have not only demonstrated the market's confidence in our potential but also attracted large institutional investors. This diverse and strategic blend of financial backing positions us strongly in a challenging financial landscape for junior developers in Canada. Our long-term vision is to emulate the success of mid-tier producers like Gold Corp and Kirkland Lake.

Why will the Madsen project be successful this time around?

The mine has a rich history, operating for 18 months before facing challenges under previous management. Our strategy involves a comprehensive approach to rectify-

ing past issues. By intensifying underground drilling and development over the next 12 months, we aim to address historical setbacks, including issues arising from the Covid pandemic and debt-related pressures. Our goal is to capitalize on the existing infrastructure, eliminate challenges associated with greenfield development, and position the Madsen mine for success.

The Red Lake region in Ontario offers an ideal environment for West Red Lake's operations due to its rich mining history and strong infrastructure. We strategically chose this region for its government support and successful mining track record. With major players like Evolution Mining and Kinross, there is an opportunity for growth, and we are exploring JVs or partnerships with Rowan and Madsen to align with our long-term vision of building a successful mid-tier producer in Red Lake.

What is West Red Lake's approach to ESG?

Madsen mine's past operations have inherently facilitated ESG compliance, given its adherence to high standards and responsible mining practices. Our approach involves maintaining positive relationships with First Nations groups, ensuring community engagement, and upholding stringent environmental standards. Northern Ontario's access to green power, particularly hydro, further enhances our ESG credentials. As we progress, we remain dedicated to meeting and exceeding industry ESG standards.

Going into 2024, what are the next steps for West Red Lake?

In 2024, West Red Lake is poised for significant growth and development. Our focus will be on intensive underground drilling and development at the Madsen mine, signaling a crucial phase in our journey. We anticipate the market's excitement as we unveil opportunities associated with drilling deeper areas. Despite being relatively new to the market, our team, assembled in June 2023, is geared for success. We have a robust mine ready for production, a seasoned team, and solid financial backing, positioning us for sustained growth over the next few years. To our audience, we extend our gratitude for their attention and emphasize the tremendous potential West Red Lake holds in the mining sector. We invite them to join us on this exciting journey as we strive to become a significant player in the industry. ■



André Tessier

President and CEO
DELTA RESOURCES

Could you introduce Delta Resources to our audience?

Delta Resources is an exploration company focused on exploring for gold and base metals in Ontario and Québec. Our flagship project is the Delta-1 gold project in Ontario, located about 50 km west of Thunder Bay, right on the Trans-Canada Highway, where we have defined a mineralized zone with a 2.3 km strike length. Our second project, Delta-2, is in Québec, where we explore for copper-zinc and gold.

What are some recent developments and highlights at the Delta-1 project?

The discovery hole at the Delta-1 project was made in October 2022, and earned Delta the "Discovery of the Year" award in Ontario for 2022. This discovery hole intersected 5.9 g/t Au over 31 m, with a section containing nearly 15 g/t over almost 12 m. Furthermore, in April/May of 2023, we hit Bonanza-grade gold, including an intersection of 1.6 kg/t over a meter.

What are your plans for Delta Resources in the coming year?

We will continue to expand the Delta-1 project; we have barely scratched the surface of the 107 km² property. We aim to leverage our current knowledge of the gold deposit to explore the entire property and expand our gold inventory. ■



Mark Trevisiol

President and CEO
MCFARLANE LAKE MINING

Can you introduce McFarlane Lake Mining?

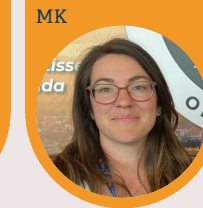
Our strategic focus revolves around six distinct properties, with five located in Ontario and the sixth situated in Manitoba. The core of our operations centers around gold, with one property also featuring gold, copper, and zinc. Our flagship property, High Lake, is situated about 40 km west of Kenora, by the Ontario-Manitoba border.

We concluded an extensive 10,000-m drill program at High Lake in 2023, yielding a groundbreaking discovery. Following our drill program, we established a compliant NI 43-101 resource, revealing approximately 96,000 oz of inferred gold at an impressive grade of 10.43 g/t. Additionally, we identified an indicated resource comprising nearly 46,000 oz at a gold grade of 9.38 g/t, solidifying High Lake's status as a high-grade deposit.

In terms of recent developments, we successfully closed a financing round, securing approximately C\$4.6 million. As of now, drilling operations have resumed at High Lake, with our sights set on expanding the existing resource base.

Are you currently looking for JVs?

While we are open to JVs or partnerships that enhance shareholder value, our immediate focus is on addressing the challenges and opportunities ahead. One major aspect involves securing additional funding for our exploration activities. ■



Trey Wasser and Maura Kolb

TW: CEO
MK: President
DRYDEN GOLD

Can you introduce Dryden Gold to our audience?

TW: Dryden Gold operates in north-west Ontario. We have focused on consolidating a significant property package in the Dryden camp, an area with a rich mining history. Our strategic land package covers 48,000 hectares along a crucial shear zone, offering exciting opportunities for high-grade gold mineralization. The region boasts excellent infrastructure, with highways and roads built by logging companies.

What are your plans for the 2024 field season?

MK: We have already initiated drilling strategically, focusing on testing theories and conducting step-outs along the mapped structures. Currently, we are focused on understanding the high-grade shoot orientation through hands-on experience rather than solely relying on historical data. With mineralization close to the surface, we see an opportunity to revisit selectively sampled areas for potential opportunities.

While our primary focus is the Gold Rock Camp due to its known high grades, we aim to maintain a diverse pipeline with targets at various phases. The insights gained from the current drill program will guide us in identifying additional on-strike drill targets, contributing to an exciting outlook for 2024. ■



Mining Finance and Investment

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With project studies experiencing significant inflationary pressures, it has become even harder for producing companies to attract investors.

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Shaun Usmar
Founder and CEO
TRIPLE FLAG PRECIOUS METALS

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TORONTO'S GLOBAL REACH 2024

Image by dchumak at Adobe Stock



Mining Finance and Investment

The financial pulse of the mining world

The high-interest rate environment seen in 2022 has continued into 2023, with the Bank of Canada's key interest rate reaching a 22-year high of 5% in 2023 – a dramatic rise from the 0.25% rate of early 2022. Moreover, rising geopolitical tensions have further complicated financing. For example, in November 2022, the Canadian government asked three

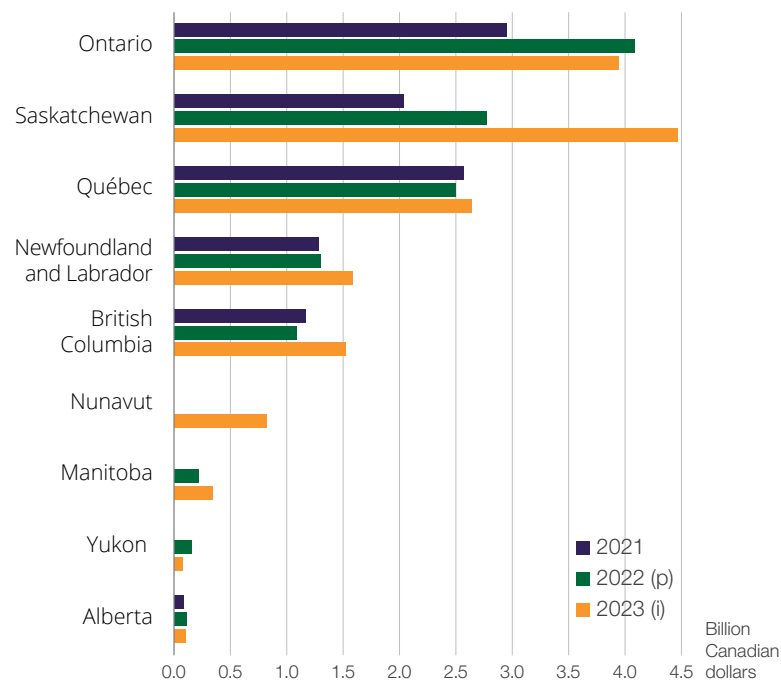
Chinese companies to sell their stakes in Toronto-listed lithium explorers following a national security review, a move that raised questions about the future of other Chinese investments in the Canadian critical minerals sector. Canada may stand to benefit in the long run from its efforts to overturn China's dominance of critical minerals supply chains,

however, Canadian policies limiting Chinese participation in its critical minerals sector may also create difficulties for local mining companies, particularly juniors, to fund projects.

In addition to the uncertainty around foreign institutional investment, retail investors seem to favor non-mining stocks. According to a report by Morgan Stanley, the most popular types of stocks traded by individual investors are those in the communication, technology, and consumer discretionary industries. Alexandre P. Boivin, CEO of Quimbaya Gold, shared his thoughts: "Mining companies are usually viewed as risky investments, but recently we have seen the more risk-tolerant investors investing in tech and crypto for example."

The retreat of retail investors from the Canadian mining sector has added to the pressure felt by many juniors, forcing them to find innovative ways to lure back amateur investors who are unlikely to have the same levels of information, expertise, and resources at their disposal compared to their institutional counterparts. EarthLabs' executive chair and CEO, Denis Lavolette, explained how his company is attempting to do just that: "We aim to build robust platforms to educate investors and help them navigate the mining and mineral exploration sector. Junior exploration is a fundamentally risky business, and it relies heavily on retail investors. There is a steep learning curve for new investors, with complex geological concepts and jargon. Our aim is to provide a one-stop shop to educate retail investors and move them up the learning curve."

Mining industry capital expenditures by jurisdiction, 2021–2023



p = preliminary expenditures, i = spending intentions

Source: Natural Resources Canada and Statistics Canada



Stephen Coates
Founder and CEO
GROVE CORPORATE SERVICES

“The primary barrier for small-cap Canadian companies aiming to access the US shareholder base is the inherent size difference, as a small cap in Canada may be considered a nano-cap in the US and may therefore be overlooked.”

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In addition to the mining industry's poor reputation among retail investors, another frequent complaint from issuers is the rampant predatory short-selling that continues to plague the market – a controversial practice that is particularly pronounced in the Canadian junior mining sector. "For juniors, the impact of short selling is noteworthy, influencing share values and hindering fundraising efforts. Resolving these issues is vital for fostering a more robust and equitable mining landscape," said Byron O'Connor, vice president - mining, Pinchin.

Some junior issuers have lodged complaints with the Canadian Investment Regulatory Organization and the Canadian Securities Administrators about predatory short-selling, in an attempt to clamp down on the practice, as was done recently in South Korea. "Short selling helps improve liquidity, so I think it needs to be maintained in some capacity. However, certain harmful practices like naked short-selling are endemic

to our industry and must be addressed," continued Lavolette.

G2 Goldfields' CEO Dan Noone is however optimistic: "Over time, I anticipate that investors will return to mining as they seek tangible assets and real value-creation opportunities. Junior exploration companies play a unique role in the investment landscape, catering to a niche segment characterized by higher risk and very high potential rewards."

Despite the troublesome macroeconomic environment, Canadian mining companies, particularly Ontario-based ones, continue to make some of the largest capital expenditures in the world. In fact, National Resources Canada projected Canada's capex in the mineral sector to rise by 21% to C\$21.4 billion in 2023. Within Canada, Ontario was the biggest spender of any Canadian province and was responsible for 31% of Canadian mining capex in 2022, dwarfing Saskatchewan's 21% and Québec's 19% shares.

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“ There is an inherent degree of optimism and resilience in mining. I think mining companies must lean on this and remain certain that the fundamentals are there. ”

Dean McPherson

Head, Business Development – Global Mining
TORONTO STOCK EXCHANGE AND TSX VENTURE EXCHANGE

What are the highlights of the past year at the TSX and TSXV?

In mid-2022, we launched the S&P/TSX Energy Transition Materials Index, which tracks exploration and production stage companies that focus on critical minerals needed for the green energy transition. This summer, BlackRock launched and listed the iShares S&P/TSX Energy Transition Materials Index ETF based on our index. This offers more investors, particularly retail investors, an opportunity to gain exposure to the companies at the root of the global green energy transition.

In October 2023, we launched the TMX ESG Data Hub in response to the needs of investors seeking ESG data on companies.

Despite a challenging 2023, we saw two significant new mining listings: Lithium Royalty Corp and Allied Gold. These listings underline how much critical minerals continue to influence the sector globally.

How have TSX-listed African mining firms performed in 2023 and do you foresee more consolidation in this scene?

Historically, Africa has been mostly known for its precious metals, but recently we are seeing Africa's rise as a critical jurisdiction for green energy transition materials. Africa-focused companies continue to do well in our markets because our market participants know Africa and are comfortable and confident in connecting investors with the vast opportunities the continent presents. Allied Gold's recent listing on TSX exemplifies this well. In

a very challenging market, Allied Gold, which is focused on West Africa, raised close to C\$300 million this summer. In the past, we saw London as the main competition for African companies. Allied Gold's decision to list on the TSX underscores Toronto's position as a leader on the global stage, with our mining ecosystem and thanks in part to its seamless connection to the large American investor base looking to access global mining equities.

In terms of consolidation, we are seeing a global trend of companies realizing they need to increase their size or scale to improve operational efficiency, for example. In addition, many companies are looking to add to or diversify their project base, sometimes on a geographic or commodity basis. As this plays out, M&A will be a big factor going forward.

What advice do you have for mining companies considering an IPO considering the current economic climate?

There is an inherent degree of optimism and resilience in mining. I think mining companies must lean on this and remain certain that the fundamentals are there, despite the current headwinds such as micro/macroeconomic challenges and geopolitical tensions.

Nowadays, with uncertainty and volatility in the capital markets, the windows of opportunity to raise capital and/or enter the public markets have been reduced from years to months. Companies must be prepared and ready to move on short notice. Do all you can to prepare, despite

the uncertainty of when that window will open. The key is to be prepared to move quickly. Our pre-listing services are there for companies to prepare them for public life.

Around 40% of public mining companies worldwide are listed on TSX or TSXV. How do you intend to maintain this dominance going into 2024?

We pride ourselves on being a market for all mining companies regardless of stage in the life cycle.

Our overarching strategy at TMX Group is to be client-centric in our business lines. We achieve this through three key areas: innovation, advocacy, and quality of service.

On the advocacy front, TMX CEO John McKenzie recognized early in his tenure that there is an opportunity for TSX and TSXV, as leaders in the global mining sector, to use our position to advocate for Canadian capital markets getting better, which includes advocating for our clients – the foundation of this market. We have already seen positive signs of these efforts with the federal and provincial governments, with increased incentives to encourage participation in the critical minerals space for example.

Finally, our internal processes are continually being improved to better serve our clients. Our adoption of new technologies/efficiencies in listing processes along with programs like our Growth Accelerator service which mentors our early-stage companies on key success factors as a public company. ■



“ Nowadays, there is seldom a sales process for a mine development project where a leading bank will refuse to consider involving a streaming and royalty provider in the capital formation stack. ”

Shaun Usmar

Founder and CEO
TRIPLE FLAG PRECIOUS METALS CORP.

What are some recent highlights at Triple Flag Precious Metals Corp.?

We established our seventh consecutive annual GEOs sales record in 2023. From 2017 through 2023, we experienced a CAGR in GEOs of more than 20%, thanks in part to the Maverix Metals (Maverix) transaction completed earlier in 2023. Furthermore, 2023 was our second largest year of capital deployment, with nearly US\$700 million in completed deals.

We currently pay an annualized dividend of US\$0.21 cents per share, a figure which has increased by approximately 5% each year since our IPO in 2021. Sustainability is core to our identity, and we now rank third out of 117 companies on the Sustainalytics' ESG Risk Rating in the global precious metals sector, up from fourth place in 2022. Moreover, we had several stock index inclusions and our trading liquidity has increased – again thanks to the Maverix transaction.

What role do streaming and royalty companies play in times like these?

Global conflicts have continued and escalated in 2023, which has been reflected in commodity prices. Interest rates have also remained elevated, and therefore debt has been expensive to service and has stressed the liquidity of smaller companies. We observed that even if issuers can raise equity capital, it is extremely dilutive. Despite recent signs of moderation, the persistence of inflation has resulted in cost escalations on mining projects. With project studies experiencing significant inflationary pressures, it has made it even harder for

producing companies to attract investors. Project delays due to permitting and other factors put stress on companies' liquidity and balance sheets. With stream financing, we share the risk like an equity shareholder – if they do not produce, we do not get paid. Some in the mining sector are starting to appreciate these favorable risk and return characteristics. We have demonstrated over the last seven years that we are long-term, patient investors and are willing to help our mining partners when the markets are closed. When our partners are successful, we are successful.

What are the main challenges facing streaming and royalty companies like Triple Flag?

We have seen a lot of deal activity in 2023, however, the size of the deals has been smaller on average than in recent years. I think the market often gets too preoccupied with when the next big deal will come. It is important to create value over time and be patient with capital allocation. Our primary opportunity set tends to lie in intermediate, single-asset companies that are either acquiring or producing, as they do not have the balance sheet of the majors.

Our biggest challenge is to continue to demonstrate discipline in execution. We have seen a return of large deal-flow opportunities and more demand for our capital than we could possibly underwrite. Despite this, we have also had to think a lot about risk. I am happy we have controlled our costs well, exercised patience, and proved ourselves as good custodians

of shareholder value, while delivering sector-leading growth for comparable capital deployment to our peers.

Have you considered changing your investment strategies considering the current climate?

A strategy that constantly changes from year to year is not much of a strategy. Nevertheless, it is important to be agile to reflect the realities of shifting market circumstances in the execution of a longer-term strategy. Our investment strategy remains unchanged – a focus on gold and silver in good jurisdictions, writing larger cheques to compete with the biggest players in this space who have the highest quality, most valuable portfolios and tend to be the most rational and rigorous in their approach to dealmaking. From a risk-reward point of view, we target producing assets with good expansion or life-extension potential. For development-stage assets, there are loads of opportunities, so we seek fully funded and permitted projects.

What are some common misconceptions about streaming and royalties?

I think the situation has improved vastly in the past eight years. Banks now appreciate streaming and royalties as a form of financing, which many of them did not previously. Nowadays, there is seldom a sales process for a mine development project where a leading bank will refuse to consider involving a streaming and royalty provider in the capital formation stack. ■



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As the most prominent lithium-focused royalty company, LRC has established itself as the go-to name in this sector, garnering substantial brand recognition.

”

Ernie Ortiz

President and CEO
LITHIUM ROYALTY CORP.

Can you introduce Lithium Royalty Corp. to our audience?

Lithium Royalty Corp. (LRC) was started in 2018 as a private vehicle with the sponsorship of Waratah Capital Advisors, an investment manager headquartered in Toronto. We had the thesis that lithium has an extremely low risk of obsolescence and was only going to continue to grow as a function of electric vehicle (EV) sales and battery chemistry. The lithium sector's main growth driver would be the electrification of transportation, which is a once-in-a-hundred-year change event. At the same time, many promising lithium companies were issuing equity capital in a dilutive way, and we felt that a royalty model would be an opportune and symbiotic form of financing in this growing sector. Today, we have 34 royalties, including four in Ontario. We see a robust pipeline for additional deals, and we aim to participate in the projected US\$50 billion of investments in lithium expected through 2030.

Can you give an overview of recent developments at LRC over the past year?

LRC went public via an IPO on the TSX in March 2023, raising C\$150 million. Since then, we have acquired six new royalties, including a 2% gross overriding royalty (GOR) from Power Metals on their Case Lake project in Ontario, where they are finding great lithium intercepts close to the surface and could have a mineral resource in 2024.

While LRC has seen substantial growth on the acquisition side, the company has also been organically

developing as a result of the ongoing natural de-risking process in our portfolio. We are excited to have two new maiden mineral resource announcements within our portfolio in 2023; one from Grid Metals Corp on their Donner Lake project in Manitoba, and the other from Green Technology Metals on their Root Bay deposit in Ontario.

What differentiates LRC from its competitors?

The lithium sector is growing by 25-30% per year for the foreseeable future, or 10x GDP. This remarkable growth sets it apart within the commodities sector. Another key differentiator is our long-life assets; we are interested in assets that have a pathway to greater than 20 years either at the time of investment or visibility to 20 years or more. As the most prominent lithium-focused royalty company, LRC has established itself as the go-to name in this sector, garnering substantial brand recognition.

Why should mining companies consider the royalty model rather than other forms of financing?

A key selling point of the royalty model is its non-dilutive nature. Valuations across the commodity landscape are fairly depressed, and this valuation mismatch presents a good opportunity for royalty investments as the issuer can then preserve their equity capital and prevent any equity dilution. Royalties are also a passive financial investment, which allows operators additional flexibility. By nature, royalty companies are long-term investors, and once there is a

deal made, both parties can be productive and positive counterparties for the benefit of both the issuer and the royalty owner.

What ESG criteria does LRC consider when making investments?

We are an early signatory to the United Nations Principles for Responsible Investment. LRC looks for high-grade, low-cost assets that by nature allow less waste into the environment. We also look for lower-emission mines and a big hallmark of our investments is that many of our projects use hydropower, especially the ones in Québec, Brazil and Ontario. Equally important is the use of dry stack tailings as opposed to tailings dams, as this allows for lower usage of water. For hard rock mines, we prefer dense media separation (DMS) type processing, which uses fewer reagents and chemicals.

How do LRC's Ontario assets fit into the company's wider portfolio?

LRC has four royalties in Ontario of which three are with Green Technology Metals and one with Power Metals. We have a 1% royalty on Green Technology Metals' Seymour project which is expected to go into production in 2025. This project is on track to be the first lithium and spodumene-producing mine in Ontario.

We are seeing significant downstream investment in Ontario which will naturally require local raw materials. Ontario enjoys a significant geological advantage, along with promising downstream investments. This combination presents a compelling formula for sustained growth. ■



Brendan Yurik

CEO
ELECTRIC ROYALTIES

Can you introduce Electric Royalties and the firm's assets?

We are at the forefront of royalties in the clean energy space; we were one of the first to acquire graphite, tin, and lithium royalties. We currently have 22 royalties in our portfolio with exposure to nine clean energy metals. One of our royalties is cash-flowing and C\$500 million has been raised by operators so far for the development of the projects underpinning our other royalties. We recently announced our proposed acquisition of 126 lithium properties in Eastern Canada, covering over one million acres; 101 are already under option agreements with third parties.

Why is Ontario a good place to acquire properties and royalties?

We see Ontario as a favorable place for critical metals and for lithium in particular. Mining in Ontario is remote, but operations are close enough to infrastructure to transport the materials where they need to go. There is also access to renewable energy; hydropower is readily available due to the province's abundant lakes and rivers.

Ontario has untapped geological potential for battery metals. Exploration for critical metals such as copper has been ongoing in the province for a century, whereas the industry has only recently begun exploring for lithium. This means that historically there has been a disproportionate focus on the province's volcanic belts so that the potential for pegmatite-hosted lithium has gone largely unnoticed. We believe Ontario will have a critical minerals boom over the next 10 to 20 years and could be an important source of the world's lithium moving forward. This is particularly important given Ontario's central location in North America and its proximity to future battery manufacturing plants – an advantage given the movement towards shortened supply chains. ■



Anthony Milewski

CEO
NICKEL 28

What are recent developments at Nickel 28?

We witnessed significant advancements in our flagship project and overall portfolio. Our flagship asset, the Ramu Nickel Cobalt Operation, has consistently exceeded production expectations in the interim years. Nickel 28 is on the verge of a major milestone with the repayment of Ramu's construction debt within the next couple of years. This accomplishment signifies a crucial phase for Nickel 28 potentially unlocking the ability to redirect cash flows to shareholders through buybacks and dividends.

Can you give an overview of the Ramu Nickel Cobalt Operation (Ramu) and its current performance?

Ramu, located near Madang in Papua New Guinea, stands as Nickel 28's primary cash-flowing asset. It is a joint venture interest between Nickel 28, MCC Ramu (85%), Mineral Resources Madang Limited (2.5%), and Mineral Resources Ramu Limited (3.94%). Operating interest is set to increase to 11.3% following the repayment of Highlands' attributable Ramu construction and development loans. Ramu is a robust producer, yielding around 33,000 t/y of nickel, and is the third-largest producer of Mixed Hydroxide Precipitate globally.

Why is it desirable to mine Mixed Hydroxide Precipitate (MHP)?

A significant decline in Western Class I nickel production due to years of low prices created a supply gap that caused battery manufacturers to turn to alternative nickel sources, like mixed hydroxide precipitate (MHP), basic nickel carbonate (BNC), and mixed sulfide precipitate (MSP). MHP has emerged as the favored option: It is a cost-effective intermediate that closely mimics the behavior of nickel briquettes, powder or oxide. Its rising dominance is evident as battery manufacturers strategically align with MHP producers, forming integrated supply chains. MHP's simplicity of production from laterite, coupled with its favorable market dynamics, positions it as the nickel intermediate of choice, offering a competitive advantage in the evolving battery industry. ■

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Toronto

In 2022, the TSX and TSXV maintained their positions as the world's top mining and exploration listing venues, where 45% of the world's total equity capital for mining was raised in 2022. The TMX Group, which runs these two exchanges, launched the TMX ESG Data Hub in October 2023 to provide a range of real-time and historical data concerning listed companies' ESG performance. Dean McPherson, head of global mining for TMX, shared: "We launched this platform in response to the needs of our investor clientele. ESG has become a key decision element in investors' decision processes."

The boom in IPO activity seen in 2020 and 2021 is behind us, and Canadian IPO activity in 2023 has been minuscule compared to past years. There were 12 Canadian mining IPOs in H1 2023, 11 of which were on the Canadian Securities Exchange, resulting in gross proceeds of C\$157 million. There were, however, two significant new mining listings on the TSX: Lithium Royalty Corp (LRC) and Allied Gold, with LRC's C\$150 million IPO accounting for 95% of the total mining IPO amount for H1 2023. "In a very challenging market, through the IPO Allied Gold, which is focused on West Africa, raised close to C\$300 million this summer. In the past, we saw London as the main competition for African companies. Allied Gold's decision to list on the TSX instead of in London underscores Toronto's position as a leader on the global stage," said McPherson.

Windows of opportunity

Timing is crucial for juniors seeking equity financing on the big exchanges. Windows of opportunity for IPOs can close as rapidly as they open. Dean McPherson shared his advice for juniors: "Nowadays, the periods of positive listing environments have been reduced from years to months. In such conditions, I would advise companies to 'get their ducks in a row' and ensure they are ready to list on short notice, not wasting precious time on administrative tasks when the right window of opportunity appears."

McPherson's comments come as the administrative burden on prospective Canadian issuers may be about to increase. The International Financial Reporting Standards (IFRS) Foundation, a non-profit responsible for developing global accounting and sustainability disclosure standards, recently released new disclosure standards. It is yet to be seen if the Canadian securities regulators will adopt some or all of these new standards that state that companies should release their sustainability information at the same time as their financial information. Heather Cheeseman, partner and national mining leader at KPMG in Canada, explained how this may pose problems: "To date, most mining companies put out a sustainability report, but typically at a much later date than their financial information. Aligning these two processes will be a significant undertaking for companies as there is limited capacity within companies to obtain, review and consolidate all the information needed to meet these new disclosure requirements; it is a time-consuming process".

Even though the conditions have not been ideal for new listings, Toronto-based law firms like Ormston List Frawley LLP (OLF) have been advising their mining clients, preparing them for when the next window opens. Denis Frawley, a partner at OLF, had this advice for juniors: "Companies need to ensure that their property ownership rights are clearly established and that they have satisfied their obligations under the agreements or laws whereby they acquired those projects. I would also urge that companies periodically refresh the geological data on their properties so that they are not relying on outdated information when embarking on a transaction."

Streaming and royalties

Traditional financing options such as equity and debt are not always sufficient to meet the needs of mining companies. As a result, alternative financing has become increasingly popular. This can include a range of financial instruments such as streaming and royalties that provide miners with access to capital while minimizing dilution and reducing risk.

The world's largest lithium-focused royalty company, Lithium Royalty Corp, made the biggest Canadian IPO of the year thus far. LRC has 33 lithium royalties, including four in Ontario. "Since the IPO, we have acquired six new royalties, including a 2% gross overriding royalty (GOR) from Power Metals on their Case Lake project in Ontario, where they are finding great lithium intercepts close to the surface and are hoping to have a mineral resource in 2024," said Ernie Ortiz, LRC's president and CEO.



Alexandre P. Boivin
CEO
QUIMBAYA GOLD

“Mining companies are usually viewed as risky investments, but recently we have seen the more risk-tolerant investors investing in tech and crypto for example.”

Ortiz believes royalties can fill the gap during times like these: "A key selling point of the royalty model is its non-dilutive nature. Valuations across the commodity space are fairly depressed, and this valuation mismatch presents a good opportunity for royalty investments as the issuer can then preserve their equity capital and prevent any equity dilution."

Electric Royalties is another Canadian company that has been snapping up royalties in Ontario's battery mineral projects, owning royalties in projects operated by companies like Northern Graphite and Green Technology Metals. Electric Royalties' CEO, Brendan Yurik, explained the strategy behind these acquisitions: "We see Ontario as a favorable place for critical metals and for lithium in particular. Mining in Ontario is remote, but operations are close enough to infrastructure to transport the materials where they need to go. There is also access to renewable energy; hydropower is readily available due to the province's abundant lakes and rivers."

Although there is yet to be a single producing lithium mine in Ontario, financiers like Electric Royalties are playing the long game – confident in the fact that Ontario will maintain its trajectory of building a local EV supply chain and the billions being poured into battery and EV plants will result in strong demand for locally sourced lithium. "We see at least a two-decade runway in this space. The growth profile for the clean energy industry is huge; it is forecast to become five times bigger than the mining sector within the next 20 years as it overtakes fossil fuel energy generation," continued Yurik.

Triple Flag Precious Metals Corp (Triple Flag), another Toronto-based streaming and royalties company, has opted to focus on precious metals. For established financiers like Triple Flag, global economic uncertainty can bring opportunity, as issuers look away from traditional equity markets where raising funds has become increasingly costly. "Interest rates have also remained elevated, and therefore debt has been expensive to service and has stressed the liquidity of smaller companies. We ob-



Denis Laviolette
Executive Chair and CEO
EARTHLABS

“Mining is a natural hedge to a lot of the chaos we see in the markets today, but the caveat is that it does not offer enough liquidity for larger cap institutions.”

served that even if issuers can raise equity capital, it is extremely dilutive," shared Shaun Usmar, founder and CEO, Triple Flag.

Many mining projects fail to be completed on time and within budget, and shareholders can be quick to jump ship at the first sign of bad news. Since bringing a mine to production can take upwards of 15 years, many argue that investors should be prepared to wait a while if they want their investment to bear fruit. "Project delays due to permitting and other factors put stress on companies' liquidity and balance sheets. With stream financing, we share the risk like an equity shareholder – if they do not produce, we do not get paid," Usmar continued.

In 2010, the mining sector made up 25% of the total value of the TSX and the TSXV, more than any other industry. That year, juniors on the TSXV were able to raise C\$5.3 billion. As of October 2023, they had raised less than half of that, and the sector's composition of the TSX and TSXV has fallen to 13%. In the face of such strong headwinds, Ontario's exploration and mining companies can only focus on what is under their control and ready themselves for the next window of opportunity. For those who cannot wait, there is no better place to be, as Ontario's capital Toronto boasts the world's best mining finance ecosystem, where a breadth of alternative financing and support can be found on a company's doorstep.

Alternative minimum tax

Ontario is renowned for its flow-through share tax credit that has helped finance local prospectors and miners for years. First introduced in the 1970s to incentivize and promote local exploration investment, the flow-through share regime has grown in popularity to become a staple of junior mining finance. The Ontario Focused Flow-Through Share (OFFTS) tax credit provides eligible individual shareholders with a refundable tax credit of 5% of eligible Ontario exploration expenses estimated to reduce the after-tax cost of a C\$1,000 investment in exploration by C\$375-625 for Ontario investors. Since 2011,

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Mining sector companies in the TSX30



RANKING	COMPANY NAME	TICKER	3-YEAR (%)
3	Filo Corp.	FIL	1217%
4	China Gold Int. Resources Corp.	CGG	703%
6	Capstone Copper Corp.	CS	624%
9	Allkem Limited	AKE	587%
14	Aya Gold & Silver Inc.	AYA	498%
20	Global Atomic Corporation	GLO	366%
28	Teck Resources Limited	TECK.B	310%

60% of mines that opened in Ontario were explored by junior exploration companies using OFFTS, leading to C\$4.3 billion in mine construction capital costs, according to the provincial government.

Companies of all sizes have been able to leverage the OFFTS, and it has proven massively beneficial in enticing investors during the dips in commodity cycles. The generous OFFTS regime has attracted prospectors from the other side of the world, such as Aston Minerals, an Australian company focusing on their flagship Edlestone nickel project south of Timmins. "Originally, when drilling for gold, we drilled over the fault and discovered nickel. The company raised A\$29.25 million in March 2022. With flow-through funding we drilled 28,000 m on the nickel deposit," said Russell Bradford, managing director, Aston Minerals.

However, all of this may be about to change. Proposed amendments to the alternative minimum tax (AMT) regime for high-income individuals were introduced in the 2023 federal budget, and are likely to have a significant impact on flow-through share investment, and thus the exploration financing space. The proposed AMT changes are complex, but in summary, the result would be a steep decrease in the efficacy and benefit of the OFFTS regime.

Issuers and investors have been preparing for the impending change to the beloved flow-through model. David LeClaire, president and founder of Oberon Capital, a firm that facilitates flow-through donation financing, observed how this shift is already unfolding: "The proposed AMT changes will reduce our clients' capacity to make donations and take advantage of the existing structure by up to a third. While these changes may have a notable impact on the availability of exploration risk capital, we

observed many issuers coming to the market in 2023 to pre-fund some of their 2024 needs. This was driven by both the perceived reduction in demand from our clients and the anticipation of the forthcoming AMT changes."

Industry organizations, issuers, investors, and companies that facilitate flow-through deals have all actively lobbied the government to reconsider the proposed AMT amendments. "PDAC is also calling for Finance Canada to change the tax treatment of flow-through shares to appeal and spur investment from a broader base of Canadians. Our recommendation to base capital gains on the issue price of a flow-through share aims to counteract a proposed increase to the AMT announced in Budget 2023, which if enacted, will no doubt create a headwind for flow-through investments in Canadian projects," said Raymond Goldie, president, PDAC.

The charitable community, mainly composed of high net-worth donors, are a large part of the flow-through financing space for mineral exploration, and will also be impacted by the AMT changes. "The charitable community, facing similar concerns, has become more organized and vocal recently; and is now actively engaging on the issue. However, due to the complexity, many stakeholders are coming to the table somewhat late," said Lisa Davis, CEO, PearTree Securities.

Experts forecast a substantial reduction — approximately a third — in funding for exploration projects through charitable flow-through deals. "We are currently navigating a complex landscape where the possibility of a 30% reduction in purchases from our primary buyers, individuals earning between C\$1-10 million a year, looms large," said Peter Nicholson, founder and president, WEALTH Group (WCPD Inc).

This all comes at a time when working and middle-class people are battling to contend with inflation and are less likely to have spare change for investments or donations. "The Canadian middle class is donating less and less, with a peak in donations in 2006," continued Nicholson.

The potential seismic shift in Ontario's mineral exploration financing space appears to have gone unnoticed by many — perhaps due to the complexity of the flow-through model and the Canadian tax code. For those involved in flow-through financing, 2023 was spent blowing the whistle to get the industry's attention on the matter. "Our ongoing challenge is to address misunderstandings and educate issuers, clients, and end buyers, often through the brokerage community," said LeClaire.

To complicate matters, the government's position on exactly how and when the proposed AMT amendments will take effect has been unclear. "The government's hesitation in finalizing the rules adds an additional layer of uncertainty, with the proposed changes set to take effect on January 1st, 2024, leaving stakeholders in a challenging position, given the potential for retroactive implementation," said Davis.

It remains to see how the AMT will impact the flow-through mechanism throughout 2024. After 40 years of bringing essential exploration risk capital to Ontario, the flow-through model might never be the same again. ■



“ The biggest challenge is that mineral projects take a long time to explore and develop, while markets offer comparatively short windows for financing. ”

Denis Frawley

Partner
ORMSTON LIST FRAWLEY LLP

Can you give an overview of the developments at Ormston List Frawley LLP over the past year?

Ormston List Frawley LLP (OLF) continues to be involved in the mineral resource and exploration space. Market conditions are currently difficult, and many exploration companies are facing challenges with raising capital. However, most of our clients in this space raised enough capital when markets were more conducive to capital-raising, and they are still financially able to advance their projects. OLF has had a quiet year in terms of new transactions and developments in the mineral resource space, but we are seeing clients consolidate their ownership interest in projects and improve their knowledge and exploration results for their properties.

What are the biggest challenges facing mining companies in Ontario, and what advice would you give them to overcome them?

The biggest challenge is that mineral projects take a long time to explore and develop, while markets offer comparatively short windows for financing. I would advise companies to be prudent and patient, to focus on the fundamentals, and to build a good team. Companies should also look at succession planning and ensure that a talented team is in place for the longer term.

Do you foresee a big consolidation period happening amongst the mining companies in Canada?

I expect that current conditions will also encourage consolidations or other strategic re-positionings. There are many pressures on the industry that could cause people to consider combining projects with those of other companies, or moving certain projects into different or new companies so as to promote a more coherent plan and market identity that focuses on a clear set of minerals. I think companies should always be nimble and look for opportunities to better position and focus their plans and identities in light of market conditions.

What would you like to see changed to improve the mining industry in Ontario, particularly critical minerals?

One thing that is remarkably clear in Ontario's 2022 Critical Mineral Strategy Report is that there are only a small

number of sites with refining and smelting capacity in the province. Both Ontario and Canada are working to build a complete critical minerals value chain. We must develop more refining capacity in the province. This would solidify the value chain and improve the economics of Ontario and Canadian exploration and mining companies by introducing certainty and reducing transportation costs. It will be interesting to see if any government initiatives can marry institutional capital with the development of industrial processing, which should further develop and strengthen the critical minerals value chain within Ontario and Canada.

How can junior mining companies make the financing process as smooth as possible from a legal and internal perspective?

Mining and exploration companies need to ensure that their reports and records are organized and accessible to allow them to quickly pivot and seize upon investor interest by making those records easy to review in a coherent manner. If the financing sought is through a public transaction, that ongoing organization is even more critical. Companies often get frustrated by the time it takes to go public or complete a significant transaction, but in many cases, a significant amount of the lead time is spent organizing company and project records so they can be reviewed and understood. Companies also need to ensure that their property ownership rights are clearly established and that they have satisfied their obligations under the agreements or laws whereby they acquired those projects. I would also urge that companies periodically refresh the geological data on their properties so that they are not relying on outdated information when embarking on a transaction. Having everything organized and updated does require time and money. However, it will pay dividends for companies by allowing them to move quickly and seize opportunities.

What are OLF's key priorities going into 2024?

A priority for OLF will be to look for opportunities for our clients to position themselves for the future. We will also work on advancing our skills at every level of our team. We will invest time and effort in training our team so that everyone understands what our clients need. ■



Ian Mitchell

Partner, Head of Mining
GOWLING WLG

Can you introduce Gowling WLG to our audience?

Gowling WLG is one of the few global firms focused on the mid-market, with the majority of deals falling in the C\$50-500 million range. This sweet spot fits well with the mining sector in Canada. Our mining expertise encompasses a large number of areas, including corporate finance, commercial mining agreements, streaming and royalty transactions, M&A transactions, real estate, construction, environment, First Nations, health and safety, and employment, among others.

Can you discuss the regulatory landscape in Ontario?

No doubt, the Mineral Exploration Tax Credit (METC) which is part of the Canadian flow-through share tax program, is a great advantage for the sector and investors, however, the funds raised with flow-through shares can only be spent on certain exploration activities to be eligible for the tax benefit. Companies still need

to raise “hard” dollars to pay for all other costs. As a result, flow-through financings alone are insufficient to plug the current financing gap.

Additionally, the changes to the Investment Canada Act (ICA) have started to impact the Canadian mining sector – in 2023 we saw Chinese investors leaving the Canadian market and not bidding on projects in Canada or held by Canadian mining companies because they knew the Canadian government was unlikely to approve their transaction. The government is concerned with the disproportionate control of many critical minerals by Chinese state-owned or influenced companies. The risk for the Canadian market is that new investors will not step in to fill the gap left by the disappearance of Chinese investors.

Ontario’s Building More Mines Act, 2023, is a step in the right direction toward securing Ontario’s place in the critical minerals supply chain. That being said, there remains a large, complex web of regulatory approvals in Canada if you want to build a mine. ■

Can you provide an overview of Cassels Brock & Blackwell LLP’s services to the mining industry?

Cassels Brock & Blackwell LLP (Cassels) is a full-service law firm with a specialized focus on the mining industry. Our comprehensive services encompass significant mining-related transactions, including corporate finance and M&A, as well as real estate, employment, and regulatory matters.

What major developments have you observed in the regulatory landscape for mining in 2023?

The increasing demand for electric and hybrid vehicles has prompted governments to take action, such as through the introduction of the critical mineral exploration tax credit (CMETC) in 2022. This tax credit, integrated into flow-through shares, has proven beneficial for Ontario companies seeking financing. Additionally, there have been changes to the Investment Canada Act, imposing restrictions on foreign investments in critical minerals. Ontario has also announced the Critical Mineral Strategy and the Building More Mines Act, 2023, aiming to streamline regulatory processes and facilitate mineral proj-

ect advancements. Furthermore, the Canadian government’s C\$1.5 billion infrastructure fund is expected to bolster projects, particularly in regions like the Ring of Fire.

What have you observed in the current financial landscape?

In the challenging market, especially for precious metals, we have observed increased creativity in financing among Ontario development companies. We have facilitated unique royalty-type transactions to raise funds, exploring alternatives to traditional financing. M&As are prevalent, with companies considering various options for growth, such as combining forces or securing financing alongside strategic activities. While these are ongoing endeavors, they showcase the industry’s adaptability.

Given the challenging financing landscape, what advice do you have for juniors?

Flexibility is paramount. Juniors must remain vigilant, identifying windows of opportunity for financing. Staying attuned to industry timing, knowing when to save and when to weather the storm, has proven crucial. ■



Alexander Pizale

Partner
CASSELS BROCK &
BLACKWELL LLP



Lisa Davis

CEO
PEARTREE SECURITIES

Can you outline the key achievements and challenges you faced in 2023?

Our overall deal flow reached unprecedented levels, with standout success in critical minerals. The introduction of the federal critical mineral exploration tax credit (CMETC) played a pivotal role, resulting in a substantial increase in financing for critical minerals projects. In about 18 months, we saw CMETC financings amounting to approximately C\$500 million, marking a significant shift from industry’s predominantly gold-focused financings. We applaud the government’s proactive approach in supporting the CMETC initiative.

How does PearTree Securities plan to maintain its leading position?

We have expanded our reach within charitable communities, building relationships with donors and diversifying our distribution channels. This has positioned us as a dominant player in the securities dealing space, with a robust pipeline of demand for flow-through shares. Our ability to facilitate large financing deals, such as those in the C\$50 million range, sets us apart. We plan to maintain this trajectory by staying committed to our core strategies, building on our reputation, and adapting to market dynamics. Our emphasis on donations and efficient deal execution positions us for continued success in 2024 and beyond. ■



Peter Nicholson

Founder and President
WEALTH GROUP (WCPD INC)

Can you introduce the WEALTH Group (WCPD) to our audience?

Our core focus revolves around financial services, with a strong emphasis on tax reduction and philanthropic tax planning. In 2006, our firm integrated donation services into our business when Canadian charitable flow-through deals commenced.

Our structure is based on two long-standing tax policies. The first is the charitable tax receipt, created in 1918, designed to promote donations. The second is the flow-through share, introduced in 1954, to provide seed funding to junior mining companies. The latter was introduced to stimulate this important Canadian industry and create jobs.

Both tax policies offer 100% tax savings. When these tax policies are combined, and you include additional provincial and critical tax credits, something special happens.

Our firm alone has facilitated north of C\$350 million in giving to Canadian charities while financing well over C\$1 billion in junior mining projects.

Can you share insights into the challenges facing the industry?

We need to educate retail investors about mining, to redirect them away from crypto and cannabis and towards critical minerals, which have the tangible benefit of supporting the energy transition. ■



David LeClaire

President and Founder
OBERON CAPITAL

What are the main recent developments at Oberon Capital?

In 2023, we experienced an almost doubling of our business volumes. This growth can be attributed to two main factors. Firstly, there was a significant rise in the prominence of critical minerals exploration, with tax changes incentivizing many projects to shift towards this sector. The additional tax incentives played a crucial role in encouraging issuers to come to the market. Secondly, the proposed Alternative Minimum Tax (“AMT”) changes will reduce our clients’ capacity to make donations and take advantage of the existing structure by up to a third. While these changes may have a notable impact on the availability of exploration risk capital, we observed many issuers coming to the market in 2023 to pre-fund some of their 2024 needs. This was driven by both the perceived reduction in demand from our clients and the anticipation of the forthcoming AMT changes. The government must reconsider some of these changes to ensure a balanced impact on exploration risk capital and Canadian philanthropy.

What lies ahead for the company?

Oberon has a fantastic team and a reputation as a trusted partner to the mineral exploration sector and brokerage community – two amazing assets that will fuel Oberon’s continued growth in 2024 and beyond. ■



Critical Minerals

“

Ontario is now the number one mining jurisdiction for exploration in Canada. Our strategy around critical minerals is clearly working and exploration is at the heart of it.

”

George Pirie
Minister of Mines
GOVERNMENT OF ONTARIO

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Critical Minerals

Connecting the links in Canada's EV supply chain

The Ontario Critical Minerals strategy was released in 2022 and outlined the province's five-year roadmap to secure Ontario's position as a global leader in responsibly sourced critical minerals. Off the back of this announcement, 2022 saw a 41% year-by-year increase in Ontario's critical mineral production. Meanwhile, critical minerals exploration expenditures in Ontario amounted to C\$328 million in 2022 and accounted for 33% of all exploration expenditures in the province.

Ontario has immense potential to be a leading critical minerals producer. In 2022, Ontario was responsible for a third of Canada's copper production, 45% of its nickel production, and 77% of its Platinum Group Elements (PGE) production, by value.

Nickel

Magna Mining navigated the difficult financing environment for juniors and is fully funded to complete its exploration programs throughout 2024. Upon completing its acquisition of Lonmin Canada in late 2022, Magna Mining added the past-producing Crean Hill property to its portfolio. Magna's strategy of acquiring brownfield sites like Crean Hill is likely to make the permitting processes smoother. "Both the Crean Hill and Shakespeare projects are already impacted brownfield sites, so that's a great platform from which to achieve high standards of compliance with ESG objectives," explained Jason Jessup, CEO of Magna Mining.

In the Timmins Nickel district, Canada Nickel's Crawford project is claimed to have the second-largest nickel reserve globally. Thanks to the deposit being hosted in ultra-mafic rock, there is potential for Crawford to double as a carbon sequestration project, absorbing CO2 from the air. "Our location in Ontario grants access to low-carbon electricity from the grid, enabling us to produce a 34% nickel concentrate with a minimal carbon footprint. We can store 35 t of CO2 for every ton of nickel produced, resulting in a net negative 30 t CO2 footprint," said Mark Selby, CEO, Canada Nickel Company.

The nickel sulfides from projects like Crawford are generally easier and less carbon-intensive to process than the laterite ores commonly mined in places like Indonesia, the world's largest nickel producer. This lends great potential for Ontario to produce class 1 nickel, suitable for battery technologies for Ontario's budding EV industry. "Car companies prefer their supply chain to be located as close to auto operations as possible. Ontario is one of the few places in the world where we mine metals and produce cars, allowing us to be a part of an integrated supply chain," continued Selby.

Building a local EV supply chain

With increasing geopolitical tensions and pressure to decarbonize, critical mineral producers will be competing on more than just price. "Lithium can be sourced in many

jurisdictions overseas. However, this can come with the risk of political uprisings and other uncontrollable risks," explained Allan Frame, president and CEO, Beyond Lithium.

Offtakers are increasingly considering ESG credentials and seeking to source from stable, safe jurisdictions like Canada. "As EVs become more popular, companies are working to produce 'passports' for their batteries, allowing insight into where the nickel was sourced," explained Russell Bradford, managing director, Aston Minerals.

Digital battery passports (DBPs) are emerging as a digital technology that provides stakeholders with data in support of the sustainable management of batteries, with the EU mandating that every new battery of more than 2 kWh must have its own passport by 2027. "Battery manufacturers do not want their nickel originating from a supplier with poor ESG credentials," Bradford continued.

Ontario's juniors are confident in their jurisdiction's reputation as a socially and environmentally conscious mining destination. "Although there is potential supply coming online from Asia that could impact nickel prices, I think that the high-grade, low-carbon intensity nickel that we will be producing here in Sudbury will always have a place in the global supply chain," said Jason Jessup of Magna Mining.

In addition to ESG and geo-political risks, oftakers are increasingly choosing to reduce their logistical requirements and to make their supply chains simpler and more robust. This trend has been spurred, in part, by recent black swan events like the Covid pandemic and the Suez Canal obstruction. "There has been a rising demand for rare earth metals, driven by emerging markets like EVs and electronics. Additionally, the demand for domestically produced products has surged in the wake of supply chain risks associated with imports from other countries," said Martin Jette, president - Canada, Brenntag Essentials.

Lithium

Juniors have taken varying approaches to their business model. For example, Beyond Lithium, which has 61 properties spanning 180,000 hectares in

Ontario, decided to adopt a project generator model, focused on lithium. Project generators maintain a portfolio of many projects and fund major exploration work by creating joint-venture partnerships with other companies. In addition to its project generator model, Beyond Lithium differentiated itself by focusing exclusively on Ontario. Allan Frame, Beyond Lithium's president and CEO, shared the strategy behind this move: "When we decided to focus on lithium, we saw that things were more advanced in Québec. There is good infrastructure and well-known deposits, however, the cost per hectare is very high now. A lot of the geology is similar in the region."

Some of Ontario's critical minerals players are taking things a step further - opting to become as vertically integrated as possible to reduce logistical hurdles and extend their control further down the supply chain. We spoke with Green Technology Metals (GT1), an Australian company looking to become the first lithium producer in Ontario, with multiple mines, spodumene



Doug Engdahl
President and CEO
AXIOM
EXPLORATION
GROUP

“ We are seeing a rush in the industry with downstream manufacturers like LG and Mercedes taking equity in junior exploration companies to secure future supply. ”

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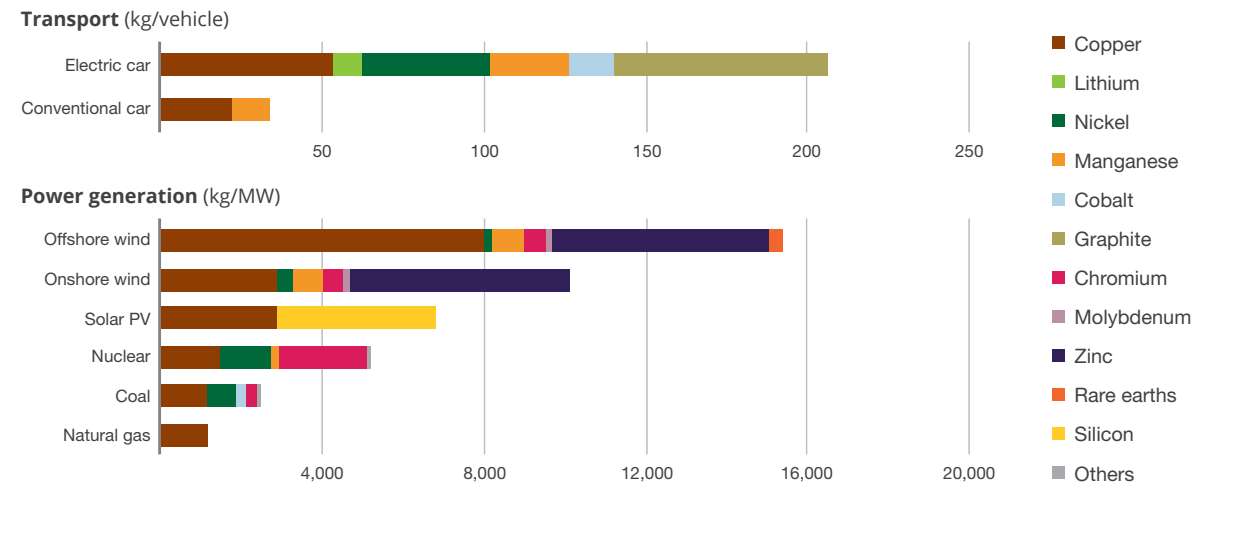
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Source: International Energy Agency (IEA)

process plants, and a lithium conversion plant planned to be built in Ontario. Having already signed offtake agreements with battery manufacturers like LG Energy Solutions, GT1 is positioning itself to tap into the C\$1.5 billion earmarked for critical minerals by the Canadian government's Strategic Innovation Fund. "Having an entire vertically integrated supply chain in one region will decrease North America's reliance on China for downstream pro-

cessing and substantially decrease the carbon footprint, as materials will no longer need to be shipped across the world to make one EV. That does not exist anywhere else on the planet, but soon, it will in Ontario," said Luke Cox, the CEO of GT1.

Much like GT1, Rock Tech Lithium (Rock Tech) is also on its way to becoming an integrated lithium producer. Having already secured permits for a lithium hydroxide converter at the German-Polish border in partnership with Mercedes Benz, and is now initiating preparations and permitting for a similar converter in Ontario. Rock Tech is aiming to complete a FS for its Georgia Lake project in 2024, which it hopes to bring into production in 2026. Dirk Harbecke, CEO of Rock Tech, explained the strategy behind moving upstream with the Georgia Lake project: "Given the recent volatility and current dip in lithium prices, smaller Canadian projects may struggle to reach production. Achieving economies of scale becomes crucial to navigating these challenges successfully. Infrastructure, JVs, and regional supply chains play pivotal roles in achieving this scale."

Headquartered in Toronto, Avalon Advanced Materials (Avalon) is also taking the vertical integration approach, with plans for a lithium processing plant in Thunder Bay. Avalon's flagship JV property, Separation Rapids, 70 km north of Kenora, is undergoing a drill program to increase the resource from the current 10 million t. Although the government has poured billions into the downstream EV supply chain and attracted big names like LG, some feel that the same level of support should also be extended to the upstream. However, Zeeshan Syed, Avalon's president, thinks the government is on the right track: "Focusing on downstream demand was the right initial step, followed by attention to midstream processing capacity, a capital-intensive aspect of the supply chain. Budget 2023 emphasized recycling and midstream processing, aligning with Avalon's thesis. By creating economic conditions for midstream capacity, we enable upstream players to regionalize the supply chain, reducing ESG footprint and catalyzing the entire region".

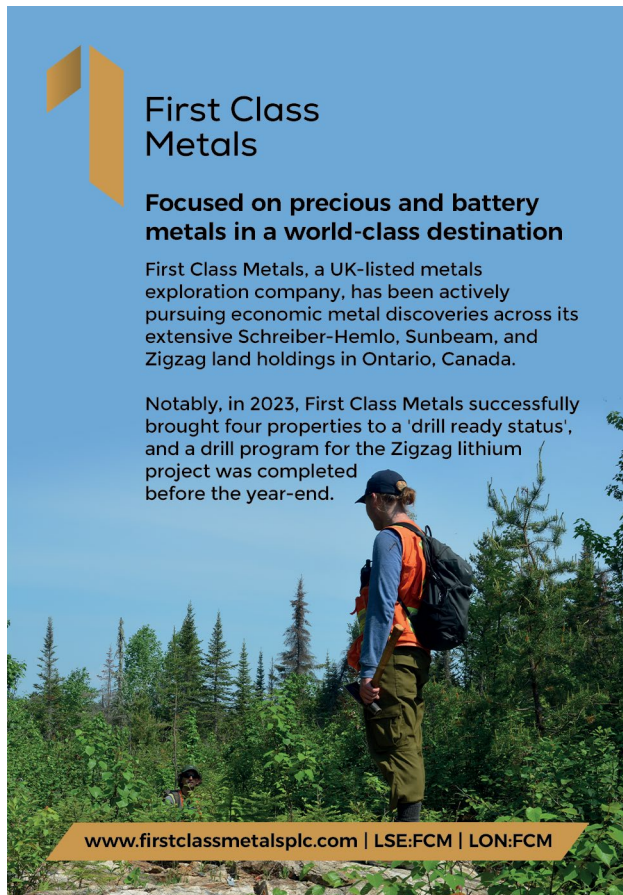
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First Class Metals, a UK-listed metals exploration company, has been actively pursuing economic metal discoveries across its extensive Schreiber-Hemlo, Sunbeam, and Zigzag land holdings in Ontario, Canada.

Notably, in 2023, First Class Metals successfully brought four properties to a 'drill ready status', and a drill program for the Zigzag lithium project was completed before the year-end.



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“Our vision is to explore, mine and produce concentrates for a lithium conversion plant capable of producing the required chemicals for battery manufacturers. This is a made-in-Ontario story.”

Luke Cox

CEO
GREEN TECHNOLOGY METALS

Can you give an overview of the milestones achieved by Green Technology Metals (GT1) in 2023?

We reached the point of delivering a Preliminary Economic Assessment on building a vertically integrated lithium business in Ontario. Our vision is to explore, mine and produce concentrates for a lithium conversion plant capable of producing the required chemicals for battery manufacturers. This is a made-in-Ontario story.

At GT1's flagship Seymour project, we drilled out the resources and have sufficient tons to now go into operation. We have nearly completed three years of environmental baseline studies and are in the planning phases of the mining operation and concentrator. We are consulting resident First Nations groups about potential Impact Benefit Agreements (IBAs), which are our social license to operate. This is in their backyard, we want to ensure everyone is happy, so we are discussing potential jobs, training and education the mine can provide.

Why would the former Cascades paper plant be the ideal site for GT1's planned lithium hydroxide conversion facility, and what synergies will this facility unlock for the business?

Along Thunder Bay there are various brownfield paper mill sites, which provincial and federal governments are looking to clean up. The site location on the outskirts of Thunder Bay helps prevent haul trucks from disrupting the town itself. The site has road infrastructure, rail infrastruc-

ture, sewerage, and access to water, electricity and gas, which will be necessary for us to operate.

With many companies looking to establish processing facilities in Thunder Bay, do you foresee any consolidation through M&A or joint processing ventures?

The government has put money into the Strategic Innovation Fund to invest in a potential conversion plant in Thunder Bay. GT1 was one of the first companies to apply. With this fund, the government is trying to build a vertically integrated lithium business in Ontario - from a mine to a battery to an EV car. The government suggested that GT1 join forces with other industry players in Ontario to consolidate the supply chain, and we immediately made a deal with a battery manufacturer building a plant in Ontario: We sold 25% of our future production to LG Energy Solutions. We acquire the raw materials, process them, and deliver them to make batteries in Ontario.

Once we have our conversion plant in operation, we can hold talks with other raw material producers to bring their feed to us for future processing. We can double production if another producer wants to join this supply chain.

Has the government been supportive of GT1 and other critical mines in Ontario?

The government's mandate is to get the critical mineral supply chain running as soon as possible. There are

established departments to support critical minerals companies, like GT1, along the production pathway. They helped us navigate permitting and converting our exploration claims to mining claims.

The government spent C\$25 billion on the downstream players: Car and battery manufacturers are building plants and Umicore signed a cathode factory deal with the government. None of them have feed. These players want to secure raw material supply, and many are looking to GT1.

Why did GT1 select Ontario as the place to create an integrated lithium supply chain?

With GT1's experience, board, and team there is the potential to reinvent the success of Australia's lithium production in North America.

Demand for critical minerals will be concentrated in North America; we are trying to create a homegrown critical mineral supply chain in Canada to meet demand and mitigate reliance on other countries. Ontario has great potential, not only for lithium mining but also for downstream processing, all a stone's throw away from each other. Having an entire vertically integrated supply chain in one region will decrease North America's reliance on other countries for downstream processing and substantially decrease the carbon footprint, as materials will no longer need to be shipped across the world to make EV batteries. That does not exist anywhere else on the planet, but soon, it will in Ontario. ■



Trevor Walker

President and CEO
FRONTIER LITHIUM

What were the main developments at Frontier Lithium in 2023?

In 2023, Frontier Lithium faced a complex and challenging lithium market, which it navigated with resilience through groundbreaking discoveries, strategic hires, and extensive groundwork and studies that confirmed the viability of the PAK lithium project. Additionally, in 2023, the US and Canada experienced the fastest-growing EV sales among major regions, with a 59% increase compared to 2022.

A significant milestone was achieved with the filing of the NI 43-101 Pre-Feasibility Study (PFS) for the PAK project, encompassing an integrated project from a proposed mine in Northwestern Ontario to a lithium hydroxide chemical plant in the Great Lakes Region. The PFS confirms the PAK project's financial viability, positioning it as a potential continent-leading, lowest-cost producer of lithium hydroxide, with a pre-tax NPV of US\$2.59 billion discounted at 8%.

The PFS results demonstrate Frontier Lithium's potential to become a major, low-cost lithium chemicals producer for the electric vehicle supply chain in North America.

Can you outline the current status of the PAK project and the main challenges you will face along the path to production?

The PAK project is progressing, focusing on advancing the Definitive Feasibility Study (DFS), a pivotal phase in the project's development. The

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The PFS confirms the PAK project's financial viability, positioning it as a potential continent-leading, lowest-cost producer of lithium hydroxide.

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local markets and competitive advantages from supportive infrastructure in northern Ontario.

Has Frontier Lithium taken advantage of government incentives like the Critical Mineral Exploration Tax Credit (CMETC)?

Frontier Lithium has capitalized on government incentives, securing a C\$2 million in grant funding from the Government of Ontario for lithium processing research. The company has also received support from the Critical Mineral Innovation Fund through Ontario's Ministry of Mines to enhance support in battery mineral processing research.

What will make Frontier Lithium's final product more appealing than that of your competitors?

Frontier Lithium's final product will stand out due to its superior quality resources with a low strip ratio. The volatile lithium market in 2023 underscores the significance of quality and a low strip ratio. Quality impacts profitability at the beneficiation circuit, while a low strip ratio directly affects the cost of raw material feed. In the face of market fluctuations and oversupply cycles, Frontier Lithium gains an advantage, shielding against volatility that may impact high-cost producers.

What are Frontier Lithium's priorities for 2024?

In 2024, Frontier Lithium will focus on delivering the Definitive Feasibility Study as a critical step in establishing the viability of its lithium project. Concurrently, the company prioritizes finalizing the Baseline Environmental study, actively engages in advancing the Impact Benefit Agreement process, and works towards finalizing government subsidy applications. Infrastructure improvements, specifically the development of a Lithium Chemical Refinery, are key focuses. Simultaneously, Frontier Lithium advances offtake conversations, explores partnership opportunities, and maintains ongoing discussions with stakeholders, reflecting a holistic approach to project development, environmental stewardship, and sustainable partnerships in the dynamic lithium industry landscape. ■

fully integrated mine, mill, and refinery flowsheet, initially demonstrated in the PFS, will undergo refinement during the DFS. The first scope of work, involving the mine and mill, is set to be completed over the next 12 months, aiming to establish a facility producing 200,000 t/y of spodumene concentrate. Alongside these advancements, we continue to de-risk the technical complexities in refining the integrated flowsheet, logistical considerations, and potential environmental and regulatory aspects.

Can you comment on the supply and demand fundamentals for lithium, and how the dip in lithium prices has impacted pre-production companies like Frontier Lithium?

Despite an 80% decrease in lithium chemical prices in 2023, Frontier Lithium remains optimistic about short-term opportunities and the long-term fundamentals of the lithium market. The company anticipates global electric vehicle penetration rates to exceed 9%, positioning them well for future electrification and growth. The dip in lithium prices, including fluctuations in China's spot prices, has not deterred Frontier Lithium's confidence, emphasizing its enduring value proposition and strategy. Last year, EV sales grew 31% year-over-year, with BEV sales up by 27% and PHEV sales by 43%. With strong demand growth projected regionally, the proposed project would capitalize on proximity to emerging



Dirk Harbecke

CEO
ROCK TECH LITHIUM

Can you highlight the most significant developments at Rock Tech Lithium over the past year?

Rock Tech Lithium (Rock Tech) is a German-Canadian company on its way to becoming an integrated lithium producer. We are currently developing a mining project in Ontario, located near Thunder Bay. Additionally, we have obtained permits for a lithium hydroxide converter at the German-Polish border. Leveraging our converter knowledge from Europe, we have also initiated the development of a similar converter in Ontario. Our key partners in Germany include companies like Mercedes Benz. In Canada, we have announced that we are considering building a converter in Red Rock, together with the Red Rock Indian Band First Nation and the BMI Group.

Could you provide an update on the recent developments of the Georgia Lake project in Ontario?

We released a PFS for Georgia Lake and our focus is now on advancing the FS and collaborations with neigh-

boring properties. We recently announced discussions with Imagine Lithium, one of our neighbors, aiming for a consolidation of properties in the area. Our vision is to establish a concentrator and a large lithium converter, drawing on our extensive experience from European operations. The goal is to bring the mining property into production in alignment with our plans for our second converter in Canada. As for the Canadian project, we anticipate starting lithium chemicals production in the second half of 2027, positioning ourselves as a leading player in Canada. Despite the potential competition, we believe the industry will see more collaborations, as being an integrated lithium player involves distinct elements of mining and chemistry.

What caused the recent drop in lithium spot prices?

We observed a moderation in the growth rate of the Chinese EV market, coupled with a notable increase in the production of lithium concentrate. ■



Zeeshan Syed

President
AVALON ADVANCED MATERIALS

Can you provide a detailed overview of Avalon's main highlights in 2023?

Our focus shifted towards implementation and production, departing from the traditional junior mining company model. Notable milestones include a strategic partnership with Sibelco for our upstream lithium assets through a new JV that now includes our flagship project, Separation Rapids.

The acquisition of a fully serviced industrial property in Thunder Bay was a pivotal move. This property serves as the cornerstone for our midstream lithium processing platform.

Additionally, our partnership with Metso stands out as a major accomplishment. Metso's expertise brings innovative process technology solutions to Canada, accentuating environmentally sound practices and propelling the country into a leadership position on the global stage.

Have you been supported by the federal and provincial governments?

I applaud the position taken by the federal and provincial governments. Canada's boldness and support has attracted major players like Volkswa-

gen and Stellantis. Focusing on downstream demand was the right initial step, followed by attention to midstream processing capacity, a capital-intensive aspect of the supply chain. Budget 2023 emphasized recycling and midstream processing, aligning with Avalon's thesis. By creating economic conditions for midstream capacity, we enable upstream players to regionalize the supply chain, reducing ESG footprint and catalyzing the entire region.

What challenges does Avalon anticipate in 2024?

The futures market indicates potential growth in upstream supply, directly impacting pricing. This aligns with Avalon's move into advanced manufacturing, anticipating significant opportunities. The evolving battery technology adds complexity, but Avalon remains bullish on lithium's future. Our diversified portfolio, including a substantial asset in the Northwest Territories with heavy rare earths, positions us strategically. The rich zirconium content found there, crucial for military and defense applications, aligns with North American energy security initiatives. ■



Srini Godavarthy
CEO
LI-METAL

“To mitigate disruptions, OEMs are securing lithium supply through partnerships with miners, thus ensuring pricing stability. A nuanced, longer-term perspective is essential for lithium.”

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Ontario's Critical Mineral Strategy does seem to be working, as Ontario has attracted over C\$25 billion in automotive investments for EV batteries and battery materials since 2020.

Canada's historic push to build a homegrown EV supply chain is not merely borne out of environmental consciousness, but also to strengthen its geopolitical position on the world stage. "The Canadian government, like many other Western governments, is concerned with the disproportionate control of many critical minerals by Chinese state-owned or influenced companies," said Ian Mitchell, partner, head of mining, Gowling WLG.

Li-Metal, whose carbonate-to-metal technology was chosen as one of TIME magazine's 'Best Innovations of 2023', recognized Canada's desire to reshore the lithium metal and anode production process, as currently over 90% of lithium metal is sourced from Russia and China. "Grants from the Canadian government have been vital to help scale our technology. As an intermediary, we fill a gap in the vertically

integrated lithium supply chain. Currently, raw material is shipped to China and brought back as anodes. Once we scale production, an important part of the battery value chain will take place domestically," said Srini Godavarthy, CEO, Li-Metal.

Ontario is already one of the largest automotive manufacturing jurisdictions in North America, serving as the Canadian headquarters for five global players: Stellantis, Ford, General Motors, Honda and Toyota. Together, these companies assemble millions of vehicles each year at their Canadian plants. If the province plays its cards right, it has the potential to build a world-class end-to-end EV supply chain.

Ontario's Ring of Fire

Located 500 km northeast of Thunder Bay, the Ring of Fire has immense potential to produce the critical minerals needed to fuel the green energy transition, including platinum, copper, nickel, cobalt and chromite. The Ring of Fire is estimated to have the second-largest chromite deposit globally. In the last few years, juniors have been scrambling to stake claims and explore this remote part of Ontario. The Ring of Fire's isolation and lack of infrastructure will pose significant hurdles to mine development. "The government is starting to install power lines and build roads to open things up in Northern Ontario, but this will take many years," shared Greg Ferron, president and CEO, Platinex Inc., an exploration company active in the area.

On the heels of completing the acquisition of Ring of Fire Metals, Australian nickel producer Wyloo has been focused on advancing the Eagle's Nest project. Much like the Canadian critical mineral prospectors, Australians are mindful of the West's desire to be less reliant on China, leading them across the world to like-minded, democratic, tier-one jurisdictions such as Ontario. "We anticipate a continuous demand for nickel and, in particular, high-grade clean nickel," said Kristan Straub, CEO, Canada, Wyloo.

With nine First Nations residing in the Ring of Fire, there are also social and environmental factors to consider as the area is developed. The Northern Road Link (NRL) project, an all-season

road access to the Ring of Fire, will greatly boost the chances of success of projects there, while also benefiting the inhabitants. "Chief Bruce Achneepineskum of Marten Falls and Chief Cornelius Wabasse of Webequie First Nation are extraordinary leaders in their communities who are working on the environmental assessments for roads in the region," shared Minister Pirie.

The debate on whether or not to develop the Ring of Fire is still ranging, with some critics and First Nations arguing that the NRL project, and the anticipated uptick in mining activity that will follow, may release billions of tons of carbon dioxide equivalent of GHGs as the peatlands in the area are disrupted. For others, like the Marten Falls First Nation, the NRL project is seen as a lifeline: "The road is the first step. Even communities with access to roads are still in poverty. We are looking at the grander picture for our youth, to put them in a better starting position. The road will help attract qualified teachers to our community," said Bruce Achneepineskum, Chief, Marten Falls First Nation.

As the climate crisis worsens, the clock is ticking for the Ring of Fire's residents and prospectors who are keenly awaiting the NRL. "The changing weather patterns, attributed to climate change, affect the viability of the winter road and limit its lifespan to six weeks, at most. We must bring in all our lumber and fuel during that period. The Community Access Road's connection to the provincial road network will significantly decrease the cost of transportation of goods and freight," continued Chief Achneepineskum.

Global demand for critical minerals will more than double by 2030, according to the International Energy Agency. Canada is not free from this demand chokehold, mandating that 60% of all passenger vehicle sales will be electric by 2030. In Ontario, the government is subsidizing US\$21 billion to Volkswagen and Stellantis-LG Electric Solutions to incentivize the establishment of electric vehicle (EV) plants in St. Thomas and Windsor, respectively. With the commencement of LG's plant operations in 2024, critical mineral output in the province must be maximized to reap the benefits of a vertically integrated supply chain. ■



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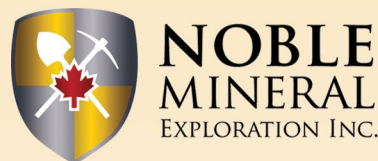
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- o 2.9mm Canada Nickel Shares
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- o 1.4mm Go Metals Shares
- o 350k MacDonald Mines shares

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- **Project 81** -25,000ha in the Timmins-Cochrane area of Northern Ontario, for which it holds the mineral rights for VMS and Gold available for option;
- **Nickel-Cobalt/VMS/Gold** -11,000ha in the Timmins-Cochrane area of Northern Ontario, for which it holds the mineral rights optioned to Canada Nickel Company;
- **Boulder Project** -4,600ha drilling in 2024 to follow up Airborne EM/Mag for Boulder producing 70%+ Copper;
- **Cere-Villebon** -482ha near Val d'Or, Québec with historic Copper-Nickel-PGM results on the property with additional drilling scheduled for 2024;
- **Havre St Pierre** -10,152ha untested Nickel, Copper, Gold Prospect;
- **Central Newfoundland** -175ha untested VMS/Copper/Gold anomaly on strike with Spruce Ridge Great Burnt project.
- **Buckingham Graphite** -3,700ha in the Outaouais area of Western Québec with large flake recoverable graphite with infill drilling proposed for 2024;
- **Laverlochere** -518ha near Rouyn-Noranda, Québec follow up work on Nickel-Copper-Cobalt-Gold and PGM results from 1960's;
- **Dargavel Gold Trend** -7kms strike length with gold results reported;
- **Lucas Gold** -17km strike length with gold results reported;
- **Nagagami River Carbonatite** -4,845ha Niobium and Rare Earth discovery near Hearst in Northern Ontario.





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With four permitted drill targets, each equivalent to a primary project for many exploration companies, we are poised for an exciting future.

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Marc Sale

CEO
FIRST CLASS METALS

What were some developments from the 2023 field season?

Our extensive land portfolio encompasses 10 property blocks covering over 300 km², with the most significant four constituting 75% of the total area. These key properties include the North Hemlo block, featuring a JV with Palladium One; Sunbeam, a historical gold mine near the Hammond Reef deposit; Esa property located 11 km north of the Hemlo Barrick Williams gold mine; and Zigzag, a newly acquired hard rock lithium project. The pivotal focus of the 2023 field season was to bring four of our properties to drill-ready status in 2023. This goal has been conclusively realized across all these properties.

While gold remains our primary focus, we have strategically diversified into valuable EV minerals and initiated a nickel-copper JV on West Pickle Lake. Furthermore, in 2023 we 'inked' an Earn-In agreement on a hard rock lithium property – Zigzag, only 10 miles from the Seymour Lake development, where we undertook a 10-hole drill program with every hole targeting the pegmatite being successful.

A standout in our exploration endeavors is the Dead Otter Trend on the North Hemlo block, where a 19 g/t gold sample has been reported.

Only our Esa property necessitates some additional exploration (stripping), which was initiated now the Exploration Permit is granted. A geochemically anomalous (in gold) structure of 4 km in strike and up to 200 m wide, dissects the property, and the preliminary soil samples in-

dicates anomalies in gold and other elements like rare earths. Our strategy is to bring Esa to a point where its value is evident before considering JVs or selling.

As for Zigzag, initial grab samples indicate a 400 m long core area with over 1% lithium oxide. Channel sampling further substantiates this, with one channel showing over 5 m at over 2.5% lithium oxide. While we have already received offers for this property, our philosophy prioritizes conducting an initial drill program to consolidate potential and increase the overall value. With an initial modest drill program now completed; striking a balance between advancement to add value and preserving potential is imperative.

I have been liaising with seven First Nation groups who have traditional ownership of land on which our exploration properties sit. I feel a notable achievement is securing six permits on our properties within just over 12 months.

How has First Class Metals navigated the challenging environment for financing in 2023?

In terms of financing, our company encounters a constraint known as the 20% rule on the main board of the London Stock Exchange (LSE). FCM can only issue up to 20% of the issued shares in a rolling 12-month 'headroom'. Despite facing this limitation, we completed an oversubscribed £1,000,000 funding round in June. A subsequent round in November 2023 for over £600,000, using a share loan scheme, mirrored our earlier success.

Why did First Class Metals choose to list on the LSE?

Listing on the LSE distinguishes us in a market as very few small-cap Canadian-focused exploration companies are listed in London.

I feel it is worth highlighting the increasing interest in small-cap exploration companies in London. Moreover, a significant development took place in December of 2022 when the LSE's main board adjusted its listing requirements. Previously, the minimum market cap for listing was below £1 million. However, this threshold was then raised to £30 million. Strategically, we submitted our documents at the eleventh hour on the final day, thus making us one of the few smaller companies listed on the main board.

Could you share your key goals for 2024 and the upcoming field season?

My belief for the upcoming field season is grounded in the progress at Zigzag and the untapped potential of Esa and Sunbeam. Whilst not underestimating the significant potential of North Hemlo's Dead-Otter trend as a new discovery that spans over 3 km and remains open, with intermittent samples ranging from 1-20 g/t. Looking ahead to 2024, our strategy involves developing these promising projects incrementally, seeking partnerships, and remaining open to additional opportunities, all while maintaining a financially sustainable approach. With four permitted drill targets, each equivalent to a primary project for many exploration companies, we are poised for an exciting future. ■



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The model we have established involves identifying unexplored or underexplored areas for initial de-risking through activities such as airborne surveys, compilation of geological reports and preliminary drilling.

”

Vance White

President and CEO
NOBLE MINERAL EXPLORATION

What are the main developments at Noble Mineral Exploration since our last conversation?

In the past year, our focus has been on following up on earlier projects, notably the Boulder project located just south of Hearst. This project aimed to explore the Boulder deposit discovered several years ago, which yielded an analysis indicating over 70% copper. If the source could be identified, it would represent a significant mineral discovery. Additionally, we have initiated a drill program north of the Kid Creek mine in Carnegie Township. This program targets areas with similar geology to the Kidd mine. Five holes have been drilled so far, and we eagerly await the results.

Another area of focus has been Spruce Ridge Resources (Spruce), where Noble Mineral Exploration (Noble) currently holds a substantial shareholding. Our collaboration with Spruce extends over several years, creating a strategic tie between Canada Nickel, Noble, and Spruce.

Can you outline the main challenges Noble has faced, especially considering your project generator business model?

The model we have established involves identifying unexplored or underexplored areas for initial de-risking through activities such as airborne surveys, compilation of geological reports and preliminary drilling. This forms the basis for potential collaboration with other junior or mid-tier companies, where we would exchange projects for cash, shares, and a commitment from the partner to carry out a work program. Given the current market conditions, many junior companies are facing constraints, either due to stretched resources or a lack of capital, limiting their ability to engage in such collaborations.

Our efforts to generate additional projects have faced challenges in this market environment. However, we are currently working on a program that holds promise. This program aims to bring added value not only to Noble but also to Canada Nickel. We have identified satellite projects associated with Canada Nickel's operations, and the project we have optioned to them has the potential to generate accretive value for both Noble and Canada Nickel. This collaborative approach positions us strategically to navigate the market challenges and create value for all involved parties.

With metals prices fluctuating and gold hitting all-time highs, has Noble Mineral Exploration considered altering its focus on battery minerals?

Our strategic focus remains unchanged, centered on battery and critical minerals. The notable investments by federal and provincial governments in battery manufacturing highlight the importance of a robust feedstock supply. Projects like Crawford have become integral in addressing this need. Our commitment to this space persists, driven by the anticipation of sustained demand for these commodities, propelled by the ongoing energy transition.

How does the government support for your Ontario projects compare to those in Québec and Newfoundland?

In my experience, both Ontario and Québec are favorable jurisdictions for our projects. The key factors influencing our decisions are infrastructure and labor availability. For example, when we acquired Project 81 in Ontario, it was because we identified it as underexplored, it had access and essential infrastructure including services and supplies.

Which of your projects will you prioritize for the 2024 field season, and which is the most de-risked?

In terms of de-risking, we are particularly interested in the Boulder project, where we recently concluded a survey. It is likely to be part of a post-breakup program, potentially involving drilling. Over the past three years, we have conducted a program identifying glaciation in the area, with two trends from the northwest and northeast. An airborne program followed, revealing EM and mag targets. We plan to proceed with a spring/early summer program in the accessible area just south of Hearst, Ontario. Success here would be akin to winning the lottery—truly fantastic and exciting.

Can you provide a final message for our audience?

Our investment portfolio is poised for significant growth, with the upcoming year looking promising for both Canada Nickel and Spruce. The developments at Boulder, specifically, are worth closely monitoring as they play a crucial role in our overall strategy for success. ■



Mark Selby

CEO
CANADA NICKEL COMPANY

Can you discuss highlights from the October 2023 Crawford Nickel Project (Crawford) feasibility study?

The study results affirm Crawford's status as a world-class asset, positioning the deposit as the second-largest nickel reserve globally. If operational today, Crawford would be the third-largest nickel sulfide operation worldwide and the largest outside Russia and China. The project's NPV exceeds US\$2.5 billion with an 18.3% IRR, including the projected carbon capture and storage tax credits. We are positioned to be one of Canada's leading carbon storage operations, capable of storing over 1.5 million tons of CO₂ annually during peak production, which will last 27 years over a 41-year mine life.

Can you elaborate on the advantage of Canada Nickel's location?

The North American nickel market has demanded between 120,000-150,000 tons of nickel annually for the last 20 years. That number is set to double or triple in the next 10 years. Car companies prefer their supply chain to be located as close to auto operations as possible. Ontario is one of the few places in the world where we mine metals and produce cars, allowing us to be a part of an integrated supply chain. We are in the "Timmins Nickel District", a location we anticipate will emerge as the primary nickel supply district for the coming century.

How is the macroeconomic climate impacting nickel demand?

The current economic slowdown and high-interest rates have created a temporary lull in the battery supply chain, primarily due to decreased lithium prices. North America is the region with the highest EV demand growth globally. Nickel is the primary metal responsible for the longest-range EV batteries. In North America, where long driving distances are the norm, we expect double-digit demand growth for nickel throughout the rest of this decade. ■

Can you give an overview of developments and highlights for Magna Mining over the past year?

A huge milestone for Magna in 2023 was the closing of the acquisition of Lonmin Canada. We started diamond drilling at Crean Hill after the transaction closed, and we immediately had great success in the 101-footwall zone and the 109-footwall zone. Following this drilling success, we completed a C\$18 million financing in January of 2023, which allowed us to be fully funded for our exploration programs for 2023 and 2024.

How de-risked are the Crean Hill and Shakespeare projects, and how do they compare?

We completed a feasibility study on the Shakespeare project in 2022, so Shakespeare is a significantly de-risked project from a technical perspective. At Shakespeare, we have an approved closure plan, and the major permits for the construction of a 4500-ton-per-day open pit, mine mill, and tailings storage facility. We also have an Impacts and Benefits Agreement (IBA) in place with the Sagamok Anishnawbek First Nations, so overall the project is already significantly de-risked.

Magna is currently focusing on our Crean Hill project, as it has many of the attributes that will allow us to move rapidly towards production over the coming year, and it is a perfect fit for our longer-term growth strategy here in the Sudbury mining camp. Crean Hill is a brownfield project that only requires a few amendments to the existing closure plan, and the metallurgy is well understood. Permitting to take water should be completed before the end of 2023. We will then be able to execute advanced exploration and test mining at Crean Hill in early 2024 for a modest amount of capital, and this will be a further de-risking step for the project. Despite the troublesome equity markets at the moment, we have seen a lot of interest in our projects from OEMs and other industry players in the critical minerals space. ■



Jason Jessup

CEO
MAGNA MINING



Jamie Levy

President and CEO
GENERATION MINING

What are the recent developments at the Marathon project since we last spoke in 2022?

In the last year, we have executed a community benefit agreement with our partners, Biigtigong Nishnaabeg First Nation. Shortly after, the environmental assessment (EA) was approved, which allowed us to commence the permitting process. Finally, our closure plan as well as a species-at-risk permit were approved.

The Marathon Palladium-Copper Project is a valuable and strategic asset containing critical metals needed to support the transition to a greener economy.

What were the main findings of the updated 2023 Feasibility Study?

The Feasibility Study Update estimated a Net Present Value of C\$1.16 billion, an Internal Rate of Return of 25.8%, and a 2.3-year payback. A lot of the updates had to do with the supply chain and the current inflationary environment. We had some scope changes, including increasing the throughput from 25,000 to 27,000 t/day with a larger mill.

How do you assess the supply and demand fundamentals for palladium?

Most of the platinum group metal (PGM) projects in production globally are not profitable, except for places like Norilsk, Russia, where PGMs are a by-product of nickel mining. Should prices continue at these depressed levels, the unprofitable mines may have to stop production, which will reduce supply, thus pushing prices back up. In either case, the Marathon project has a built-in hedge as it is also a copper project.

How supportive is the government?

As part of its Critical Minerals Strategy, the federal government has put forward billions of dollars in grants, loans, and tax credits. If initiatives like the Strategic Innovation Fund (SIF) are successful, they will significantly boost the Canadian mining industry. As one of the few critical mineral projects currently going through the permitting process, we hope to take advantage of some of this support to get fully financed. ■



Russell Bradford

Managing Director
ASTON MINERALS

Can you introduce Aston Minerals?

Our flagship Edlestone project started as a gold project. Originally, when drilling for gold, we drilled over the fault and discovered nickel. The company raised A\$29.25 million in March 2022. With flow-through funding, we drilled 28,000 m on the nickel deposit. In February 2023, we announced the maiden nickel resource—a 1.044-billion-t resource, with 2.7 million t of contained nickel. In July 2023 we raised a further A\$11 million.

Can you describe the advancement of your Edlestone project?

Our project is approximately 70 km south of Timmins. We have two First Nation groups on our site. I met with the leaders of the two groups and asked for their help, which kindled a healthy relationship. We are in an environment where people understand mining, which is beneficial for advancing the project.

We call The Edlestone Project 'Boomerang' because it has the geographical appearance of one. There are three sections—gold, B2, and Bardwell. For the gold section, we

have a 1.5 million oz resource and intend to conduct laboratory work, specifically focusing on leach testing.

Our other focus is nickel, and all our nickel is sulfide. In the nickel portion, we have the Bardwell section and the B2 zone.

Can you discuss the supply and demand dynamics of nickel in the coming years?

The main country currently dictating supply is Indonesia. In Indonesia, nickel output is growing astronomically. As EVs become more popular, companies are working to produce 'passports' for their batteries, allowing insight into where the nickel was sourced.

In Canada, the growth of the processing and development of end-user facilities like car and battery manufacturing is promising. In Québec, Ford and SK on Co. announced a US\$1.2 billion cathode manufacturing facility. Since Canada aims to develop a domestic supply chain, supply needs to come from Canada. This works well for Aston's Boomerang project. ■



Kristan Straub

CEO, Canada
WYLOO

Can you comment on the highlights of 2023 at Wyloo?

On the heels of completing the acquisition of Ring of Fire Metals by Wyloo Metals, a new leadership team was introduced for our company at the beginning of 2023. Our primary focus was on redefining our strategy and identifying key priorities, particularly the development of the Eagle's Nest project in northern Ontario's Ring of Fire. As well, we continued focusing on outreach and engagement with First Nation communities in the region.

Mid-year, Wyloo Metals successfully acquired Mincor Resources with operations in Australia, becoming a global nickel producer.

In both Canada and Australia, we envision developing processing facilities tied to our respective projects and operations with the objective of producing the cleanest IRA-supplied low-carbon nickel. In Canada, the Eagle's Nest project represents a generational opportunity to supply critical minerals like nickel and cobalt to the battery electric vehicle manufacturing sector in North America.

Recently, Wyloo announced the sus-

pension of operations in Western Australia, due in part to slumping nickel prices. This reflects a current trend in the nickel space, and this decision was made to preserve resources and opportunities for the future.

What are your thoughts on the current state, and significance of, the Northern Road Link project?

This link is essential for economic development for both First Nations, who are leading the environmental assessments. In 2023, the terms of reference for the NRL were approved, marking a significant step towards their shared goal of regional development and self-determination.

Can you outline the next steps for the Eagle's Nest project?

In 2024, we will ramp up technical definition work and launch an updated feasibility study to further advance the project. Our unique approach involves First Nations as co-leaders in assessments, permitting, and business opportunities, setting a new industry benchmark for sustainability and community engagement. ■



Greg Ferron

President and CEO
PLATINEX INC.

Can you give an overview of Platinex in Ontario?

Our original asset, the Shining Tree project, is now a part of the South Timmins Mining Joint Venture, in collaboration with Fancamp. Our flagship project, the W2 Copper-Nickel-PGE project, located 50 km west of Ontario's Ring of Fire, controls a significant part of the Oxford Stull Dome Complex. W2 is a layered mafic-ultramafic Lansdowne House Igneous Complex ("LHIC"), which is highly prospective for copper-nickel, platinum group element, and chromite deposits. We are currently conducting a resource review on the historical drilling. Recently, we received exploration permits for the W2 project after months of close work with the First Nations and the Ministry of Mines. Once the resource review is complete, we will commence drilling.

Finally, we control a major underexplored greenstone belt, known as Muskrat Dam, with a focus on lithium and rare metals. Our strategy here is to buy up big greenstone belts, expand the resources, and exit through

a sale of the asset, similar to what we did with the Shining Tree project.

What is the operating environment like in Ontario compared to other jurisdictions?

Ontario benefits greatly from the Ontario Focused Flow-Through Share (OFFTS) Tax Credit, as well as good infrastructure and many major mining camps and operating mills.

The Canadian markets have generally always led global finance, but recently we are seeing a lot of Australian investors and corporates in Ontario and elsewhere, who are increasingly supportive of juniors when compared to their Canadian counterparts. I also think the Canadian banks have been overly restrictive of supporting investment into junior mining and energy. The Ontario government has made exploration grants recently (OJEP) for two of our projects which is a positive step for Platinex. Soon commodities prices will reflect the steady long-term global demand and the lack of immediate supply in safe jurisdictions and ultimately, we will experience major inflows of capital into the sector. ■



Toronto's Global Reach

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Allied Gold's decision to list on the TSX underscores Toronto's position as a leader on the global stage, thanks in part to its seamless connection to the large American investor base looking to access global mining equities.

”

Dean McPherson
Head, Business Development – Global Mining
**TORONTO STOCK EXCHANGE AND TSX
VENTURE EXCHANGE**

GBR Series • ONTARIO MINING AND
TORONTO'S GLOBAL REACH 2024

Image courtesy of Barrick Gold



Toronto's Global Reach

Mine the mines afar, mine the markets in Toronto

The latest data available from Natural Resources Canada shows a total of 1,412 Canadian mining and exploration companies possessed Canadian Mining Assets (CMAs) valued at C\$285.8 billion in 2021. Of these companies, 748 had CMAs located abroad worth C\$195.9 billion. Canadian companies were present in 96 foreign countries in 2021, and foreign assets abroad accounted for about two-

thirds of the total value of CMAs. Additionally, around 40% of the world's public mining companies are listed on the TSX and TSXV. For years, foreign mining companies and international investors worldwide have been drawn to Ontario, thanks in part to the numerous Foreign Investment Promotion and Protection Agreements and Free Trade Agreements Canada has in place with other nations.

Gold

The spot price of gold rose from lows of around US\$1,100/oz in the summer of 2018, to record highs above US\$2,000/oz in May 2023. Sanctions on Russia, de-dollarization, and talk of a potential recession in the USA may all have contributed to gold's meteoric rise over the past few years.

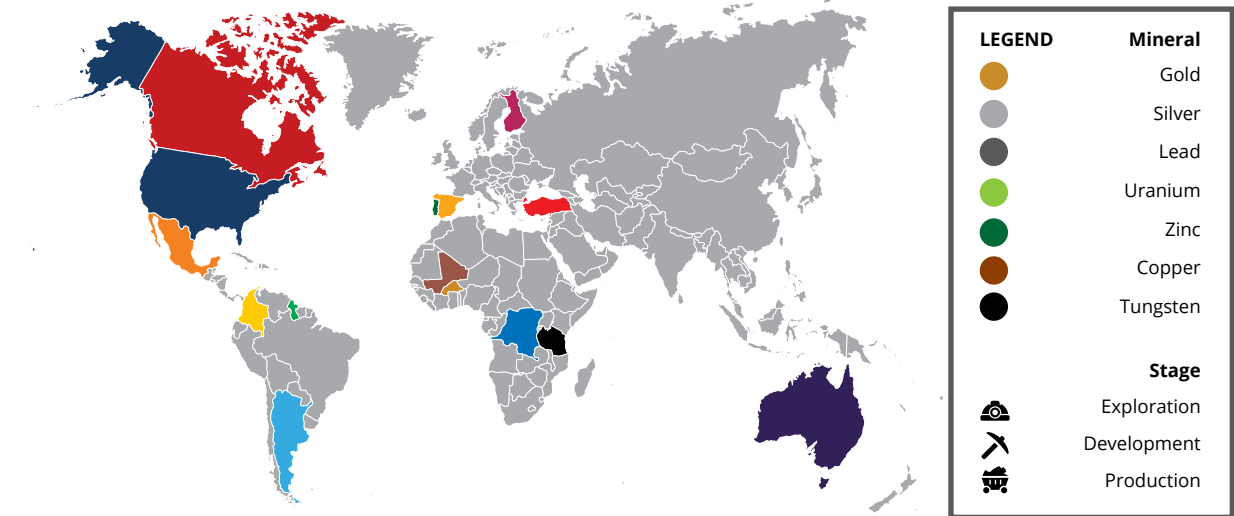
Ontario's juniors have been venturing south in search of the next big gold deposit. Guyana is one of the fastest growing economies in the world due to the ongoing development of its oil and gas sector with the International Monetary Fund (IMF) stating it grew by 62% in 2022, and that it was projected to add another 38% in 2023. Due to the Commonwealth Caribbean Countries Tariff (CARIBCAN) – an economic and trade development assistance program for Commonwealth Caribbean countries established by Canada – 94% of all Caribbean exports to Canada enter duty-free. Cognizant of this, Toronto-based junior G2 Goldfields has been exploring for gold in the mineral-rich Guyana shield. G2 Goldfields released a maiden resource estimation in April 2022, indicating a combined resource of 1.2 million oz at just above 9 g/t at its flagship Oko project. The Guyanese government has been supportive of extractive industries, with giants like ExxonMobil investing billions of dollars in offshore oil projects. Although mining companies are unlikely to match the oil majors in spending, they do bring other benefits to the region, as Dan Noone, CEO of G2 Goldfields explained: "The oil sector tends to be less labor-intensive, primarily relying on skilled imported labor, unlike mining, which has the potential to generate numerous jobs for

Torex Gold
RESOURCES INC.

torexgold.com

TSX | TXG

Toronto's Global Reach Projects



CANADA	USA	COLOMBIA
Barrick Gold	Barrick Gold	Quimbaya Gold
Agnico Eagle	McEwen Mining	
Alamos Gold	Argonaut Gold	
McEwen Mining	Seabridge Gold	
IAMGOLD		
Seabridge Gold		
Baselode Energy		
Purepoint Uranium		
Denison Mines		
MALI	MEXICO	TURKEY
Barrick Gold	Torex Gold	Alamos Gold
IAMGOLD	Alamos Gold	
	Argonaut Gold	
	Silver Storm Mining	
DRC	ARGENTINA	SPAIN
Barrick Gold	Barrick Gold	Almonty Industries
	McEwen Mining	
BURKINA FASO	TANZANIA	PORTUGAL
IAMGOLD	Barrick Gold	Almonty Industries
AUSTRALIA		
Agnico Eagle		

* This infographic showcases Toronto-headquartered companies featured in this report with operations outside of Ontario.

the local population. The Guyanese government reports that over 40,000 people are employed in mid-scale mining in Guyana."

Further west, another Toronto-headquartered junior, Quimbaya Gold (Quimbaya), is exploring in the Segovia region of Colombia. Colombia, being a relatively underexplored and less mature mining jurisdiction compared to some of its South American

neighbors, is already home to many Canadian producers. This is likely thanks to the Canada-Colombia Free Trade Agreement, ratified in 2011, and the Framework for Cooperation in Natural Resources, signed by Natural Resources Canada and Colombia's Ministry of Mines and Energy in 2016 at the PDAC convention in Toronto. Quimbaya has now amassed over 40,000 ha of property, including Qui-

mbaya's flagship Tahami project, adjacent to Canadian producer Aris Mining's operating gold mine. Quimbaya's CEO, Alexandre P. Boivin, is confident Quimbaya can replicate the success of its Canadian neighbors in Segovia: "I have noticed that the people who have success in Colombia always have certain traits in common. Take the teams behind Aris Mining and Collec-



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With US\$508 million left to spend on the Media Luna project south of the river, we have a strong, cash-producing asset at ELG that is financing the construction of our future.”

Jody Kuzenko

President and CEO
TOREX GOLD RESOURCES

Can you discuss Torex's performance in 2023?

At El Limón Guajes (ELG) we crossed 10 million hours worked without a lost time injury for the third time since 2020. In September, we celebrated the production of 3 million oz since beginning production and achieved annual production guidance for the fifth consecutive year, supported by record mining and milling rates that exceeded 13,000 t/day. The Mexican peso was strong, which impacted production costs; however, our balance sheet remains very healthy. With US\$508 million left to spend on the Media Luna project south of the river, we have a strong, cash-producing asset at ELG that is financing the construction of our future.

Media Luna is tracking well to our schedule and capex plan. At the end of Q3, Media Luna was 50% complete, and we were 70% committed in terms of spending. We made excellent progress in 2023 de-risking the project; for example, in November we secured the final permit required for the operational phase of the project, allowing us to deposit slurry tailings into the depleted Guajes Pit. Breakthrough of the Guajes Tunnel took place in December, three months ahead of schedule, and first concentrate production is still expected in Q4 of 2024. The maiden reserve on Media Luna showed 3.3 million oz in reserve, extending the mine life until 2033; however, the magnetic anomaly has only been a third drilled off, so we expect to be there far into the future.

How will copper play into Torex's strategy going forward?

Copper represents approximately 20% of the forecast life of mine revenue, with the percentage increasing as Media Luna ramps up. We expect to produce 45 million lb/y of copper concentrate.

What is Torex's stance on Mexico's regulations and the creation of new international standards?

I believe the spirit of the new mining reforms is well intended. With respect to mining concessions, I understand that the government has a concern with mining concessions that sit claimed and idle rather than developed, tying up the country's mineral assets without generating tax revenue, national wealth, or jobs. I also believe the government is well intended in measures to ensure companies have the financial means to cover closure obligations, to consult with communities and Indigenous peoples, and to address water usage in water-scarce areas.

In terms of international standards, the issue is that there are just too many of them. I am encouraged by recent efforts by the World Gold Council, ICMM, the Mining Association of Canada and Copper Mark to consolidate a single standard for mining companies that provides assurance that the mining industry is holding itself to a high standard when it comes to responsible mining.

How does Torex develop culture?

We want to build a culture where people come to work and willingly give the best they have. For example,

our crews at the Guajes Tunnel are developing at a rate of 8 m per day; they are a group committed to a goal, who understand its significance to the business, and show up every shift to willingly give their best.

Why is it important for women to lead mining companies?

I often think of the adage 'you can't be what you can't see'. Women occupying leadership roles creates a sense of "I can do that too" for other women, opening the aperture for them to strive towards unexplored possibilities. Women typically have collaborative leadership styles; gone are the days of the 'command and control' style of leadership and in the complexity of the world today, collaboration is necessary. We need to attract more women into the mining sector – and not just traditional roles like communications or HR.

What are Torex's priorities going forward?

Our top priority is to bring Media Luna online safely, with commercial production by Q1 2025. ELG and Media Luna form our overall Morelos property, and we want to continue to optimize and extend the life of that asset through strategic mine plans and an aggressive drilling program so that Morelos continues to be our flagship asset that can be used as a platform for growth through intelligent M&A. We endeavor to keep our balance sheet in excellent condition. Finally, we are looking to retain the talent we have and attract new talent to support us as we grow in Mexico and beyond. ■



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Silver Storm has a near-term production asset, La Parrilla, and an advanced stage exploration project, San Diego, both located in the prolific mining locale of Durango State, Mexico.”

Greg McKenzie

President and CEO
SILVER STORM MINING

Can you introduce Silver Storm Mining, previously Golden Tag Resources, to our audience?

Silver Storm has a near-term production asset, La Parrilla, and an advanced stage exploration project, San Diego, both located in the prolific mining locale of Durango State, Mexico. After being appointed CEO in mid-2020, we hired a new management team, recapitalized the company, and commenced exploring our first project, San Diego. San Diego hosts over 210 million oz of indicated and inferred silver equivalent resources. We have successfully executed a couple of drill programs to add to that resource.

An opportunity to create value for shareholders came with the acquisition of La Parrilla from First Majestic Silver in August 2023. The transaction resulted in what I describe as a partnership as First Majestic became our major shareholder, owning about 41% of Silver Storm. La Parrilla was First Majestic's first silver mine; they grew their US\$2 billion company in-part by bootstrapping the cash flow from La Parrilla to buy and grow other assets. Historically, La Parrilla produced over 3 million oz/y of silver equivalent and was always very profitable. First Majestic put La Parrilla on care and maintenance in Q4 2019 due to low commodity prices together with refocusing their resources on their larger mine, San Dimas. Nonetheless, it is a fantastic asset, and perfectly sized for us. We intend to put La Parrilla back into production in the next 18 months, at a 3 million oz/y run rate. We expect a return to its previous profitability, meaning it will become an excellent cash generator for us.

What is the infrastructure and environment like at the La Parrilla and San Diego mines?

There are daily connections through Dallas and Mexico City to Durango City, the state capital. La Parrilla is 45 minutes away from Durango City and San Diego is about one hour away in the opposite direction.

La Parrilla was in production for ~15 years. We estimate the replacement value of the in-place infrastructure to be greater than US\$150 million. There is a 2,000 t/d processing plant. The oxide leaching plant can produce doré bars, which improves profitability by direct selling metal to the off-takers and refiners. Although La Parrilla was last operated in Q4 2019, the care and maintenance program was executed very well. The mine will be a relatively low capital restart for us and there is even a partial underground mining fleet that remains onsite.

How have the supply and demand fundamentals for silver changed since First Majestic closed La Parrilla in 2019?

Most silver mines in Mexico are polymetallic, but among them La Parrilla is relatively unique: it produces 2/3 silver and the other 1/3 is split evenly between lead and zinc, there is also a bit of gold included. With higher silver prices and a greater focus on green electricity and the circular economy, we expect an increasing amount of silver will be used industrially, granting us a great opportunity to supply an expanding market. In 2022, the silver deficit was over 200 million oz. The dearth of investment in silver pro-

duction and silver mines in the recent past is notable. We expect the deficit to continue to grow, leading to higher commodity prices going forward.

How do you view Durango State as a jurisdiction?

Durango is a great jurisdiction to work in. It has a near 500-year mining history with a well-established mining culture, highly skilled labour and 23 operating mines. We have good communication with local stakeholders; they look forward to La Parrilla being back in production and once again being a significant employer providing hundreds of jobs. Our team is almost entirely Mexican.

Why should someone invest in Silver Storm Mining?

We are actively advancing both projects and there is much value to be brought to the market in the coming 6-12 months. The company operates in an attractive jurisdiction with good access to capital and stakeholder support. A 7,000 m drill program at La Parrilla is underway to expand the inferred resource base in proximity to existing underground development and infrastructure. We will follow with a 10,000 m program, fine-tuned based on results from the first phase. Concurrently, we will complete the technical work to restart the La Parrilla mine. If La Parrilla achieves milestones similar to that under First Majestic, we will generate significant cash flow going forward. Our San Diego deposit has over 210 million oz of silver equivalent resources with upside growth. Our current market cap provides a good entry point for new shareholders. ■



Rob McEwen

Chairman and Chief Owner
MCEWEN MINING

Can you provide an overview of McEwen Mining's performance in 2023?

In 2023, we successfully reduced our debt by 39% to US\$40 million. Production increased by approximately 16%, marking the first time we met production guidance in three years. We also executed fundraising, securing about US\$16 million in flow-through financing. Exploration at our Fox Complex continued with US\$14 million spent last year, and we plan to allocate about US\$7 million for exploration this year. Overall, operations generated positive cash flow, and both production and costs showed improvement.

Can you update us on the main developments at the Fox Complex in 2023?

We are advancing on a ramp at our Stock deposit, facilitating a transition from the Froome mine. This move is advantageous as the Stock deposit is situated next to our mill, eliminating the need for rock transport, and its softer composition allows for increased throughput. These improvements not only positively impact pro-

duction but also considerably extend the overall lifespan of the mine. Additionally, in Mexico, we acquired at a favorable price a used process plant from Argonaut. Our goal is to assemble and have the plant operational by the end of this year.

Furthermore, we have submitted an environmental permit application and are anticipating a decision by the middle of 2024. This expected approval is crucial for expediting the advancement of the project.

Given your recent fundraising success, is an IPO for McEwen Copper still under consideration?

The IPO is still in the works. We have raised a significant amount, giving us flexibility and eliminating the need for a rushed market entry. Feeling confident about our financial position, we believe the cash we have raised already will take us through to our feasibility study at Los Azules. We currently have around US\$90 million in cash and 20 drills actively working on the property for infill drilling and technical preparations for the feasibility study. ■

Can you introduce G2 Goldfields and its projects in Guyana?

Our history in Guyana dates to 2019, marked by our initial discovery on the Oko project. Subsequently, we released a maiden resource estimation in April 2022, indicating a combined resource of 1.2 million oz Au at just above 9 g/t. Notably, our exploration efforts have unveiled additional zones such as Ghanie Central and South, underlining the vast potential of the region. The area we operate in has a rich history dating back to the 1870s gold rush, and it holds promise for establishing a thriving mining district.

What is Guyana like as a mining jurisdiction?

In terms of mining, Guyana is best described as an emerging nation with significant potential. Guyana's history boasts a rich mining heritage, and there is a growing trend of new discoveries. The Guyanese government has been supportive and accommodating.

How does G2 Goldfields approach ESG in Guyana?

We believe in leaving the environ-

ment in a better state than we found it each day, and this philosophy guides our decisions. While operating in more remote areas of Guyana can present challenges, our overarching objective is to minimize our environmental footprint, preserve the ecosystem, and enhance the well-being of local communities. Our approach is supported by well-defined processes and procedures that ensure sustainability is not merely a goal but a measurable and ongoing commitment.

Do you have a final message?

Our primary focus over the next 12 to 18 months revolves around expanding our high-grade resources. We are particularly keen on projects with low capital expenditures, and we believe high-grade mines equate to a rapid payback and substantial value creation for our shareholders. Our unwavering commitment to exploration and our high-grade deposits position us for success, not only as a mining company but as a key contributor to the development of a thriving mining district in Guyana. ■



Rudi Fronk

Chairman and CEO
SEABRIDGE GOLD

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Recognizing that an ounce of gold is worth more in your pocket than in the ground, we are now advancing to the second phase of our strategy by looking to partner our giant KSM project with a major mining company.

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Can you please introduce Seabridge Gold and provide a rundown of the highlights of 2023?

Seabridge Gold was founded in October 1999 with the goal of creating a leading investment platform to capitalize on very low gold prices. Over the past 24 years, our company has delivered exceptional performance, with our share price increasing by over 5,000% against the backdrop of a 500% increase in the price of gold during the same period. This outperformance was achieved by our ability to grow ounces in the ground faster than shares outstanding. Today, with over 2 oz of gold in the ground per common share, Seabridge leads the industry in ounces of gold per common share.

Recognizing that an ounce of gold is worth more in your pocket than in the ground, we are now advancing to the second phase of our strategy by looking to partner our giant KSM project with a major mining company that possesses the technical, financial, and social skills to build and operate KSM. To this end, in 2023 we initiated a formal KSM joint venture process to secure a partner, while at the same time continuing early site construction to ensure our permits remain valid for the life of the project.

What was the strategy behind the US\$150 million sale of an NSR royalty in May 2023?

In addition to its size, capital efficiency, and location, what sets KSM apart from other large undeveloped gold/copper projects is its environmental approvals and construction permits in hand. However, to ensure that the approvals remain in place for the life of the project, KSM needs to be Substantially Started by July 2026.

In 2021 we decided to start early-site construction activities to ensure that we achieve a Substantially Started designation. We have now raised US\$375 million in two secured note transactions from Sprott Royalties without share dilution. Both of the notes issued to Sprott and their partners will convert into royalties at commercial production.

By the end of 2023, we spent in excess of C\$400 million on the construction of roads and bridges, camps, power, and fish habitats. We filed our Substantially Started appli-

cation with the government of British Columbia in January 2024.

What are the biggest challenges you have faced in developing the KSM project?

The biggest challenge in developing KSM is its immense scale. With over 11 billion tons of economic mineral resources, coupled with a projected construction cost of US\$6.4 billion, there is a limited number of potential partners capable of building and operating the mine. Thus, we need the right JV partner.

Another challenge is the regulatory process. We commenced the environmental assessment (EA) process in early 2008 but did not achieve final approvals until late 2014. The EA process is time-consuming and expensive.

What are Seabridge's priorities for 2024?

Firstly, we are focused on securing the 'Substantially Started' designation for KSM, which is critical to maintaining our permits throughout the project's duration. We submitted our application for this designation in January 2024.

Secondly, our goal is to secure a JV partner for KSM. Our objective in a JV is to maintain a meaningful interest in the project while minimizing our capital exposure. In Q3 2023 we had five large mining companies visit KSM and discussions are advancing with several of these companies. To facilitate our JV process, we have engaged RBC Capital Markets as our advisor.

Finally, our commitment to exploration remains steadfast. We have three promising early-stage projects in our portfolio: Iskut in British Columbia, 3 Aces in the Yukon, and Snowstorm in Nevada. Each of these projects has the potential to be a game-changer for our company.

In conclusion, if you believe the price of gold is set to go higher, or you are just looking for portfolio insurance, Seabridge common shares have a 24-year track record of outperforming the gold price and other gold equities when the price of gold is rising. I personally have over 90% of my net worth invested in Seabridge common shares, underscoring my confidence in the company's future and the value we intend to deliver to our shareholders. ■

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tive Mining; they both have very similar backgrounds and seem to have a recipe for success; we are the next one.”

Further to the north, in Mexico’s Sonora state, Alamos Gold’s Mulatos District produced 53,900 oz of gold in Q3 2023 and 164,700 oz year-to-date, nearly double the prior year period. Alamos president and CEO John McCluskey shared the company’s plans for the Mulatos District: “Unlike the oxide heap leach resources originally developed at Mulatos, we now have higher-grade sulfides that will require milling. We are preparing for a new phase of development for the Mulatos project, which will take some investment from the company to bring to fruition.”

In recent years, Mexico’s president López Obrador has been pushing through policies to reassert state control over natural resources. In May, Mexico reformed its mining regulations which included changes such as requiring all mining concessions to be awarded under a public bidding process, and a reduction in the term and scope of mining concessions, among others. The reform drew criticism from various industry leaders, and Canadian Trade Minister Mary Ng expressed her concern about the changes. Although the reforms have not impacted Alamos’ Mulatos District, they are likely to impact Canadian players embarking on new mining projects. McCluskey shared his thoughts on the reforms: “In terms of new projects, I do not see us doing much outside the Mulatos area until there is clarity as to the associated risks of doing business there going forward. If you raise taxes and the treatment of certain costs,

you are sending a signal to the market you do not want further investment in the sector. The market will respond to those signals, which is what we are seeing right now.”

Toronto’s reach extends to far-flung corners of the world, but sometimes, there are riches to be found much closer to home. For almost 25 years, Seabridge Gold (Seabridge) has been working on the giant KSM project in British Columbia. KSM is claimed to be the world’s largest undeveloped gold project by resources. Having secured its environmental approvals and spent over C\$400 million on construction and infrastructure, Seabridge is now searching for a partner to help bring this behemoth project to production: “The biggest challenge in developing KSM is its immense scale. With over 11 billion t of economic mineral resources, coupled with a projected construction cost of US\$6.4 billion, there is a limited number of potential partners capable of building and operating the mine,” shared Rudi Fronk, chairman and CEO, Seabridge Gold.

Silver

The silver spot has also significantly increased over the past five years, reaching highs of around US\$25/oz in mid-2023. In light of this, Silver Storm Mining, previously Golden Tag Resources, has been working on bringing its past-producing La Parrilla silver project in Durango State, Mexico, back into production. In choosing to re-start a past-producing mine, companies like Silver Storm are often able to re-use existing permits and licensing, potentially allowing them to bypass some of the hurdles introduced by the reforms that Canadian mining companies are likely to face going forward. Mexico is the largest producer of silver – an increasingly important metal for its use in solar panels, electric vehicles and 5G telecoms networks. Historically, La Parrilla produced over 3 million oz/y, until its previous owners, First Majestic Silver, put the mine on care and maintenance due to low commodity prices and its desire to focus on its larger mine, San Dimas. With silver prices significantly higher, Silver Storm saw an opportunity and acquired La Parrilla in August 2023, aiming to put the mine back into production in 2025. A 7,000 m drill program is underway to expand the inferred resource base in proximity to existing underground development and infrastructure. “Although La Parrilla was last operated in Q4 2019, the care and maintenance program was executed very well. As such, the mine will be a relatively low capital restart for us and there is even a partial underground mining fleet that remains onsite,” shared Greg McKenzie, president and CEO, Silver Storm Mining.

Uranium

Ontario Premier Doug Ford’s government has been enthusiastic about nuclear power, announcing its desire to nearly double production at the Bruce Power plant and conducting feasibility studies to refurbish Toronto’s aging Pickering nuclear plant. Canada’s only uranium refinery is located at Blind River, Ontario, where uranium ore concentrates from Canada and abroad are refined to produce uranium trioxide. Ontario’s refineries need not look far to fuel these future reactors, as Canada is endowed with the fourth largest uranium reserves in the world, after those

of Australia, Kazakhstan and Russia. Cognizant of this fact, Latitude Uranium, headquartered in Toronto, has had a busy year investing around C\$8 million in 18 drill holes, including at its flagship Angilak project in Nunavut. Latitude Uranium’s CEO, John Jentz, explained why he took the approach of exploring in Nunavut, rather than more established uranium mining destinations like Saskatchewan’s Athabasca basin: “While the Athabasca region offers even higher grades, it is a challenging and costly environment for mining. Angilak falls somewhere in between; it is high-grade, but not quite as high as Athabasca.”

Saskatchewan’s famous Athabasca basin is already home to the big Canadian uranium producers, Cameco and Orano, who rank among the largest producers of uranium globally, with Cameco’s Cigar Lake mine being responsible for 14% of the world’s total uranium production in 2022, making it the largest-producing uranium mine globally. Baselode Energy, another Toronto headquartered junior, has been exploring the Athabasca basin looking for near-surface, basement-hosted, high-grade uranium deposits, avoiding the sandstone that is prevalent in the Athabasca basin.

Uranium mining is an integral part of northern Saskatchewan, to such an extent that the provincial government established a small town named ‘Uranium City’ to service the mines in the region. “Canadian uranium mining is different from Saskatchewan uranium mining. Uranium is ingrained in Saskatchewan mining, nothing needs to be re-invented here, everything has been in place since the 1950s,” said James Sykes, Baselode Energy’s president and CEO.

The Uranium spot price has more than doubled in the last three years, and Toronto-based Denison Mines has been working hard to take advantage of the bull market, raising US\$55 million in October 2023 to fund the development of its flagship Wheeler River project, the largest undeveloped uranium project in the eastern portion of the Athabasca Basin. After a five-year de-risking process, Denison Mines announced the results of its feasibility study of Wheeler River’s Phoenix deposit in June 2023. “We

pivoted to engineering design efforts, focusing on readying for project execution and early procurement. It is an exciting time for Denison Mines, as a final investment decision on Phoenix approaches,” shared David Cates, president and CEO, Denison Mines.

Toronto’s juniors are rushing to take advantage of the renewed interest in uranium and ramp up their activities. Latitude Uranium is no different, having recently announced a merger with ATHA Energy Corp and 92 Energy. However, the record uranium spot prices come with a caveat; most uranium is frequently traded through long-term contracts directly between producers and utilities and lacks a centralized exchange, unlike many other commodities.

Purepoint Uranium (Purepoint) will spend the 2024 field season drilling at its flagship Hook Lake JV project with Cameco and Orano, following up on promising results from the 2023 season. Purepoint’s president and CEO, Chris Frostad, is optimistic that spot and contract prices will continue



Lewis Black
President and CEO
ALMONTY
INDUSTRIES

“The value of sourcing materials from trusted, regulated, and transparent locations cannot be understated.”

SILVER STORM
— MINING —

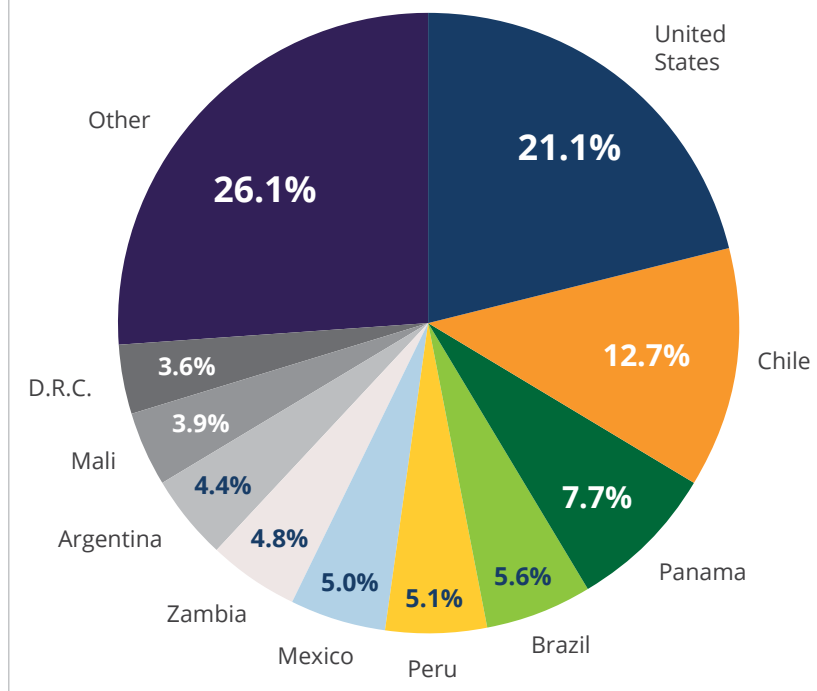
Unearthing Hidden Opportunity

La Parrilla Project, Durango
Hosts ~\$150M of in-place infrastructure including a 2,000 tpd mill and five underground mines. The complex collectively produced 34.3 million silver-equivalent ounces between 2005 and 2019. 7,000m infill and step-out drill program underway returning strong results.

San Diego Project, Durango
One of the largest undeveloped silver-zinc projects in Mexico, with significant resource expansion potential. Higher-grade structures (>300 g/t Ag₂Eq) could potentially be processed at La Parrilla.

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Percentage of Canadian Mining Assets (CMAs) abroad, by country



Source: Natural Resources Canada

their upward trend but cautions that uranium is quite unlike other commodities: “While it is an exciting time to be in uranium, it is crucial to note that, although the spot price has just surpassed US\$100/lb, the long-term price remains significantly below the threshold required to activate new mining projects. To trigger mine development or construction, the long-term contract price needs to sustainably reach and stay above the US\$80/lb range.”

Geo-political turmoil, while detrimental for some of Ontario’s juniors, creates opportunities for others. The 2023 Niger coup and the ongoing war in Ukraine have forced buyers away from the usual uranium suppliers like Russia. With the USA struggling to incentivize domestic uranium production, the number of stable uranium jurisdictions is narrowed down even further. “As geopolitical instability persists, there is great potential for Canadian supply to be seen as a premium source,” pointed out Cates.

With geopolitical factors increasingly jeopardizing uranium supply chains around the world, buyers are unlikely to be able to be as sensitive as in the past: “The current concern for utility buyers is not price; it is about securing a stable supply. These dynamics collectively maintain upward momentum and support the buoyancy of uranium prices,” explained Frostad.

With the number of viable suppliers dwindling, and the push for green energy growing stronger, the fundamentals for a uranium bull run seem to all be in place – but uranium is not gold, and it presents its unique challenges for juniors seeking investment. “Marketing uranium projects can be challenging due to fears surrounding nuclear power. Effective communication and community education are key to addressing these concerns,” explained Jentz.

Across most commodities, it is apparent that the fallout of the Covid pandemic and the current vola-

tile geopolitical situation in many regions is pushing buyers to emphasize stability and safety when deciding where to purchase their minerals. For Toronto-headquartered tungsten producer Almonty Industries, which operates mines from Portugal to South Korea, selecting safe jurisdictions is a core component of their strategy: “When it comes to the jurisdiction of our mines, we place high importance on transparent territories with a strong rule of law. We favor democracies, even though they come with regulations and occasional challenges. Our customers value the transparency democracies offer, and it simplifies the supply audit process,” shared Lewis Black, president and CEO, Almonty Industries.

Toronto’s miners and prospectors seeking to make their fortunes abroad know a stable jurisdiction when they see one, as their home province is renowned worldwide for its stability and equitability. ■

Can you discuss the major developments at Denison Mines since we last spoke in 2020?

In 2020, uranium prices were in the US\$30/lb U3O8 range. It has accelerated in the last 18 months, on top of progressive increases from the last few years. Today, the spot price is in the US\$74/lb range. We were active with our assets since before things improved. Between 2022 and 2023 we completed technical de-risking for the Phoenix In-Situ Recovery (ISR) project, including a variety of laboratory and field tests, concluding with a pilot operation that was permitted, constructed, commissioned, and operated during 2022.

Can you comment on the current macroclimate impacting uranium prices?

Uranium is generally a long-term contract business, which makes for long cycles. Production curtailments led to the drawdown of inventories in past years, setting the stage for the price to increase. The recent coup in

Niger and the war in Ukraine destabilized the current and future reliance on supplies from Russia and countries where there is a perceived geopolitical risk. Kazakhstan is the largest supplier of uranium in the world, but it is stuck both physically and politically between China and Russia—both have significant needs and will procure much of their uranium from there. As a result, there was significant contracting interest from potential projects in Niger. The recent coup undoubtedly drove the Western market to focus even more on North American sources of supply. Incentivizing production from the USA has been challenging, given the small scale and high costs of idled projects; this makes the potential for low-cost and large-scale production from Canada very attractive to utility fuel buyers. As geopolitical instability persists, there is great potential for Canadian supply to be seen as a premium source, thus positioning companies developing and exploring in Saskatchewan in the right place. ■



David Cates

President and CEO
DENISON MINES



James Sykes

President and CEO
BASELODE ENERGY

Can you introduce Baseode Energy?

Baseode Energy is a uranium exploration company with a focus on making a discovery in northern Saskatchewan’s Athabasca basin, which is home to the highest-grade uranium in the world. We launched publicly in June 2020 and we made a discovery, named ACKIO, in our first drill program.

Our ‘Athabasca 2.0’ thesis is quite different from those of our peers, as we are looking for a near-surface, basement-hosted, high-grade uranium deposit whereas they are generally looking within the sandstone of the Athabasca basin. There are technical issues with developing a mine underneath sandstone, as it is spongy and holds a lot of water.

The drill assay results we recently released were from the deepest parts of ACKIO that we drilled in 2023. Two of the holes intersected the best results at depth. They show the structural system goes deeper than we originally thought. We have been focusing on the ‘low-hanging fruit’, the material above 200m, but now we know we must go deeper.

What are your plans for Baseode Energy in the coming years?

We are going to keep exploring; that is what we do best. We want to discover more uranium and make Baseode Energy the best uranium exploration company in the world. We are fully funded to have an excellent 2024 and are planning to grow four of our projects, and we hope any one of them will yield an additional discovery. ■



John Jentz

CEO
LATITUDE URANIUM

Can you introduce Latitude Uranium?

Latitude Uranium was established two years ago when it spun off from Consolidated Uranium. Initially, our projects were situated in Labrador and the company’s name was Labrador Uranium. We then expanded our operations to Nunavut after acquiring the Angilak project from ValOre Metals, this expansion led to a name change to Latitude.

Can you give us an overview of Angilak?

Angilak is a significant project for us, boasting a historical resource of 43.3 million lbs of uranium at a leading grade of 0.69%. It resembles a traditional hard rock, narrow vein deposit, making it relatively straightforward to mine. Our primary focus for 2023 and 2024 is expansion of the mineralization. To that end, we invested around C\$8 million in 18 drill holes in 2023, which yielded some exciting results.

It is worth noting that we have not even begun to explore the other three zones, let alone the rest of the highly prospective property. So, the potential for further development is quite promising.

What are your plans for 2024?

In 2024, we plan to execute a more substantial drilling program than in 2023, with the primary goal of further developing our resources. We are eager for people to see the forthcoming assay results from the Angilak project. ■



Chris Frostad

President and CEO
PUREPOINT URANIUM GROUP

Can you provide an overview of Purepoint Uranium’s 2023 field season and plans for 2024?

Purepoint Uranium has been actively exploring nine uranium projects in Canada’s Athabasca Basin for almost 20 years, including key JV projects with Cameco and Orano, two of the largest uranium suppliers in the world. The company also holds a third joint venture with Foran Mining on a copper-zinc project in east-central Saskatchewan.

Our 2023 field season began with our flagship Hook Lake JV project with Cameco and Orano, revealing encouraging mineralization trends during the drill program very reminiscent of our earlier Spitfire discovery. As we enter 2024, we will be following up on the radioactivity encountered in 2023 to determine whether we are coming into a prominent area of mineralization. Additionally, the Smart Lake project, a JV with Cameco, is set for a geophysical program preparing it for our next drill program.

In the second half of the year, we will focus on the 100%-owned projects on the eastern side of the Athabasca Basin, with geophysical and drilling programs at our Turnor Lake, Red Willow, Tabbernor, and Carson projects.

Do you foresee more consolidation in Canada’s Uranium sector?

We are not expecting much consolidation at the exploration stage, however, development-stage projects might see more consolidation, as seen in the recent merger of IsoEnergy and Consolidated Uranium. ■



Equipment and Innovation

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Cities like Sudbury are even surpassing places like Colorado, Nevada and Toronto when it comes to mining technology.

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Raffi Jabrayan
VP, Business Development and Commercial Sales
EXYN TECHNOLOGIES

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Image courtesy of IAMGOLD



Ontario - A Progressive Tech Center

From pickaxes to pixels; how innovation is reshaping the future of mining

Across North America, there is a malaise threatening the mining industry: Its public perception. For Ontario, the long-term impacts could be nothing short of life-threatening. The present situation paints a dire picture: Visiting the classrooms of Ontario high schools, Marla Tremblay, executive director at MineConnect, found that for students mining means “putting on overalls and working in a dirty environment for long hours.”

Mining companies are looking to advances in technology for the solution to this problem. Ontario is home to over 1,400 mining supply and service companies, many of which are technology focused. Surveying the technology landscape during 2022, Canada’s national statistical agency found that 30.9% of mining businesses adopt advanced technologies, the highest adoption rate of any industry in Canada. These technologies are advancing rapidly: “If you look at technology from the last 50 years, we are not 50 years ahead of the linear curve, we are thousands of years ahead,” said Kevin Dagenais, CEO of Cascadia Scientific.

In 2021, Canada’s Centre for Excellence in Mining Innovation (CEMI) launched a C\$112.4 million initiative, dubbed the Mining Innovation Commercialization Accelerator (MICA) Network, to accelerate the development and commercialization of innovative mining technologies. Supporting the project, the Government of Canada’s Strategic Innovation Fund invested C\$40 million, and BHP, Vale, Glencore and Teck are all members. MICA has invested over C\$28 million in mining innovation technologies across Canada in the two years since its founding. Having secured an additional C\$30 million for the MICA in 2023, CEMI’s president and CEO, Doug Morrison shared how the MICA’s contributions to Ontario’s mining technology start-ups extend beyond just financial support: “The strategic strength of the network lies in its ability to combine the solutions provided by [its] solution providers, offering tailored answers to specific challenges. This adaptability is essential given the varied locations and climates of mining operations globally.”

Technology and innovation can address diverse challenges that face Ontario’s mining sector. “Deposits are getting deeper, meaning higher processing costs due to harder and lower-grade ore, while global demand is at an all-time high, creating tension that puts pressure on the assets that perform the mining work,” said Ash Agarwal, president and CEO of Symbioticware, that developed 4-Sight-ai, the industry’s first vertically integrated IoT and AI platform allowing companies to monitor asset health and reduce fuel use and carbon emissions.

Underground electrification

In light of the green energy transition, the electrification of diesel-powered mining equipment and trucks provides



exyn.com



Tom Di Francesco
General Manager
B&D MANUFACTURING

Sudbury is a hidden gem. The city boasts a robust economy, among the strongest in the province, with a thriving industrial sector. In my experience, the mining world feels interconnected, and Sudbury serves as a focal point.



the greatest avenue for innovation. Agnico Eagle’s Macassa mine in Kirkland Lake was the first to introduce battery electric vehicles into operations and commissioned the world’s first 50 t battery electric truck in 2020. Newmont’s Borden mine in Chapleau was the first all-electric underground mine in Canada. “We have noticed an uptick in mining companies asking us to assess the tradeoffs between BEVs, diesel vehicles, or mixed fleets,” said Morné Beukes, director of operations at BBE Canada.

Despite these efforts, the electrification of mining equipment is not widespread. Currently, only 0.5% of mining equipment is fully electric, according to McKinsey & Company. Agarwal explained: “By 2030, not much will happen from an electric fleet conversion perspective. For example, large, publicly traded mining companies will only see a 5% impact on their electrification projects by 2030.”

For Ontario’s underground miners, it is not just carbon emissions reductions that are driving electrification, but also health and safety. In 2023, Ontario regulators updated the laws around diesel exposure

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Don Duval

CEO
NORCAT

Can you share recent highlights?

Firstly, our ongoing development and deployment of our VR and AR-integrated training solutions has been well received by the Canadian mining industry with a noteworthy uptick in the adoption rate of these blended learning technologies.

Secondly, the ongoing labor market pressure in the global mining industry has continued to reinforce the importance of investing in supervisor and manager training and development. As a result, our market-leading supervisor training programs are experiencing strong growth.

Lastly, we have continued to see unprecedented demand for both our Underground Hardrock Common Core program and our bespoke content and curriculum development for mining operators and educational partners around the world.

How has NORCAT reinforced its global brand as the one-stop shop for all that is the future of mining technology and innovation?

NORCAT is the only innovation center in the world that has an operating

mine designed to enable start-ups, SMEs, and international companies to develop, test, and demonstrate emerging technologies that are poised to transform the global mining industry. 2023 was an unprecedented year as we hosted over 50 mining operators and supported close to 40 technology ventures from around the world using the mine to expedite their product development pathways with the ultimate goal of commercial growth.

What are some budding mining technologies that you find promising?

First, ore characterization technologies continue to gain momentum in the marketplace. These technologies involve sophisticated hardware and software components that provide near real-time insights that enhance a variety of activities from exploration and extraction to downstream processing and tailings management.

Next, the increasing adoption of tele-remote or autonomous mobile equipment control systems continues to not only improve productivity but also improve the health and safety of the workforce. ■

What were the major highlights at CEMI in 2023?

Over the past year, our primary focus has been on securing the second tranche of project funding, amounting to C\$30 million for the Mining Innovation Commercialization Accelerator (MICA). The independent selection process for these projects was completed in June 2023, resulting in the allocation of funds to 40 projects. An additional 80 projects, though unfunded, contribute to a collective pool of innovation. The strategic strength of the network lies in its ability to combine the solutions provided by these 40/100-point solution providers, offering tailored answers to specific challenges. This adaptability is essential given the varied locations and climates of mining operations globally.

Our Technical Showcase in November featured presentations from around 30 funded projects, alongside guest speakers, including representatives from Indigenous groups. Internally, our efforts have centered on technologies and techniques that fa-

cilitate obtaining social license to operate. Building positive relationships with local communities is essential.

What advice do you have for commercializing innovations?

The critical challenge for many companies lies in the "commercialization gap," which requires conducting field trials under authentic, real-world conditions. For those dealing with underground solutions, designated locations like NORCAT offer opportunities for practical testing.

Overall, our assistance to startups kicks in at a certain stage, specifically addressing the commercialization gap and supporting them through field trials. Our aim is to expedite the entire mining operation, eliminate long-term tailings storage, and enhance water quality through a suite of innovative technologies. These solutions are available now, and the collaborative nature of our network allows companies to join forces, creating comprehensive solutions that are more appealing and viable for presentation to mining companies. ■



Doug Morrison

President and CEO
CENTRE FOR EXCELLENCE IN
MINING INNOVATION (CEMI)



JL



JS

Jacob Lachapelle and Jaha Sohail

JL: CEO-In-Training
JS: COO
MAESTRO DIGITAL MINE

Can you provide an overview of Maestro Digital Mine's (Maestro's) performance in 2023?

JL: We have seen a remarkable increase in revenue, surpassing 120% YoY. This growth notably exceeds the typical 30% we projected. Initially rooted in the local mining sector in Sudbury, our company now generates over 70% of its revenue from international markets. This shift presented both opportunities and challenges, leading us to scale up our global support infrastructure to keep pace with the rapid expansion.

Can you outline Maestro's approach to R&D?

JS: The collaboration to integrate with Spot, by Boston Dynamics, marked a significant step in our innovation journey. Strapping our gas sensors onto Spot robots allowed us to revolutionize data collection in hazardous mine locations, prioritizing both safety and productivity. The success of this collaboration underscores our interest in integrating robotics and AI into our strategies.

In our current R&D pipeline, a notable project is Duetto. It addresses the growing challenge of data analysis by harmonizing mine ventilation and automation through preventative and smart maintenance. This not only optimizes resource allocation but also enables predictive maintenance in larger mine infrastructures.

Could you discuss the impact of the recent DPM limits in Ontario and the ongoing electrification of equipment on mine ventilation requirements?

JL: In terms of the recent legislation in Ontario, I would not view the electrification of mining equipment as a

complete solution to the challenges of mine ventilation. It is a relatively new development, and its deployment is ongoing. The full extent of the implications, especially regarding large-scale batteries underground, is not yet fully understood. EVs on the surface have shown that they pose significant health risks if they catch fire. These risks are even more pronounced in the confined space of an underground mine.

JS: The risk-to-reward ratio for underground battery use is uncertain. While it is a positive step, ensuring safety demands data and continuous production improvements, the challenge is making battery use safer in underground mines.

What are the main challenges you have faced recently?

JL: The massive 120% growth we experienced poses hurdles. Our existing supply chains, team, and output were not initially equipped to handle such rapid scaling.

JS: The industry has been grappling with similar challenges. To sustain and grow, we have adopted a strategy of scaling for continuous growth. Bringing in consultants from the Canadian and US automotive and aerospace industries has been crucial. We are also implementing lean manufacturing practices inspired by successful examples like Toyota's. This is not just limited to our internal operations but our customer-facing operations as well.

In terms of talent, we focus on placing each person in the right role for success and personal growth. Our objective is not just to fill positions but to ensure we have the right team to build and carry their departments forward. Our workforce is diverse, with 75% being international employees, repre-

senting 11 different languages. This intentional approach to hiring has been essential to our success, harnessing the power of diversity and merit.

How is the rising importance of sustainability in the mining sector impacting demand for ventilation products?

JL: Beyond being the right thing to do, complying with ESG standards is essential for accessing investment dollars. Many asset managers now require companies to align with ESG profiles or portfolios to secure investments. This financial pressure is driving mining companies to adopt practices that are not only environmentally responsible but also financially beneficial. In response to this trend, we are witnessing an increase in the adoption of ventilation control and monitoring systems. These technologies not only contribute to energy savings but also ensure compliance with ESG standards, reflecting the dual focus on environmental responsibility and financial viability within the mining industry.

How do you plan to repeat the success of 2023?

JL: Our approach involves a continuous effort to sustain our growth curve. For instance, we have sought expertise from consultants experienced in landing gear for companies like Boeing. While it might seem unconventional for a mine ventilation technology company to do so, the insights gained, especially in areas like quantity and safety, are invaluable. We believe in tapping into the knowledge of best-in-class individuals from diverse industries to guide us and ensure quality and safety as we scale up. ■



SH



MB

Stephen Hardcastle and Morné Beukes

SH: Managing Director
MB: Director of Operations
BBE CANADA

Can you introduce BBE Group to our audience?

MB: BBE Group (BBE) was founded in 1989 to address cooling and ventilation challenges in the South African ultra-deep mines. Over the years, BBE expanded globally, establishing offices in Canada, South Africa and Australia. Our service portfolio evolved, now encompassing comprehensive engineering, procurement, construction and maintenance services. This includes the construction of critical facilities such as refrigeration plants and main fan stations. BBE's Canadian office recently designed and commissioned multiple cooling plants in Canada and Mexico.

In addition to cooling solutions, we expanded our services to include heating solutions for mines operating in colder climates. Our diversification extends to occupational hygiene, emergency response, fire management, emergency preparedness, risk analysis, and various facets of the underground working environment, including radiation protection.

SH: Deeper reserves and varying climatic conditions in Canada are now making refrigeration indispensable for these mine operations. Our scope of responsibility also covers all of the Americas. We participated in projects with notable companies like Vale, Glencore, Agnico Eagle, and Rio Tinto, among others.

In Canada, some mines require both cooling in summer due to their depth and heating in winter due to the climate.

Has the uptick in battery electric vehicles (BEVs) in mines impacted the demand for ventilation?

SH: BEVs do not produce diesel particulate matter (DPM) and generate less heat than their diesel equivalents. Each mine can have unique circumstances, and ventilation systems must consider multiple factors in their design. Despite technologies like BEVs generally reducing ventilation needs, other aspects may negate some of the advantages. While BEV technology should be a considered choice for new projects, transitioning existing operations with extensive diesel equipment fleets will require careful planning.

MB: BBE is seeing an uptick in mining companies asking us to assess the tradeoffs between BEVs, diesel vehicles, or mixed fleets. Numerous older, deeper mines already have established diesel-based infrastructure in place, garages, etc., and would now require the introduction of battery charging stations.

How will the new regulations in Ontario related to exposure limits impact mine ventilation?

SH: Ontario Mining regulations have recently updated the dilution require-

ments to be more specific, recognizing the impact of newer, cleaner-burning diesel engines, fuels, and emissions controls, while reducing the exposure limit for workers to DPM. The advancements in diesel equipment have been remarkable since the introduction of the 0.06 m3/s requirement. Many of today's diesel machine engines are Tier 4F or Euro 5 compliant with dramatically reduced gas and particulate emissions. This benefits both workers and the mining companies.

These recent regulatory changes in Ontario are, in part, a catch-up acknowledging the technological strides, while also recognizing the additional health concerns. The recent adjustments in regulations in Ontario mark a positive step towards embracing more global standards. It is crucial to emphasize that while these regulatory changes represent progress, they alone cannot guarantee safety in all underground mines. BBE's experience can help our clients ensure minimal impact on operations while being fully compliant with new regulations.

What does the future look like for BBE Canada?

MB: BBE Canada envisions substantial growth on the horizon. The mining industry in the Americas is rapidly evolving, pushing mines to even greater depths. As a result, the demand for ventilation and refrigeration systems is on the rise, and we anticipate BBE playing a pivotal role in meeting these requirements. Our commitment to the Canadian market remains unwavering. Here we have established a robust presence and are engaged in several promising projects. New and existing client projects in the US are coming to fruition, and we are bolstering our capacity to deliver services in Spanish.

What truly distinguishes BBE is our global presence and adaptability. Across three continents, we possess a diverse range of skills that we can readily harness. This interconnectedness enables us to pool resources and provide holistic solutions. Our independence is a source of pride; we do not bind ourselves to any specific OEMs or equipment types. Instead, we source the best equipment that is tailored to the unique needs of each mine. ■



Paul Stephenson

Regional CEO – North America
DSI Underground

Can you introduce DSI Underground?

DSI Underground is a market leader in the provision of ground stabilization products to both the mining and construction sectors. DSI Underground is now part of Sandvik and can provide fully integrated bolting systems.

Whilst we have the strength of being a global business, we maintain a very strong regional presence. The commonality within the global mining regions allows for the transference of technologies and best practices.

In addition to our global focus, we also have a well-defined regional strategy. We aim to develop the necessary competence and capability in our chosen operational centers. These centers manufacture products tailored to meet the unique demands of their respective markets. We align our manufacturing facilities with the specific needs of customers in each geographical area.

How important is mining to DSI Underground's business?

We have a deep history of supporting the mining industry and our growth has been aligned to the specific service and support of this market segment. Our journey has been a continued focus on innovation both in ground support practices and product development, but also the alignment with our customers to drive safer working environments and operational efficiency. Our focus on Civil Construction with Tunnelling is complementary to mining and enables the transference of

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In addition to smart bolts, we are exploring LIDAR scanning to determine bolting density and ensure conformance with the mine plan.

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technologies between the two market sectors. The technologies of ground support are very similar, it is really only the life expectancy that is different.

What sets DSI Underground apart from its competitors?

DSI Underground's strength lies in its global reach, extensive R&D efforts, and commitment to embracing new technologies. We offer the broadest product range among ground support suppliers worldwide, from standard ground support to fully integrated systems inclusive of ground consolidation resin injection systems. Our distinct advantage is that, as part of Sandvik, we can explore integrating ground support with OEM equipment. This opens doors to providing end-to-end systems, enhancing operational efficiency and lowering costs for our customers. We are also investing in automation and remote bolting systems.

How has automation impacted ground support solutions?

Customers are looking for suppliers that will embrace this technology and provide strong solutions. The alignment with Sandvik now affords a unique ability to advance these solutions. These seamless solutions embrace everything from primary and secondary bolting to ground stabilization encompassing various materials. These automated systems are designed to allow ground stabilization products/systems to be simplistic in their installation but equally remotely operated.

Bolting systems can now digitally capture information about an individual bolt's installation, such as its speed at installation, its location, and the load required to break out the bolt. The next step is smart bolts with embedded sensors that capture data on load conditions or detect failures, for example. The potential integration of smart bolts with mine planning software could help in the assessment of ground support's response to various scenarios, improving safety and efficiency.

What other technologies is DSI Underground employing in ground support?

In addition to smart bolts, we are exploring LIDAR scanning, which can scan the mine to determine bolting density. This technology helps mines identify the specifics of their bolts and their density patterns, ensuring conformance with their mine plan. It also helps in cases where shotcrete is applied over the bolts, providing information about the ground support behind it.

We are also developing virtual reality training programs. These are used for training in shotcreting and some bolting processes. These 3D training programs help mines leverage technology for training purposes, reducing the need for on-site training personnel.

What are DSI Underground's plans for 2024?

We are excited about the opportunities in North America, we have made significant investments in automation and capacity to align with the market's requirements. This has afforded us the ability to significantly increase capacity and efficiency around our standard product range and equally to allow the MD and MDX products to be manufactured within Canada to support our North American business. To further support and allow full control of our core processes, we recently acquired Norgalv, a state-of-the-art galvanizing facility, which makes us self-sufficient for our coating technologies and galvanizing needs. In 2024, our focus is on continued growth, building capacities, competencies and capabilities to support our customers. ■

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limits in underground workplaces by reducing the maximum allowable level of exposure to diesel particulate matter (DPM). For Accutron Instruments, a Sudbury headquartered manufacturer that pioneered ultrasonic airflow monitoring, this change in the law could represent an opportunity: "This move brings Ontario in alignment with other jurisdictions that have similar or even more stringent requirements. We recognize that such regulatory changes will necessitate enhanced ventilation systems to ensure compliance. The demand for our products and services, particularly those addressing real-time monitoring of DPM levels, is expected to rise as mine operators strive to meet and exceed these new standards," said Chad Methe, general manager, Accutron Instruments.

Of course, eliminating diesel engines and electrifying underground fleets is an alternative, albeit potentially more expensive way, of adhering to the new regulations. However, EVs are not a silver bullet. Despite providing opportunities to reduce mine ventilation demands and providing environmental benefits, EV failure in an underground mine could be catastrophic from a health and safety perspective. EVs on the surface have shown that they pose significant health risks if they catch fire, which could be even more pronounced in the confined space of an underground mine. "The risk-to-reward ratio for underground battery use is uncertain," said Jaha Sohail, COO, Maestro Digital Mine.



Ash Agarwal
President and CEO
SYMBOTICWARE

“Historically, technology providers disappointed the industry because they did not offer solutions. Vendors transferred the burden of integration onto mining companies, resulting in failed projects.”

Cascadia Scientific CEO Kevin Dagenais developed: "No available technology will replace diesel-powered haulage equipment in the near term. For large and ultra-class haul trucks, we are probably a decade away from a fully deployable electric solution. Our tools offer a lens for companies to evaluate alternatives for immediate incremental decarbonization."

Cascadia Scientific's tool, SmartRView, resulted in average fuel savings of 15%, equivalent to 2,738 t CO2e at New Gold's Rainy River operation.

The switch from diesel-powered to electric requires a reliable and robust electrical infrastructure, especially in remote mining operations where the existing electrical grid may not support the increased electricity demand. This will likely be the case in Newmont's fly-in, fly-out Musselwhite mine, for example. The Pickering Nuclear Generating Station, responsible for 14% of electricity generation in Ontario in 2022, is set to shut down in 2025 or 2026, adding to the challenge of meeting demand. Luckily, a solution is on the horizon: "Moving to renewable sources of electricity is becoming increasingly feasible, even in off-grid environments, as the cost of battery packs is projected to decline 50% from 2017 to 2030," according to McKinsey & Company.

Ontario is due to see the opening of a few new precious metal mines in 2024, and likely many more critical mineral mines in the coming years. In such cases, there is an opportunity for mine operators to electrify from day zero, rather than going through the often difficult and expensive process of replacing or retrofitting existing diesel machinery. "We have significant greenfield projects in the pipeline, incorporating battery equipment. These projects, when initiated, contribute substantially to the adoption of electrification," shared Charlie Ekberg, general manager, Epiroc Canada.

This trend extends beyond electrification and into automation: "Greenfield projects embrace our technology, especially for reliability, incorporating it from the start. Brownfield transitions pose more significant roadblocks as there are challenges to integrating new technology into existing processes," said Greg Houston, president and CEO of Lakeside Process Controls, a provider of process automation solutions to the local mining sector.

As EV technology advances at breakneck speed, Ontario's miners will have to think carefully about their adoption strategies and how they navigate the ever-growing list of electrification solutions available. "The ongoing evolution of battery chemistry adds another layer of complexity to the decision-making process. The rapid pace of change in this domain makes it challenging for end-users to predict the trajectory of BEV technology accurately. Simultaneously, many traditional mining entities find themselves in a position where they lack the capacity to conduct in-depth evaluations," said Jean-Guy Coulombe, vice president - North America, Normet Canada.

TECH-nically not laborious

Canada's mining industry is expected to experience shortages of around 80,000 to 120,000 workers by 2030, according to the Mining Industry Human Resource Council's 2020 Canadian Mining Labor Market 10-year Outlook. Firms are turning to technology as a solution. "The shortage of skilled labor is a critical driver of our investment in technology, particularly autonomous machinery. These machines offer distinct advantages, such as increased productivity as they can operate continuously between shifts and tackle high-risk tasks," remarked Paul Healy, president Americas at Redpath Mining. "If people are not available, we can use a machine."

DSI Underground Canada is approaching the problem from another angle, reducing the number of required staff to begin with. "We are developing virtual reality training

programs.... These 3D training programs help mines leverage technology for training purposes, reducing the need for on-site training personnel," said Paul Stephenson, regional CEO of North America.

Jannatec Technologies, a Sudbury-based radio communications company, is innovating to make mining more attractive to young talent. Originally, Jannatec developed SmartView, a modular underground wireless communication system, to enhance safety in mines. Now Jannatec is expanding into the mobile segment of the IoT space, as it provides an extra level of comfort, especially for new talent. "Clients increasingly want access to the same amenities available in a car or in their home, which we aim to realize in the future," said Rey Boucher their president.

Leveraging technology to make mining safer and more comfortable is a surefire way of increasing its appeal to the young generation. This is especially true after the Covid pandemic when many people grew accustomed to working from the comfort of their own homes. Companies like Seequent, which offers earth modeling and geo-data management software to Ontario's mining industry, provide solutions that reduce the travel requirements for mining professionals. "The need to adapt to cloud strategies and remote work became prominent due to the pandemic. In response, we have developed our EVO cloud strategy, which will be a cornerstone for new cloud-enabled applications," said Rob Ferguson, segment director, exploration and resource management, at Seequent.



Aaron Lambert
Founder and CEO
RIINO INC.

“ Sudbury's concentration of mining companies, coupled with a culture of driving innovation, provided fertile ground for Riino to collaborate, receive feedback, and advance its monorail technology. ”

Sudbury, the mining tech Mecca

Executives from Timmins, Thunder Bay and the glass towers of Toronto all agree that Sudbury is the center of mining tech innovation. This comes with reason; the greater Sudbury area hosts nine operating mines, two mills, two smelters, and a nickel refinery. It also houses 300 mining supply and service firms, including 157 of MineConnect's 260 members. Across North America, no mining tech hub looks more promising. "Sudbury is even surpassing places like Colorado, Nevada and Toronto when it comes to mining technology," said Raffi Jabrayan, vice president of business development at Exyn Technologies.

There is currently ample funding available for mining technology innovation, including the Sudbury Catalyst Fund, a C\$5 million venture capital fund accelerating the growth of tech start-ups in Sudbury. NORCAT, headquartered in Sudbury, is the only innovation center in the world that has an operating mine designed to enable start-ups, SMEs, and international companies to develop, test, and demonstrate emerging tech-

nologies that are poised to transform the global mining industry. Following its success, in 2022 NORCAT is due to host its Mining Transformed technology exhibition in its Underground Centre in May 2024, but this time, the Underground Centre will have some new additions: "In 2023, we welcomed the launch of the Rogers Technology Centre of Excellence at the Underground Centre, providing a place for Rogers to demonstrate the capabilities of 5G communications infrastructure to support underground mining operations. The collaborative exchange between Rogers and various use case technologies leveraging the 5G backbone has further contributed to the overall vibrancy of our unique ecosystem," shared Don Duval, CEO, NORCAT.

Looking to the future, the greater Sudbury area has six post-secondary education institutions training the next generation of miners, while endeavoring to refresh the perception of mining in classrooms: "The Goodman School of Mines created and hosted a mine opportunity challenge for high school students to get them excited about mining," said Tremblay.

As new technologies emerge, the aging mining workforce will find it increasingly difficult to keep up to date with the most recent advancements, as their educations were centered around technologies that did not yet exist. "Canadian graduates with degrees in data science, ML, or AI typically want to work in glass towers and live in cities," explained Kevin Dagenais, CEO, Cascadia Scientific.

Statistics Canada's most recent Survey of Innovation and Business Strategy showed that Ontario's mining industry adopted advanced clean technologies at higher rates than industries such as utilities and manufacturing. With so much innovation and research coming out of the town, Sudbury and its environs are likely to continue to attract large international companies from around the world such as Foraco, the third-largest global drilling company based on the number of drill rigs catering to the mining and water industries. "The Sudbury Basin, near our main office in North Bay, acts as an excellent testing and training ground for our crews engaged in intricate projects for Glencore and Vale throughout the year," said Tim Bremner, CEO, Foraco International. ■



Jean-Guy Coulombe

Vice President - North America
NORMET CANADA

“ Expect more acquisitions, partnerships and investments in the Canadian business in the coming years. ”

Can you provide an overview of the developments at Normet Canada in 2023?

Normet Group has been actively present in the Canadian market for about 12 years, and has been selling primarily through its direct sales channel. Recently, the group decided to accelerate success by investing in physical infrastructure, expanding facilities in Sudbury, and establishing new facilities in Québec. We are also strengthening our human resources, particularly in service, aftermarket, sales, and product support throughout Canada, with a specific focus on Québec as a key area for growth.

In addition to these strategic initiatives, Normet has introduced new products, with one standout being the upcoming 'XS' personnel carrier, designed for enhanced operating ergonomics.

Normet's acquisitions, including the notable addition of XRock, are integral to our growth strategy. Originally conceived as a pedestal boom, XRock has evolved into our own rock breakers. Coupled with this development, we will soon be introducing a rock breaker line, expanding our reach into both the underground and surface mining and construction markets. Our emphasis on technology has resulted in numerous acquisitions and equity partnerships with tech companies worldwide. This has strengthened and enhanced Normet's technology platform, aligning us with industry giants such as Epiroc and Sandvik.

Is there sustained interest in Battery Electric Vehicles (BEVs) for local mining, and how has the adoption of BEVs evolved in 2023?

There has been a discernible shift in the industry's stance toward BEVs. The market, particularly end-users, has taken a momentary step back, reflecting a more measured approach. BEVs, positioned within the broader technology sphere, are experiencing a phase where early adopters are recalibrating their expectations. This technology is still in its nascent stages.

Normet, in introducing its BEV line in late 2021, witnessed initial success. However, the prevailing industry landscape presents challenges such as inflation, heightened interest rates, and fluctuations in commodity prices. These factors have collectively contributed to an industry-wide pause, with stakeholders taking a more cautious stance and subjecting BEV technology to rigorous evaluation.

It is worth noting that this momentary restraint is not indicative of a lack of interest in BEVs. On the contrary, the industry remains committed to the integration of BEVs, albeit after a comprehensive review.

The ongoing evolution of battery chemistry adds another layer of complexity to the decision-making process; it is challenging for end-users to predict the trajectory of BEV technology.

Despite the temporary slowdown, BEVs are unequivocally recognized as a transformative technology in the mining sector. The benefits encom-

pass aspects such as operating costs, productivity enhancements, safety improvements, and ergonomic advantages. Normet understands that BEVs, like any groundbreaking technology, will continue to undergo refinement and evolution over time.

Where are Normet's R&D efforts currently focused in the BEV space?

Our primary focus lies in advancing battery chemistry, particularly exploring solid-state batteries for their increased efficiency and stability. Addressing concerns about battery stability, especially in underground environments where overheating is a potential issue, is crucial. We are actively gathering data from our fleet and competitors' units to support the value proposition for BEVs. While BEVs remain more capital-intensive than diesel equivalents, we anticipate a future mix of fleets. Additionally, alternative technologies like hydrogen power are under consideration, with some large OEMs worldwide working on hydrogen technologies.

Have you faced supply chain challenges?

Yes, we have experienced ongoing supply chain issues, particularly in trans-ocean transportation. Logistics problems persist, likely stemming from the aftermath of Covid. While the situation is gradually improving, it will take time to fully recover. Positive signals from vendors, sub-suppliers, logistics, and freight companies indicate a return to normalcy, albeit uncertain. The industry still grapples with the lingering impact, notably inflationary trends, leading to projects exceeding budgets.

What is Normet's growth strategy?

Our plan is to sustain growth by investing in the business, continuing to make strategic acquisitions, and prioritizing human resources. Safety and ESG considerations are top priorities at Normet, and I commend the company for its commitment to environmental and safety standards. Our approach to growth is methodical, emphasizing respect for employees, their well-being, and all stakeholders. Expect more acquisitions, partnerships, and investments in the Canadian business in the coming years. ■

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Charlie Ekberg

General Manager
EPIROC CANADA

Can you share key highlights from Epiroc Canada's 2023 performance? In 2023, one of our major accomplishments was the successful deployment of the fully autonomous Pit Viper rigs in Canada. Collaborating closely with IAM-GOLD on this project was essential, emphasizing the importance of effective teamwork and change management.

On the acquisitions front, we have been actively integrating new entities into our operations. Notable additions include MineRP, as well as the Australian company RCT. These strategic moves enable us to expand our automation solutions not only for our equipment but also for other brands, addressing the challenges of mixed fleets in the industry. We further strengthened our position with the acquisition of CR Mining, focusing on enhancing equipment lifespan through innovative solutions and digital monitoring. Connectivity is a key focus for us, and acquisitions like 3D-P are instrumental in providing network solutions for digital and automation requirements.

Our commitment to transformation is evident in our battery technology endeavors. We are progressing

towards a complete underground EV fleet by 2025, offering both new and converted battery-operated machines. Additionally, we have established infrastructure, including a battery maintenance hub, to support the maintenance and repair needs of these systems.

Expanding our presence, we have initiated operations in Québec, establishing a local warehouse and a training center in collaboration with ACE Services Mécaniques. This initiative allows us to be closer to our customers, providing essential services such as training facilities and quick access to inventory components.

Maintaining a customer-centric approach, we have increased our workforce by over 15% in response to growing demand. This expansion ensures that we can effectively support our customers with service technicians, training facilities, and simulators, aligning with our mission to be a reliable partner in the mining industry.

Can you share Epiroc's plans for 2024?

For 2024, our focus on Canada remains strong, given its significance as a priority market. ■

Can you provide an overview of B&D Manufacturing?

We contribute significantly to the surface mining sector, producing safety maintenance tools for industry giants like Caterpillar, Komatsu, Liebherr, Epiroc, MacLean, and Sandvik. Notably, innovations like our remote-control EJ200 jack for lifting 400-ton trucks and the multi-handler for versatile component removal of mining haul trucks underscore our commitment to safety and productivity. Additionally, our range includes work platforms for both surface and underground equipment, exemplified by rear access platforms and fabricated aluminum products like wheel chocks and ramps—all engineered for stringent safety standards. The ongoing pursuit of innovative solutions, such as a remote-controlled belly pan removal tool, reflects our dedication to enhancing efficiency and safety in the mining industry.

What are the main challenges you have faced recently?

Inflation is a significant concern for us, leading to major price increases

in raw materials and components over the past 18 months. We have witnessed extended lead times, with some vendors going from 14-week to 48-week delivery. To manage this, we maintain a substantial inventory to meet customer demand.

Have you noticed any trends in the demand for your services and products, particularly given the focus on underground mining in Sudbury?

Demand for our machining services has surged, because of strategic investments in cutting-edge technology and equipment, including two boring mills and five-axis CNC machines. Our emphasis on bolstering fabrication capabilities, especially in aluminum welding, has significantly enhanced speed and efficiency. As the upward trend continues, we have directed capital expenditure over the past five years to meet the escalating demand.

It is crucial to highlight that our sales extend beyond direct transactions; we operate through an extensive dealer network covering both Canadian and global markets. ■



Tom Di Francesco

General Manager
B&D MANUFACTURING



Raffi Jabrayan

VP, Business Development and Commercial Sales
EXYN TECHNOLOGIES

“The average miner from just 10 years ago would have been far more apprehensive about operating a drone underground compared to the average miner today.”

What are the major developments at Exyn Technologies since we last spoke in 2021?

Exyn Technologies (Exyn) has experienced a lot of growth; we have opened offices in Chile, kicked off a global partner program with partners in Mexico, Peru, Africa and Australia, and are in the process of opening a new office in Germany. While we started out exclusively offering aerial platforms, we now provide hardware-agnostic geospatial services. We have integrated our autonomous solutions into ground-based robots and are now present at over 50 mines internationally, actively realizing the short-interval control dreams of our clients. In 2022 we completed our US\$35 million series B funding round. We will continue to prioritize R&D, with one of our goals being to harden and ruggedize our existing products. We are growing our sales team to ensure we have worldwide coverage to pursue our expansion plan. We are in a good place right now with strong management and great products already on the market with more in the pipeline.

Have you noticed a difference between your Canadian and American mining clients when it comes to the adoption of new automated technologies?

We have not noticed any significant divide between the two jurisdictions. The main factors impacting adoption are budget and management styles – some companies simply do not have the budget to adopt certain solutions. We have noticed a general increase in adoption rates recently across borders. Drones and robots allow opera-

tions to be carried out faster, more accurately, and most importantly – safely. It is becoming increasingly difficult for mining companies to ignore this fact.

We have seen a huge uptick in adoption rates in northern Ontario, as it has become a mining technology hub. Cities like Sudbury are even surpassing places like Colorado, Nevada and Toronto when it comes to mining technology. Other notable hubs are Denver, and parts of Germany, where very interesting things are happening in the robotics and AI space, both in mining and in other sectors.

I think that the workforce has become more tech-savvy than ever. As such, the average miner from just 10 years ago would have been far more apprehensive about operating a drone underground compared to the average miner today. This is also contributing to the increasing adoption rate of our technologies.

Do you think the mining industry is eager to adopt technologies like AI and robotics in its operations?

The adoption of technologies like AI and robotics in the mining industry has been a growing trend in recent years thanks to the improvements in efficiency, safety, operations, and resource optimization they provide. Around five years ago, we began observing a noticeable change in the attitudes of mining companies towards autonomous solutions, for example. This period also coincided with the first deployments of our solutions in underground mines. At the time it was quite difficult for some mining companies to fathom flying an

autonomous drone underground. Today, mining companies are looking for more ways to use robotics and AI to optimize their operations across all their work efforts.

What is coming next for the Exyn-Aero?

The biggest opportunities we have now are on the hardware side. We are actively working with multiple manufacturers on a smaller-sized drone that can accommodate our payload while allowing us to fly in much smaller spaces, like the narrow-vein mines found in Africa for instance. Our software enables us to carry out missions so quickly, battery life is never a major limitation as it can be with other platforms. ExynAero flies at speeds of 2 m/s, allowing us to cover a lot of ground in a seven- or eight-minute flight.

How do your products improve mine safety?

Using traditional tools, surveyors would have to be very near the face or underground over a long period of time. With our products, surveyors can be a safe distance away, as a several-minute mission achieves what would have taken surveyors hours to do previously using traditional methods.

Another area adjacent to safety where our product can help is mine rescue. Our products can quickly and accurately provide mine rescuers with a complete image of the scenario underground before physically entering a dangerous area. Additional sensors can be added to the payload to test air quality, fumes, etc. ■



Dustin Angelo

President, CEO and Co-Founder
NOVAMERA

Can you provide an update on the key developments at Novamera in 2023?

On the customer development front, we signed five MoUs with juniors expressing interest in deploying surgical mining. This segment is a strong early adopter market for us, contributing significantly to our growing momentum. Additionally, we established a strategic alliance with Stantec, adding to our existing one with WSP, to collaborate on potential surgical mining projects. Another noteworthy development involves our engagement with Epiroc through the Combient Foundry, where we proposed a pilot project for the joint deployment of our technology and Epiroc's equipment at a client site. While it is still in progress, the collaboration is heading in a positive direction.

We completed a trial with the Canada Mining Innovation Council, facilitated by OZ Minerals, and Vale. This trial, conducted at the Romeo and Juliet deposit in Newfoundland, included taking our guidance tool underground for the first time, marking a crucial milestone. Subsequently, we initi-

ated a financing round and secured government amounting to over C\$3 million. Combined with MICA funds received earlier in the year, these finances will support a full production demonstration scheduled for 2024.

Can you identify common themes in the players that show interest in surgical mining?

The current economic climate has made it increasingly difficult to raise mining capital, this is particularly true for juniors. Their reliance on capital markets, coupled with smaller deposits, makes conventional mining less feasible. Our surgical mining method offers a solution to unlock relatively smaller deposits, with scalable capex, ensuring revenue generation at a lower cost. This addresses a critical need for juniors by allowing them to generate cash to execute exploration on their terms while reducing dependence on volatile capital markets.

For juniors dependent on external funding, our technology provides a secondary cash source, empowering them to control their destiny. ■

Can you introduce Draganfly?

Founded in 1998 in Saskatoon, Draganfly is the longest-running commercial drone manufacturer, boasting over 24 years in the industry. While our core business remains OEM solutions, we expanded to include services like surveying, industrial inspection, wildfire monitoring, and emergency response. Beyond platform manufacturing, we offer comprehensive training and onboarding for UAV fleet management.

Can you discuss recent milestones at Draganfly?

We signed a contract with the BC Wildfire Service to actively monitor wildfires using thermal and RGB sensors. We provide crucial data to first responders and wildfire crews, aiding in fire modeling, assessing mitigation efforts, and understanding the impact of weather changes.

Simultaneously, our Saskatoon facility underwent significant expansion, moving to a new, larger space.

What products or services are favored by your mining clients?

In our mining operations, we have

primarily focused on three key areas. The first is predictive analytics, where we collaborate closely with Windfall Geotek. Draganfly contributes by offering specialized sensor operations, like magnetometers. The captured data is then input into Windfall Geotek's platform, providing recommendations on the likelihood of different materials, thus aiding clients in exploration efforts.

Our second focus is security monitoring using UAVs to monitor mining sites for unauthorized access or perimeter breaches and enhancing security without human presence. Lastly, we have engaged in tailing pond sampling and core transport, reducing the reliance on human involvement or traditional methods like trucks and helicopters.

Can you highlight the evolution of the mining industry's adoption of drone technology?

Widespread adoption is still a work in progress, hindered by industry-wide hesitancy and regulatory complexities, particularly concerning beyond visual line-of-sight requirements. ■



Paul Mullen

COO
DRAGANFLY



Paul House

CEO
IMDEX

Can you provide an overview of recent developments and milestones at IMDEX?

The acquisition of Devico, strategic investment in Krux Analytics, and the ongoing success of our new product development and R&D initiatives made it an eventful year for the company. Devico's acquisition has fortified IMDEX's position as the number one directional drilling company globally and strengthening our position as the leading provider of advanced rock knowledge sensors.

Can you provide insights into your partnership with Krux?

Krux, a Canadian company, excels in translating successes from the oil and gas sector using analytics software and applying them to hard rock minerals. Their cutting-edge drilling analytics software replaces traditional paper records, streamlining operations for drillers and resource companies. By consolidating real-time measurement while drilling (MWD) and drilling activity data, Krux provides comprehensive datasets that enable optimization and informed decision-making.

Can you outline your plans for 2024?

In 2024, our focus is on addressing rising global costs with a shift towards productivity, particularly through our investment in Devico and directional drilling. This strategic move allows us to optimize exploration budgets, tackle complex targets efficiently, and maintain quality. ■



Matt Mackinnon

Founder and President
UNMANNED AERIAL SERVICES (UAS)

What services do you provide the mining industry?

While we perform vent raises, ore passes, and stove monitoring, our distinct advantage lies in pushing technological boundaries, particularly in vent raises. We recognize the industry-wide challenge of handling copious amounts of drone-generated data, a challenge exacerbated by the lack of dedicated drone teams in many mining companies. We leverage established workflows and a robust storage system to efficiently manage data.

Our baseline scans reveal insights into the rock mass behind shotcrete applications, ensuring structural integrity. On one mine site, we measured the thickness and change within an entire vent raise. By identifying areas with insufficient shotcrete, we facilitated necessary reinforcement, validated by subsequent ground truthing. This approach extends to ore passes.

How has your location in Sudbury helped to advance UAS?

The concentration of mining sites within an hour's drive of our office allows us to have a deep and daily engagement with the industry. This proximity enables us to respond rapidly to incidents. Working closely with the mines surrounding Sudbury exposes us to diverse challenges, environmental conditions, and operational nuances, making us valuable product advisors for our partners. Sudbury is one of the world's greatest mining technology hubs. ■



Rob Ferguson

Segment Director,
Exploration and Resource
Management
SEEQUENT

What are some recent products you have launched?

We consistently release new versions of our nine products each year. One of our recent releases, SLOPE3D, has proven to be highly successful. Developed by our team in Calgary, this software is tailored for slope stability analysis in both hard rock and soft rock environments - it garnered us a mining technology excellence award. Additionally, our MX Deposit Drill Hole database management system, which has strong connections to the Ontario market, also secured a mining technology excellence award in 2023. We are increasingly focused on cloud solutions, given the industry's demand for more collaborative and remote working post-Covid.

Are certain regions or jurisdictions quicker in adopting new mining technologies?

The pace of adopting new mining technologies varies and is often company-dependent. However, we have noticed generational changes in North America, particularly in regions like Ontario. Younger professionals are assuming leadership roles and are eager to embrace new, digital technologies. Connectivity also plays a significant role. Some regions may have limited bandwidth and challenging connectivity, which can slow down technology adoption. However, with advancements like Starlink, we are witnessing improved connectivity in previously remote areas. ■

Business Insights on Smart Mining



Greg Houston, President and CEO, LAKESIDE PROCESS CONTROLS

"Our current hardware devices connect data from the underground or open pit all the way to recovered mineral and tailings management. Real value emerges when we elevate this data to machine learning and AI through the control system."



Kevin Dagenais, CEO, CASCADIA SCIENTIFIC

"Every business with a technology slant needs to watch closely for the disruptive impacts expected to arise from generative AI powered by large language models."



Paul Stephenson, Regional CEO - North America, DSI UNDERGROUND

"Bolting systems can now digitally capture information about an individual bolt's installation, such as its speed at installation, its location, and the load required to break out the bolt."



Chad Methe, General Manager, ACCUTRON INSTRUMENTS

"The integration of real-time monitors, automated control systems, and comprehensive data analysis software will further increase the efficiency of ventilation management systems. Demand for digital solutions is expected to intensify."



Rey Boucher, President, JANNATEC TECHNOLOGIES

"When we began, miners communicated from afar with devices such as party line phone systems. As two-way radios advanced, these were integrated into operations for broader communications capabilities. The next step is to deploy LTE technology underground."



Ash Agarwal, President and CEO, SYBOTICWARE

"Most mining companies recognize that embracing new technology is not merely a choice but a necessity to keep their business profitable. If they do not, their competitor will sell at a better margin. Mining companies want plug-and-play solutions."



Martin Jette

President - Canada
BRENTAG ESSENTIALS

“Over the past two decades we have strategically invested in building a professional team to serve the mining industry.”

”

Can you introduce Brenntag Essentials in Canada?

Brenntag Essentials in Canada consists of more than 20 sites across the country. We maintain an extensive industrial footprint from coast to coast, and we adapt our product portfolio to cater to different regional industry needs. Our goal is to get products as close to the application as possible, ensuring a competitive supply chain.

How important is mining to Brenntag Essentials in Canada?

Mining is a vital sector for Brenntag Essentials in Canada. We allocate dedicated resources, including product management, business management, sales, and operations to this industry. Over the past two decades we have strategically invested in building a professional team to serve the mining industry. We have account managers strategically positioned across various regions to ensure proximity to our mining clients. Our product offerings for the mining industry encompass dust control, flotation, solvent extraction, and water treatment solutions, among others.

Have you noticed any recent trends in the demand for your products from the local mining industry?

There has been a rising demand for rare earth metals, driven by emerging markets like EVs and electronics. Additionally, the demand for domestically produced products has surged in the wake of supply chain risks associated

with imports from other countries.

What is Brenntag Canada's approach to ESG?

ESG is a critical aspect of our business strategy and we manage it through three key pillars. Firstly, on the supplier side, we have a stringent vetting process to ensure our suppliers align with our values concerning ESG. This includes considering geopolitical factors, geopolitical stability, and the potential involvement of stakeholders that do not align with our values. We have a dedicated team with boots on the ground that conducts thorough supplier audits around the world. Secondly, we engage closely with our customers to be able to offer them product alternatives and service solutions that align with our goals as well as theirs. This process often involves redirecting focus from pure financial benefits to values and sustainability. Lastly, we conduct internal audits to verify our compliance with ESG and sustainability goals. These efforts are closely linked to our broader goals surrounding sustainability and they form an integral part of our long-term strategic planning.

What are the current challenges that Brenntag faces in getting its chemical products to clients?

Supply chain challenges have become increasingly intricate in recent times, presenting a multitude of risks and uncertainties. Several critical issues impact our supply chain. For instance,

there are constraints related to container shortages, often exacerbated by surges in global consumer consumption, notably through e-commerce giants like Amazon. Such supply chain disruptions put pressure on our access to essential raw materials and components, challenging us to leverage our sourcing, supply chain, and pricing expertise. Additionally, labor disputes within various sectors, such as port workers or truck drivers, can lead to bottlenecks in the supply chain. Social unrest and protests that disrupt transport routes or block critical infrastructure elements further exacerbate supply chain challenges. Finally, disruptions related to extreme environmental events such as hurricanes and storms also come into play when considering potential disruptions.

To address these challenges, we have embraced a comprehensive approach. We continue to focus on the "last mile" within our supply chain. This means concentrating on local representation, local customer service, and localized operations and logistics. This strategy minimizes inefficiencies and risks by bringing our products closer to end users. We have also adapted by increasing our working capital to account for potential supply chain disruptions. This includes maintaining larger inventories and resources, ensuring we are better prepared to navigate through uncertainties to guarantee a reliable supply of products to our customers.

What are your plans going into 2024?

Our priorities for 2024 and beyond are building our local strengths by leveraging our global reach, ensuring that we continue to reduce risks in the supply chain and remain closely connected to our customers. In the realm of sustainability, we are at the forefront of partnering with Indigenous and First Nations communities, involving them in the growth of the mining industry. We see sustainability and ESG as fundamental components of our long-term strategy and business success. Our goal is to be leaders in delivering value-added chemistry and products to the mining industry while promoting sustainability and social responsibility. ■



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Bureau Veritas will be releasing a novel solution for low-level gold analysis that addresses the hazardous waste generated in the testing process.

”

Jon Landau

VP Minerals North America
BUREAU VERITAS

Can you give an overview of Bureau Veritas and how the company serves the local mining industry?

Bureau Veritas is a leading global provider of geochemistry, mineral processing, and environmental services to the exploration and mining community. We support companies throughout the mining value chain: Exploration, extraction, processing, and transportation. Our services are structured to support the life cycle of your assets, from planning and design through procurement of components and equipment to construction, operation, and closure. Through our green line of services and solutions we can also help demonstrate the impact of your ESG actions by making them traceable, visible, and reliable to support your sustainability objectives.

I joined Bureau Veritas in 2008 as part of the Australian minerals testing business. From this time, the company continued to invest in the commodities space acquiring a range of businesses, including the Canadian-based Acme Analytical Laboratories, creating a global network to service our customers.

As a Global Group, Bureau Veritas has had the benefit of a network with technical centers that offer genuine points of difference and expertise to support resource development. We are taking learnings from across our network to offer the best solutions to our mining customers in Canada to help them be smarter and more agile.

Can you highlight a case study where Bureau Veritas supported a mining client in Canada?

The mining industry is focused on doing things smarter with a focus on CSR. Bureau Veritas has successfully developed an onsite lab service offering for battery minerals that significantly reduces the total cost of ownership while also enabling the customer to reduce their carbon footprint, remove the use of acids on site, and support the mine to have a cleaner and less labor-intensive process. We have successfully offered this service in Australia for several years and will be commissioning our first site in central Canada.

What other trends have you noticed in the mining industry in recent years, and how have they reflected on the demand for Bureau Veritas' services?

In light of the energy transition and increased demand for battery minerals, we have seen a change in terms of what customers require. Bureau Veritas will always move with

the market, and today offers a range of new analytical services to support critical minerals. While our traditional services have focused on the elemental nature of a resource, we have developed a new spectral solution. This innovation involves harnessing the power of infrared spectroscopy to support the analysis and evaluation of ore bodies and process performance using a spectral fingerprint of a resource to understand a range of critical characteristics, predicting metallurgical parameters, mineralogical characteristics, chemistry, and physical properties. By harnessing these predictive insights, mining companies can make informed decisions and optimize their operations for greater efficiency and profitability.

How has the growing importance of ESG impacted demand for Bureau Veritas' services?

There is a realization in the mining industry that there is a need to change and adopt new technologies to do things in a more effective and environmentally friendly way. Over the next year, Bureau Veritas will be releasing a novel solution for low-level gold analysis that addresses the hazardous waste generated in the testing process. Providing a detection limit that enables the required granularity for your resource data set while also removing the traditional waste streams of the testing, and substantially reduces the carbon footprint associated with obtaining the data.

What advice do you have for mining companies when it comes to exploration, development, and mine closure?

People are often comfortable with the status quo and using techniques they know, but things are changing rapidly in our industry. I would encourage mining companies to engage in conversations with companies like Bureau Veritas to see how they can generate and use data more effectively; they may be surprised by the advancements that have been made in this space.

What are Bureau Veritas' key priorities for the next year?

From an innovation pipeline perspective, Bureau Veritas has several services that are about to be commercialized that will help make a difference for our customers in terms of how they approach their resources and what they can achieve with them. We are excited to soon bring these services to market and help our customers improve their operations. ■



The Drone Revolution

Revolutionizing mining from the skies

The mining industry has always been a dangerous and challenging field, with workers facing hazardous conditions and the risk of accidents. However, the advent of drone technology has revolutionized the industry, providing a safer and more efficient way to conduct inspections, transport material, and conduct surveys. Drones can access difficult or unsafe areas like pits, tailing dams, and stockpiles, and are now even venturing deep underground.

Draganfly, founded in Saskatoon in 1998, is the longest-running commercial drone manufacturer in the world, offering drone solutions to the mining industry covering predictive analytics, security monitoring, tailing pond sampling and core transportation. Draganfly has witnessed and contributed to the dramatic advancements in drone technology over the past two decades, which have led to their unprecedented popularity and affordability today. However, as industrial and recreational users rush to reap the technological benefits of drone technology, hurdles remain: "Regulatory frameworks often struggle to keep pace with rapid technological advancements. Currently, both manned and unmanned flights are often overseen by the same regulators in North America. This regulatory lag poses challenges to effective scaling," said Paul Mullen, COO, Draganfly.

This, however, may change in the coming years as Canadian regulators catch up to the booming drone industry: "Regulatory bodies, such as Transport Canada and the FAA, are ac-

tively developing protocols to permit beyond-line-of-sight drone operations for airborne geophysical surveys. This regulatory progress indicates that, in the next two to three years, drones will likely become even more prominent in the industry," said Howard Barrie, president, Terraquest.

Drone technology has advanced to the point where the hardware itself is

no longer the limiting factor in the performance of some drone operations. Companies like Exyn Technologies are focused on developing software to enable drones to complete tasks under- ground autonomously.

Currently, Exyn's software has achieved Automation level 4 (AL4), meaning its platforms can fully autonomously navigate GPS-denied areas without any input from a human operator during flight, or any infrastructure such as a Wi-Fi network. "Our AL4 does not require a pre-programmed route; the machine can think and navigate for itself," explained Raffi Jabrayan, VP, business development and commercial sales, Exyn Technologies.

Drones are now ubiquitous in the world of recreational photography and other hobby scenes, with companies like DJI offering affordable and intuitive products for civilians. Jabrayan explains how this may have contributed to the huge uptick in adoption rates for Exyn's solutions in northern Ontario: "The average miner from just

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10 years ago would have been far more apprehensive about operating a drone underground, compared to the average miner today”.

For those companies in the airborne geophysical surveying space, drones can be another useful tool in their arsenal: “We see drones as a valuable instrument for gathering geophysical data. We use the same skills, equipment, and knowledge on our drone surveys as we would on our fixed-wing surveys. They are a tool that allows us to efficiently conduct surveys over a smaller area where a fixed-wing aircraft would not be suitable,” said Stephan Sander, co-president, Sander Geophysics.

Expert Geophysics Limited, based in Aurora, Ontario, is working to exploit the advantages drones have over traditional manned aircraft by adapting their existing electromagnetic systems. “We have ongoing efforts to create a drone version of the MobileMT system. This drone platform will revolutionize airborne surveys as it will be the deepest penetrating EM airborne system globally,” said Andrei Bagrianski, president and founder, Expert Geophysics.

In addition to the potential cost savings, drones can have other technical benefits in certain airborne surveys: “The transition from traditional helicopter platforms to drones aims to provide better data quality at depth rather than merely reducing costs. Drones afford us the ability to operate at slower speeds, mitigating motion noise that could compromise data quality,” continued Bagrianski.

Ontario being a center for mining technology, has left at the opportunity to deploy drones for mining and exploration purposes.

As the technology continues to shrink and become more affordable and performant, we can expect to see the Ontario mining sector’s appetite for drones continue to grow. However, it remains to be seen if the next barrier to adoption will be a technical one, or a regulatory one. ■



Andrei Bagrianski

President and Founder
**EXPERT GEOPHYSICS
LIMITED**

Can you provide an update on Expert Geophysics’ developments in 2023?

A highlight was the commercial launch of TargetEM. This system seamlessly integrates time domain EM data with AFMAG and VLF data. This makes TargetEM the sole hybrid system capable of producing AFMAG and VLF data alongside time domain EM data, significantly expanding our capabilities to cater to our clients’ diverse needs.

Another noteworthy development involves our ongoing efforts to create a drone version of the MobileMT system. We successfully executed the inaugural flight of the prototype version last year and are currently focused on refining the commercial version. This drone platform will revolutionize airborne surveys, by offering the lowest frequency among existing airborne systems, making it the deepest penetrating EM airborne system globally.

Is this emphasis on increased depth a central theme?

The pursuit of increased depth of investigation remains a central focus for Expert Geophysics, aligning with broader industry trends. Recognizing that numerous near-surface deposits have already been discovered, there is a growing demand for exploring deeper levels, particularly in regions with high conductivity, such as Australia. Thus, our continuous efforts to enhance depth capabilities reflect the industry’s collective commitment to advancing research and development in this crucial direction. ■



Jonathan Rudd

President
DIAS GEOPHYSICAL

Can you introduce DIAS Geophysical (DIAS)?

We deploy ground technologies including induced polarization, resistivity, and magnetotellurics along with airborne capability in magnetics and electromagnetics. The backbone behind nine years’ continual growth is DIAS32, our patented 3D IP system. Engineered to generate high-quality, high-volume data up to 200 times that of conventional systems, DIAS32 images to depths of 1 km to meet the growing need for deeper exploration. In February 2023, DIAS acquired Discovery International and their differentiated offerings of ground SQUID, HeliSAM, and high-power borehole techniques to expand upon our capability, expertise, and solutions.

What is the current R&D pipeline at DIAS?

We are developing a high-power IP transmitter to explore to greater depth. We are also developing EM receiver coils to measure magnetic fields for EM and MT applications. Other developments include a high-power airborne EM system and processing and inversion software for our various data sets.

Have technology sensors used for exploration evolved recently?

We are currently in a cycle where there is sustained demand for minerals which allows for innovation funding. We are starting to see the fruit and the new systems that are improving exploration efficiency and efficacy. ■



Howard Barrie

President
TERRAQUEST

Can you introduce Terraquest to our audience?

Terraquest is an airborne geophysical survey company. Our footprint extends globally, with projects executed across Africa and the mapping of substantial areas, including one-third of France, all of Puerto Rico and the Great Central Valley of California for the US Geological Survey.

Have you observed any recent trends in demand for your services?

Presently, we are experiencing a period where some sectors, notably North American gold exploration, are facing funding challenges, making it a difficult time for some juniors. On the other hand, the lithium miners and explorers are receiving significant funding and investment. We understand that the industry’s requirements can shift, and we adapt our services accordingly. We work closely with consulting geophysicists, aligning our data collection with their specialized needs. The key to our success lies in our ability to cater to the specific demands of our clients, delivering the data they need.

What sets Terraquest apart from your competitors?

We take a meticulous approach to data processing and validation, ensuring that the data we deliver is not only accurate but also untouched by excessive computer smoothing. Our motto is “better data, better results,” and this reflects our dedication to

“Our clients invest significant resources in geophysical surveys, and fluctuations in funding availability can significantly impact the industry’s health.”

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What are the biggest challenges facing your industry?

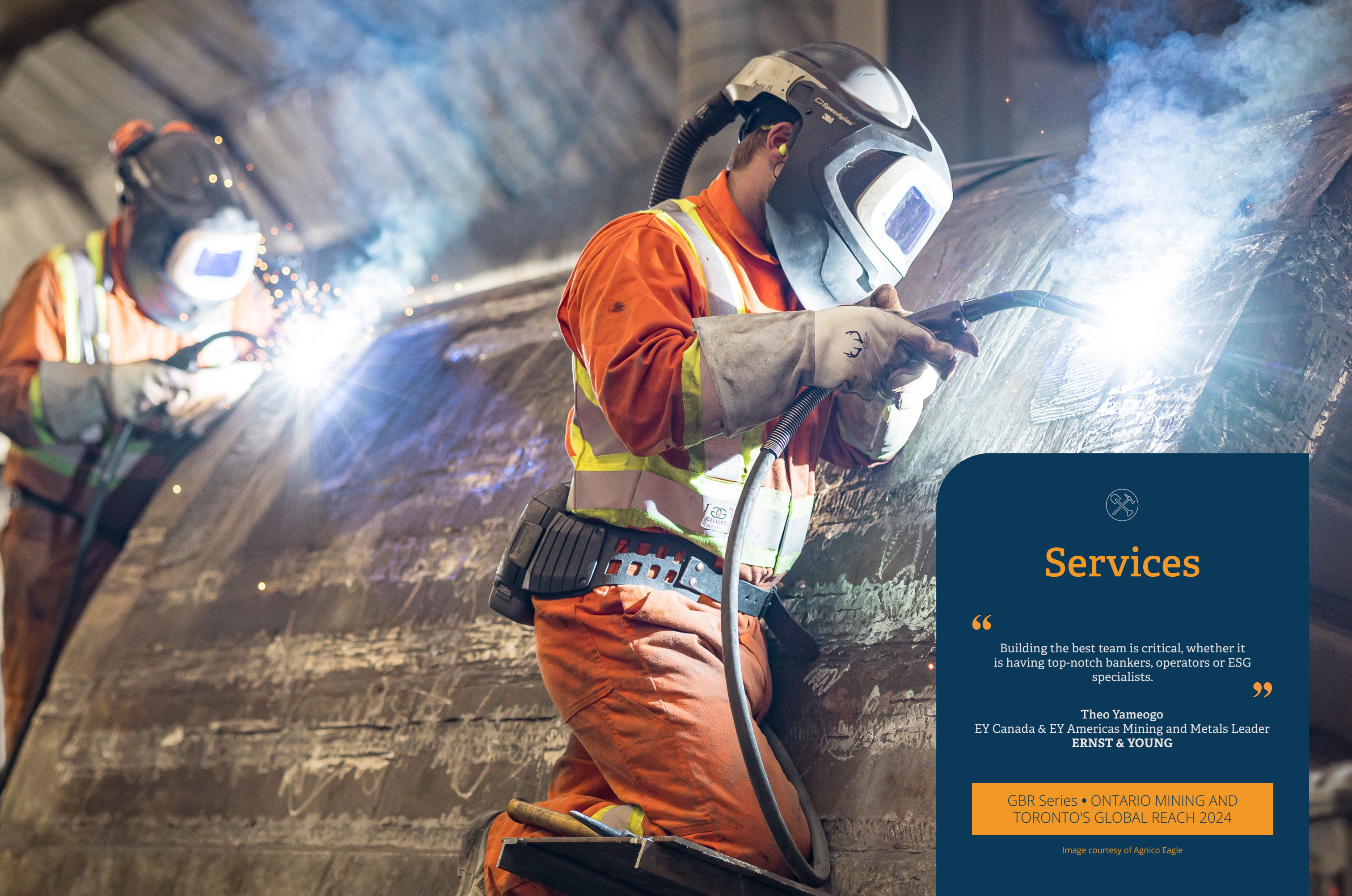
The primary challenge confronting the wider mineral exploration industry is funding. Our clients often invest significant resources in geophysical surveys, and fluctuations in funding availability can significantly impact the industry’s health. Additionally, the industry is currently grappling with a shortage of qualified professionals willing to work in remote and challenging locations. This shift in workforce dynamics contrasts with the earlier days of the industry when fieldwork was more appealing to younger talent.

How do you see the role of drones evolving in the airborne geophysical survey space?

Drones are poised to play an increasingly significant role in the airborne geophysical survey space. Their key advantage lies in their ability to capture high-resolution data in areas that are challenging for traditional aircraft. These areas may include rugged, mountainous terrain, which is often inaccessible or expensive to survey using conventional means. Drones offer agility, cost-effectiveness, and access to locations that would be otherwise difficult to reach. Regulatory bodies, such as Transport Canada and the FAA, are actively developing protocols to permit beyond-line-of-sight drone operations for airborne geophysical surveys. This regulatory progress indicates that, in the next two to three years, drones will likely become even more prominent in the industry.

Can you share your plans and expectations for Terraquest in the coming years?

Terraquest is on the brink of significant changes and collaborations. We anticipate engaging in new projects across different parts of the world in partnership with new collaborators. We are actively working on these initiatives and expect to make announcements soon. These changes will set the course for Terraquest’s next chapter. Our aim is to remain at the forefront of the geophysical survey industry, adapting to the evolving needs of our clients and the industry in order to provide better data, and better results. ■



Services

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Building the best team is critical, whether it is having top-notch bankers, operators or ESG specialists.

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Theo Yameogo
EY Canada & EY Americas Mining and Metals Leader
ERNST & YOUNG

GBR Series • ONTARIO MINING AND
TORONTO'S GLOBAL REACH 2024

Image courtesy of Agnico Eagle



Greening Ontario's Mines

Setting the standards for social and environmental responsibility

Ontario has long stood out as a sustainable and relatively clean mining destination. However, maintaining this reputation will only become more challenging as sustainability credentials attract more scrutiny from investors and stakeholders. Unsurprisingly, ESG once again took the top spot on EY's 'Top 10 business risks and opportunities for mining and metals in 2024', with environmental impacts standing out as a particular concern among the respondents who were surveyed for the report.

In the EY survey, tailings and waste management came in second place as the second-most scrutinized ESG factor by investors, with 55% of respondents expecting tailings to receive investor attention, compared with less than 5% the previous year. This jump was likely due to the International Council on Mining and Metals' (ICMM) members releasing tailings disclosures to demonstrate their ongoing commitment and provide transparency on the Global Industry Standard on Tailings Management (GISTM).

The GISTM, launched in 2020, became the first mining sector global standard and a dam safety global benchmark. Mary-Jane Piggott, vice president, mining environmental group at Klohn Crippen Berger, a consultancy focused on tailing-related designs and assessments, observed that the introduction of the GISTM prompted a change in how mining companies approach tailings management: "Mining companies and consultancies are now placing more importance on creating and maintaining robust documentation and change management practices. This focus is essential for creating transparency and accountability. It allows for future reference, offering insights into why specific decisions were made and providing the basis for various design and governance choices," shared Piggott.

Beyond non-legally binding standards like the GISTM, Ontario's miners will likely face more stringent regulations enforced by Canadian authorities such as the Task Force on Climate-Related Financial Disclosures (TCFD). Previously a voluntary initiative, it has now been fully embraced by the International Financial Reporting Standards (IFRS). The IFRS, a mandatory global standard, finalized its rules in June 2023, and the Canadian Securities Administrators has expressed its intention for a Canadian-adapted adoption of the IFRS. "This adoption represents a seismic shift, making it mandatory for publicly traded companies to adhere to these global standards. Notably, IFRS mandates scope 1, 2, and 3 GHG reporting, although its adoption by the US and Canada is yet to be confirmed," shared Emily Thorn Corthay, founder and CEO, Thorn Associates.

Not relying solely on the 'stick', Canadian authorities are also using the 'carrot' to incentivize best practices and make the net-zero journey easier. "In general, incentive funding for mining companies has seen a significant



And we love a good challenge. We are innovating to unlock the minerals and metals of the future in a more sustainable way. Let's reduce impact on the planet, together.

Ausenco



Liana Frenette
CEO
TBT ENGINEERING

“ We have noticed a significant uptick in demand for environmental services. This is largely driven by evolving regulations, with a growing emphasis on environmental monitoring and compliance. ”

increase, with a notable focus on proceeds from various carbon pricing initiatives,” continued Thorn Corthay.

One such example is the Green Industrial Facilities Manufacturing Program (GIFMP), a program that provides financial assistance to support the implementation of energy efficiency and energy management solutions for Canadian industries, including mining.

In addition to adopting industry initiatives and standards, Ontario's miners are drawing upon First Nations communities for guidance when it comes to ESG. This has been evidenced in recent years, with the Marten Falls and Webequie First Nations leading environmental assessments for the Northern Road Link project, which is hoped will benefit both the First Nations residing there, as well as the prospectors seeking to tap into the rich deposits of critical minerals found in the region. In the case of the fly-in- fly-out Marten Falls community, Chief Bruce Achneepineskum hopes the Northern Road Link project will alleviate transportation costs, improve food security, and bring other benefits.

Chief Achneepineskum stressed the importance of respectful dialogue and fairness when developing on traditional lands like the Ring of Fire: "That is home for us; we do not want to see it destroyed. Through collaboration, we can find a mindful way to mine the area ”.

As many of Ontario's richest deposits lie in traditional First Nation territories, some service providers have stepped up to facilitate communications between miners and Indigenous communities. One such company is FROSKR, born in Sudbury during the Covid pandemic. FROSKR's president, Kati McCartney, stressed the importance of acknowledging the invasive nature of mining activities and recognizing that each Indigenous community has its own priorities. "We draw inspiration from our First Nations partners, who inform decisions with the future seven generations in mind. Mining is slowly adopting this philosophy," said McCartney.

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Theo Yameogo

EY Canada & EY Americas Mining and Metals Leader
ERNST & YOUNG

Can you highlight any notable developments at EY Canada since we last spoke?

One significant achievement is the ongoing success of our Americas Centre of Excellence. Established four years ago, this initiative has proven instrumental in assisting clients with navigating the energy transition and other imperatives in the metals and mining sector. Comprising technical and operations experts, innovators, and EY professionals, the Centre has become a distinctive offering, setting us apart from our competitors.

Another noteworthy update revolves around our 2024 'Top 10 business risks and opportunities for mining and metals' report, which highlights the evolving business ecosystem for metals and mining companies. While ESG and License to Operate remain paramount, issues such as biodiversity in mine closure have gained prominence, signaling a shift in industry priorities. Additionally, the report sheds light on the changing role of capital in the mining sector. Sovereign and retirement funds are now playing a more significant role in financing mining projects, with a strong emphasis on tying capital availability to a company's ESG performance.

On the operational front, challenges persist with rising costs and inflation impacting the industry. Talent acquisition also remains a critical aspect, with geographical variations in the availability of skilled workers and professionals.

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Mining companies should strive to be symbols of performance and global citizenship.

Diversity in our sector is not just gender; it should include race, professional background, and creativity.

”

In summary, our recent updates reflect a dynamic industry landscape, where a focus on sustainability, capital alignment, cost management, and talent acquisition are central to navigating the evolving challenges in the mining sector.

How are the new tax disclosure regulations driving demand for EY's services?

Indeed, the anticipation around regulations like the S1 and S2 from the International Sustainability Standards Board (ISSB) is shaping a landscape where global adoption seems imminent, urging companies to prepare themselves proactively. While the regulations are not mandatory yet, the expectation of Canada signing sooner than later is a key driver. Clients are not only seeking guidance on compliance but also exploring avenues to access energy transition funding. Simultaneously, there is a palpable shift in focus toward disclosure requirements related to climate change impact and sustainability financing, particularly in S1 and S2.

Beyond tax considerations, several other factors contribute to the buoyancy of our mining and metals business. The audit sector is experiencing significant growth, driven by our Center of Excellence, which has created a pool of technical experts supporting audits. The establishment of a mining academy to train audit teams specifically for the industry has been pivotal.

How significant is the issue of cybersecurity in the mining industry, considering recent attacks?

More mining companies are reporting cyber attacks. With the increasing use of operational technology (OT) and cloud-driven mineral processing, the sector needs to be more aware of, and ready to tackle cyber threats. Our industry group actively addresses these concerns through international collaboration and tabletop exercises, recognizing the urgency of safeguarding against cyber threats in mining, given the potential impact on operations and safety.

Do you have advice for owners of small mining companies, given the current financial climate?

In the mining sector, success hinges on teamwork. Building the best team is critical, whether it is having top-notch bankers, operators, or ESG specialists. Mining is international by nature and as a result, diversity should play a key and uniting role. Embrace diversity to assemble the best talent. The future of mining lies in forming diverse, high-performing teams. It is also essential to upgrade practices in line with modern standards, ensuring operations prioritize technology, health, and safety. Regardless of location, mining companies should strive to be symbols of performance and global citizenship. Diversity in our sector is not just gender; it should include race, professional background, and creativity.

What are your plans for growing the mining and metals business in 2024?

Our approach is centered on drawing on our vast pool of talents to support clients in their chosen pathways while anticipating and dealing with the winds of change. We prioritize helping clients achieve their ambitions, measuring success by their satisfaction. Collaborating with our Centre of Excellence and our ecosystem alliances, we aim to stay ahead of industry trends, presenting clients with innovative solutions. The ongoing expansion of our Centre of Excellence with top global talent is key to our commitment to clients. ■



Heather Cheeseman

Partner, National Mining
Leader
KPMG IN CANADA

What recent trends have you noticed in the local mining industry, and in the demand for KPMG's services?

KPMG is certainly seeing an increase in demand for our services around ESG strategy and decarbonization. We have developed a decarbonization hub that helps companies implement decarbonization strategies including at the operational level, and are helping companies execute their ESG strategies throughout their business, such as in capital allocation processes and implementation of technological advancements. We are also seeing a focus on sustainability reporting and how companies are getting the message out and meeting the ever-evolving requirements, regulations, and voluntary frameworks associated with ESG.

What are KPMG's key priorities for 2024?

KPMG is focusing on three main pillars. One is innovation and technology, which is critical to increased operational output and the ESG agenda. There are some fantastic technologies and advancements that can help companies change and improve their operations and make them safer and more sustainable. Second is the workforce; we want to help bring a voice to the industry and attract talent. Third is the energy transition and how we can help companies in their ESG journey. ■



Kati McCartney

President
FROSKR

Can you introduce FROSKR?

FROSKR was born in Sudbury, and have tailored services for permitting, compliance, reporting, closure planning, financial assurance, and air quality emission studies, with an emphasis on GHG emissions and corporate social responsibility reports. We carved a niche for ourselves, championing authentic relationships with clients and Indigenous communities.

We operate real-time environmental monitors that feed air quality data to smelters, the government, and a public website.

How can the industry harness data to improve environmental sustainability?

Data is a tool for informing not just operations but also the right to operate, disclosing impacts, and fostering accountability. In a time where mining is vital to the new green economy, data allows companies to maximize production and minimize negative impacts. Real-time data empowers companies to make informed decisions, preventing harm to communities and the environment. Transparency in reporting, driven by data, initiates a dialogue and compels companies to improve. Data is the storyteller, guiding the industry toward sustainable practices, ensuring production meets demand while minimizing environmental impact, and fostering continuous improvement. ■



Emily Thorn Corthay

Founder and CEO
THORN ASSOCIATES

Have you observed any trends in demand for your services?

We have seen an increase in demand for climate risk assessments. Additionally, there is a growing interest in scope three GHG emissions analysis. On the other hand, we have noticed a decline in demand for decarbonization strategies. This is likely because most companies have already completed their strategies, and our focus is now on supporting them in implementing and tracking progress toward their decarbonization targets.

Can you provide an update on any changes in climate standards and initiatives?

The Task Force on Climate-Related Financial Disclosures (TCFD), previously a voluntary initiative, has been fully embraced by the International Financial Reporting Standards (IFRS). Now known as IFRS S1 and S2, it goes beyond the TCFD by introducing new requirements. This includes disclosing the capital allocated to decarbonization efforts. The Canadian Securities Administrators has expressed its intention for a Canadian-adapted adoption of IFRS which will likely follow suit after the U.S. adoption. This adoption represents a seismic shift, making it mandatory for publicly traded companies to adhere to these global standards. Notably, IFRS mandates scope 1, 2, and 3 GHG reporting, although its adoption by the U.S. and Canada is yet to be confirmed. ■



Louise Pearce

Global Mining Director
ERM

What are the recent developments in ERM's metals and mining business?

We are focusing on critical minerals leadership, e.g., through our in-depth study of the reasons behind the delays in getting mines online and minerals to market. We released preliminary research before COP28 and it clearly showed the importance of addressing social opposition rooted in environmental concerns amongst the most important delay factors. We expect to publish our findings in April 2024.

Are there specific areas of expertise gaining or losing demand among your mining clients?

One notable trend is an uptick in addressing legacy issues, particularly in mine closure markets. By viewing mining companies as land stewards and exploring partnerships, we aim to re-define closure thinking and envision alternative, value-adding uses for the community.

In terms of the ambitious decarbonization targets of COP28, the mining industry faces the challenge of balancing its role as part of the solution and part of the problem. Key themes include carbon markets, accelerating innovation, and responding to diverse investor expectations, ranging from downstream manufacturers to government partnerships. Lastly, the social paradigm is shifting, requiring a deeper understanding of the social context of mining. ■



Mary-Jane Piggott

Vice President,
Mining Environmental Group
KLOHN CRIPPEN BERGER
(KCB)

What trends have you observed in how mining companies approach tailings management?

One significant trend is an increased focus on governance, dam breach assessments, and better documentation practices. The introduction of the Global Industry Standard on Tailings Management (GISTM) in 2020 played a crucial role in highlighting the importance of good governance. Due to this, mining companies and consultancies are now placing more importance on creating and maintaining robust documentation and change management practices. This focus is essential for creating transparency and accountability. Consequently, improved data management has been a prominent trend in the past few years.

How can the industry improve data collection for better predictions and modeling?

The collection of vast amounts of data is not always the solution, and there is a need for discernment in determining what data is required for specific objectives. Effective data management and data quality are crucial aspects of the process. Furthermore, the industry must strike a balance to ensure that the collected data is meaningful and relevant to the goals of the predictive models and analytical tools being used. In some cases, collecting too much data can lead to inefficiencies, making it challenging to extract valuable insights from the overwhelming volume of information. ■



David Oliphant

VP Business Development -
Heavy Industry
VEOLIA WATER
TECHNOLOGIES CANADA

What services does Veolia provide to the Ontario mining industry?

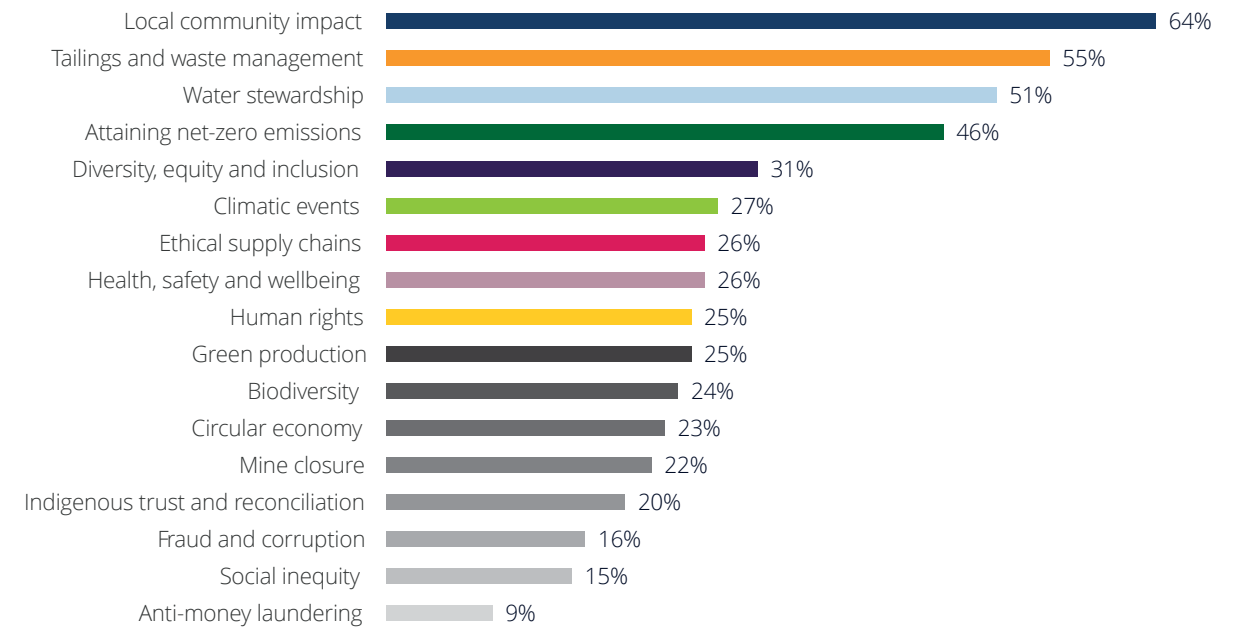
We offer a wide range of services to address the mining industry's environmental and regulatory challenges. Our mobile water services are a cornerstone of our offerings. We have one of the largest fleets in North America, equipped with various advanced technologies that can be deployed for discharge to the environment and other critical applications. We also have a strong presence in the chemical space, which plays a crucial role in water treatment processes. Additionally, our digital platforms offer innovative solutions to our clients.

Can you highlight recent case studies in Ontario?

We often face the challenge of excess water due to the region's numerous lakes. Our technologies are designed with a small footprint, making them particularly suitable for remote areas. Additionally, we utilize a state-of-the-art monitoring system called Hubgrade to track water treatment, quality, and efficiency in real-time, enabling proactive maintenance and immediate response to any issues.

Northern regions tend to have harsh weather conditions, so we use our knowledge to address issues such as dealing with ammonia, a common problem in cold weather conditions. Our biological processes are highly effective in removing ammonia and other contributors to toxicity, such as cyanide species. ■

Which are the ESG factors facing the most scrutiny from investors in 2024?*



* Respondents could choose more than one option

Source: EY mining and metals business risks and opportunities survey data 2024

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At a time when the world desperately needs Ontario's vast critical mineral deposits to facilitate the energy transition, some have been pushing for regulations to be relaxed to hasten the time it takes to build a mine. The rationale here is that the environmental impact of a hastily built critical mineral mine is far outweighed by the environmental benefits the mine will bring once it is in production – as the minerals mined will go on to be used in wind turbines, EVs, and the like. Louise Pearce, global mining director at ERM, the world's largest pure-play sustainability consultancy, shared her thoughts: "Achieving a balance is crucial, understanding the needs of all stakeholders is paramount to a project's success. Instead of trying to bypass regulations, the key is early de-risking of projects, engaging stakeholders, and integrating environmental and social considerations from the start."

ESG is not just limited to environmental responsibility, social issues are also a crucial component, and there is a good reason both are often grouped as 'ESG'. Diversity and inclusion comprise the central 'S' in ESG. There can be no successful ESG without a honed focus on these issues as well. "Statistically, diversity in C-suite positions increases operating performance and promotes creativity and resilience. Diversity is the key to disrupting sustainability, decarbonization, and safety goals," said McCartney.

Ontario's miners and service providers are well-positioned to take advantage of their rich history in gold mining and a rich ecosystem of environmental experts. Taking advantage of technological advancements and an improved understanding of the environment will give Ontario a chance to make its next generation of mines greener from the get-go, considering ESG at all steps of a mine's life. "The increase in exploration activity for critical minerals has led us to reevaluate and reapply many technologies in our portfolio. We are working closely with

clients to maximize resource recovery and provide solutions for a circular economy, addressing both the front-end and end-of-life aspects, including battery recycling," shared David Oliphant, VP business development - heavy industry, Veolia Water Technologies Canada.

For miners operating in Canada, and other similarly mature mining jurisdictions, strong ESG credentials are no longer merely an extra 'cherry on top' for a project, but a necessity. With the impending changes in regulation and increasing investor scrutiny, there is less and less margin for error when it comes to environmental and social responsibility. "Sovereign and retirement funds are now playing a more significant role in financing mining projects, with a strong emphasis on tying capital availability to a company's ESG performance. This shift underscores a broader trend where sustainable practices are becoming integral to securing financial support for mining endeavors," said Theo Yameogo, EY Canada & EY Americas mining and metals leader, Ernst & Young. ■

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FROSKR



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The significant advantage of this ownership change lies in leveraging a robust balance sheet to acquire additional service businesses.

”

Zimi Meka

Co-Founder and CEO
AUSENCO

Can you provide a brief overview of Ausenco's performance in 2023?

2023 was an exceptional year for Ausenco. In terms of performance, we achieved around AU\$1 billion in revenue, our highest on record. We successfully completed the Magino project, and are finalizing the Mantoverde project in Chile for Capstone Copper. Additionally, we initiated the Zafranal project for Teck and the San Gabriel gold-silver project for Buenaventura in Peru. These projects, along with ongoing work on over 100 feasibility and pre-feasibility studies, showcase the robustness of our project delivery capabilities. Overall, it was a dynamic and successful year for Ausenco.

Another major recent highlight was the announcement of our new investors in September 2023. A new shareholder group including Eldridge, Brightstar and Claire Group is in the process of closing a deal to take over as majority shareholders of Ausenco. This marks a strategic move for our investors who are looking for a way to support the energy transition.

Will the change in ownership change Ausenco's approach towards its mining work?

Not at all. We will continue to serve the mining market, focusing on the critical metals that drive the energy transition. We have always maintained a focus on copper, base metals, gold, and consistent work with nickel. We are also focused on lithium. This group of investors was drawn to our experience with these commodities. The significant advantage of this ownership change lies in leveraging a robust balance sheet to acquire additional service businesses. This enables us to

seek providers that complement our existing skills, with the necessary capital for expansion—marking a pivotal shift in our growth.

Have you observed any changes in the demand for Ausenco's services?

We have witnessed a shift in demand this past year as securing funding has been challenging for smaller players in Ontario. Interestingly, our client base has diversified, with increased business from major mining companies like BHP, Rio Tinto, and Newmont. However, some pre-development juniors have faced financing difficulties, leading to project delays. Our strategy of maintaining a diverse client base has proven crucial. I anticipate changes in the latter half of the year, with an expected surge in financing particularly in the gold sector.

How did Ausenco handle the challenges of 2023, including inflation?

We noticed the impact of inflation slowed down in 2023. There continues to be strong demand for our services, especially in the feasibility study space, which is performing exceptionally well. Juniors are facing challenges with the development phase of projects, but the feasibility study segment remains robust. Diversification across commodities, regions, and client bases has been crucial in maintaining growth, and we have been aggressive in capturing market share. The focus is on ensuring resilience and adaptability in different market conditions.

As for ESG-related services, this has been a significant area of growth for our environmental group. The demand for these services continues to increase, driven by a shift towards

more sustainable practices in the mining industry. There is a clear emphasis on achieving more with less—less water, less energy, and less land disturbance. This shift aligns with broader industry trends and is further accelerated by recent developments in the regulatory landscape. Meeting these challenges has become a key focus, and we are actively developing innovative solutions to address environmental concerns while supporting the mining sector's sustainability goals.

How would you compare Canada and Australia as mining destinations?

In my experience, the permitting process in Canada tends to be slightly longer than in Australia. In Canada, objections to development can come from various parties at any stage, leading to uncertainties. On the other hand, Australia follows a defined process with a clear timeline, providing better clarity for stakeholders. In Canada, navigating through various authorities like Provincial Governments, the Federal Government, and First Nations can be challenging, with unexpected obstacles emerging even after obtaining permits. In contrast, Australia's permitting process seems more structured.

On the other hand, once a fiscal loyalty program is negotiated in Canada, it remains consistent, while in Australia, we have seen increases in royalties despite previous agreements. The difference lies in the consistency in government royalties. Canada maintains stability, whereas Australia's royalties may fluctuate based on sudden government decisions driven by commodity price changes. ■



Pierre Julien

Executive Vice President
DRA GLOBAL

Can you provide an overview of DRA Global's performance in 2023?

2023 marked a transitional year for DRA Americas, as we shifted from primarily executing project development studies to executing projects. Our strategy involves identifying project development opportunities that have a high probability of getting financed and permitted. We then assist the asset owners by guiding them through various development stages, helping them build the best business case and leveraging our expertise in NI 43-101.

Our strength in battery elements played a crucial role in our success.

Can you discuss the challenges faced by DRA Global and similar companies in recent times?

The challenge arises from societal cognitive dissonance surrounding mining. While there is a collective push towards electrification, renewable energy, and achieving net zero, there is a simultaneous resistance to mining due to its perceived detrimental effects.

The industry faces challenges in three pillars of capital needed to develop the mineral projects. Obtaining finance capital, social capital, and talent capital are equally difficult.

Despite the obstacles, we are succeeding in assisting our clients to advance their projects. For instance, our ESG readiness service assists clients in identifying their carbon footprint during early-stage designs. This allows us to explore processing options with different carbon footprints. ■



Byron O'Connor

Vice President - Mining
PINCHIN

Can you introduce Pinchin in Ontario?

In Ontario, we have a strong team of over 500. Our focus in Northern Ontario is particularly pronounced, with offices in Sudbury, Timmins, Sault Saint Marie, Thunder Bay, and Kenora. As a comprehensive consulting company, we offer a range of environmental services, from baseline studies to feasibility study support. Our expertise includes groundwater and surface water assessment, permitting support, hazardous materials management, and industrial hygiene. Our recent activities, particularly in environmental services focused on water, have led to substantial growth, achieving over 200% revenue growth in the past five years.

Can you provide an overview of trends in demand from the mining sector?

We have been actively involved in the critical minerals sector.

Can you share Pinchin's plans for growth?

We are present nationally, notably in Newfoundland, Labrador, Northern Ontario, Manitoba, and Saskatchewan. While our current focus is on improving partnerships with Indigenous groups, we aim to extend our mining exposure into Alberta, BC, and Canada's North. We are committed to supporting regional projects and fostering Indigenous partnerships to uphold the high service standards we are known for. ■



Andrew Hall

CEO
AMC CONSULTANTS

Can you provide an overview of the recent developments at AMC Consultants?

In 2023, AMC experienced strong activity within a thriving industry marked by numerous new projects and ongoing support to existing ones. One notable trend we have observed recently is a significant pressure on profit margins at many operations. This is primarily driven by a combination of escalating costs and the softening of metal prices from their recent peaks further contributing to margin squeeze.

On the other hand, we have witnessed growing demand to secure sources of minerals essential in green energy generation and batteries. Ontario has numerous assets in this segment, leading to increased competition for mineral sources through acquisitions, expansions, and project developments.

As a result, our advisory and consulting services, spanning operational excellence, strategy optimization, and operations consulting, have experienced heightened demand.

Can you share AMC Consultants' plans for 2024?

Our focus remains on delivering high-quality services and tailored solutions for our clients, a commitment that has served us well for four decades. We aim for continued growth in Canada, leveraging our strong presence and track-record, and expanding our reach by developing and attracting top talent. ■



Tim Bremner

CEO
FORACO INTERNATIONAL

“ The key strategy involves leveraging the expertise we have developed in Canada and Ontario to offer a full range of drilling services worldwide. ”

Can you provide a brief overview of Foraco and highlight your presence in Ontario?

Foraco is ranked as the third-largest global drilling company based on the number of drill rigs catering to the mining and water industries worldwide. In Ontario, Foraco primarily services tier one customers. Our company offers a diverse range of drilling services, encompassing surface and underground core drilling, long hole drill and blast, reverse circulation, rotary, water wells, large-diameter bulk sampling, and deep directional drilling, among others. This diversity allows us to engage in mining activities across various stages of the mining life cycle, from exploration to closure.

Have you observed any recent changes in demand for drilling services, specifically in Ontario?

Yes, the challenging equity markets have affected junior customers and even some mid-tier customers. Despite favorable gold and copper prices, we have noticed a decrease in service levels from junior customers. Fortunately, Foraco is not heavily weighted in that segment — it represents less than 20% of our total revenue globally and even less in Ontario. While it has not significantly impacted us, we remain mindful of the importance of the junior mining space.

Can you provide insights into the composition of your client base?

Our client strategy involves align-

ing ourselves with tier one miners, particularly focusing on EV minerals such as copper, nickel, and lithium. We emphasize drilling during the pre-feasibility and feasibility stages, which is some of the most technically challenging work for drillers. This strategy provides predictability with longer-term contracts, typically lasting 3-5 years. Moreover, it opens opportunities for water drilling services, addressing water issues in both open pit and underground operations.

Can you discuss Ontario's contribution to Foraco's success?

Ontario holds a crucial position in Foraco's operations. It serves as a vital arena for refining our most challenging drilling techniques, particularly deep directional drilling. What sets us apart is our unique approach to handling all aspects internally, including borehole planning and directional management, without relying on subcontractors. This allows our Ontario customers to collaborate with a single service provider, streamlining the process. The Sudbury Basin, near our main office in North Bay, acts as an excellent testing and training ground for our crews engaged in intricate projects for Glencore and Vale throughout the year. Ontario is not just a testing ground; it also serves as the operational base for our drill and blast division, underground coring division, and rotary division involved in water-related projects.

Can you share your perspective on the recent technological advancements shaping the drilling sector?

I am thrilled about the increasing user-friendliness of technology in the drilling industry. A decade ago, the idea of a drilling contractor surveying their own holes seemed far-fetched. However, we not only survey our own holes but also leverage various software and programs to understand and correct their trajectory accurately. The improvements in directional drilling tools, particularly our alliance with BG Drilling Solutions and their continuous wedging tool, have revolutionized our approach. The success rate has soared, providing us and our customers with better, faster, and more cost-effective results.

Some of our rotary drill rigs are remote-controlled, which allows the crew to operate the rig at a safe distance and in some cases, a climate-controlled environment as opposed to being exposed to the harsh elements we sometimes operate in. This has helped us attract the newer generation and has led to more women working in the field.

How has Foraco handled the ongoing talent shortage?

Attracting talent has been challenging for us. In the junior market, projects are often seasonal or short-term, leading to inconsistency in employment. By transitioning to longer-term contracts spanning 3-5 years, we can offer our field crews a predictable rotation schedule, addressing the work-life balance concern. The certainty of employment and the structured rotation have made us more appealing, especially to the new generation who value stability and predictability in their work schedules.

Could you outline your plans for 2024?

We anticipate a significant amount of repeat business and projects from our key clients. However, our primary focus is on diversifying our services in Canada and, more importantly, extending this diversification globally. The key strategy involves leveraging the expertise we have developed in Canada and Ontario as well as other regions in the Foraco world. ■



Engineering and Contracting

Shaping the future: Ontario's mining service providers navigate the new year's terrain

The buzz surrounding critical minerals has prompted mining companies in Ontario to redirect their exploration and development efforts to the north, in pursuit of unlocking a potential treasure trove of green gold. Yet, these colder, more remote regions pose unique challenges. This hive of activity resulted in a 30% increase in mining claims in Ontario's Ring of Fire from 2022 to 2023. Luckily, mining service firms across Ontario are ready to help.

“Clients operating in these challenging environments require partners that understand the unique challenges they face,” stated David Oliphant, the VP of business development at Veolia Water Technologies Canada. “Veolia's technologies are designed with a small footprint, making them particularly suitable for remote areas. This small-footprint technology is not only robust but also highly efficient, making it easier to transport and install in areas where logistics can be challenging,” explained Oliphant.

Remote operations deem onsite services more valuable. Bureau Veritas has developed an onsite lab service offering for battery minerals clients. “This helps to reduce their carbon footprint, remove the use of acids on site, and support the mine to have a cleaner and less labor-intensive process,” said Jon Landau, vice president of minerals North America at Bureau Veritas.

Navigating mine development in 2024

Ontario's mining companies will have to contend with stubbornly high inflation and sharp dips in the prices of certain critical minerals like lithium and nickel. “One notable trend we have observed recently is a significant pressure on profit margins at many operations. This is primarily driven by a combination of escalating costs with sky-high inflation increasing expenses across the board,” said Andrew Hall, CEO, AMC Consultants.

With funding drying up for juniors, competition for capital is high, and according to Pierre Julien, executive vice president at DRA Global, it is easy to fall into the trap of allocating more time and money to raising funds, instead of technical work: “The mining industry fails to deliver projects successfully, with four out of five projects failing to meet budget and schedule. A recurring problem is



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the lack of well-defined scope and insufficient technical groundwork in the early stages of project development. Often, there is inadequate drilling, geotechnical understanding, and metallurgical testing.”

2023 saw certain traditional precious metals miners dip their toes into critical minerals, such as with Agnico Eagle's recent C\$23.1 million investment in Canada Nickel Company. “Traditional base metals miners are increasingly venturing into [the critical mineral] space, and we have been accompanying them on this journey. The current landscape is marked by intense exploration efforts by base metals miners seeking additional deposits of critical minerals,” said Byron O'Connor, vice president - mining, Pinchin.

As prospectors move away from their bread-and-butter minerals and rush to take advantage of the high government and investor interest in critical minerals, technical rigor must not be left behind. The importance of solid technical work cannot be understated, as evidenced by the recent failure of Pure Gold Mining with the Madsen gold mine, resulting in the company's insolvency and a potential class-action lawsuit. “Projects built on preliminary studies without full feasibility assessments can face significant challenges. It is important to invest more in the project's technical base to make it more attractive for funding and avoid struggling to get more funding later,” continued Julien.

License to operate

In December 2023, Canadian producer First Quantum was ordered to close its Cobre mine after protests erupted across Panama against the mine. Despite the Cobre mine accounting for around 5% of the country's total GDP, the public's environmental concerns prevailed. The closure goes to show that maintaining a social license to operate is crucial and public perception can change rapidly.

For precious metals miners, maintaining a social license to operate is arguably even more important than their counterparts in critical minerals. Although many precious metals do have a role to play in the energy transition, the general public is more likely to associate gold with expensive jewelry than photovoltaic panels. “Precious metals face ideological pressures related to environmental concerns, particularly the carbon footprint associated with gold operations,” said Chris Dougherty, president and chairman, Nordmin Engineering.

Ontario is lucky to benefit from a rich mining history, strong environmental and safety laws, and low public sector corruption levels compared with many other jurisdictions globally. Ontario's mining sector will have to work even harder to maintain these in the coming years by engaging with communities and maintaining the highest ESG credentials possible, as younger generations become increasingly wary and hostile towards extractive industries. Eric Smith, managing director at Cementation Americas, a large global mine contracting and engineering company, shared his thoughts: “On the whole, Canadians show greater awareness and support for mining, whereas in the US, there is often a lack of understanding when it comes to modern mining amongst the general public. Permitting in Canada seems to have a more measured approach, whereas in the US, changes with each administration can impact years of progress. Despite challenges in both jurisdictions, Canadians typically display more support for mining, balancing economic benefits with stringent environmental expectations.”

Canada's complex and thorough permitting process for mine development is a double-edged sword. While it maintains the country's ESG standards, it can sometimes come at the expense of clarity for stakeholders, discourage prospectors, and deter impatient investors. “In my experience, the permitting process in Canada tends to be slightly longer than in Australia. In Canada, objections to development can come from various parties at any stage, leading to uncertainties,” said Zimi Meka, co-founder and CEO, Ausenco.

The heavy regulatory burden and red tape in Ontario extends not only to developers and producers but also to OEMs and suppliers in the mining sector. “Recently, we have faced significant regulatory hurdles to expanding our facility. This challenge is felt by a lot of manufacturers in Ontario and slows things down,” said Andrew Guiducci, president of Domite Wear Technology, a Canadian-owned manufacturer of specialized long-lasting wear products for the mining industry.

Mining for data

Mining to meet the green energy transition comes with the weight of monitoring an operation's carbon footprint. EY's Top 10 business risks and opportunities for mining and metals in 2024 report stated: “ESG is attracting more scrutiny from investors and the community. Better use of data and a focus on net-positive impact can help meet growing expectations.”

The collection, interpretation and use of data will be paramount for incorporating ESG into operations. For remote operations, though, data collection becomes complex. “Some regions may have limited bandwidth and challenging connectivity, which can slow down technology adoption,” emphasized Rob Ferguson the segment director of exploration and resource management at Seequent.

Seequent developed two new technologies to help. “MX Deposit, for instance, is designed for drill hole logging and data management, streamlining the process. We also offer Imago, a tool that captures photos of drill hole cores. These photos are then promptly uploaded to the cloud, where they can be accessed, analyzed and integrated into the modeling workflow. The cloud's real-time accessibility is pivotal, allowing mining professionals to make informed decisions while drilling is in progress, reducing costs and environmental impact,” described Ferguson.

“Mine owners and operators are learning the value of robust data collection. For example, core scanning technology and underground use of LIDAR-based mapping are now being used to collect data quickly, and in areas that are challenging to access,” explained Kathy Kalenchuk, president and principal consultant at RockEng.

As Canada suffers heightened inflation, its mining sector is finding inventive ways to collect more data with less time and money: “There are economic benefits to co-collecting LIDAR, spectral, radiometric, time-domain EM, and magnetic data in one flight. Our approach is to minimize data collection costs while maintaining data quality by working around the limitations of flight parameters and instrument interference,” said Doug Engdahl, president and CEO of Axiom Exploration Group.

How data is used afterward is just as important as how it is collected. “Too much data can lead to inefficiencies, making it challenging to extract valuable insights from the overwhelming volume of information,” said Mary-Jane Piggott, vice president of the mining environmental group at Klohn Crippen Berger.

“Ultimately, despite the technological tools at our disposal, the responsibility for data quality remains with humans,” said Eugene Puritch, president and principal mining engineer at P&E Mining Consultants. ■

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Cementation Americas

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Eric Smith

Managing Director
CEMENTATION AMERICAS

Can you provide a brief overview of Cementation Americas' highlights in 2023?

The year 2023 was a successful year for Cementation Americas, with a standout achievement being the exemplary safety performance of our Canadian team. They achieved zero-harm for the calendar year, showcasing our proactive safety culture. Our revenue reached one of the highest levels in recent years, thanks to strategic partnerships with major clients in North America.

What is driving the demand for Cementation Americas' services in Ontario?

In Ontario, we have observed similar circumstances in that majors are focused on continuing capital projects and initiating fewer greenfield projects, though we have seen a slight uptick recently. We attribute the significant distinction to the regulatory environment, which is much more mining-friendly in Ontario. This encourages companies to invest confidently in ongoing operations. Moreover, Ontario has more industry players compared to the Western US, providing additional opportunities.

Can you elaborate on the challenges that Cementation Americas has faced in Ontario in the past year?

We have witnessed a significant rise in cost inputs, particularly in labor, which typically constitutes over 50% of our revenue. Additionally, raw ma-

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We are concluding a groundbreaking shaft project in northern Ontario, overcoming technical hurdles in constructing the deepest shaft in the Sudbury Basin.

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How has the increasing trend of automation and digitalization impacted Cementation Americas?

We have embraced digital innovations to enhance our operations. A couple of years ago, we shifted from manual data collection to a computerized approach, eliminating the need for manual data entry.

Of note, we have partnered with a software provider to implement short-interval control at our sites. Employees now use handheld devices to input real-time data, allowing supervisors to make immediate and informed decisions during shifts. This granular, constantly updated information not only facilitates continuous improvement but also provides the ability to practice even more proactive safety measures and aggregates crucial records for assessing project costs and productivity. While we have not implemented this system everywhere due to network constraints, especially in areas without LTE or underground wireless networks, we are making remarkable strides as data continually becomes a valuable commodity for service providers like ourselves. The information on how work is done, costs, and resource requirements are essential for adding value to existing projects and bidding on future ones, enabling us to stay competitive and constantly refine our approach.

What are your priorities for the coming years?

In the Western US, we are currently engaging with a major mining company in Nevada, marking an exciting opportunity for long-term collaboration. It can be difficult to secure large, new clients initially, but we aim to leverage our successful track record for repeat business. In Ontario, we are concluding a groundbreaking shaft project in northern Ontario, overcoming technical hurdles in constructing the deepest shaft in the Sudbury Basin. Looking ahead, we are enthusiastic about maintaining our skilled shaft team's momentum. Additionally, we are focused on innovative approaches, like mechanized equipment for ground support installation in the Canadian Shield, and plan to extend such practices to other project sites. Our goal is to not only meet but exceed expectations, fostering growth and success beyond 2024. ■

terial costs have increased, although there is a recent tapering off from the high rates observed post-Covid. While we hope for further stabilization, this pricing variability has made mining companies somewhat hesitant to invest in capital projects, despite favorable commodity prices. Ongoing global events, such as the wars in Ukraine and the Middle East, also add to the prevailing uncertainty in the industry.

Have you struggled to find skilled labor?

I find that in Ontario, there is a larger pool of skilled labor due to greater opportunities, educational focus, and a long history of mining as a career path, especially in historical mining camps like Sudbury. In the US, while we have been successful in attracting skilled labor, the pool is inherently smaller. We are anticipating a significant labor shortage due to retirements and fewer people entering the industry. To address this, we are exploring technological solutions, shifting towards mechanized equipment, and partnering with local stakeholders for enhanced and condensed training programs. In Canada, we are collaborating with Indigenous partners to deliver regionally customized mining training programs, and in the US, we are exploring partnerships with community colleges for new hire training to ensure a sustainable skilled workforce for the future.



Paul Healy

President Americas
REDPATH MINING

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We are excited about the opportunities in the industry, but we also recognize the need to address challenges such as the skilled labor shortage and attracting new talent to mining.

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Can you discuss Redpath's operations during 2023 and highlight notable projects in Ontario?

We secured a substantial amount of work, including continuing partnerships with key clients like Glencore, Vale, Newmont and Alamos Gold. We expanded our global presence with new projects in the USA, and additional scope at Oyu Tolgoi in Mongolia and PT Freeport Indonesia. Despite this growth, one of the most significant challenges we are facing is the shortage of skilled labor.

What is Redpath's approach to innovation and technology?

We are continually exploring the latest advancements to enhance productivity, efficiency and safety. Our in-house team of experts is well-equipped to assess and develop technology when needed. For example, we developed technologies to support shaft sinking and raise boring.

The shortage of skilled labor is a critical driver of our investment in technology, particularly autonomous machinery. These machines offer distinct advantages, such as increased productivity as they can operate continuously between shifts and tackle high-risk tasks. Moreover, they exhibit a shorter learning curve compared to human labor. If people are not available, we can use a machine. We deployed autonomous machinery at Newmont and the Haile mine in South Carolina. These technologies are most viable for

longer-term projects, as they require infrastructure installation, which can be challenging to justify for shorter-term endeavors.

We are actively implementing technology like digital training initiatives in our operations. Equipment simulators are great because they do not require immobilization of equipment when training new employees. In 2022 we signed a global framework agreement with Sandvik making them our primary equipment supplier.

How has the global framework agreement with Sandvik progressed, and what benefits will it provide?

We are in the process of transitioning our equipment fleet, with a goal to reach around 80% Sandvik equipment in the Americas market by the end of 2023. This transition brings several benefits, including equipment commonality which significantly enhances efficiency. The partnership offers opportunities for collaborative product development, ensuring access to cutting-edge equipment and technologies that will drive our future success.

What technologies will Redpath deploy to meet the demand in remote regions of northern Canada?

Our extensive experience in operating in challenging environments, including those with permafrost, positions us well to support the increased exploration in colder regions. As

exploration projects transition into mine development, technology will play a crucial role in ensuring efficient and safe operations. Technologies like autonomous machinery and other advancements in mining equipment will be pivotal in meeting the growing demand for our services.

How will increasing ore body depth impact Redpath's services?

While shallow ore bodies can be accessed with ramps, truck haulage is not cost-effective for deeper ore bodies. Instead, deeper ore bodies necessitate the construction of shafts. Our expertise in shaft sinking positions us well to meet this demand. We are capable of efficiently handling both shallow and deep shaft projects, ensuring the continued success of our operations.

In terms of safety, the risks of operating in a shallow or deep shaft are typically the same. We recognize those risks and work to mitigate them as best as we can. There is both a moral and operational obligation to ensure people do not get hurt. To stay in business, we must ensure our people are safe.

How does Redpath approach ESG?

Redpath has a formal ESG program with a strong emphasis on the social and governance aspects. While we are committed to environmental responsibility, we are working on better quantifying and documenting our environmental efforts. We are committed to being good corporate citizens and recognize that our clients have the same ESG standards as we do.

What is Redpath's outlook for 2024?

We anticipate growth in our operations, not just in Canada but also internationally. Our goals include developing the next generation of mining professionals and providing innovative solutions to our clients. We are excited about the opportunities in the industry, but we also recognize the need to address challenges such as the skilled labor shortage and attracting new talent to mining. Our focus is on sustainable growth and remaining at the forefront of the mining sector. ■



Chris Dougherty

President and Chairman
NORDMIN ENGINEERING

Can you provide a brief overview of Nordmin Engineering's achievements in 2023?

Notable projects include working with Redpath Mining on South 32's Hermosa project in Arizona and working with Alamos Gold at their Island Gold operation near Wawa, Ontario, implementing a new ore and waste handling facility as well as working on an assessment of process improvements at their Young-Davidson operation. We are also engaged in environmentally positive power generation solutions with a gold project in northwestern Ontario and collaborating with critical minerals juniors like Tartisan Nickel and Green Technology Metals. Our international involvement includes projects with Ivanhoe Electric in North and South America. It has been a busy period, and we anticipate the industry's momentum continuing despite the current slowdown in the junior space.

Have you observed a change in your clientele?

The industry is undergoing a transition. While there has been a significant focus on lithium and critical minerals in recent years, we are now witnessing a shift back to traditional base metals. Larger projects, delayed by the pandemic, are resurfacing, and there is a notable trend in industrial mineral installations in the USA reaching the end of their long mine life cycles. These installations, with 40-50-year mine lives, are now look-

“ Parametric modeling has revolutionized the industry, integrating various aspects into a single, efficient model, and drastically reducing project timelines. ”

ing to expand and secure resources for the next several decades.

Precious metals, on the other hand, find themselves in a state of flux. While gold prices are high, the increased operational costs in fuel, energy, and commodities are impacting the mining industry. Escalating living standards necessitates higher wages, contributing to the challenges of maintaining a workforce in industry. Moreover, precious metals face ideological pressures related to environmental concerns, particularly the carbon footprint associated with gold operations. The industry is in a constant state of change, prompting us to introspect and evaluate our focus areas.

What is the biggest challenge facing service providers in the ECPM space?

The current major challenge in the mining industry, especially in the technical sector, revolves around a substantial shortage of skilled personnel spanning roles from geology to operations and environmental recovery. This scarcity is a result of a significant decline in industry entrants over several decades, creating a critical talent gap despite technological advancements enhancing efficiency.

To tackle this, the industry must focus on promoting itself to young people, dispelling negative perceptions, and emphasizing the importance of a career in mining.

How does Nordmin employ digital tools in mine design, and how have they evolved over the years?

I have experienced the industry's transition from manual design to the digital era, marked by tools like AutoCAD. This shift to a purely digital environment has significantly boosted project efficiency, enabling collaborative work across offices, and involving clients and suppliers in unprecedented ways. The adoption of parametric modeling has been transformative, allowing comprehensive work in a fully three-dimensional environment spanning geology to instrumentation. This has empowered smaller teams to handle larger projects effectively. Over the past 15 years, parametric modeling has revolutionized the industry, integrating various aspects into a single, efficient model, and drastically reducing project timelines. The ratio of engineers to drafters has shifted greatly, with fewer drafters handling more work efficiently. This transformation has empowered companies with small teams to effectively take on large projects. Cooperative work with other companies has become more streamlined, which is crucial given the large increase in M&A activity in the EPCM space.

The reality of remote work has enabled talent acquisition without geographical constraints. Looking forward, our commitment to parametric modeling persists, with ongoing collaboration with software providers for tailored solutions. We are exploring new tools, like large-scale tablets, and focusing on communication infrastructure to support effective remote work.

What is Nordmin's growth strategy?

Our strategy involves expanding our teams, without necessarily being bound by physical offices, and with a special emphasis on growth in Salt Lake City, Utah. We are in the process of relocating our office there to a new space, which will serve as a hub for that region. In Sudbury, we aim to add more professionals to our existing office and continue expanding our team.

Our board is currently full for the next few years, but we remain open to new opportunities that may arise. Additionally, we will continue to consider opportunities to merge with other companies. ■



Kathy Kalenchuk

President and Principal Consultant
ROCKENG

Can you introduce RockEng to our audience?

RockEng is a Canadian-owned consultancy specializing in geomechanics and rock engineering. We provide services ranging from mine design and complex ground control studies for operating mines to due diligence and internal review work for mining and investment companies.

We work on both underground and open-pit mines all over the world. Demand for our services fluctuates between supporting mine operations and pre-feasibility or feasibility studies – recently support to mine operations has been increasingly in demand. In Ontario, this recent demand for operational rock mechanics has largely been for underground gold mines. We are also seeing a significant increase in demand for secondment and training services, due in part to the current labor shortages across many sectors.

How has the rise of critical minerals impacted demand for your services?

We have been involved in some pre-feasibility and feasibility studies, especially for lithium projects. There is a lot of excitement in the industry for these commodities, though we have not yet seen that excitement translate into an increase in demand for our services in critical minerals proportionate to other commodities. This may be tied to a broader slowing of pre-feasibility and feasibility work - the current economic climate has

“ Rock mechanics and ground control are a critical component of mining best practices and safety management. Increasingly stringent regulations are also a contributing factor. ”

seen elevated operations and borrowing costs; this impacts investment in studies across all commodities, not just critical minerals.

What are some recent trends you have observed in underground mining?

Demand for rock mechanics and ground control expertise is increasing – this has been a trend throughout my career. I believe this is because rock mechanics and ground control are a critical component of mining best practices and safety management. Increasingly stringent regulations are also a contributing factor. For example, the Ministry of Labor in Ontario updated regulations so that starting September 1st, 2023, all underground mines require a seismic risk management program; this plays right into our area of expertise.

Secondly, mines have been increasingly operating 'leaner' – less dilution, lower costs, and more optimization. Our industry recognizes that expertise in rock mechanics and well-managed ground control programs improve the economics and productivity of mines.

How has the rise in computing power impacted your field?

Numerical modeling and computational tools are the most common engineering tools employed in our field. While our engineering tools have advanced rapidly, our ability to characterize conditions and understand the stresses on a rock, for example, has

not advanced at the same pace. Our biggest challenge in mining and geological sciences is that we are data-limited; we are limited by uncertainties in our model inputs. Significant risks can be introduced if these computational tools are misused. Competency in engineering means more than just running calculations and making designs – competency also requires recognition of design uncertainties, communicating the risks that those uncertainties may introduce, and making a practical plan for any necessary risk mitigation.

While data limitations are a huge challenge, we are seeing big improvements in the amount of geotechnical data collected as a standard practice. Further, there are lots of emerging technologies that target our challenges in data collection. For example, core scanning technology and underground use of LIDAR-based mapping are now being used to collect data quickly.

What are the recent trends in academia in rock mechanics?

Rock mechanics is a broad field. The tools used to characterize ground conditions are always improving and becoming more applicable to a broader range of geological settings. We are also seeing a lot of investment and research in instrumentation, for example through improved scanning technologies or instrumented ground support strategies. There are also continued advancements in our understanding of fundamental mechanics. For example, in simple terms, as we continue to gain a better understanding of how rocks break, we can make a better prediction of where or when a rock burst might happen in a mine.

What are the plans for RockEng in the coming years?

Consulting firms have a choice to either balloon in size – as there are always clients knocking on the door – or be very selective in hiring strategies and the projects taken on. The management team at RockEng is committed to controlled and sustainable growth through selective hiring focused on providing diversity of gender, ethnicity, and beliefs, but also a diversity of engineering experience and skill sets. ■

Critical Flights

Unlocking Ontario's remote north

As Ontario's Ring of Fire heats up, flights will be essential to accessing the region, especially considering the Northern Road Link project still has a long way to go before it breaks ground. For Air Bravo, whose main base is in Thunder Bay, the Ring of Fire presents an opportunity: "As the mining industry expands to northern regions like the Ring of Fire we foresee a growing demand for our services. The only way to access many regions of the north is by air. Aviation will continue to be a big part of operations in the north," said Rick Horwath, president and chief pilot, Air Bravo Corp.

In Ontario's north, flexibility is key, given the lack of infrastructure and the harsh geography. "The Ring of Fire is exciting. We have a flexible capacity model and strong relationships with other carriers, which we can leverage to bring in other aircraft to support our local mining clients there," said Jeffrey Stout, president and chief operating officer of North Star Air.

Perimeter Aviation is leveraging its ownership by the Exchange Income Corporation, which grants the firm access to the services of its sister companies to extend its services north. Joey Petrisor, president and CEO, explained: "For exceedingly remote sites, we will deliver cargo and personnel as far as the runway will take us, and Custom Helicopters will complete the journey."

Many of Ontario's airlines fly altered aircraft to cater to the mining sector. "We performed the 'Large Cargo Door' modification on one of our ATR72s, increasing the cargo door size to 117"x71". This has been a game changer for mining and construction clients, enabling us to carry oversized cargo into remote locations," said Stout.

In Perimeter Aviation's fleet, the Dash-8-300's back bulkhead was moved forward to accommodate more cargo.

"Now it is a combination aircraft that provides a unique lift to our mining customers," commented Petrisor.

Although Ontario's airlines have been able to overcome the challenge of scant infrastructure in northern regions, there are still limitations as the region poses hurdles to scaling up operations. "Everyone wants economies of scale, but the infrastructure in the North must support it. If it does not, we will only be able to land a Twin Otter, rather than a Dash-8," emphasized Petrisor.

To help, Transport Canada issued Advisory Circular (AC) No. 300-021 in June 2022, which formalized guidance and standards for the construction, maintenance, and repair of Thin Bituminous Surface (TBS) Runways.

TBS runways are asphalt pavements with a thickness of 50 to 100 millimeters, primarily used in smaller airports due to cost-effectiveness and expedited construction timelines. The document outlines acceptable methods that comply with regulations to ensure safety and standardization across Canadian aerodromes.

TBS runways not only provide a reliable and cost-effective alternative to traditional asphalt runways but also prove less expensive and challenging to construct in less accessible regions.

They can be laid over compacted gravel bases, making them suitable for areas where materials like asphalt are hard to come by. "Thin Bituminous runways will also improve runways which enhances aviation safety by easing operational strain," added Horwath.

Good connectivity and infrastructure will be invaluable for Ontario's miners and explorers as demand for critical minerals pushes them into the most isolated and unreachable corners of the Heartland Province. ■

Image courtesy of Perimeter Aviation



Founded in 2001 as a one-aircraft air service in Northern Ontario, Air Bravo has grown to become one of Ontario's most successful air carriers.



The popularity of Air Bravo's corporate/cargo charter division is growing steadily as more and more customers discover the convenience and value of flying with Air Bravo. Our charter clients appreciate that Air Bravo can fly directly to any town or city in North America any time of the day or night.

We always go the extra mile to accommodate the needs of our clients - providing safe, courteous, and comfortable service at all times.

Air Bravo is proud to be a progressive leader in Air Ambulance Medicine. We have years of 'MEDEVAC' experience and have conducted many thousands of patient transfers on behalf of the Government of Ontario and private insurance companies. We are committed to constantly improving our services to provide the highest possible level of patient care.



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“

As the mining industry expands to northern regions like the Ring of Fire, we foresee a growing demand for our services.

”

Rick Horwath

President and Chief Pilot
AIR BRAVO

Can you introduce Air Bravo?

Air Bravo services all the communities in Ontario, from the south to the far north. Our three bases are Sudbury, Barrie Lake Simcoe Regional, and Thunder Bay, which is our main base. We have two new Thunder Bay and Barrie facilities and a well-established facility in Sudbury. We service all the northern communities that miners need access to. Our fleet consists of 13 versatile Pilatus PC-12 aircraft capable of handling cargo, cargo-passenger combo, and air ambulance services. We do the air ambulance for the northern area, in coordination with Orange. If miners need to get out quickly, we have air ambulance capability which alleviates the need to wait for governmental aid. Additionally, our corporate planes provide a luxury option for industry professionals.

Air Bravo boasts a perfect 23-year safety record. As one of the few Argus-rated 703 operators in Ontario, we hold the prestigious platinum elite rating, demonstrating our commitment to safety with no violations, and instilling confidence in miners choosing our services.

Can you elaborate on the advantages of the Pilatus PC-12 aircraft?

The PC-12 is extremely versatile, being configurable for passengers or freight, and features large cargo doors (53" x 52") accommodating various cargo sizes. It is pressurized and has a 28,000 ft operational ceiling, allowing the aircraft to bypass weather. The PC-12 is one of the few turboprops that can land on short strips and get above the weather. It operates the Pratt Whitney engine,

one of the safest on the market. Air Bravo exclusively operates with PC-12s, simplifying operations and enhancing safety. When necessary, we can flexibly sub-charter from carriers like North Star Air for larger aircraft, meeting client needs without disrupting continuity.

How can mining companies leverage your services?

We operate 24/7 with multiple crews per airplane. Our availability and versatile fleet offers mining companies flexible, efficient travel options within Ontario, Québec, and internationally. We are committed to never saying no without exploring all options as longstanding partnerships with major mining companies can attest to.

In the winter, we fly into unimproved strips, like ice runways on frozen lakes. Our whole staff has experience operating into and out of the north.

How does Air Bravo Corp address challenges in servicing remote areas, and do you foresee increased demand for your services as mining moves north?

Air Bravo Corp is committed to servicing remote areas, especially where infrastructure is limited. We collaborate with Indigenous communities and local authorities to enhance infrastructure, prioritizing safety, and efficiency. As the mining industry expands to northern regions like the Ring of Fire, we foresee a growing demand for our services. Our partnership with Indigenous communities and government initiatives strengthens infrastructure, making it safer for the miners going forward. The only way to access many

regions of the north is by air. Aviation will continue to be a big part of operations in the north.

While upgraded infrastructure is vital, retaining experienced crew members is paramount for safe operations. At Air Bravo, our strong retention program ensures a team of seasoned professionals, crucial for safety in northern operations.

Can you elaborate on your relationship with First Nation communities?

We have great relations with northern First Nation communities. We serve various First Nations, including Webequie, Kasabonika, Kitchenuhmaykoosib Inninuwug - Big Trout Lake, Nibinamik - Summer Beaver, and others. Although we do not operate scheduled flights, we provide regular ad hoc and specialty flights. We deliberately avoid scheduled flights, leaving that market to other carriers. Our strong rapport with these communities is built on our commitment to on-time performance, reliability, and safety, factors we pride ourselves on.

Why is Thunder Bay an ideal hub for Air Bravo?

Thunder Bay is a perfect hub for us due to its strategic location, serving as the primary center for northern routes. This central position allows convenient access for travelers from both southern and northern regions, eliminating the need for detours to Pickle Lake. The city's infrastructure supports our operations, providing our fleet with efficient staffing and overnight facilities. Much of Ontario's mining industry is centered in Sudbury; having a base there gives our mining clientele direct access to the north. ■



Joey Petrisor

President and CEO
PERIMETER AVIATION

Can you give an overview of Perimeter Aviation (Perimeter) and your role of the Ontario mining industry?

Perimeter was founded in 1960 by William Wehrle. He sold the company to the Exchange Income Corporation (EIC) in 2004. The business grew to around 45 aircraft, with a mix of Dash-8s and Metros. We are in the people business, helping them travel as well as move medical supplies, mail, and cargo. We also service charter clients, including a couple of mining customers in northern Manitoba and Ontario.

Which aircraft in Perimeter's fleet best service your mining clients?

The Dash-8's exceptional wing design makes it an excellent STOL aircraft, allowing it to operate on strips 500 to 600 feet shorter than what other aircraft require. Many of the runways we service in northern Ontario are in that 3500-foot strip range. The Dash-8-300 holds around 9,000 pounds of freight. The other aircraft we have are the Metro-II and Metro-III.

If we need to upgrade to a larger aircraft, our sister companies under the EIC umbrella— like Calm Air and Keewatin Air— will provide it.

How does Perimeter benefit from being under EIC's ownership?

This grants us opportunities that our competitors do not have access to. For example, the EIC also owns Custom Helicopters. For remote sites, we will deliver cargo and personnel as far as the runway will take us, and Custom Helicopters will complete the journey.

EIC bought Bearskin Airlines in 2010, allowing Bearskin and Perimeter to merge in 2018. Bearskin is a special company; they deliver workers to all the mining hubs throughout Ontario. The brand recognition for Bearskin in Ontario is very high.

What are Perimeter's main priorities for 2024?

Safety is always number one. A close second is to become an airline that is always on time, servicing our customers in a safe, efficient manner. ■

Can you introduce North Star Air to our audience?

We serve 23 fly-in only communities in northern Ontario from our airbases in Red Lake, Pickle Lake and Kapuskasing. We also have a base in Thompson, Manitoba. This facility, constructed in 2017, is our flagship and was designed around moving freight into the North. From Thompson, we serve 23 communities throughout Northern Manitoba and Nunavut directly with the ATR-72, which can land on shorter, unpaved runways, unlike a jet aircraft.

We service 56 communities throughout northern Canada with a combination of cargo and passenger services. We know what we are good at: Serving remote, hard to reach places in northern Canada.

How important is the Ontario mining industry to North Star Air's operations?

We have grown our fleet to meet the complete spectrum of services that mines require. We operate with 17 aircraft. We have the Pilatus PC-12, a nine-seater that runs well in remote areas with ice strips. We scaled up into the larger Basler BT-67, a completely redesigned and overhauled DC-3 with turbine engines, glass cockpit, and large cargo door. We have landed the Basler on sand eskers and ice strips; it enables us to deliver to mining clients in areas that other carriers cannot service with the same size of aircraft. Recently, we pivoted to more traditional regional aircraft— ATR-72-500F. It is the leading aircraft in its class, capable of carrying 17,000 pounds of either bulk freight or fuel. In 2021, we performed the "Large Cargo Door" modification on one of our ATR72s, increasing the cargo door size to 117"x71". This has been a game changer for mining and construction clients, enabling us to carry oversized cargo into remote locations. Most recently, we added the Dash-8 aircraft, focused on workforce transportation and able to hold 37-50 passengers. ■



Jeffrey Stout

President and COO
NORTH STAR AIR



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Thank you!

We would like to thank all the executives and authorities that took the time to meet with us.

Also, special thanks to:

TMX Group - <https://www.tmx.com/>

Ontario Mining Association (OMA) - <https://oma.on.ca/>

Ontario Ministry of Mines - <https://ontario.ca/page/ministry-mines/>

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