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Dear Readers,

The Democratic Republic of Congo's rise to become the world's second-largest copper producer, surpassing Peru, was never inevitable. In fact, it is the result of Peru's lack of political unity and stability over the last years, and the failure to establish a more predictable framework for its mining industry, with several projects in the pipeline being cancelled or delayed. As mining remains the country's economic engine, Peru cannot afford to let other countries meet the growing copper demand driven by the energy transition.

Peru still has a chance to catch up in the "race" against the DRC. Between 2023 and 2024, several projects received approval for their respective environmental studies. For instance, Antamina's life extension was granted its MEIA, and Zafrañal, a greenfield project, received its EIA. Also, in June, Southern Peru announced that it is restarting the long-awaited development of the Tía María project in Arequipa.

Under the leadership of the new Minister of Energy and Mines, Rómulo Mucho, the impulse to the mining industry seems renewed, with a focus on how mining can harmoniously coexist with other sectors, such as agriculture, to generate synergies that benefit local communities.

Mucho has ambitious plans for the industry in 2024. He aims to increase copper production to 3 million t/y, supported by new regulatory measures allowing producers to easily ramp up operations by 10%. Building on the efforts of the previous minister, he wants to streamline permitting and attract more juniors through one-stop-shop bureaucratic procedures.

In this context, Global Business Reports returned to Lima this year to produce the *Peru Mining 2024* special report. After more than 130 interviews, this edition aims to highlight not only the challenges, but also the significant improvements and opportunities available for both local and international players. Peru is not just copper; it also supplies gold, silver, lead, and zinc and has a window of opportunity with other minerals like lithium and manganese. For the world, Peru represents a mature jurisdiction from whose experience the world can learn a lot.

This report helps connect industry players along the value chain, and also serves as a bridge between the industry and our valued readers. We would like to thank all the interviewees for their time and insights, and we also hope you find this report insightful and enjoyable.



Alfonso Tejerina
Director and General Manager
GLOBAL BUSINESS REPORTS



Peru Mining 2024

Introduction

- 8 Copper’s Era and Peru’s Endowment
- 9 Interview with the Minister of Energy and Mines
- 12 Interview with SNMPE
- 13 Factsheet
- 14 The Peruvian Energy Mix
- 15 Interview with Kallpa
- 18 Community Relations
- 20 Universities and Mining Schools
- 21 Business Insights: Industry and Academia

Mining Production

- 24 Copper Output
- 25 Interview with Southern Peaks Mining
- 26 Interview with Southern Copper Corporation
- 27 Interview with Las Bambas (MMG)
- 28 Interview with Hudbay Minerals
- 31 Interview with First Quantum Minerals
- 32 Map: Peru’s Main Producing Mines
- 34 Precious Metals Production
- 36 Interviews with Buenaventura and Minera Poderosa
- 37 Interview with Gold Fields
- 38 Interviews with Hochschild Mining and Bear Creek Mining
- 40 Interview with Dynacor Group
- 41 Zinc and other Base Metals
- 42 Interviews with Volcan and Sierra Metals
- 43 Phosphate
- 43 Interview with Miski Mayo

Exploration and Development

- 46 Exploration and Project Development
- 48 Interviews with Chakana Copper and Tinka Resources
- 49 Interview with DLP Resources
- 52 Business Insights: Highlighted Projects
- 55 Interviews with American Lithium and Aftermath Silver

Engineering, Construction and Consultancies

- 58 Engineering, EPCM and Consultancies
- 59 Interview with WSP
- 61 Interview with Knight Piésold
- 62 Interview with AtkinsRéalis and Stantec
- 63 Interview with Worley
- 65 Environmental and Tailings Management
- 67 Interview with Lara Consulting
- 68 Interview with Walsh
- 69 Interviews with Anddes and Hatch

- 70 Interviews with JCI, Arcadis and IMSS
- 71 Construction and Contractors
- 72 Interview with Construplan
- 73 Interview with Techint
- 74 Interview with MUR
- 77 Interview with ByV IESEMIN
- 78 Interviews with Grupo JJC, COSAPI and Milicic
- 79 Underground Contractors
- 81 Interview with AESA
- 83 Interview with INCIMMET
- 84 Raise Boring and Shotcrete Specialists
- 85 Interviews with Master Drilling and Tumi Raise Boring

Equipment and Technology

- 88 Mining Equipment
- 89 Interview with Ferreyros
- 90 Interview with KMMP
- 93 Interviews with Epiroc and Cummins
- 94 Interview with Terpel
- 95 Interviews with Sandvik and Resemin
- 98 Interviews with Scania and Volvo
- 99 Comminution and Material Handling
- 101 Interview with Metso
- 102 Interview with Weir
- 103 Interview with Weir ESCO
- 104 Interview with Tecnomina
- 105 Interview with Movitecnica
- 106 Interview with Martin Engineering
- 108 Interview with Servingsa
- 109 Interview with Beumer Group Andina
- 110 Equipment Components, Instrumentation and Air Compressors
- 111 Interview with Bosch Rexroth
- 112 Innovation and Technology
- 113 Business Insights: The Mines of the Future

Service Providers

- 116 Drilling
- 118 Interview with Geotec
- 119 Interview with Ak Drilling
- 120 Interviews with Explomin and MDH
- 121 Third Party Services
- 122 Interview with Confipetrol Andina
- 123 Laboratories, Chemicals and Blasting
- 124 Interview with Bizalab
- 125 Business Insights: Innovation for Efficiency
- 126 Logistics, Security and Insurance
- 128 Company Directory



Mining Production
22-55



Exploration and
Development 44-55



Engineering, Construction
and Consultancies 56-85



Introduction

“

The state must respect established rules and promote research to add more value to the industry. The general perception that we only sell raw materials must change, so we must gradually modernize our conditions and refineries.

”

Rómulo Mucho
Minister of Energy and Mines
GOVERNMENT OF PERU

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Image courtesy of Jose Luis Stephens at AdobeStock

Copper's Era and Peru's Endowment

The mining potential within a political minefield

It seems that the words “turmoil” and “politics” are often used together to describe Peru’s current situation and its impact on the mining sector. President Dina Boluarte reshuffled her cabinet many times in 2024. The first time was when she appointed Rómulo Mucho and José Arista as the new Minister of Energy and Mines and the Minister of Economy, respectively. Then came the “Rolexgate”, when, at the end of March, the Peruvian Police raided Boluarte’s home as part of a preliminary corruption case, searching for Rolexes and undisclosed luxury watches. Many ministers quit, which led Boluarte to appoint new ministers in sectors such as Interior, Education, Agrarian, Development, Production, Foreign Trade and Tourism, and Women and Vulnerable Populations. Amid this scandal, Gustavo Adrianzén—the appointed Prime Minister after Alberto Otárola resigned following allegations of favoritism in awarding government contracts to a woman—received a vote of confidence from Congress. During his investment speech, he outlined the Government’s commitment to facilitating mining investments in the order of US\$4.6 billion and strengthening the national mining industry by prioritizing projects like Tantauatay, Huancapetí, Romina, and the expansion of Antamina and Raura.

On April 2024, S&P Global Ratings downgraded Peru’s long-term foreign currency sovereign credit rating from BBB to BBB-. “Peru urgently requires a comprehensive national strategy and policy for the mining sector to offer clarity to investors and communities. The lack of government cohesion leads to uncertainty in stakeholders,” commented Steve Botts, president of consultancy firm Santa Barbara Consultants.

But how can Peru develop a cohesive national strategy for the mining sector when ministerial changes occur almost every month? “The inconsistency in governmental policies disrupts continuity and negatively affects the entire economic landscape,” said Marcial García, partner at EY.

Peru’s GDP contracted by 0.55% during 2023, and this downturn would have been even worse if not for the mining industry’s contribution: “Despite Peru’s overall economic growth dipping to 0.55%, mining contributed approximately 1.5% growth, mitigating what could have been a more severe downturn. It is crucial to convey this message to the public as we continue to grapple with a global challenge in shaping a positive perception of mining,” asserted Rómulo Mucho, Minister of Energy and Mines, to GBR.

Investors’ perception of Peru’s political landscape is crucial, but what do Peruvians think? You can argue that not every part of society is aware of S&P’s downgrade. Still, there are many other political and economic layers that they can grasp. According to a survey by Datum International for El Comercio from June 1 to June 4, 2024, President Boluarte’s popularity dropped to 5%, the lowest approval rating for a president in Peru since 1980. On the other hand, an Ipsos survey for América TV, also conducted in early June 2024, revealed that 84% of participants believe it would be better to hold elections before 2026, and 52% support Congress proposing Boluarte’s removal through a vacancy process.

This prompts various questions. Will the Peruvian society take to the streets to protest against Boluarte, similarly to how protests precipitated Castillo’s removal in late 2022? If so, when? And what about Boluarte’s support?

Boluarte no-longer has the support of Peru Libre, the party with whom she ran for vice president before assuming the leadership in Peru following Castillo’s removal. In fact, when the Rolexgate came to light, *Perú Libre* and *Cambio Democrático-Juntos Por el Perú* presented several motions or petitions for vacancy, citing “permanent moral incapacity”. However, Fuerza Popular (a right-wing party founded and led by Keiko Fujimori, former presidential candidate and daughter of the former president Alberto Fujimori), along with its right-wing allies, blocked these attempts. They argued that such actions would adversely affect Peru’s governance.

There are some interesting synergies between Boluarte and *Fujimorism*. While Boluarte continues in office, Fuerza Popular, Fujimori’s, continues to exist. On June 10, 2024, Boluarte enacted Law 32051, which exempts political parties from criminal liability in corruption cases, thereby preventing Fuerza Popular from being dissolved by the Judiciary. Fuerza Popular was in trouble with the Peruvian justice because of the “Cócteles Case”, which investigated Keiko Fujimori and other *Fujimorists* for money laundering, belonging to a criminal organization, and obstruction of justice, among other offenses. The law enacted by Boluarte happened to be approved less than a month before Keiko Fujimori’s trial.

It is uncertain if this alliance of interests will persist until 2026, as Alberto Fujimori suggested when he stated that Fuerza Popular would support Boluarte throughout her presidency. In the worst-case scenario, at least for Boluarte, *Fujimorists* may close ranks to avoid being splashed by new scandals, such as the Rolexgate.

>> 10



Rómulo Mucho

Minister of Energy and Mines
GOVERNMENT OF PERU

“Peru has more political stability than a year ago, an attractive legal framework for investments, and abundant local talent and capital.”

Could you provide an overview of the current state of the mining industry?

The pandemic was a tragedy for the country, and there were few advances in mining projects. While 2021 marked a year of recovery, the progress in 2022 did not match the same intensity witnessed in 2021. In 2023, mining maintained positive results. Despite Peru’s overall economic growth dipping to -0.55%, mining contributed approximately 1.5% growth, mitigating what could have been a more severe downturn. It is crucial to convey this message to the public as we continue to grapple with a global challenge in shaping a positive perception of mining.

We anticipate 3% growth in 2024, and mining will play a key role. To achieve this growth, mining must take decisive steps forward, securing the necessary permits and garnering support from the Agriculture, Culture, and Environment Ministries. The current government recognizes the importance of mining, which I believe is the reason for my appointment. I am very pleased to have a competent team, including the Director General of Mining, the Vice Minister, and the promotion and sustainability team.

With approximately 70 exploration projects in progress, Peru must intensify exploration and efforts to attract investors and meet the growing demand for metals. We aim to exceed US\$500 million in exploration investments, building upon last year’s closing figure of US\$481 million. Peru has more political stability than a year ago, an attractive legal framework for investments, and abundant local talent and capital.

How are mining projects in Peru’s pipeline progressing?

The Zafranal project, scheduled for 2026, could move forward if there is a favorable disposition and surface land issues are resolved. Meanwhile, San Gabriel is actively undergoing construction. Corani has all the necessary elements in place and is awaiting the resumption of financing. Conversely, the Magistral project is currently not on Nexa Group’s immediate agenda, mainly due to its complex logistics, including access challenges. Romina, a medium-sized project, is progressing. Regarding Newmont’s Yanacocha Sulfuros project, although it was ready for development, it was indefinitely postponed during Castillo’s government.

What is the status of the projects stalled due to social issues?

We expect the start of operations at Las Bambas’ second pit, Chalcobamba, this 2024, which would represent a significant increase in Las Bambas’ production. The integration of Corocchohuayco at Antapaccay also holds promise for a significant increase in copper production.

Do you think the forced closure of First Quantum’s mine in Panama has increased the perceived risk of investing in Latin America?

Yes, investors often group all of Latin America into a single category. In Panama, the focus on ESG and communication was insufficient to avoid the population’s opposition to the project. First Quantum had been present in Panama for over 20 years and developed a project that represented one of the most significant investments in the world,

amounting to US\$11.3 billion. Apart from the mine, the investment included a port, a 300-megawatt coal-fired power plant, a railway, and a copper production plant with capacity to produce 400,000 tons of copper annually. The effects of the forced closure of the mine had consequences globally, as much of the copper that was to be produced already had customers.

Following the events in Panama, First Quantum has decided to focus on Peru, not only on La Granja, one of the largest undeveloped copper deposits in the world, but also on the next project, Haquira. The Panama incident should serve as a warning to Peru, as it demonstrates that if we do not handle our laws and regulations properly and manage modern mining projects adequately, we could face similar situations.

Do you have a final message?

Peru remains an attractive country for investments. The state must respect established rules and promote research to add more value to the industry. The general perception that we only sell raw materials must change, so we must gradually modernize our conditions and refineries. The population needs to see mining as a solution, not a problem.

The government is making a great effort to streamline processes through the Ministry of Energy and Mines. Currently, we are working with 10 public institutions to implement a transactional one-stop shop that facilitates procedures. In addition, recent regulations, such as sworn affidavits, have been introduced, simplifying some processes and providing legal certainty to investors. ■

8 >>

Peru's economic slowdown is associated with a lack of predictability and political cohesion. This highlights the urgent need for a proactive approach, starting within the political sphere. As Eric Caba, president and CEO of Bear Creek Mining, said: "For projects to progress in Peru, it is necessary for the country to gradually improve its risk profile, which will require time and sustained efforts to build confidence among investors and stakeholders."

The one-stop shop initiative and a goal of 3 million t/y of copper

"Congo has already surpassed us [...] Congo's reserves are small compared to Peru's. We have almost 10% of the world's reserves [...] With time, we will become even richer in copper," stated current Minister of Mines, Rómulo Mucho, during an interview with the Peruvian outlet RPP Noticias.

According to more recent figures from the Central Bank of the Democratic Republic of Congo (DRC), the African country surpassed Peru as the second-largest copper producer in 2023, having produced around 2.84 million t/y, while Peru's output was 2.75 million t/y.

Does this mean that everything is lost for Peru? Not at all. There is a window of opportunity for Peru to get back on track and regain that second position.

Between late 2023 and early 2024, the Ministry of Energy and Mines (MINEM) appeared to have listened to the industry and, after working with the Executive Branch, who launched the "Plan Unidos" to reactivate the economy and boost the productive sectors, managed to include within the 25 measures a release of mining projects worth US\$4.64 billion for 2025 and US\$4.65 billion for 2026. Among these projects, we find the short-term extensions of Antamina and Toromocho (US\$2.41 billion), Yumpag, Romina, Corani, and Chalcobamba (US\$964 million), and Zafranal (US\$1.26 billion).

Some of these projects have already obtained their respective permits. For example, Zafranal has received approval for its Environmental Impact Assessment (EIA), Antamina has been granted an extension for its Modification of the Environmental Impact Study (MEIA), and Buenaventura has obtained approval for the EIA for its Yumpag project. However, others, such as Corani and Romina,

require their respective companies to address financial concerns before progressing with the projects.

On February 2, 2024, MINEM announced the launch of the 'digital one-stop shop' (VUD). Under this system, different widespread entities, like the Senace, Ingemmet, and the Ministry of Culture, will work together to meet the deadlines for the approval of permits and reduce a period that currently takes between two and six years. The launch of the VUD seems to be a positive signal for the industry. Stakeholders along the value chain are seeking not to lower international standards but to reduce timelines while adhering to the existing robust standards. "While the existing permitting process is robust and methodical, the key factor is time. Acknowledging the importance of time efficiency, a streamlined process can significantly benefit junior mining companies and expedite the realization of projects," commented Jay Chmelauskas, president and CEO of Camino Corporation.

More recently, Minister Mucho made two interesting announcements during his speech at the "ProExplo 2025" launch on March 21. First, he stated that by 2024, Peru aims to surpass 3 million t/y of copper production. Second, he proclaimed: "I can announce that in the last few days [...] we have arranged, with just a ministerial mining regulation, to increase production capacity by 10%."

Peruvian mining is at a crossroads. On the one hand, there is the opportunity to increase production, but this must be balanced with maintaining positive relationships with local communities, which can often be fragile. On the other hand, the Peruvian government needs to demonstrate unity, transparency, and efficiency to attract foreign investors for exploration. Simultaneously, it must expedite mining permits to overcome the bottleneck hindering the development of new projects.

Being second makes a difference

The difference in copper production between the DRC and Peru during 2023 was approximately 90,000 t/y. Compared to the substantial 2.46 million t/y gap between the DRC and Chile, which produced 5.3 million t/y in 2023 and remained the world's largest copper producer, this 90,000 t/y difference between DRC and Peru might seem insignificant. Is it really so crucial for Peru to maintain

its position as the world's second-largest copper producer? Or is it just a matter of Peruvian pride?

There is a consensus across the Peruvian mining value chain that it is of utmost importance for Peru to maintain its position—and even to try to surpass Chile someday if the country can unlock the projects in the pipeline. Keeping its leading position serves as a benchmark for international companies to allocate their resources and capital. Strong copper producers attract strong copper investments, making this competition vital for Peru's economy. "Maintaining its position as the world's second-largest copper producer signifies the presence of major players supporting significant projects and untapped potential. Although Peru holds roughly 10% of global copper reserves, it is estimated that only 1.25% of its territory has been explored, indicating substantial potential for new discoveries. This ranking underscores Peru's capacity for continuous growth, reminiscent of Chile's perception in the copper sector, where investment decisions are often influenced by perceptions that may not always align with reality but impact economic dynamics," explained Marcial García, partner at EY.

However, are Peru and the DRC comparable in other aspects that contribute to being considered as a tier-one mining jurisdiction?

According to the 2023 Fraser's survey (published in May 2024), Peru ranks 59th out of 86 on the Investment Attractiveness Index, while the DRC follows closely behind at 61st.

Regarding the Policy Perception Index however, which evaluates the attractiveness of mining policies, Peru is notably ahead, ranking 61st whereas the DRC ranks 77th out of 86. "Despite the headlines, Peru's overall situation surpasses that of the DRC in terms of the Fraser Institute's ranking. Competition unfolds in diverse environments with challenges, and many international mining companies are adept at navigating complex jurisdictions," concluded García.

While the DRC surpassed Peru in copper production for 2023, the Fraser rankings indicate that Peru remains stronger in other critical areas that influence the mining sector's investment decisions. This highlights the importance of considering multiple factors beyond copper output. In the report that follows, these will be explained. ■



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“ We have observed increased dialogue and a more market-friendly cabinet. ”

Víctor Gobitz

President
SOCIEDAD NACIONAL DE MINERÍA, PETRÓLEO Y ENERGÍA (SNMPE)

What have been the most significant initiatives undertaken by SNMPE in the past few months?

We have focused on three major themes. Firstly, we have concentrated on streamlining the process of acquiring licenses and permits, without compromising environmental, social and safety standards. We have also worked to establish a unified platform with state representation to provide a holistic overview to mining and to avoid lengthy step-by-step processes.

Secondly, we have addressed the issue of illegal mining and its connection to criminality. We advocate for full traceability of this activity to identify those involved, understand the extent of the problem, and identify the ultimate beneficiaries.

Lastly, we have expressed concerns about the lack of transparency in Petróperú, especially regarding the use of public funds and decisions made behind closed doors. For example, we have seen how investment in a refinery has escalated from US\$1 billion to US\$6 billion, and how oil lots have been awarded without a competitive tender process.

How do you analyze the current state of the Peruvian mining sector?

After the attempted coup on December 7, 2022, the government led by Dina Boluarte has managed to stabilize the country's situation. While we mourn the loss of nearly 60 lives during those violent events, we recognize that Peru has since enjoyed stability, evidenced by a significant increase in production, especially in the southern region.

We have also observed increased dialogue and a more market-friendly cabinet. The recent declaration of a state

of emergency in the province of Pataz demonstrates the government's commitment to taking necessary actions.

However, we are concerned about the lack of large-scale projects after Quellaveco. Although Peru has an interesting pipeline of projects exceeding US\$50 billion, no significant projects have been announced in recent months. This is partly due to country risk and uncertainty in the international market, especially in China, the main consumer of copper. The current price of copper does not incentivize investment in new mines. Although existing operations and expansions will continue, new investments will be limited until the price reaches a more favorable level, probably around US\$10,000/t.

Can you provide a brief context about illegal mining and explain its effects?

The richness in geology, combined with a long mining tradition and a weak state, has allowed for the emergence of artisanal mining. There was an unsuccessful attempt at formalization, since a regulation was created to delegate permitting and oversight of artisanal and small-scale mining activities to regional governments. The result was the creation of two differentiated standards for large and medium-scale mining and small-scale mining.

This regulatory gap has created an environment akin to “the law of the jungle,” enabling the unchecked proliferation of informal mining and processing facilities masquerading as small-scale operations. The economic recession, exacerbated by the pandemic, and the rise in gold prices, have exacerbated this problem. Additionally, recent waves of migration have heightened levels of crim-

inal activity, increasing violence within mining areas. The combination of these factors has created an explosive cocktail that requires a comprehensive solution.

The solution does not lie solely in the Comprehensive Mining Formalization Registry (Reinfo) but in designing a broader and deeper strategy in collaboration with the government. It is necessary to understand the entire production chain and find ways to formalize it gradually, recognizing the complexity of the problem and avoiding social upheaval.

It is estimated that illegal gold production exceeds 2 million oz/y, representing more than US\$4 billion.

What is the status of the life extension process at Antamina, given the projected investment of US\$2 billion?

The Antamina life extension process is about to be completed after more than four years. It is not about increasing production but extending the mine's life. This process reflects the commitment of Antamina's shareholders to the country and its workers.

Do you have a final message for our readers?

Peru is a mining jurisdiction par excellence thanks to the geological formation of the Andes, which provides an extraordinary wealth of various metals and great quality of deposits. Additionally, it has an ecosystem that includes professionals and technicians with expertise in the mining industry, as well as suppliers of goods and services, contractors, and engineering and technology firms. Although there are pending regulatory challenges, the country offers a stable regulatory and tax framework and a favorable environment for private investment. ■



PERU AT A GLANCE

CAPITAL
Lima
HEAD OF STATE
Dina Boluarte

GDP
US\$267.6 billion

GDP GROWTH
-0.6%
TOTAL INVESTMENT (% OF GDP)
18.2%

GROSS NATIONAL SAVINGS (% OF GDP)
19.5%
CURRENT ACCOUNT BALANCE (% OF GDP)
0.6%

DEMOGRAPHIC DATA

POPULATION
34.07
MILLION

UNEMPLOYMENT RATE
6.6%

GDP PER CAPITA
US\$7,930

GDP PER CAPITA (PPP)
US\$16,000

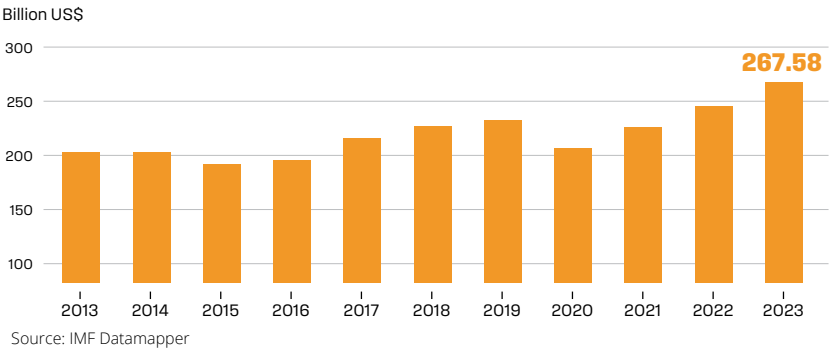
INFLATION RATE
6.3%

HUMAN DEVELOPMENT INDEX (2022)
87 OUT OF 193 COUNTRIES

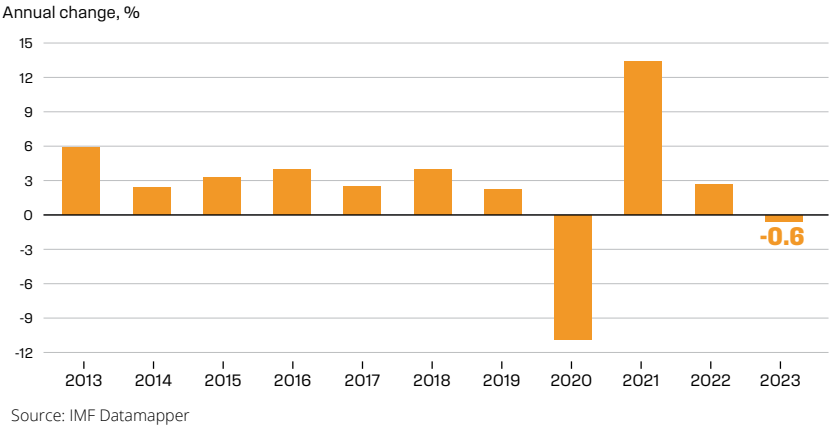
Source: World Bank (2023); UNDP



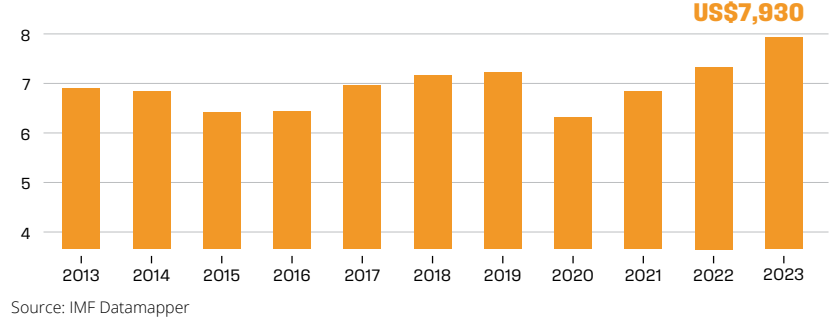
GDP Evolution in US Dollar Value



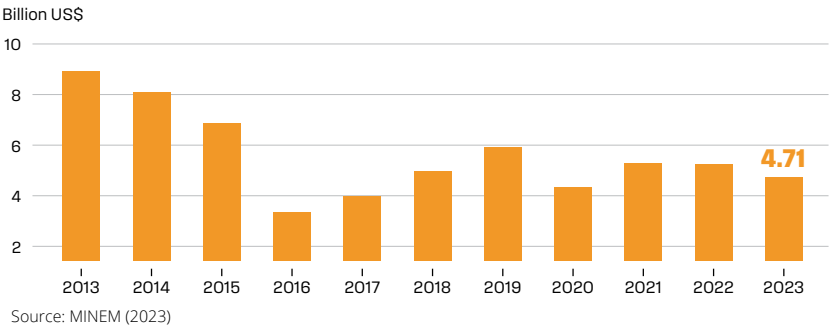
GDP Growth



GDP per capita in US Dollar Value



Total Mining Investment in Peru



The Peruvian Energy Mix

Winning the green race?

International mining conferences and summits have extensively addressed the energy transition and emphasized the significance of mining for it to succeed. Delving into the role that copper and other minerals will play will likely be nothing new to many GBR's readers. The problem is complex, and time is ticking by.

An intriguing aspect of round-table discussions at these international mining summits is the use of the plural “we”: “We need to change our energy mix,” “We need to focus on renewable energy,” etc. On a global scale, there is no doubt that “we”, as a civilization, face these challenges all together. However, what happens when we focus these discussions into the Peruvian context?

According to a report published by the Institute of Mining Engineers of Peru in December 2023, the Peruvian mining sector consumes 9% of Peru's energy and accounts for 2.5% of the CO₂ emissions, far behind other sectors, such as transportation and fishing. There are several alternative solutions in the journey to a green economy, but discussing these initiatives lacks significance without considering a comprehensive green energy mix. So, how “green” is the Peruvian energy mix?

Figures from the National Society of Mining, Petroleum, and Energy (SNMPE) state that in 2023, hydroelectric generation accounted for 48% of Peru's energy mix, while thermal generation accounted for 47% (gas accounted for 96% of thermal generation, with the remaining 4% shared between diesel, coal, biomass,

and biogas). Eolic energy represented 4%, while solar generation 2%.

The balance between hydroelectric and natural gas —the “cleanest” fossil fuel— is almost equal, making Peru a “greener” country, at least from a generation perspective. Rosa María Flores-Araoz, CEO of Kallpa, one of the Peruvian energy power generation companies, said the challenge for Peru does not lie in generation but rather in emissions: “Unlike many other countries, the main challenge does not lie in the power generation sector, but in other sectors such as transportation,” to which she added that Peru has an ideal mix of both conventional renewable energies and non-conventional ones, all backed by the security and efficiency of natural gas.

Kallpa is a corporate umbrella under which three entities operate: Kallpa, managing two natural gas combined cycle plants south of Lima and the Cerro del Águila hydroelectric power plant in Huanavelica; Orazul, operating the Carhuaquero and Cañón del Pato hydroelectric power plants in Cajamarca and Ancash, respectively; and Kondu, established in 2022 to address the SME market in the electricity sector, recently completing the construction of the first 0.5 MW distributed solar power plant in Carhuaquero.

In addition to its generation plants, Kallpa has a pipeline of non-conventional renewable energy projects. These include eolic farms like Vientos in Ica, and Norteño and Cherrepe in Chiclayo, for which it is currently processing the permits. Regarding solar power, Kallpa is

working on a project in Arequipa called Sunny, which has all permits in place and is ready for construction.

Perhaps the most interesting project, from both a financial and scale perspective, is the off-take agreement Kallpa entered into with Solarpack, a Spanish renewable energy company. This agreement aims to build what is claimed to be the largest solar plant in the history of Peru, which, according to Peruvian outlets, has secured financing of US\$176.6 million: “We have also entered into an off-take agreement with Solarpack, which enables them to build a 250 MW solar power plant called San Martín, as we procure all the produced energy to supply our customers. This agreement will allow Solarpack to obtain the financing needed for its construction,” concluded Flores-Araoz.

A palette of colors

From a linguistic point of view, what is truly fascinating about the energy transition is the semantic use of colors, with hydrogen serving as the main example. There are three main types of hydrogen: green, blue, and grey. Green hydrogen is produced using renewable energy sources like wind, solar, and hydro; Blue hydrogen is generated from natural gas, with the carbon dioxide captured and stored underground. Grey hydrogen, the most commonly produced type, comes from fossil fuels.

In recent months, green hydrogen has taken center stage in many interviews,

>> 16



“

Peru has an optimal combination of natural resources and technologies to meet the electrical demands of intensive industries like mining.

”

Rosa María Flores-Araoz

CEO
KALLPA

Can you give a brief introduction to Kallpa?

Kallpa is a major player in the electricity generation sector in Peru. There are three companies under the Kallpa corporate umbrella: Kallpa, Orazul, and Kondu. At Kallpa, we manage two natural gas combined cycle plants located south of Lima, with capacities of 896 megawatts (MW) and 322 MW respectively. Additionally, we own the Cerro del Águila hydroelectric power plant in Huanavelica, the largest private hydroelectric facility in Peru, with an installed capacity of nearly 600 MW. Orazul, our second company, operates two significant hydroelectric plants: Carhuaquero with 110 MW in Cajamarca and Cañón del Pato with 266 MW in Ancash. Kondu is our most recent company, established two years ago to address the SMEs market in the electricity sector. Through this company, we also develop and provide energy solutions tailored to each customer needs helping them to be more competitive and to reach their sustainable development goals.

How important is mining for Kallpa?

Mining constitutes one of our main customer segments due to its high energy demand. The opening of new mines implies significant investments in electrical infrastructure. Additionally, the modern mining industry has ambitious decarbonization goals, prompting us to offer clean and reliable energy supply, as well as to optimize mines' energy consumption. We work with large mining clients such as Southern Copper Corporation, Antapaccay (Glencore), Gold Fields, Chinalco, Cerro Verde (Freeport-McMoRan), Yanacocha (Newmont), Miski Mayo and Alpayana, among others.

Peru has an optimal combination of natural resources and technologies to meet the electrical demands of intensive industries like mining. With conventional renewable energy sources such as hydroelectric, and unconventional ones like wind and solar, distributed throughout the country, backed by the security and efficiency of natural gas, an ideal energy mix is created. Our goal is to maintain this balance to ensure a reliable, competitive and sustainable energy supply.

What is the potential for the development of green hydrogen in Peru?

Peru has very favorable conditions for the development of green hydrogen. Wind energy is well developed in the northern and center part of the country, while the south (Arequipa) is one of the places with highest solar radiation in the world. This, combined with extensive mining activity, could position Peru a center of excellence in this field.

How is the energy transition within Peruvian mines progressing?

In the Peruvian mining sector, we are observing a trend towards energy solutions tailored to the specific needs of each client. Initially, we provided green energy certificates (I-REC as an example) certifying that we have generated electricity from renewable sources equivalent to customers' electricity demand. Unlike many other countries, the main challenge in Peru to reduce emissions does not lie in the power generation sector, but in other sectors such as transportation.

What projects does Kallpa have in the pipeline?

We have a very diversified portfolio, in-

cluding wind, solar and hydroelectric projects, alongside a power plant refurbishing initiative. Currently we are working on a solar project in Arequipa called Sunny (204 MW), which already has all necessary permits and its ready to build. We have also entered into an off-take agreement with Solarpack, which enable them to build a 250 MW solar power plant called San Martín.

Additionally, we have wind projects in different stages of development such as Vientos in Ica, Norteño and Cherrepe in Chiclayo; in which we are processing the permits, but we already have the Preoperability Study approved by the COES.

What challenges do mining companies face when optimizing their energy consumption?

The main challenge is finding the balance between a clean system that uses renewable energies and security of supply.

What are Kallpa's goals for the coming months?

We will continue to operate and maintain our existing assets. Additionally, we will face competitive energy renegotiation processes with our customers and hope to maintain our current contract share. The duration of contracts depends on the strategy of each client, but the mining sector generally prefers long-term contracts due to the importance of electricity costs in their operations.

Finally, we are focused on expanding our energy solutions business with Kondu, and we plan to be ready to implement our personalized energy solutions offering, ranging from distributed generation to solving problems related to deficient transmission infrastructure, which often hinder industry expansion. ■

highlighting Peru's potential on this front. However, there are challenges associated with positioning hydrogen within this color palette. Producing green hydrogen requires competitive access to renewable generation: "Green hydrogen is a beautiful concept, but it hinges on the availability of green electricity. Without green electricity, green hydrogen remains unattainable. In this scenario, the egg comes first: there must be electricity to produce green hydrogen," commented Daniel Rochon, deputy general manager at TotalEnergies Peru.

Flores-Araoz explained to GBR that to promote green hydrogen development, Kallpa is part of an institution called H2 Peru: "Its goal is to anticipate and promote the necessary regulation to facilitate the growth of green hydrogen, recognizing that the lack of regulation has been a barrier to the adoption of new technologies in the past."

According to a 2021 report by this association, the northern (Tumbes, Piura, Amazonas, Lambayeque, Cajamarca, La Libertad, Ancash) and southern regions (Ica, Huancavelica, Ayacucho, Apurimac,

Arequipa, Cuzco, Madre de Dios, Puno, Moquegua, and Tacna) are identified as the primary potential green hydrogen production centers due to their abundance of renewable resources such as wind and solar, coupled with favorable electricity prices. Interestingly, these two zones coincide with the locations of the main mining operations.

It seems that the efforts of H2, among other key players in Peru, have paid off, when in March 2024, President Dina Boluarte made official the approval of Law N°. 31992 for the promotion of green hydrogen. This law defines green hydrogen as an energy vector produced with low greenhouse gas emissions technologies, and seeks to promote the research, development, production, transformation, and storage of this source of energy.

Soon after, on May 8, the Presidential Office spokesperson, Fredy Hinojosa, announced in a press conference that the Peruvian government, in collaboration with South Africa's Phelan Green Energy, has commenced the construction of a green hydrogen plant in Arequipa, with a total investment of US\$2.5 billion.

This is indeed promising news for Peru, especially regarding the energy transition and its potential benefits for the mining industry. However, it also places significant pressure on engineering and contractor companies that deal with tension lines, such as Abengoa Peru, which celebrated its 30th anniversary in 2024.

Among its notable projects is the delivery of transmission lines for the Engie-Lomitas eolic farm, which commenced operations in June 2023 and provides Anglo American's Quellaveco mine with wind-generated energy, making it the first Peruvian mine to run entirely on renewable energy. Abengoa has also contributed to Kallpa's Sunny solar park and supervised high-voltage systems for mining companies like Volcan, Hudbay, and Las Bambas. When asked about how the company is adapting to its client's growing demand for sustainable projects and the inception of new renewable energy projects, Ignacio Baena, Abengoa Peru's president, commented: "We face significant challenges in Peru, such as saturation of connection substations, permitting issues that take a lengthy process, and the need for additional infrastructure. In the past, an oversupply of energy in the market had hindered the progress of some projects due to a lack of clear price signals. However, oversupply is decreasing with the ongoing energy transition, finally allowing some projects to move forward."

These initiatives are gaining momentum not only for their sustainability benefits but also from an economic perspective. In line with this, Marcelo Santillana, Minera Poderosa's general manager, explained that the company has been aggressively focusing on cost reduction. One means to achieve this is by connecting the Santa María treatment plant to the national power grid through the Chacparosas substation, which was inaugurated on May 1, 2024: "Increasing the voltage from 25 to 60 kilovolts will improve energy transmission from the national grid to our Santa María Plant, reducing our dependence on oil," he commented.

Waste disposal

At the very end of the value chain, mining, like any other industrial activity, produces waste. This can be in tailings, construction materials, and chemicals. In this context, circular economy is gaining ground.

Séché Group Peru, a subsidiary of the French multinational specializing in environmental services, focuses mainly on hazardous waste management for the mining, oil, and chemical industries. According to its regional director for the Andean Region and Mexico, Carlos Barrientos, the company operates the largest secure landfill in Chilca. In an interview with GBR, Barrientos explained that the company has been embracing the "Zero Waste to Landfill" philosophy, scrutinizing mining processes and technologies to minimize the production of waste destined for landfills: "The crux of effective waste management lies in early separation at collection sites, preventing widespread contamination by amalgamating waste from various sources. We advocate for revaluating materials like cardboard and glass from the outset, promoting reuse whenever feasible. Ongoing initiatives explore tailings as construction materials, emphasizing the need to prevent long-term adverse effects," commented Barrientos.

Double or nothing?

The fact that the mining industry only represents 2.5% of CO₂ emissions in Peru is not a valid excuse for mining companies not to allocate efforts to reduce them. Additionally, companies have a growing incentive to reduce consumption by integrating energy sources such as solar or wind power that are cheaper than conventional fuels. The problem? Availability: "Finding the balance between a clean system that uses renewable energies and security of supply is crucial. Renewable energy sources like solar or wind are not permanent and, thus, not 100% reliable, so the mining industry, as a large energy consumer, must incorporate other sources into its energy mix, finding the right balance between a cleaner supply without losing the reliability essential to the business," expanded Flores-Araoz.

Several companies have been implementing different approaches and technologies to improve operations and make them more sustainable. For instance, Javier del Río, Hudbay's vice president South America and USA, commented that Hudbay has implemented significant efforts at Constanca to reduce greenhouse gas emissions by engaging with ENGIE for renewable energy supply from 2026 to 2035.

Also in the copper segment, Adolfo Vera, Southern Peaks Mining's president and CEO, shared that the company has been focusing on electromobility by partnering with Enel X for fast charger implementation and acquiring an electric truck from BYD for ore transportation: "The operational experience has been exceptionally positive, evidenced by the successful transport of 20,000 t of ore in 2023. The electric truck incurs an approximate monthly electricity cost of US\$1,000, considerably reducing operating and maintenance costs. Beyond the cost savings, the primary benefit lies in utilizing clean and renewable energy," he emphasized.

Besides using non-renewable energy sources, companies can counter GHG through carbon credits. For example, Bosch Rexroth Peru is using carbon credits to support reforestation projects, which led the Ministry of Environment to certify the company as 100% carbon-neutral, according to Kai Rothgiesser, general manager of Bosch Rexroth.

A2G is a company that identified a niche and seized the opportunity to develop its services. In discussions with GBR, Arturo Caballero, CEO of A2G, mentioned that the company's

focus has broadened to include comprehensive business metrics like KPIs measuring GHG impact on industries, carbon footprint, and CO₂ reduction plans. Now, it aims to "democratize" carbon footprint measurement through its MetriCO2 app. "Our objective is to democratize carbon footprint measurements, transcending the realm of larger corporations to make it accessible for medium and small-sized companies. A2G provides the software, customizing it for each company, and the company's team inputs the necessary information, generating their carbon footprint data," he explained, adding that companies like Buenaventura and Marcobre have already embraced this platform.

It is clear that Peru, at least in terms of its energy matrix, does not start under the same conditions as other countries. This is because of its relatively greener energy mix and the advancements in regulatory matters. However, while Peru is on track regarding optimal energy performance, climate change does not know borders: "Peru ranks as the world's third-most climate-vulnerable country. It grapples with diverse climatic phenomena like El Niño and La Niña, poorly integrated communication networks, and elevated poverty levels, which collectively render Peru highly susceptible to the impacts of climate change," concluded Caballero.

If anything can be gleaned from these discussions, it is a trilemma: energy must be clean, competitive, and secure. The energy transition is a complex puzzle, and non-conventional energy sources like wind, solar, and green hydrogen are just small pieces of it. ■

We are the energy that makes the world never stop

kallpa

Qorikilla: Manos Chilcanas

"Qorikilla" is a company made up of women in southern Lima who, after participating in entrepreneurship workshops promoted by Kallpa Generación, decided to combine the knowledge they acquired with their passion for weaving and turn it into a source of income for their families.



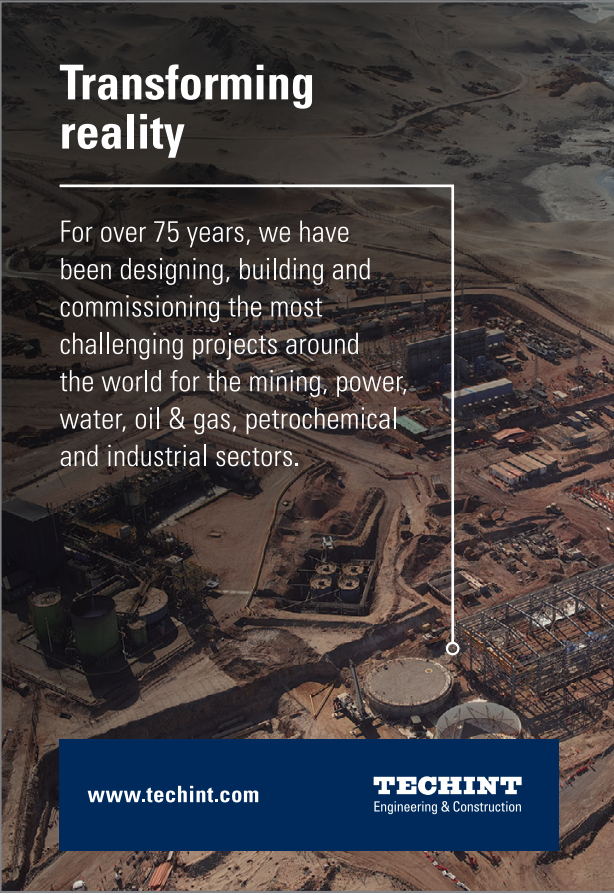
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Community Relations

Strengthening the often fragile relationships

The mining industry has undergone significant changes, and today, a broad spectrum of trends, opportunities, and challenges are transversal and intersect more frequently. Within this intersectionality, one factor stands out as the convergence point: society and, consequently, community relations.

Societal needs drive the demand for minerals like copper, while local communities' approval is, in most cases, the key to the success of a mine. Mining and society share an intrinsic and mutually influential relationship.

In this context, it is crucial to recognize that understanding social phenomena is not solely the responsibility of the State but also falls within mining's remit. From exploration, where high expectations of mineral potential and economic benefits arise, throughout production, and ultimately during closure —when companies should leave a positive legacy in

their area of influence for future generations—, community relations are integral to mining operations. "It is essential to gain and maintain the trust of communities, which involves solid commitments and timely execution of concrete objectives to establish long-term credibility," commented Gonzalo Morante, general manager of Walsh Peru.

Mining-community relations in Peru are often fragile. There are many examples of projects in the pipeline that are not yet mining, and many examples of operations halted due to social issues, especially in 2023. This makes one wonder: Have Peruvian mining companies learned valuable lessons from these experiences over the years?

According to Gonzalo Delgado, director of the Center for Studies in Mining and Sustainability (CEMS) at the Universidad del Pacífico, there has been a notable evolution as to how companies un-

derstand social issues. However, there seems to be a reluctance to showcase positive results in the face of criticisms: "Criticism is important and necessary. But it is equally important to acknowledge progress and positive outcomes. We still have a long way to go in this regard," he stated.

Delgado also highlighted the complexity of Peru, emphasizing the need to analyze it through clusters. He explained: "The mining context in Cajamarca, for instance, differs significantly from that in the south of Peru. Therefore, solutions cannot be one-size-fits-all."

Fostering, not investing

When GBR interviewed Steve Botts, president of Santa Barbara Consultants, he explained that, because of historically entrenched hostile relations between both parties, communities may negotiate assertively with mines out of fear of

exploitation: "Bridging these gaps of mistrust and building constructive relationships are pivotal outcomes of these engagements, addressing concerns about fair benefits and possible obstacles from both sides [...] This rush, especially among juniors aiming to sell to larger companies, can backfire if community relations are mishandled," he explained.

Juniors developing new projects must be cautious about how to approach new communities so there are no misunderstandings or false expectations. "Success lies in striking a joint balance and ensuring fair benefits for both parties. When this balance is achieved, positive relationships flourish; however, any disproportionate inclination can trigger tensions and difficulties in collaboration," commented Álvaro Espinoza, CEO at Silver Mountain Resources.

It appears that juniors have learned from both their successes and failures to enhance their community relations strategies. For instance, Forte Minerals, a junior company, has recently obtained the DIA approval for two projects, Esperanza and Pucarini. Each permit allows them to establish 40 drilling platforms, but it must first undergo the Consulta Previa process. Anticipating this requirement, it has already released an ESG report. "By proactively addressing environmental and social considerations through our ESG initiatives, we demonstrate our commitment to ethical business practices and long-term value creation. Moreover, the ESG report is a benchmark for measuring our performance against industry standards and stakeholder expectations. By fostering transparency and accountability, we enhance trust and credibility with investors, regulatory authorities, and local communities, safeguarding our social license to operate and ensuring the long-term sustainability of our business," emphasized Patrick Elliot, president and CEO of Forte Minerals.

Illegal mining vs artisanal mining

To claim that the relationship between local communities and mining is at its best would be inaccurate; it remains delicate. According to the Peruvian Office of the Ombudsman for the Prevention of Social Conflicts and Governance, as of December 2023, two-thirds of the 134 active socio-environmental conflicts were mining-related, a percentage that is in line with 2022 figures as well.

Based on information from the Financial Intelligence Reports (IIF) by the Superintendence of Banking and Insurance (SBS), in their Financial Intelligence Unit (UIF) report of June 2023, illegal mining is the crime worth the highest accumulated amount, reaching US\$8.2 billion, surpassing drug trafficking, which amounted to US\$640 million. In addition to the "synergies" among illegal mining and other illegal activities, which affect the sector's image, illegal mining has several environmental consequences, such as the indiscriminate use and disposal of mercury for gold recovery.

Since illegal miners do not adhere to the regulations proposed by the government, unlike formal mining, illegal mining operations often neglect environmental safeguards. Addressing illegal mining is a complex challenge. According to Marcial García, partner at EY, when informal mining emerges, there is no clear response, especially from specific leftist parties that oppose formal mining activities due to environmental risks: "The lack of control has allowed these illegal activities to grow, even infiltrating certain power structures, backed by lobbyists who hinder necessary legislative changes," he explained.

The most delicate aspect of illegal mining is its impact on Artisanal and Small-Scale Gold Mining (ASGM), particularly in terms of public perception. Unlike illegal mining, ASGM is legal and adheres to environmental standards. According to the World Gold Council, ASGM is among the fastest-growing rural livelihoods in numerous developing countries. Various reports from the UN Environment Programme and the World Gold Council suggest that ASGM contributes between 15% and 25% of the world's gold. However, this practice is often overshadowed by the prevailing perception of environmentally unsound extraction methods and the association of such activities with illegal mining.

In Peru, the MINEM does not explicitly outline specific figures regarding ASGM's contribution to the national gold output. Nevertheless, Jean Martineau, president and CEO of Dynacor Group, observed its considerable impact: "It is estimated that between 22% and 24% of annual gold production comes from these miners, a significant percentage that continues to increase, unlike the conventional mining sector."



Jimena Sologuren
President
PERUMIN 37

“It is essential to increase public spending to benefit people's quality of life genuinely. Additionally, both companies and the government must adopt a broader territorial development approach, avoiding compartmentalization by districts or provinces and fostering integration with other sectors, such as agriculture and agro-export.”

Dynacor is one of the few companies in Peru focusing on ASGM. To ensure that the gold it exports to Switzerland does not originate from illegal mining, the Peruvian government requires the company to guarantee the traceability of gold to its origin. Additionally, according to Martineau, Dynacor adheres to rigorous due diligence when admitting new miners: "We set compliance standards with 25 points that we check thoroughly. We maintain constant oversight of these criteria each time a miner returns, ensuring that they are met continuously," he explained.

Peru has been trying to formalize several informal mining operations through the Reinfo (Integral Mining Formalization Registry). However, for Víctor Gobitz, president of the SNMPE, the Reinfo is not enough: "The solution does not lie solely in the Reinfo but in designing a broader and deeper strategy in collaboration with the government. It is necessary to understand the entire production chain and find ways to formalize it gradually, recognizing the complexity of the problem and avoiding social upheaval," he said. ■



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Universities and Mining Schools

Too many students, not enough projects

Universities, schools, and institutions specialized in mining education are indispensable pillars for the industry's future. Not only they are the hotbeds for talent and human capital necessary to drive the industry's progress, but they also represent the hubs where research can be conducted and current industry problems can be analyzed and integrated into syllabus to prepare students for these challenges.

The relationship between these educational centers and the private sector should be mutual, collaborative, and symbiotic: universities must forge partnerships with companies to provide their students with real-world practical experience to apply their knowledge. On the other hand, the private sector relies on this fresh talent with new eyes and innovative ideas to challenge established paradigms. "The university can be crucial in generating highly trained human capital and continuously enhancing its level. Furthermore, it promotes applied research that can yield economic benefits through economies of scale. Academia and industry must adopt an open and collaborative approach to capitalize on these opportunities fully," pointed out Pedro Grados, director of the Graduate School at the University of Lima.

On the research side, the Center for Studies in Mining and Sustainability (CEMS) was established in 2014 as part of the Universidad del Pacífico. The CEMS focuses on five main research

lines: local governance for development; productive chains and innovation; artisanal and small-scale mining; impact and outcome's assessment; and mine closure's social aspects. Besides its strong research-focus, the CEMS offers consultancy services: "We occasionally receive financial support from mining companies for applied research. There is a straightforward rule: the sponsor can suggest the research topic, but it cannot and should not influence the research questions or results. These must be public domain and widely disseminated," asserted Gonzalo Delgado, the CEMS's director.

In Peru, there are 27 universities offering programs in Mining Engineering, Geology, and Metallurgy. Paradoxically, while jurisdictions like Canada, Australia, and the USA are dealing with a talent shortage in the mining industry, and universities are striving to attract fresh young talent, Peru finds itself at the opposite end of this spectrum.

At a forum organized by the Institute of Mining Engineers of Peru in 2023, Mario Cedrón, a professor at PUCP, UNMSM, and UPC, highlighted that Peru had 16,650 mining students in 2023. He anticipated that around 1,000 would have graduated in 2024 and approximately 1,500 each year from 2025 onward. However, the Peruvian mining industry will only be able to hire around 150 of these graduates, representing a mere 10%. To address this issue, Ced-

rón suggests equipping young people with additional skills to enable them to thrive beyond the confines of traditional mining.

The Mining Technology Center in Peru (Cetemin) was established 21 years ago with the support of Cégep de l'Abitibi-Témiscamingue (Cégep) to create a school for mining technicians. Today, it offers six technical programs: Electrical and Instrumentation Maintenance, Heavy Equipment Maintenance, Geology and Exploration, Risk Prevention, Occupational Health and Safety, Mining Exploitation, and Metallurgical and Chemical Processes. Raúl Benavides, president of Cetemin, noted that the industry's limited capacity to absorb so many students is a significant issue. However, it is exacerbated by the fact that many engineers lack practical experience, even when undertaking internships. "Cetemin stands out by having a training mine in Cajamarca, providing its students with hands-on, real-world experience that gives them a significant advantage in the market. Competency-based teaching is fundamental in mining education. Transmitting theoretical knowledge is crucial, but so is developing practical and soft skills, as well as fostering the ability to work effectively in a team," added Benavides.

Empowering women

From a purely mathematical perspective, whether the surplus of students is

male or female, is irrelevant. However, understanding this information could be interesting, particularly considering Peru's relatively low female workforce rate and the mining industry's efforts to increase female representation: "We expect to reach 30% of female participation by 2030. In Latin America, we are already very close to that, with 26% in Chile and 25% in Peru. In Peru, only 7% of students with mining-related degrees are female, and only 11% in Chile. So, we need to promote female talent internally and externally," commented Luis Rivera, executive vice president at Gold Fields.

Gold Fields and Cetemin have been working with the "Talento Mujer" (Female Talent) to train female operators to increase gender representation in the industry. Despite these efforts, Benavides acknowledged that recruiting female talent for administrative roles is relatively straightforward but more challenging for operational positions. To foster the retention of female talent, Benavides highlighted the importance of addressing seemingly minor aspects within the industry, such as reimagining the design of overalls. "It is crucial to challenge deep-rooted paradigms, as numerous women aiming for operational careers encounter resistance from their families due to ingrained stereotypes," he concluded.

Up to this point, all the quotes in this article, particularly within this dedicated subsection on empowering women and female talent, have been attributed to male C-executives or directors. So, what do women in the Peruvian mining industry have to say in this regard?

GBR interviewed Marilza Carneloz, the recently appointed president-director of Miski Mayo, a phosphate producer. She was the only woman leading a producer mining company interviewed in this report. During the interview, the conversation covered the gender gap in the Peruvian industry, leading GBR to ask her if she had a message for both the industry and other fellow women. She answered: "When a woman sees another woman in a position she once thought unattainable, it sparks a belief in the possibility for herself. The main message is that female representation can and should be increased. It is not just about discussing percentages but about taking concrete actions to make changes happen." ■

Industry and Academia

Executive insights on higher education



Raúl Benavides, President, Cetemin

"Peruvian universities graduate approximately 1,500 students yearly. However, according to Mario Cedrón, a founder of Cetemin, the companies in the industry cannot absorb more than 100 of these graduates. The problem is worsened by many engineers lacking practical experience, even for internships."



Gonzalo Delgado, Director of the Center for Studies in Mining and Sustainability (CEMS), Universidad del Pacífico

"Academic research has mostly focused on identifying shortcomings, problems between companies, communities, and society, or the State's actions at various levels. I believe it is important to focus on opportunities and possibilities for improvement and how to mitigate or eliminate these weaknesses."



Pedro Grados Smith, Director, Graduates School, University of Lima

"Academia is fundamental in generating long-term knowledge and its immediate application. Beyond anticipating future developments, some of that knowledge must be applied now. Collaborating with the private sector facilitates this transfer and strengthens a mutually beneficial relationship."



Mining Production

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Óscar González Rocha
Executive President
SOUTHERN COPPER CORPORATION

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Image courtesy of Hudbay Minerals

Copper Output

Peru vs Congo

Peru's top 10 copper producers have remained consistent. In 2023, Cerro Verde grabbed the lead as the first copper producer in Peru, experiencing a 1.6% increase in output (466,463 t/y compared to the 459,100 t/y produced in 2022). In contrast, Antamina, which held the top position in 2022, saw a 7% decrease, from almost 468,000 t/y to 435,378 t/y.

Southern Peru (Southern) maintains its third-place position, showing a significant 9.4% increase to 374,189 t/y from the 341,898 t/y produced in 2022. According to Óscar González Rocha, executive president of Southern, the company intends further expansion: "In the specific case of Cuajone, we want to expand our operations to achieve the necessary volume to justify the construction of an additional smelter to the current one with a processing capacity of 1 million t/y of concentrates, along with an expansion of the copper refinery in Ilo. This will also represent a new logistical challenge for transporting over 500,000 t/y of copper concentrate to the new smelter in Ilo."

Southern has several projects in the pipeline in Peru, including Tía María, Los Chancas, and Michiquillay, which collectively amount to an investment of US\$6.5 billion, according to González. However, these projects have been in the pipeline for decades, with Tía María being the most contentious.

The project was initiated in 1994, and over the past three decades, it has faced opposition from various authorities. Under Boluarte's administration, there have been mixed messages. For instance, former Peruvian Prime Minister Otárola stated: "Tía María is not within the Government's agenda." However, the current Prime Minister, Gustavo Adrianzén, expressed a different stance during an interview with Peruvian media outlet RRP Noticias, stating: "We have turned our attention to Tía María. We have high expectations there...". José Arista, the newest economy chief, expressed "optimism" about the project's

progress under Boluarte's administration when asked if the project was going to move forward, stating: "We hope so. We hope that will be achieved..."

At the XV Symposium held in Lima in May 2024, there was a buzz about the news that Raúl Jacob, vice president of finance at Southern Copper, had announced that the company was fine-tuning the details to commence construction by the end of 2024 or in mid-2025, with operations set to begin in 2027. Soon after, Grupo Mexico, the conglomerate under which Southern operates, issued a statement to the Peruvian Superintendency of the Securities Market to clarify the situation. Grupo Mexico stated that while Southern would consider it very positive to commence the project before 2024, construction would begin at the most appropriate time, and no specific date had been set. In the meantime, Rómulo Mucho, head of the MINEM, announced that the Executive Branch is evaluating joint measures to promote Tía María.

González Rocha acknowledges that the attitude of the current government has improved. He stated: "As a result of the pandemic and uncertainties regarding establishing an investment-promoting policy, Peru has experienced a recession that needs to be reversed as soon as possible. The country could be in a better situation, and Southern Peru has always been willing to work throughout Peru."

Continuing with the top copper producers, Anglo American's Quellaveco presented a 219.9% increase, becoming the fourth-largest copper producer in Peru, having produced 319,061 t/y of copper. The mine was brought online in late 2022. Las Bambas demonstrated an 18.5% increase following a challenging first half of 2023, with operations picking up swiftly. The mine, operated by the Chinese MMG, produced 302,039 t/y of copper in 2023 (vs 254,712 t/y in 2022). On the contrary, Chinalco experienced an 18.1% decrease (200,317 t/y in

2023 compared to 244,712 t/y in 2022). The remaining companies in the top 10, namely Antapaccay, Marcobre, Hudbay, and Sociedad Minera El Brocal, also showcased positive variations.

Beating costs

In 2023, there was a surge in copper prices, particularly towards the year's end. Concerns arose about declining production due to lower grades and the suspension of activities at First Quantum Minerals' Cobre Panama mine, among other factors. Consequently, 2023 concluded with the average copper price at US\$3.89/lb. As 2024 began, the copper price increased by 10%, reaching its highest since 2022. Another contributing factor to this uptick was when giant BHP, the world's largest miner, offered an unsolicited bid for Anglo American valued at US\$39 billion, which Anglo American rejected.

The price of copper surged to an all-time high, surpassing US\$5 per pound by the end of May 2024. Despite relatively favorable prices, especially during the latter half of 2023, copper mining companies have struggled in the past months with high costs and inflation, which seems to be eating up profit margins. Javier del Río, Hudbay's vice president South America and USA, highlighted that the interplay between a looming supply deficit and challenges related to declining grades and depleting resources globally exerts pressure on prices. Rising costs further contribute to narrower profit margins despite the positive outlook for copper. "In this environment of heightened operational complexity and rising costs, it is imperative to streamline processes and enhance operational efficiency to safeguard profitability," he said.

At a global level, Hudbay acquired Copper Mountain in British Columbia and Rockliff in Manitoba, both in Canada. Additionally, in the US it advanced the Copper World Complex in Arizona

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As a result of the pandemic, Peru has experienced a recession that needs to be reversed as soon as possible. Poverty has increased, and the best way to help overcome this situation is to promote productive employment.

”

Óscar González Rocha

Executive President
SOUTHERN COPPER CORPORATION

What were the copper production and by-products in Southern Copper's operations in Peru in 2023?

Copper production in 2023 increased by 1.8% year-on-year to 911,014 t/y. The annual result was mainly attributed to higher production in our Peruvian operations (+9.5%); this result was partially offset by a 2.9% reduction in production from our Mexican operations, mainly driven by a decrease in ore grades, processing and mineral recovery. Molybdenum production was 26,836 t/y in 2023, 2.3% higher than the 2022 figures. This increase was due to higher production in all our mines, except for the Toquepala mine, where ore grades and recovery fell. Mined zinc production increased 9.2% year-on-year due to higher production in the Chancas and Santa Bárbara mines. Mined silver production decreased slightly in 2023, mainly due to lower production in our Mexican mines. This reduction was partially offset by increased production in our Peruvian operations.

Has Southern managed to maintain operational efficiency and reduce costs?

The cash operating cost per pound of copper in 2023, including credits for by-products, was US\$1.03. This 25-cent increase in cash costs (+32.6%), compared to the US\$0.78 reported in 2022, was mainly attributed to a 17-cent increase per pound in production costs and an 8-cent decrease in by-product credits. Southern Copper has the lowest cash cost of any copper producer.

What are the key projects for Southern Copper, and how do they align with the company's long-term growth strategy?

Southern is working on expanding its current operations and developing its greenfield projects. Our operations at Toquepala and Cuajone always seek to increase efficiency to enhance productivity. In the specific case of Cuajone, we want to expand our operations to achieve the necessary volume to justify the construction of an additional smelter to the current one with a processing capacity of 1 million t/y of concentrates, along with an expansion of the copper refinery in Ilo. This will also represent a new logistical challenge for transporting over 500,000 tons of copper concentrate to the new smelter in Ilo.

What is the status of the Tía María, Los Chancas, and Michiquillay projects?

We are simultaneously developing all three projects, each with its particular characteristics. The estimated investment for the three projects is approximately US\$6.5 billion. We estimate that we could generate 30,000 direct and indirect jobs from these projects.

What new technologies will they apply to improve operational efficiency and reduce environmental impact?

In the case of greenfield operations, Tía María will employ leaching to obtain copper cathodes. This process does not require using a smelter or refinery. Los Chancas and Michiquillay, due to the difficulties of the area where the project are located, engineering studies will determine whether concentration, leaching, or both copper extraction processes will be employed. Southern Peru will employ the most advanced and environmentally friendly technology in its projects.

How does Southern Copper view the current environment in Peru regarding the pipeline of mining projects?

Compared to the previous Government, the perception of the current Government has improved. However, we believe that the current administration should consider those willing to invest to contribute decisively to economic recovery. As a result of the pandemic and uncertainties regarding establishing an investment-promoting policy, Peru has experienced a recession that needs to be reversed as soon as possible. Poverty has increased, and the best way to help overcome this situation is to promote productive employment. The country could be in a better situation, and Southern Peru has always been willing to work throughout Peru.

What are Southern Copper's objectives for 2024 and 2025?

Our objectives will always be to increase our production capacity so that local, regional, and national governments have more significant resources to achieve Peru's development as soon as possible. If the authorities inform us that we can start the development of our projects tomorrow, rest assured that we will assemble teams with the best professionals in both the productive, social, and environmental areas to achieve benefits for all. ■

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Our production target for 2024 is between 280,000 and 320,000 t of refined copper. However, this figure also depends on the development plan for the Chalcobamba pit.

”

Luis Ticona

General Manager Operations
LAS BAMBAS (MMG)



What factors contributed to the copper production and revenue increase for Las Bambas in 2023?

In 2023, Las Bambas produced 302,033 t of refined copper, a 19% increase from the previous year. Net sales reached US\$3.417 billion, a significant rise from US\$2.087 billion in 2022, while the EBITA stood at approximately US\$1.397 billion, surpassing the previous year's figure by 24%.

This growth is primarily attributed to higher sales of copper and molybdenum, supported by stable logistics from March 2023 until the end of the year, which facilitated transportation from the mine to the Matarani Port. 2023's results reflect strong performance from the deposit, highlighting the effective operation of all operational and support areas.

What are the stages of the three pits at Las Bambas, and what does their future hold?

Las Bambas consists of Ferrobamba, Chalcobamba, and Sulfobamba. At Ferrobamba, we are in stage 6 of exploitation and relocating key components such as the Truck Shop. Additionally, we are evaluating the development of at least three more phases, as the pit still holds significant growth potential. We have already started the development of Chalcobamba, and in the coming years, it is expected to become Las Bambas' main ore source.

On the other hand, Sulfobamba is the third pit under development. We face challenges due to informal mining, which holds back our progress. However, we are implementing social strategies and other measures to address this situation and advance the project. If fully developed, we will need an additional

tailings deposit for all these pits. We operate with a tailings dam located 4,519 meters above sea level, with expansion plans in progress. This project is in the pre-feasibility stage.

How is the Ferrobamba Deeps project progressing?

In Ferrobamba Deeps, we continue our deep exploration activities to increase our mineral reserves. Although we operate as an open-pit, we are considering transitioning to an underground mining method when open-pit mining is no longer economically viable. This project is currently under long-term evaluation and depends on our reserves running out, which are expected to last about 18 more years.

How is Las Bambas managing the transition to automation?

Las Bambas has achieved a milestone in the Peruvian mining industry by establishing the first Integrated Remote Operations Center (IROC) located in Lima. We manage mining operations from this center using advanced technologies such as Big Data, IoT, and automation systems. These tools allow for real-time, data-driven decision-making, optimizing performance, and correcting deviations during the process. Although we are still automating and expanding sensors to obtain more comprehensive data, we aim to achieve a fully automated operation.

What alternatives has Las Bambas explored to improve its transportation operations?

We are focused on analyzing the implementation of hybrid trucks, which significantly impact decarbonization by reducing fuel consumption by up to 25%,

according to our estimates. We have also looked into hydrogen technology, which is currently in the initial phase.

All mining companies are committed to reducing their emissions by 40% by 2030, which drives us to seek innovative solutions to achieve our goals.

How important is Las Bambas' contribution to Apurímac and Peru?

Las Bambas plays a crucial role in Apurímac's economy, contributing 92% of the region's mining transfer payments, which have amounted to over S/2 billion in contractual royalties. Since its inception in 2016, Las Bambas has driven a remarkable 142% growth in Apurímac's GDP, ranking it among the top eight regions in Peru in terms of GDP per capita and among the top four with the highest public budget per capita. Nationally, the mine represents 1% of Peru's GDP and 78% of Apurímac's GDP, employing over 8,000 workers, 28% of whom are from Apurímac and 21% from Cusco.

In addition to the economic impact, Las Bambas is committed to local communities' well-being and sustainable development. In this context, we have launched the 'Heart of Las Bambas' program to transform our relationship with communities through participation, collaboration, and value creation via strategic social investments.

What are Las Bambas' production expectations for 2024 and 2025?

Our production target for 2024 is set between 280,000 and 320,000 t of refined copper. However, this figure also depends on the development plan for the Chalcobamba pit. We have high expectations for 2025 and hope to achieve our production target of 420,000 t. ■



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In Peru, we emphasize that Constancia is not the endpoint but the starting point. We have a significant interest in the development of Maria Reyna and Caballito.

”

Javier del Río

Vice President South America and USA
HUBBAY MINERALS

What were some of the milestones that Hudbay achieved globally?

Hudbay has achieved exceptionally positive global performance, operating in various locations such as Lalor in Manitoba, Canada, an underground mine with a processing capacity of 5,300 t/d approximately; Copper Mountain in British Columbia (BC), Canada, an open-pit mine with a processing capacity of 45,000 t/d approximately, which features a 28 haul truck fleet and Trolley Assist system. In the US projects like Copper World in Southern Arizona and Mason in Nevada, with around 2.2 million t in M&I resources, complement our portfolio. The Constancia mine and projects like Caballito, Maria Reyna, and Llaguen are crucial in Peru.

In 2023, we acquired Copper Mountain in BC, and we completed Rock-cliff's acquisition in Manitoba, providing access to Talbot's property and other satellite deposits for a promising future pipeline. Additionally, we have an exploration agreement with Marubeni in Manitoba to explore the Greenstone Belt. Lastly, Hudbay's Peruvian business unit successfully navigated socio-political complexities while mining Constancia and Pampacancha, operating within expected guidelines.

Could you elaborate on the efforts implemented at Constancia to reduce greenhouse gas emissions?

Constancia's processing plant operates at full capacity, optimizing production, while the nearby Pampacancha satellite deposit enhances the average ore grade. Hudbay's business unit has maintained production within reasonable indices, with a processing capacity of 90,000 t/d and a recovery rate of around 84%.

Hudbay has implemented significant efforts at Constancia to reduce greenhouse gas emissions. Thus, we engaged with ENGIE for renewable energy supply from 2026 to 2035. Additionally, energy audits have identified optimization opportunities, focusing on reducing mining waste.

How have new technologies impacted overall operational efficiency across Hudbay's operations?

Notable investments include Magnetic Aggregation equipment for ultrafine particle filtration and a system accelerating bubble discharge to enhance copper and molybdenum recovery in the concentrator plant. We employ machine learning in throughput modeling at Constancia, Peru, achieving over 90% effectiveness in predicting mill events. This allows optimized metallurgical responses by anticipating mineral behavior from crusher discharge to the processing plant.

What are some challenges the copper sector faces?

We are devoted believers in the promising future of copper; however, there are challenges to address. The impact of declining grades and depleting resources reduces reserves each year. From a net present value perspective, initially, operations prioritize high-grade material, resulting in decreased metal production as lower-grade deposits are processed later. This phenomenon is ubiquitous across all mining operations. Moreover, project approvals and financing now experience significant delays. This makes the outlook on the supply side less optimistic.

Additionally, in 2024, global demand is estimated to grow by 3%, offering a contrasting perspective. Copper production

has declined in the United States from around 2 million t/y in 2000 to approximately 1.3 million, echoing a similar trend at Codelco.

Finally, the costs, in real terms, are also not easing. The operational landscape becomes more complex, challenging and expensive. As a result, profit margins tighten, necessitating a focus on increased efficiency.

With Hudbay's global presence, what lessons can each jurisdiction you operate in learn from one another?

In Canada, specifically in BC, we are currently incorporating an electric shovel, electric drill and renewable diesel, a move incentivized by the positive impact of carbon tax credits.

Positive initiatives in Peru, such as “Obras por Impuestos” (work for taxes), stand out. This model allows local companies to play a pivotal role in addressing community requirements. Their proximity ensures a more effective and timely response than the central government, fostering a model that could be exported.

What are Hudbay's goals for the next 12 months?

First, securing permits for Copper World and initiating our feasibility study, followed by the construction phase. Additionally, our focus remains on stabilizing production at Copper Mountain and continuing to optimize Lalor in Manitoba. Turning to Peru, we have a significant interest in the development of Maria Reyna and Caballito. Realizing this ambition hinges on continuing our exploration program in these two deposits. In Peru, we emphasize that Constancia is not the endpoint but the starting point. ■



“

We are finalizing the technical details and drafting of the EIA for Condestable, which will include, among a few changes in some components, a production increase to 10,000 t/d.

”

Adolfo Vera

President and CEO
SOUTHERN PEAKS MINING (SPM)

How would you assess Southern Peaks Mining's performance over the past few months?

In the first four months of 2023 we faced challenges meeting the projected budget for Condestable's production ramp-up, resulting in missed opportunities with high copper prices. Despite these setbacks, we achieved a recovery throughout 2023, meeting the annual production target. Additionally, we took several initiatives, including Condestable's Environmental Impact Assessment (EIA), changes in Ariana, and overcoming bureaucratic challenges in Peru.

2024 is off to a promising start. We reviewed the mining plan in detail, which ensures a restart with no foreseen production disruptions. However, industry-wide cost escalation concerns persist. Addressing these concerns requires improving process efficiency and renegotiating terms with suppliers.

How do you plan to ensure a smooth approval process for the production increase at Condestable?

As part of the renewal process of our EIA, we are including, among a few changes in some components, a production increase to 10,000 t/d. We are finalizing the technical details and drafting of the EIA for Condestable, which is set for submission during the first quarter of 2024. Given the close coordination we have had with the authorities, we anticipate a streamlined approval process. In 2023 we secured the approval for a filtered tailings facility via an Informe Técnico Sustentatorio (ITS). We have extensively informed surrounding communities about the process through workshops, garnering a generally positive response.

How did the transition from a local resource estimation model to a global approach boost Condestable's resources?

The Canadian consulting firm SLR recently concluded an audit of our exploration resources and reserves. We transitioned to a global approach, consolidating mineralized blocks into a single reserve block for enhanced mining efficiency. While this integration may lead to a loss of ore grade in some areas, the gained efficiency outweighs the drawbacks. This restructuring has boosted our in-situ resources to over 120 million tons of copper, narrowing them down to 70 million tons of resources and 40 million tons of reserves in mineable resources. This represents a substantial 25% increase from our previous reserves of 32 million tons.

In line with this, we have allocated a significant investment of US\$25-30 million for constructing a tailings entry plant. This facility promises operational and environmental advantages, elevating recycled water from 65%-70% to 95%-98% and improving safety. Additionally, the tailings area footprint will be significantly smaller than that of conventional methods.

What impact did the new government have on the approval of projects in the pipeline?

Under the previous government technical matters became overly politicized, and, in my opinion, with or without intention, meticulously constructed technical teams within MINEM were dismantled. The absence of expert intermediaries caused, and it is still causing, significant delays in obtaining permits for projects.

With the new government, there has been a notable improvement in the attitude toward the mining sector, even though the complete reconstruction of MINEM's technical team is still pending. We now have a Deputy Minister of Mines, Henry Luna, who understands the sector, providing a platform for constructive discussions.

Can you provide details about the pilot plan to implement electric equipment at Condestable?

Our primary investment focus is electromobility, with successful initiatives in electrifying the surface fleet of pick-up trucks for personnel transport and acquiring an electric truck from BYD for ore transportation. We have furthered our commitment by partnering with Enel X for fast charger implementation, and plans are underway to acquire four additional electric trucks.

The operational experience has been exceptionally positive, evidenced by the successful transport of 20,000 tons of ore in 2023. The electric truck incurs an approximate monthly electricity cost of US\$1,000, resulting in a considerable reduction in operating and maintenance costs.

What can we expect from SPM in 2024?

In 2024, we are optimistic about a positive legal resolution for Ariana's case. At Condestable, expansion plans are underway, with a decision pending on whether it will occur in the underground mine or explore open-pit opportunities identified in the new resource definition. Furthermore, we are actively assessing the integration of a copper project in southern Peru into our portfolio. ■

to a pre-feasibility stage. Locally, Hudbay has invested significant efforts in its Constancia mine, including the Pampacancha Satellite deposit, to navigate socio-political complexities while adhering to expected guidelines. Constancia has a processing capacity of approximately 90,000 tons per day and achieves a recovery rate of around 84%.

The copper company also invested in Magnetic Aggregation equipment for ultrafine particle filtration and a system to accelerate bubble discharge to enhance copper and molybdenum recovery. It also explored the implementation of ore sorting technologies, which not only improve copper output but also help to reduce energy consumption: “We have invested in new technologies, such as ore sorting, following the experience of Copper Mountain (British Columbia), which we want to

implement it in Peru. At Constancia, we employ machine learning in throughput modeling, achieving over 90% effectiveness in predicting mill events. This allows optimized metallurgical responses by anticipating mineral behavior from crusher discharge to the processing plant,” continued Del Río.

Del Río emphasized the Peru’s importance for the company: “Turning to Peru, we have a significant interest in the development of María Reyna and Caballito. In Peru, we emphasize that Constancia is not the endpoint but the starting point,” he concluded.

Fueled M&A

Adolfo Vera, president and CEO of Southern Peaks Mining (SPM), emphasized the need to improve process efficiency and

renegotiate terms with suppliers. In 2023, SPM encountered challenges in meeting the projected budget for Condestable’s production ramp-up, causing missed opportunities with the higher copper price. However, it recovered throughout 2023 to successfully meet the annual target: “As part of the renewal process of our EIA, we are including, among a few changes in some components, a production increase to 10,000 t/d. We are finalizing the technical details and drafting of the EIA for Condestable,” explained Vera.

In line with enhanced mining efficiency, SPM transitioned to a global approach, consolidating mineralized blocks into a single reserve block. “While this integration may lead to a loss of ore grade in some areas, the gained efficiency outweighs the drawbacks. This has boosted our in-situ resources to over 120 million t of copper, narrowing them down to 70 million t of resources and 40 million t of reserves. This represents a substantial 25% increase from our previous reserves of 32 million t,” concluded Vera.

SPM also owns the Ariana project, which is subjected to a legal process. Despite this, Vera remains optimistic and anticipates a favorable legal outcome for the case in 2024: “We anticipate support from the judges of the Constitutional Court due to the lack of evidence supporting allegations against the project,” he commented.

SPM has submitted a dossier to the SENACE to obtain approval for Ariana’s new filtered tailings system through an ITS. However, Vera explained that the process has stalled due to the National Water Authority’s request for input. He expects that a change in authorities at SENACE will unlock the process: “In Ariana, beyond the shift in tailings disposal, we have relocated dry tailings away from the controversial Trans-Andean tunnel. This adjustment aims to alleviate any perceived risks, all of which were properly addressed and mitigated in the approved EIA for the project. We simply decided to eliminate that perception while adhering to more modern tailings disposal practices,” concluded Vera.

With copper trading above US\$4/lb, free cash flow is expected to fuel expansions, technology investments, exploration, and mergers and acquisitions (M&A). Many analysts speculate whether BHP’s recent bid for Anglo American assets will trigger various M&A across the industry. This is an opportunity SPM does not want to miss: “We are actively assessing the integration of a copper project in southern Peru into our portfolio,” explained Vera.

In late 2023, it was announced that the Chilean multinational Antofagasta acquired approximately 19% equity stake in Buenaventura, which led to a gain of over 25% in the value of Buenaventura’s stocks: “Antofagasta’s purchase of shares is a positive sign that reflects the market’s strong confidence in our company. We are confident that Antofagasta will bring its experience in the development and operation of copper projects, which will undoubtedly increase the value of our businesses,” commented Leandro García, CEO of Buenaventura.

The Peruvian company operates El Brocal, the largest underground copper mine in Peru, where, according to García, they have reached a historical production record of 10,000 t/d: “This also allowed us to achieve the production record of 58,000 t of fine copper. We plan to gradually increase production from the underground mine to 12,000 tons daily over the next two years,” added García. ■



Jorge Benavides Kolind-Hansen

Legal and Corporate Affairs Manager – South America
FIRST QUANTUM MINERALS

How is FQM advancing its Haquira project?

In mid-2023, we reached an access agreement with key communities in the directly influenced area, which allowed us to resume drilling at the Haquira East deposit. After signing agreements with Parani, Huanacopampa, and the Lahuani communities, drilling has been underway since September 2023.

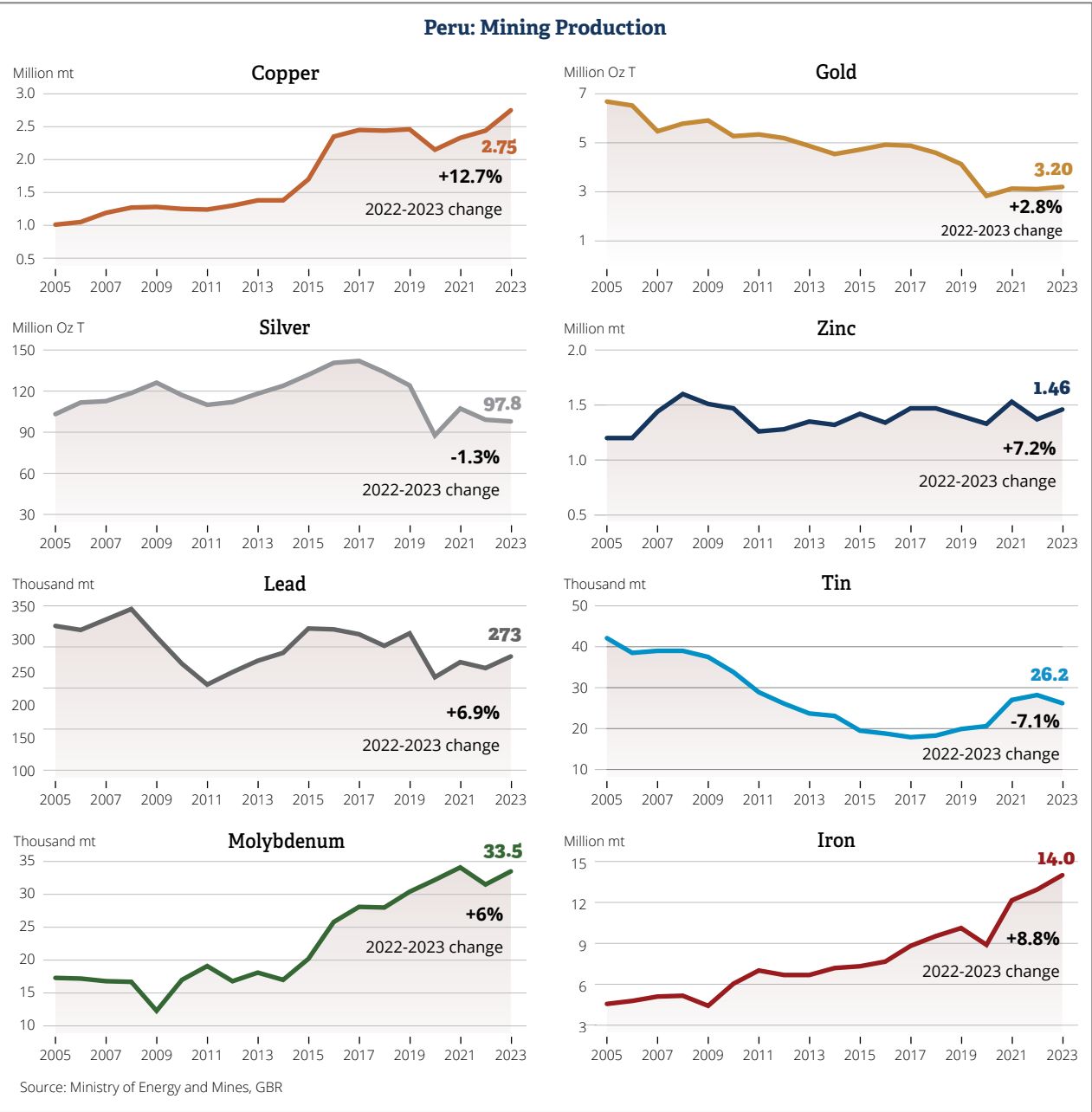
We are confident on the unrealised potential of the deposit. The last published resource statement issued prior to FQM ownership included 703.7 million t at 0.51% copper in the Measured and Indicated categories with an additional Inferred Mineral Resource of 683.9 million t at 0.40% Cu. Ongoing work has identified more areas that we are confident have the potential to expand this resource.

The plan for the remainder of 2024 involves the continuation of drilling at Haquira East deposit and expanding the campaign to the less-explored and shallower Haquira West deposit once access agreements are reached with an additional two communities.

What is the status and prospects of the La Granja project and the rationale that led Rio Tinto to choose FQM as a key partner?

FQM’s competitive advantage is its technical expertise, and specifically our in-house ability to develop, design, and execute mining projects. FQM’s capacity to execute projects without heavy reliance on complex and expensive EPCM contractors, together with our decades of experience at similar projects is key for a large and complex project like La Granja.

La Granja has a published Inferred Mineral Resource of 4.32 billion t at 0.51% copper, again with potential for substantial expansion. FQM acquired a 55% equity stake in the now renamed Minera La Granja SAC in late August 2023 and became the operator of the project, and soon after in October 2023 commenced a drilling campaign following completion of necessary permitting. ■



Peru's Main Producing Mines

NUMBER	MINERAL	COMPANY	MINE
1	Copper, Molybdenum, Silver, Lead, Zinc	Antamina (BHP-Glencore-Teck-Mitsubishi)	Antamina
2	Copper, Molybdenum, Gold, Silver	MMG-Guoxin-CITIC	Las Bambas
3	Copper, Molybdenum, Silver	Southern Copper	Cuajone
4	Copper, Molybdenum	Southern Copper	Toquepala
5	Copper, Gold, Silver	Glencore	Antapaccay
6	Copper, Molybdenum	Jessica	Cerro Verde
7	Copper, Silver, Lead, Zinc	Nexa Resources	Cerro Lindo
8	Copper, Silver, Lead, Zinc	Nexa Resources	El Porvenir
9	Copper, Silver, Lead, Zinc	Nexa Resources	Atacocha
10	Copper, Silver, Lead, Zinc	El Brocal (Buenaventura)	Colquijirca
11	Copper, Gold, Silver	Southern Peaks Mining	Condestable
12	Copper, Molybdenum, Silver, Lead, Zinc	Chinalco	Toromocho
13	Copper, Silver, Lead, Zinc	Sierra Metals	Yauricocha
14	Copper, Silver, Molybdenum	Hudbay Minerals	Constancia
15	Gold, Silver	Yanacocha (Newmont-Sumitomo)	Yanacocha
16	Gold	Boroo Pte Ltd	Lagunas Norte
17	Gold, Copper	Gold Fields	Cerro Corona
18	Gold, Silver	Buenaventura	Orcopampa
19	Gold, Silver	Caraveli	Chacchuille
20	Gold, Silver	Coimolache (Buenaventura-Southern-Espro)	Tantahuatay
21	Gold, Silver	La Zanja (Buenaventura)	La Zanja
22	Gold, Silver	Pan American Silver	La Arena
23	Gold, Silver	Pan American Silver	Shahuindo
24	Gold	C.M. Horizonte	Parcoy
25	Gold, Silver	Retamas	Retamas
26	Gold, Silver	Laytaruma	Laytaruma
27	Gold, Silver	Aruntani	Jessica
28	Gold, Silver	Apumayo	Apumayo
29	Gold, Silver	Minsur	Pucamarca
30	Gold, Silver	Poderosa	Poderosa
31	Gold, Silver	Buenaventura	Tambomayo
32	Gold	Summa Gold Corporation	Isabelita (El Toro)
33	Gold	Yanaquihua	Alpacay
34	Gold	Minera IRL	Corihuarmi
35	Gold	Sierra Sun Group	Antapite
36	Silver, Zinc, Lead	Buenaventura	Uchucchacua
37	Silver, Gold	Buenaventura	Julcani
38	Silver, Gold	Hochschild	Inmaculada
39	Silver, Gold	Hochschild	Pallancata
40	Silver, Lead, Zinc	Lincuna	Huancapetí
41	Silver, Lead, Zinc, Copper	Pan American Silver	Huarón
42	Silver, Zinc	Pan American Silver	Morococha
43	Silver, Lead, Zinc	Fortuna Silver	Caylloma
44	Silver, Lead, Zinc	Volcan (Glencore)	Cerro de Pasco
45	Silver, Lead, Zinc	Volcan (Glencore)	UAE Chungar
46	Silver, Lead, Zinc	Volcan (Glencore)	UAE Yauli
47	Lead, Zinc, Copper, Silver	Alpayana	Yauliyacu
48	Zinc, Lead	Trafigura	Catalina Huanca
49	Silver, Lead, Zinc	Casapalca	Americana
50	Silver, Lead, Zinc	Colquisiri	María Teresa
51	Lead, Zinc	Mitsui	Santa Luisa
52	Zinc, Lead, Silver	Cerro de Pasco Resources	Santander
53	Zinc	San Ignacio de Morococha	San Vicente
54	Copper, Silver, Lead, Zinc	Raura	Raura
55	Iron	Shougang	Marcona
56	Phosphate	Mosaic-Mitsui	Bayóvar
57	Tin	Minsur	San Rafael
58	Copper	Anglo American-Mitsubishi	Quellaveco
59	Copper	Marcobre (Minsur-Alxar)	Mina Justa
60	Copper, Silver, Zinc	Southern Peaks Mining	Ariana (en construcción)
61	Zinc	Sierra Sun	Sumaq Rumi
62	Silver, Lead, Zinc	Silver X	Nueva Recuperada
63	Silver, Lead, Zinc	Kolpa	Huachocolpa
64	Silver, Lead, Zinc	Volcan (Glencore)	Alpamarca



Precious Metals Production

Does the age of precious metals operations show?

The closing average price for gold in 2023 was US\$2,033.31/oz. As 2024 progressed, gold's value increased even further. Geopolitical tensions continue to escalate, and growing expectations of Federal Reserve interest rate cuts in the second half of the year have fueled a rally in gold prices with a bullish momentum. This has resulted in the gold spot price hitting another record high of US\$2,313.50/oz on April 3, 2024. Gold production in Peru demonstrated a strong performance, with a 2.8% increase (3.4 million oz produced in 2022 vs 3.5 million oz in 2023). In contrast, the silver segment experienced a slight dip of 1.3%, though less severe than the decline observed in 2022 (108 million oz in 2022 vs 107 million oz in 2023).

The top performers in gold production for 2023 included Minera Yanacocha, leading the rank with a production of

275,681 oz/y, marking a significant 13.1% increase compared to 2022. Compañía Minera Poderosa followed closely, producing 269,518 oz/y, but experienced a slight decrease of 11.1% in its production. Poderosa has been subjected to attacks by illegal miners. For example, on December 2, 2023, a group of illegal miners attempted to seize control of Minera Poderosa's operations in Patate, killing nine security agents by detonating multiple charges of ANFO (high-powered explosive) in one of the underground galleries of the mine. Then, in January 2023, illegal miners brought down a high-tension tower that supplies power to the operations. During a conversation with GBR, Marcelo Santillana, Minera Poderosa's general manager, explained that the combination of these events and road blockades that interrupted mineral transportation to the compa-

ny's plant led to the company's failure to meet its production expectations. "Despite our efforts to maintain production, we had a setback resulting in a reduction of 28,000 oz of gold output for the year, below our estimated production of over 290,000 oz," he added.

For 2024, Poderosa has an investment program totaling US\$130 million. Of this amount, US\$70 million will be allocated to geological projects, and the remaining US\$60 million will go towards energy and infrastructure: "In our exploration plans for 2024, we plan to carry out about 70,000 meters of mining work to replenish gold reserves and achieve a 10% to 15% increase. Regarding greenfield exploration, we are focusing on our Palca project. In the Montañitas area, we are working with communities to negotiate and reconcile their high expectations with the realities of a medium-sized company. Once we reach a point of agreement, we can consider initiating an environmental impact assessment," explained Santillana.

Consorcio Minero Horizonte exhibited notable growth, with a gold output of 203,108 oz for 2023, representing an 8.3% YoY increase. On the other hand, Minera Aurífera Retamas saw a modest decline of 5.5% in gold output, yielding 196,503 oz for 2023. Meanwhile, Minera Boroo Misquichilca demonstrated a remarkable surge, achieving a 68.7% increase in production, totaling 175,649 oz/y. Lastly, Hochschild's Compañía Minera Ares faced a downturn, with a 13% decrease in production, reaching an output of 144,323 oz/y for 2023.

Despite facing challenges in early 2023 due to disruptions, Eduardo Landín, the new CEO of Hochschild Mining, commented that the company surpassed the reviewed production target, achieving a production of 300,749 oz of gold equivalent. A significant milestone for the company was securing approval for the Modified Environmental Impact Assessment (MEIA) for Inmaculada, enabling another 20 years of production with 262 hectares and 558 km of underground development.

Given the uncertain nature of gold price fluctuations, the company is pre-

paring for both high and low-price scenarios: "To address this, the company implemented a 'Zero Cost Collar,' placing 100,000 oz of gold at a price range of between US\$2,000 and US\$2,252. If the price stays within this range, we receive the market price. If it falls below US\$2,000, we receive this guaranteed figure; if it exceeds US\$2,252, we receive the latter price. Although common in trading, this strategy is novel for the company and represents a proactive measure to manage exposure to the gold price, providing security in a fluctuating environment," explained Landín.

Buenaventura ranked as the 10th largest gold producer in Peru and experienced a 3.9% increase in production, aligning with the projected guidelines for 2023, according to Leandro García, Buenaventura's CEO. Focused on the San Gabriel project, continuous efforts have resulted in noteworthy progress: "At San Gabriel, we concluded 2023 with engineering reaching 90%, procurement at 89%, and construction at 14%, contributing to an overall advancement of 28% by year-end. Additionally, we accomplished a CapEx of approximately US\$140 million in 2023, with expectations to invest around US\$200 million in 2024," García commented.

Buenaventura aims to complete construction at San Gabriel in 2025 and secure the first gold bar by the end of that year.

Looking at the broader scenario, Peru has been showing a declining trend in gold production since 2005, when it peaked with a total output of 6.68 million oz/y. This might be a sign that the Peruvian gold segment has been maturing; thus, companies must replenish reserves with exploration.

Tailings management could be another indication of the mining industry's maturity. Cerro Corona represents the Peruvian operation of the international mining company Gold Fields. Luis Rivera, executive vice president of Americas, reported that Gold Fields' Peruvian assets produced 238,000 gold equivalent oz and generated free cash flow of around US\$70 million in 2023. Rivera further mentioned that, in 2023, the company initiated the minelife extension program: "The basis of this extension is using the old Cerro Corona pit, where mining will stop towards the end of 2025, as a tailings storage facility. So, we

will be extracting ore until 2025, stockpiling it on the side, and that ore will be processed until 2030 [...]. The technological challenge is accelerating the natural process that makes tailings consolidate and become more compact, thus making more space. The real limitation to another minelife extension at Cerro Corona is the tailings storage capacity, not reserves or resources," he said.

Gold Fields is a South African company, but Rivera says that Latin America is extremely important for the company, especially now that it started producing gold in April 2024 at its Salares Norte operations in Chile. Additionally, it has various exploration projects and investments in different companies like Chakana Resources in Peru, Torq Resources, and Tesoro Gold in Chile, "Salares Norte will contribute between 220,000 oz and 240,000 oz in 2024 and 580,000 oz in 2025, boosting Gold Fields' overall production by 20%. Over the next years, Salares and Cerro Corona will contribute over 25% of the company's total output. Our budget for exploration in Latin America is US\$30 million for 2024," concluded Rivera.

A disconnect between prices and investor's interest

Despite the current uptick in precious metals prices, there appears to be a discrepancy between the actual price of gold and the stocks of gold miners, a trend that several global asset managers have analyzed. For instance, Sprott suggested in April 2024 that gold mining stocks are historically undervalued, citing the ratio of GDX/GLD as a metric. Similarly, Incrementum AG, an independent investment and asset management company based in Liechtenstein, compared the gold price with the HUI (NYSE Arca Gold BUGS Index), and, according to them, miners are trading 170% lower than their highs in 2011.

There seems to be a prevailing sentiment among companies, particularly in the junior segment and small producers, that there is a disconnect between investors and reality. For example, Graham Speirs, general manager of Sierra Sun Group, had previously expressed intentions to list the company on the London Stock Exchange during an interview with GBR in 2022. However, his plans have changed, and during our interview in the first quarter of 2024, Speirs shared that after securing assistance from a lo-



Graham Speirs
General Manager
SIERRA SUN GROUP

“We are looking for investors for our green play to allow us focus our capital on our precious metal division.”

cal bank, the company may circumvent seeking equity through the stock markets. "In Canada, despite demonstrating operational excellence, including robust safety measures and strong community engagement, investors typically require reserves spanning 15 to 20 years. Although we replenish reserves annually for a three-year period, we are hesitant to allocate capital towards drilling to showcase a 15-year reserve life to potential investors," he explained.

Sierra Sun's general manager explained that the company is now divided into two segments: precious metals and "green metals." Under the gold segment falls the Antapite mine, which he aims to increase to an output of 1,000 t/d, with an expected production of 30,000 to 35,000 oz of gold: "The mill was designed to process 1,000 t/d, and we are optimizing it to make it more efficient. Additionally, we are installing new cells to process course gold. These activities will help increase our recuperation factor and, hence, our ounce output. All these modifications will cost us approximately US\$10 million, and they should be completed by Q3 2024," he continued.

Regarding the green segment, the company owns the Sumaq Rumi mine, which produces manganese, later processed into MnO2 used in battery production, and zinc. The company aims to



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Leandro García

CEO
BUENAVENTURA

What was Buenaventura's production in 2023, and what were the latest developments in El Brocal and San Gabriel?

The production of our units was within the estimated range for the year 2023, in line with what we announced to the market.

At El Brocal unit, located in the Pasco region, at the end of 2023, we suspended operations at the open-pit mine for two years due to delays in approving permits to expand our environmental footprint. However, we continue to process the previously accumulated ore. On the other hand, we had a significant achievement at the El Brocal underground mine, reaching a historical production record of 10,000 t/d. This also allowed us to achieve the production record of 58,000 t/y of fine copper. We plan to gradually increase production from the underground mine to 12,000 t/d over the next two years.

At our San Gabriel project in Moquegua, we ended 2023 with 90% engineering progress, 89% procurement, and 14% construction, representing an overall progress of 28% by

the end of the year. Additionally, we reached a CapEx of nearly US\$140 million, and for 2024 we estimate investing close to US\$200 million. We expect to complete construction in 2025 and obtain the first gold bar by the end of that year.

What is the status of Uchucchacua, and what plans does Buenaventura have regarding this project?

At Uchucchacua, located in the Oyón province, northern Sierra of Lima, by the end of 2023 we resumed operations after two years of being in Care & Maintenance. Additionally, we continue to explore and develop the mine. Furthermore, it should be noted that Uchucchacua is transitioning from being a 100% silver mine to a polymetallic operation, as it has a balance between silver, lead and zinc. We are producing close to 800 t/d, and the plan is to increase production above 1,500 t/d gradually.

What is the importance of receiving the Environmental Impact Assessment (EIA) for Yumpag, and what are the next steps?

in Santa María and 800 in Marañón), a pace we aim to maintain for two or three years to increase reserves to 1.3 million oz, compared to the current reserves of 802,000 oz. We will consider expansion once we surpass 1.2 million oz in reserves, especially at our Marañón plant.

How is the 2024 investment split between exploration, energy and infrastructure projects?

Our investment program for 2024 amounts to US\$130 million, with US\$70 million allocated to geological projects and the rest to energy infrastructure. In our exploration plans for 2024 we have scheduled to carry out about 70,000 m of mining work to replenish gold reserves and achieve a 10 to 15% increase. Regarding greenfield exploration, we are focusing on our Palca project. In the Montañitas area we are working with communities to negotiate and reconcile their high expectations with the realities of a medium-sized company.

We have a fairly aggressive program to reduce costs, and we aim to inaugurate the Chacparrosas project in March 2024, connecting the Santa María treatment plant to the national power grid,

The approval of the EIA for our Yumpag project in Pasco is a significant milestone as it allows us to put this high-grade silver deposit into production. This deposit and the restart of Uchucchacua will allow us to produce over 10 million oz/y of silver. We are awaiting approval of the operational permit, which we estimate will be ready by the end of the second quarter 2024. The potential of Yumpag is enormous, and we continue our explorations with very positive results. The Camila, Tomasa, and Cóndor veins have a potential of over 150 million ounces of silver.

What does Antofagasta's investment mean for the company, and what synergies do they expect to leverage?

Antofagasta's purchase of shares is a positive sign that reflects the market's strong confidence in our company. We are confident that Antofagasta will bring its experience in the development and operation of copper projects, which will undoubtedly increase the value of our businesses. ■

reducing our dependence on oil. We are investing in an 8-MW photovoltaic plant and a hydropower project estimated to generate 11 MW by 2027. These initiatives ensure both reserves and energy for future production expansions.

What opportunities and challenges do high gold prices present for Poderosa?

While gold prices remain favorable, our operating costs continuously increase, with a 6% increase in 2023, and a projected 5% increase for 2024. Despite this, our cost per ounce is approximately US\$1,200, allowing us to continue investing in exploration projects. It is worth noting that while high gold prices are advantageous, they also act as a double-edged sword by incentivizing informal and illegal mining activities.

What is the planned production target for Minera Poderosa in 2024?

We plan to produce 256,000 oz in 2024. The first quarter has fallen slightly below our expectations. Assuming illegal mining activities do not disrupt our operations, we anticipate smoother operations. ■



Luis Rivera

Executive VP Americas
GOLD FIELDS

What were the highlights in Cerro Corona over the last year?

2023 was a good year for Cerro Corona, with production north of 238,000 oz AuEq and free cash flow of around US\$70 million. In 2023 we also started our minelife extension program, going from August 2023, when we were scheduled to shut the mine down, to late 2030. The basis of this extension is using the old Cerro Corona pit, where mining will stop towards the end of 2025, as a tailings storage facility. So, we will be extracting ore until 2025, stockpiling it on the side, and that ore will be processed until 2030. Looking ahead, the technological challenge is to be able to accelerate the natural process that makes tailings consolidate and become more compact, thus making more space. The real limitation to another minelife extension at Cerro Corona is the tailings storage capacity, not reserves or resources.

Last year we also inaugurated a new potable water plant with the Manuel Vásquez community. This is a PEN 12.5 million investment that is helping over 3,000 families, and another example of the different social programs that we have across the Cajamarca region.

How has global inflation affected operational costs?

The main impact has actually been the price of ammonium nitrate for explosives. Russia is the main producer, and the war with Ukraine has disrupted the market. Australia is an alternative supplier, but shipping costs from there have increased as well. In any case, our operations team is constantly working on offsetting that cost inflation. In Cerro Corona, we have implemented our digital integrated control center, comprising the mine, the plant and the port. This has allowed us to improve geo-metallurgical recovery, as well as to improve efficiency of the different processes, which has helped us save on explosives and fuel.

How is the Americas' region gaining importance within Gold Fields, especially with Salares Norte's commissioning this year?

Salares Norte will contribute between 220,000 oz and 240,000 oz ounces in 2024 and 580,000 oz in 2025, boosting Gold Fields' overall production by 20%. Over the next years Salares and Cerro Corona will contribute over 25% of the company's total output. Additionally, in Latin America we are very active in exploration, with projects in Cajamarca and Moquegua, and a participation in Ancash through Chakana Resources. Meanwhile, we also have a stake in Torq Resources and Tesoro Gold in Chile, where we also have a project of our own, Azufreras, 90 km north of Salares. Our budget for exploration in Latin America is US\$30 million this year. We are obviously focused on gold, but the beauty of the Andes is that they are polymetallic, so we are open to gold-copper deposits like Cerro Corona, or gold-silver deposits like Salares.

Then, in North America we have Windfall, a joint venture with Osisko Mining. Having an operation in Canada is an important milestone for Gold Fields. It is a project a bit larger than Salares, expected to be in production in the next few years. ■



Marcelo Santillana

General Manager
MINERA PODEROSA

What obstacles did Minera Poderosa encounter during 2023 that impacted its operations?

In 2023, as the world began its post-pandemic recovery, we resumed our energy and brownfield exploration projects that were left pending. However, we faced significant obstacles due to criminal activity linked to illegal mining and road blockades that interrupted mineral transportation to our plants for 48 days.

Despite our efforts to maintain production, we had a setback resulting in a reduction of 28,000 oz/y of gold output, below our estimated production of over 290,000 oz/y. In this context, the authorities became aware of what we had been claiming for several years, and the National Police was deployed, declaring a state of emergency in the province of Pataz. While this intervention brought some relief, our operations were again interrupted in August by incidents related to terrorism, including attacks on high-voltage towers, which halted our activities.

We hope this situation is resolved so that operations can resume smoothly. We are focused on replenishing reserves and considering expansion plans. Our two plants process 1,800 t (1,000



Eduardo Landín

CEO
HOCHSCHILD MINING

Can you provide an overview of Hochschild Mining's achievements during 2023?

In 2023, Hochschild faced challenges, especially at the beginning of the year, due to disruptions affecting national mining production. Despite setbacks, we surpassed our revised production target, achieving 300,749 oz AuEq.

We secured the approval for the Modified Environmental Impact Assessment (MEIA) for Inmaculada, enabling a further 20 years of operation with 262 hectares and 558 km of underground development. This success paves the way for a brownfield exploration strategy to incorporate new resources and extend Inmaculada's lifespan. Additionally, we confirmed the discovery of the Royropata deposit near Pallancata, with 50 million oz AgEq of inferred resources and, also in 2023, commenced the engineering and permitting processes for the new MEIA for the new deposit,

What are the challenges currently facing the Peruvian mining sector?

The longstanding challenge of streamlining the process for obtaining exploration and exploitation permits has shown positive signs under the current

government. Private investment in mining has improved.

What is the current status of Royropata/Pallancata?

The permitting process for Royropata is expected to be more straightforward than Inmaculada's, benefiting from a more favorable political context. Royropata has a projected output of 3.1 million t at grades of 1.9 g/t Au and 515 g/t Ag, which will give 700,000 oz AuEq. The mineralization is approximately 5 m in width, which will allow for cost-effective mechanized mining methods. Production is anticipated to commence in 2027 with an annual output of 100,000 oz. The initial CapEx is estimated between US\$55-65 million, and all-in-sustaining costs are expected at around US\$1,100/oz, making Royropata an attractive investment for Hochschild with low initial costs and potential for significant cash flow generation.

What is Hochschild's planned investment for exploration in Peru?

Out of a global exploration budget of US\$33 million, the majority will be allocated to Peru, leveraging off the new permit at Inmaculada. ■

Could you provide a detailed update on Bear Creek's developments in the last few months?

Despite the challenges inherent in turnaround operations, notable progress was made during this period. We concentrated on refining technical skills and operational practices at Mercedes, resulting in a steady increase in production throughout the fourth quarter of 2023. Additionally, we revamped our exploration approach, transitioning from traditional assays to more reliable methods. This shift yielded promising results, with significant intercepts indicating untapped potential within the Mercedes site. One noteworthy discovery in the third quarter was a vein with a true width of 5.2 m, containing 62 g/t Au. This, coupled with the vast unexplored terrain at Mercedes, fuels our optimism for the project's future.

Regarding Corani, our plans faced setbacks due to political changes in Peru, particularly with investor concerns about resource nationalization. Consequently, we redirected our focus towards Mercedes. Despite challenges in early 2023, such as social unrest and protests, the situation normalized by mid-year. We

have since restarted operations at Corani, primarily focusing on infill drilling and additional metallurgical testing. Presently, we are evaluating test results and preparing to restart the financing process for the project.

What does the future hold for Corani?

In the initial three years alone, it is projected to yield almost 50 million oz of silver. This translates to over 16 million oz/y. Furthermore, the project is expected to generate employment opportunities for approximately 1,000 individuals. Beyond construction, ongoing production will continue to contribute substantially, with an estimated annual production of just over 9 million oz of silver throughout the mine's life. This steady production, coupled with a competitive all-in sustaining cost of about US\$4.5/oz, bodes well for Peru's economy, potentially revitalizing its position as a significant player in global silver production.

What are Bear Creek Mining's goals for 2024?

We aim to expedite the financing process for Corani and expand resources and reserves at the Mercedes site. ■



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Eric Caba

President and CEO
BEAR CREEK MINING



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attract investors for its green play to enable Sierra Sun to focus its capital on its precious metals division: “We are looking for investors that can best develop the asset to its full potential as it is capital intensive and requires further exploration,” commented Speirs.

However, one of the company’s most interesting projects is the Cachi Cachi project, a placer gold deposit in Puno containing rare earth elements (REE).

True to their name, REE are uncommon in Peru. While the country is well-known for its copper, gold, and silver endowment, the Puno region could potentially diversify Peru’s mining portfolio to include metals not traditionally mined in the country, such as lithium, highlighted by the Falchani project, and uranium in the Macusani project: “For every ton processed there is 0.35 g/t and approximately 5 kg/t of rare earth elements. There are few companies in Peru that process rare earth elements, which are essential components that are driving the clean energy global program,” added Speirs.

For his part, John Thomas, PPX Mining’s interim CEO, observed: “Gold’s recent surge in price has not sparked the same rush to invest in gold mining as it has in the past. It is a bit perplexing. Despite the favorable gold prices, there has not been a notable uptick in investor interest, particularly in smaller gold mining companies like ours.”

Precious metals development

In the development segment, Bear Creek has all the permits in place to bring Corani, a silver project, online. The Corani project in Puno faced financing challenges amidst investors’ reluctance to allocate capital during Castillo’s presidency. Moreover, social unrest characterized the transition between his government and Boluarte’s. Consequently, Bear Creek postponed its Corani project, which boasts 229 million oz of silver, 2,74 million lbs of lead, and 1,69 million lbs of zinc, with a CapEx of US\$579 million.

Bear Creek’s president and CEO, Eric Caba, elaborated that the company is primarily focusing on infill drilling and

additional metallurgical testing to reinforce the company’s projections and strengthen investor sentiment toward the project: “We are evaluating test results and preparing to restart the financing process for the project. By fine-tuning these models through drilling and testing, we aim to bolster our projections and strengthen investor sentiment towards the project.”

With another asset in Mexico, the Mercedes mine, Bear Creek Mining has been restructuring the company’s agreement with Sandstorm and retiring the Nomad Gold Stream. This effort has reduced the “stream burden” by close to 80%, significantly improving Bear Creek’s financial status: “This reduction in stream burden has provided us with increased cash flow, which we are utilizing to ramp up exploration efforts, stabilize our financial books, and align our operations with our long-term goals. These measures have significantly improved Bear Creek’s financial standing and positioned us more favorably to progress with projects like Corani,” concluded Caba. ■



Jean Martineau
President and CEO
DYNACOR GROUP

What is the history of the Dynacor Group?

Our focus has been on processing gold from formalized artisanal miners. In 2016, we launched the Veta Dorada plant in Chala, initially with a capacity of 300 t/d, it later increased to 500 t/d. In 2023, we achieved sales over US\$250 million and produced more than 127,000 oz of gold equivalent.

In Peru specifically, 33% of gold production is attributed to artisanal miners.

What are Dynacor’s expansion plans?

To expand our presence, we are targeting South America and Africa, especially the latter, where most of the gold is produced by artisanal gold mining, with countries such as Ghana having more than a million miners.

The lack of processing plants in these regions poses challenges, such as the unregulated use of mercury and low recovery rates of around 50%, resulting in substantial losses for the miners.

What measures has Dynacor implemented to ensure that the gold does not come from illegal mining?

With a current team of 10 geologists, we are intensifying controls and verifications of mining facilities. In 2024, we will further expand our team with the addition of four mining engineers. This growth is aimed at offering specialized services to miners, improving safety, and providing technical support to optimize their production processes.

In collaboration with our clients, we founded the NGO International Aid Fund for Artisanal Miners (Fidamar). This project aimed to invest in education and health in the communities of artisanal miners. We introduced PX IMPACT certifications, ensuring the traceability of gold and guaranteeing that its extraction does not involve the use of mercury.

What are Dynacor’s plans for 2024?

Over the next five years, our strategic plan aims to achieve sales totaling US\$1 billion, quadrupling the figure achieved in 2023. We plan to build a pilot plant in Senegal by 2024, marking the beginning of our expansion in Africa. ■



Zinc and Other Base Metals

Management changes

Peru’s zinc production reached 1.47 million t/y in 2023, marking a substantial 7.2% increase compared to 2022 figures. Antamina continued to lead in zinc production, reaching an annual output of 527,979 t/y, followed by Volcan at 171,117 t/y and Nexa Resources at 84,710 t/y. Antamina and Volcan both showed positive trends, with a 5.6% and 13.2% increase in production, respectively. However, Nexa Resources experienced a 6% decrease in its zinc production.

Lead also demonstrated a robust 6.9% rebound in 2023, with Volcan, Nexa, and Compañía Minera El Porvenir emerging as the primary producers.

The zinc market dynamics were influenced by a combination of factors, including a sluggish post-COVID recovery in the Chinese economy. This led to a drop in zinc prices, concluding 2023 on the LME at US\$2,650/t. “We are still living in the throes of 2023. The measures adopted by China led to a sustained drop in zinc prices mainly, while silver was more stable. A drop of nearly US\$1,000/t of zinc since January 2023 is significant for the industry. As a producer of 250,000 t/y of fine zinc, it is one of the factors we are most sensitive to,” commented Luis Herrera, the recently appointed CEO of Volcan.

Volcan has achieved remarkable silver production of nearly 15 million oz/y and 250,000 fine t/y of zinc. With the ambitious Romina project in the pipeline for Peru, the company anticipates significant growth in both cash flow and metal production, reinforcing its position in the industry: “Romina has a forecasted mine life of 14 years with a production rate of 50,000 to 70,000 t/y of zinc equivalent,” commented Herrera, Volcan CEO.

Romina requires US\$150 million

CapEx, but first, the company must ensure it has the necessary resources to execute the project on time. While Romina remains the company’s priority, Volcan has signed a JV with Antofagasta to explore prospective copper zones on the same trend as Chinalco’s Toromocho: “The agreement has much potential, but there is a lot of work ahead of us, and it entails significant investments in the coming years that could change Volcan’s exposure to the metals it produces. We have a large package of almost 350,000 hectares in mining concessions that are highly prospective,” added Herrera.

Glencore announced in 2023 that it was selling its 23% stake in Volcan, which materialized into a deal in early May 2024, with Transition Metals, a subsidiary of Integra Capital, for a value of US\$20 million.

Another player in the Peruvian zinc production segment is Sierra Metals, a mid-size producer with polymetallic assets across Mexico and Peru. In Mexico, the company only operates Bolivar, a copper and gold mine with a production capacity of 5,000 t/d, since its third asset, the Cusi silver mine, was placed under care and maintenance in 2023.

In Peru, Sierra Metals owns the Yauricocha underground mine, which has been in operation for 75 years and has had a historical production capacity of 3,600 t/d. Due to the sparsely distributed mineral deposit, Yauricocha has faced challenges maintaining this production level, leading Sierra Metals to transition to a cut-and-fill mining method. By the end of 2023, the mine was operating at around 2,500 t/d. To address this issue, the company initiated the permitting process last year to extend

mining operations below level 1120. This permit, obtained in February 2024, will enable Sierra Metals to transition from cut-and-fill to sublevel caving, a more efficient and extensive mining method and achieve its full capacity. “By Q4 of 2024, we anticipate ramping up production to 3,600 t/d, matching our historical production levels. This represents a 40% increase in production, reestablishing Yauricocha as a highly profitable asset for Sierra Metals, generating significant EBITDA, and reducing costs to comparable levels in 2020 and 2021,” highlighted Ernesto Balarezo, Sierra Metals’ CEO.

Jean Pierre Fort, Sierra Metals’ business development corporate manager, believes these changes have positioned Sierra Metals with a solid platform for both organic and inorganic growth: “In 2024, our focus lies on optimization and growth, whether organically or inorganically. Organically, alongside the expansions at Bolivar and Yauricocha, we possess greenfield exploration properties of over 80,000 hectares and seven projects, some already drilled [...] Regarding inorganic growth, we aim to acquire a third asset for the company through M&A. The ideal asset profile includes being in production or near-production stage, preferably in Peru, Mexico, or the broader Americas.”

Fort also commented that in October 2023, the company executed a CAD\$16 million private placement (approximately US\$11.71 million), with the management team holding a 10% stake in the initiative: “This investment signifies a renewed confidence in our team. Following this, our share price surged by 200%, a testament to our ability to deliver on our commitments,” he concluded. ■



Luis Herrera

CEO
VOLCAN

What challenges did Volcan face in 2023, and what production milestones were achieved?

2023 presented significant challenges for the industry, particularly for Volcan. The difficulties stemmed not only from market conditions but also from fluctuations in metal prices. On the corporate front, the most relevant news was probably the decision to spin off the port business, made up of 40% stake in Cosco Shipping Ports Chancay Peru, operator of the Chancay Megaport.

Operationally, 2023 was a successful year for Volcan. We produced over 15 million oz/y of silver and 242,000 fine t/y of zinc, 8% more than in the prior year. We anticipate this positive trend will persist in the coming years with the execution of projects we are developing.

We consider, however, that our most significant accomplishment is to have achieved zero fatal worker incidents last year as for the last three years, thanks to the investments we have made in safety and the environment.

What is the status of Romina?

Our main project for growth in the next two or three years is Romina. The project is on track for production at the beginning of 2026. Romina has a forecasted mine life of 14 years with a production rate of 50,000 to 70,000 t/y of zinc equivalent.

Permitting is going according to schedule. We continue to progress in our relations with the surrounding communities as well as with the surface infrastructure, tunnel and the ramps to get ahead of the production. Romina requires a CapEx of approximately US\$150 million throughout 2024-2026.

Can you talk about Volcan's recent agreement with Antofagasta?

We have signed a JV with Antofagasta to explore prospective copper zones located on the same trend as Toromocho. The agreement entails significant investments in the coming years that could change Volcan's exposure to the metals it produces. We have a large package of almost 350,000 hectares in mining concessions that are highly prospective. ■

production capacity of 3,600 t/d. Both assets are currently in operation and doing very well. Our third asset, Cusi, a small silver mine in Mexico, was placed under care and maintenance in 2023. We see it as an exploration asset, and we are currently working on a divestment process. For Bolivar and Yauricocha, we are about to release a new NI 43-101 report to validate our reserves and resources to the market. And lastly, we have a large greenfield exploration portfolio of projects in Peru and Mexico.

What is the long-term vision for Bolivar?

EB: In Bolivar, we have successfully ramped up production from around 2,000 tpd to 5,000 tpd. 2023 was the first year we achieved sustainable and significant profits as well as a robust cash flow, resulting in a very promising EBITDA.

JPF: In 2024, we are already gearing up the mine for this ramp-up phase, planning to undertake over 8,000 meters of mine development—an essential groundwork for expansion. Bolivar is a relatively young mine holding over 30 million tonnes of resources and producing 1.5 million t/y, ensuring a promising future.

What is the significance of obtaining the permit to operate below the 1120 level at Yauricocha?

EB: By Q4 of 2024, we anticipate ramping up production to 3,600 tpd, matching our historical production levels. This represents a ~40% increase in production, reestablishing Yauricocha as a highly profitable asset for the Sierra Metals, generating significant EBITDA, and reducing costs to comparable levels in 2020 and 2021. ■



EB



JPF

Ernesto Balarezo & Jean Pierre Fort

EB: CEO
JPF: CFO
SIERRA METALS

How many assets does Sierra Metals currently possess?

EB: Sierra Metals currently owns three assets, with two located in Mexico and one in Peru. Bolivar, a copper and gold mine in Chihuahua, Mexico, with a production capacity of 5,000 t/d and Yauricocha, a copper - zinc mine in Peru, with a



Phosphate

Beyond the Peruvian metallic endowment

Peru is not only rich in metallic resources. The Andean country also boasts extensive non-metallic resources throughout the country. According to the MINEM, the extraction of these resources in 2023 showed an increase in limestone/dolomite (+12.9%), phosphates (+8.8%), and coarse/fine sand (+27.0%). Conversely, some resources recorded annual figures lower than those of 2022, including concrete (-0.6%), building stone (-25.2%), calcite (-6.9%), clays (-16.1%), pozzolana (-17.5%), and salt (-7.8%).

Compañía Minera Miski Mayo, the sole national phosphate producer, is a joint venture between Mosaic, an American company with a 75% stake, and the Japa-

nese Mitsui, holding the remaining 25%, and operates the Bayóvar mine. In a conversation with the recently appointed president-director of the company, Marilza Carneloz, she explained that Bayóvar has five different layers with varying qualities of phosphate, ranging from P1 to P5.

As in any metallic operation, they have to extract and process the mineral in a profitable way. The challenge, however, lies in the volume of material that needs to be moved: "To produce nearly 5 million t of final concentrate, we must move more than 100 million t of material, ensuring that the process is sustainable and economically viable," explained Carneloz.

Carneloz takes pride in the company's practices, which she called "green mining." According to her, Miski Mayo uses granulometric separation of the particles to separate the rock from the mineral without using chemicals. Furthermore, the company does not use fresh water. "We are supplied exclusively by seawater, which we capture at our port facility and pump to our processing plant. We also have one of the largest desalination plants in the country, allowing us to obtain desalinated water to be used mainly in the last stages of our production process, thus maintaining a sustainable and environmentally friendly approach," she concluded. ■



Marilza Carneloz

Director – President
MISKI MAYO

What type of mining does Miski Mayo practice?

We are pioneers in phosphate production in the north of the country, currently being the only large-scale phosphate mine in Peru. Our company is a joint venture formed by Mosaic, a leading American company in producing and marketing phosphate and potash, with a 75% stake, and the Japanese corporation Mitsui, with 25%. Over the last five or six years, we have focused on optimizing our operations, achieving satisfactory results in production growth, personnel development, and sustainability.

What is the main challenge in extracting and processing phosphate in Bayóvar?

Like almost all mines, phosphate operations are usually located in remote sites without infrastructure. To develop Bayóvar, investing and seeking synergies with different industries, such as energy, was necessary. Our deposit, of sedimentary origin, was a seabed mil-

lions of years ago, so the rock is "softer" and can be extracted only with giant shovels, without the need for explosives. We have five layers with different qualities of phosphate, from P1 to P5. The big challenge is to extract and process the mineral profitably. To produce nearly 5 million t of final concentrate, we must move more than 100 million t of material, ensuring the process is sustainable and economically viable.

We are proud to be a "green mining" operation, as we apply particle size separation, allowing us to separate the rock from the mineral without using chemicals or generating external waste. Additionally, we rely exclusively on seawater, which we capture at our port facility and convey through a pipeline to our processing plant. We have one of the largest desalination plants in the country, enabling us to obtain desalinated water for use mainly in the final stages of our production process. ■



Exploration and Development

“

Peru has an abundance of minerals and ranks second in copper reserves. This is particularly relevant as the energy transition will bring a significant increase in global copper demand, presenting an excellent opportunity for Peru.

”

Rosa María Flores-Araoz
CEO
KALLPA

GBR Series • PERU MINING 2024

Image courtesy of Hochschild

Exploration and Project Development

About to catch the wave of high prices?

The Peruvian exploration portfolio has remained relatively stagnant over the past few years, and the latest document published by the MINEM in early 2024 includes 75 projects with a combined investment of US\$644 million. Despite the millions of dollars in the pipeline, the total exploration budget executed in 2023 reached US\$433 million, indicating a modest 2.4% increase compared to the figures from 2022.

As reported by the MINEM, 2023 saw the highest exploration figures of the last five years, representing the third consecutive year of growth. Meanwhile, data from S&P indicates that in 2023, majors increased their exploration budgets by 1.2% for their existing assets, while intermediates and juniors reported a decrease of 4.5% in their budgets compared to 2022. This has resulted in the grassroots share of exploration falling to an all-time low of 23.4%.

The lack of liquidity in the market and limited equity financing opportunities have placed financial strain on junior mining companies. However, despite unfavorable market conditions, Camino Corporation made strides. In June 2023, Camino welcomed Nittetsu Mining as a partner for its Los Chapitos project, an IOCG (iron oxide-copper-gold) deposit. Nittetsu, a Japanese company, has invested CAD\$10 million over three years, which, according to Jay Chmelauskas, President and CEO of Camino Corporation, will propel the company's progress towards resource delineation and potentially a feasibility study. "We aim to establish multiple pits feeding a central processing plant for a prospective SX-EW copper oxide mine," commented Chmelauskas.

In March 2024, the company conducted a step-out drilling campaign and intends to proceed with a follow-up drilling program in the latter half of the year. Additionally, regarding another project, María Cecilia, a copper porphyry, Camino began constructing drill pads in April 2024 in preparation for an upcoming drilling campaign. "With an emphasis on discovery drilling, we aim to uncover a substantial deposit and achieve success in delineating a new porphyry center," emphasized Chmelauskas.

From a global perspective, the insufficient focus on exploration exacerbates the shortage of new projects essential for the energy transition. McKinsey & Company forecasts that the demand for copper is projected to reach 36.6 million t/y by 2031. A substantial gap of 5.1 million t/y exists compared with the projected supply. According to David Kelley, president and CEO of Chakana Copper, there was already a supply gap for copper before the clean energy transition became a prominent topic.

Chakana owns the Soledad project in the Áncash region. In June 2023, Chakana received a permit to drill on the south-

ern half of the project, enabling it to explore different types of mineralization, which include a porphyry target, referred to as Mega-Gold, and a high-sulfidation epithermal style of mineralization called La Joya.

Kelley, a geologist, explained that the mineralogy of the project is unique, and the company wants to test the porphyry targets and the high-grade outcropping tourmaline breccia pipes. "We are in the Miocene mineral belt, one of South America's most prolific porphyry belts. There is no better place to make a tier-one discovery than to be in the vicinity of other world-class deposits," he commented.

Despite the political instability, Kelley maintains an optimistic outlook regarding investors and Peru: "I think investor confidence is returning. We could not have raised CAD\$3 million if investors did not have confidence in Peru. I hope more foreign investment is coming into Peru in 2024," he commented.

In April 2024, Chakana started a 3,000 m exploration drilling campaign at the Mega-Gold porphyry target.

DLP Resources is another junior company with its flagship project in the Miocene belt. The Aurora copper-porphyry project is at an advanced stage and was initially drilled by Bear Creek Mining in 2001. DLP acquired the project in 2021 and conducted deep drilling down to 1,000 m. "We commenced the current drill program in August 2022 with three drill holes. In 2023, we completed 10 holes in the project. In total, we have performed 9,910 m of drilling. We have a program in place for 2024 to drill 10 holes and 10,000 m," commented Ian Gendall, president and CEO of DLP Resources.

In April 2024, DLP Resources announced that it had closed a C\$6.4 million private placement with Paradigm Capital and started the 2024 drilling campaign at Aurora, which Gendall estimates will be completed in Q1 2024. In the meantime, DLP has been making progress with its other asset in Arequipa, the Esperanza project, a porphyry copper-molybdenum project with promising rock sample results. "With two phases of rock sampling and mapping completed on the Esperanza project, an area of 3.5 km x 1.5 km has now been identified with anomalous copper and molybdenum in rock samples," commented Gendall.

The goal of the DLP is to bring Esperanza to the point of being drill-ready by the end of 2024.

Latin Metals is another Canadian company focused on copper, though with a different model from traditional juniors since it is a prospect generator. Keith Henderson, President and CEO of Latin Metals, shared that prospect generators are a longer-term investment. "It attracts those with a long-term view. Prospect generators have the potential to organically grow into royalty companies without diluting shares," he explained.

The company has two projects in Peru: Auquis and Lacsha. At Auquis, Latin Metals has identified multiple centers of mineralization for various deposit types and aims to secure a partner for the property in early 2024. As for Lacsha, there is a three-year community agreement in place along with a drilling permit. "It is truly partner-ready. Funding from a potential partner can be deployed almost immediately for drilling. This is advantageous because community agreements and drill permits can be difficult to acquire in some areas of Peru, and even the places where acquiring permits is ideal, securing them can still be time-consuming," stated Henderson.



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Contact: Erika Gabriel Tuesta
Phone: (01) 3456393

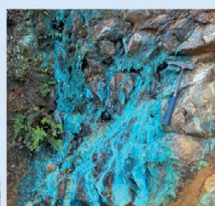
Mobile: (051) 950 194 903

Email: area.comercial@bizalab.com.pe
erika.gabriel@bizalab.com.pe

Web: www.bizalab.com.pe

>> 50

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www.dlpresourcesinc.com

Contact: Ian Gendall – CEO & President
iangendall@dlpresourcesinc.com

Tel: +1 604 897 7436



David Kelley

President and CEO
CHAKANA COPPER

What is the history of the Soledad project?

Since making an initial high-grade copper/gold silver discovery in 2017, we have drilled 62,000 m of exploration and resource drilling. We published an initial inferred resource on seven breccia pipes in 2022, and believe that there is potential for 50-100 breccia pipes on the project. The resource is open at depth and we have defined 54 additional breccia targets, giving us excellent potential to expand the breccia resource.

In June 2023 we received a permit to drill on the southern half of the Soledad project, enabling us to explore different types of mineralization. This includes a porphyry target, referred to as Mega-Gold, and a high-sulfidation epithermal target called La Joya. These targets will be the focus of the next exploration drill campaign, beginning in March 2024.

We were fortunate to raise C\$3 million recently in a private placement to fund the drilling program. The industry is currently experiencing very difficult capital markets for junior mining companies, so it was gratifying to have notable investors like Gold Fields and Rick Rule in our financing.

Can you describe your results from a geological standpoint and the Aija-Ticapampa district more generally?

We believe we have identified the principal intrusion that is driving not only the formation of the tourmaline breccia pipes but also the prominent distinct scale zoning in the Aija-Ticapampa mining district. We believe we sit on the intrusive center of the district, where there is rich copper and gold mineralization. We are surrounded by an extensive 150 km² district dominated by lead, zinc and silver mineralization, which is the focus of Lincuna's mining operation. This distinct zoning is typical of large porphyry districts. The excitement, which included a recent doubling in our share price, is around our ability to test the Mega-Gold and La Joya targets. The mining industry in Peru is defined by its giant copper and gold deposits; we are on the doorstep of discovering the next one.

Many of the copper deposits in Peru have distinct zoning, with porphyry mineralization in the center that is surrounded by distal high-grade veins, mantos, and replacement deposits. We

are in the Miocene mineral belt, one of South America's most prolific porphyry belts. There is no better place to make a tier-one discovery than to be in the vicinity of other world-class deposits.

Can you discuss possible mining scenarios for your current identified targets?

Predominately the exploitation of the breccia pipes would be underground mining, with small starter pits at the top. We have topography working in our favor, which will allow us to drive horizontal adits into the hillside to intersect the breccia pipes, which are vertically extensive. By driving adits at different elevations on the mountainside, we can quickly access different levels of mineralization.

What timeline should investors expect moving forward?

The focus for us is preparing for the next drill program, which is fully funded and will start at the end of March. We have a 3,000 m program planned that will include drilling several targets in the Mega-Gold area, La Joya, and additional mineralized breccias. ■

What aspects of this deposit stand out regarding mineralogy, and why do you believe it has the potential to become a world-class mine?

The Ayawilca deposit is truly remarkable in its scale and potential. The depth extensions remain primarily unexplored, promising significant untapped resources. There are also high priority targets along strike of known resources which are currently unable to drill due to permitting issues. Unfortunately, navigating Peru's stringent permitting processes presents challenges, limiting our drilling scope to permitted areas. Yet, there is immense potential for the future, which we aim to explore.

I am deeply passionate about this project's prospects and eventual transformation into a successful mine. Timing is crucial amidst the current industry landscape, marked by permitting complexities and fundraising hurdles, but our cautious approach ensures sustainable progress. We plan to commence drilling by September, pending necessary developments, marking the next step in our journey towards realizing the Ayawilca project's full potential. ■



Graham Carman

President and CEO
TINKA RESOURCES

Could you provide a brief overview of the 2022-2023 drilling campaign at Ayawilca?

Our drilling campaign encompassed approximately 11,000 meters. It was primarily focused on infill drilling where we aimed to bolster our indicated resources, representing a higher quality of resource than inferred resources. We achieved a 50% increase in our indicated resources with significant high-grade zinc discovered in the southern area. Ayawilca now has 3.6 billion lb of zinc in indicated resources, and around another 3.0 billion lb zinc in inferred resources, making Ayawilca one of the largest undeveloped base metal deposits in the Americas. Notably, we encountered exceptional tin grades and made a promising silver discovery, which we have named the "Silver Zone," adding to our existing deposits. Overall, it was a successful program with Ayawilca becoming truly polymetallic, culminating in releasing updated mineral resource information alongside the PEA.

What are the main differences between the 2021 PEA and the 2024 PEA?

The main changes involve a reduction in the conceptual run of mine throughput

from 3 million to 2 million t/y zinc-silver-lead circuit, while also incorporating a 0.3 million t/y tin circuit for the first time. These changes allowed for a more feasible and longer mine life to 21 years. Despite a higher initial Capex of US\$382 million, the NPV8% remains relatively consistent at US\$431 million due to adjustments in zinc prices and improved mining methods. Furthermore, the land footprint has been significantly reduced, promoting operational efficiency and environmental conservation.

What are the next steps following the publication of the PEA?

Our plan involves initiating another round of drilling, likely commencing around September 2024, with an estimated scope of 10,000 meters. The objective here is to accumulate adequate measured and indicated resources to transition into pre-feasibility study. There will also be some exploration holes to test resource growth. Additional information from drilling is required to gather essential data for a pre-feasibility study, such as geotechnical information and metallurgical samples, while also focusing on augmenting zinc, silver, and tin resources.



Ian Gendall

President and CEO
DLP RESOURCES

Can you introduce our readers to DLP Resources (DLP)?

DLP is listed on the TSXV and the OTCQB in the US. We have a strong board with members from Ascot Resources and Osisko Mining to name but a few. Fully diluted, we have 124.8 million shares outstanding. Our flagship project is the Aurora porphyry copper-molybdenum project located 60 km north of Cuzco in Southern Peru. Aurora is an advanced stage exploration project. Our other project is Esperanza, a greenfield project outside of Arequipa. We also have copper-silver-cobalt and zinc projects in BC, but our focus is Peru.

Can you provide an overview of your flagship Aurora project?

Aurora was first drilled by Bear Creek Mining in 2001 and Vena in 2005. Approximately 3,900 m of drilling was performed. The potential of the project was underestimated because most of the drilling was shallow, reaching depths of only 300-400 m.

We acquired the project in 2021 and have performed deep drilling down to 1,000 m. We commenced the current drill program in August 2022 with three drill holes. In 2023 we completed 10 holes on the project. In total we have performed 9,910 m of drilling. We have a program in place for 2024 to drill 10 holes and 10,000 m. We are currently in a round of financing seeking to raise C\$4-5 million to complete the proposed drilling. The Aurora project is in an early stage of development, and the goal is to advance it to the point where it has a defined mineral resource by 2025. We also have an excellent relationship with the surrounding Parobamba community.

What are the highlights from the current drill campaign?

All holes to date have intersected good copper and molybdenum mineralization from the top to bottom of the holes. The Aurora deposit has some of the best molybdenum grades in the world, and it is considered both a copper and molybdenum project.

We intersected intervals of over 700 m at 0.5% CuEq, and 970 m at 0.3% CuEq. The last hole returned 773 m at 0.82% CuEq.

In February 2024, we expanded the area by 500-600 m. We identified surface outcrop rock samples with good copper, molybdenum, and silver values in the northeast of the property. We will be expanding to the southeast and northeast of Aurora during 2024.

Can you introduce your Esperanza project?

Esperanza is an early stage, 100% DLP owned porphyry copper project. This year we started with a mapping and sampling program. We have also performed airborne imagery and identified alteration patterns; this will be combined with groundwork and, potentially, geophysics. The intention of the program is to bring Esperanza to a point of being drill ready by the end of 2024. ■

Investors lump together all countries in LATAM

In 2023, there was a prevailing perception that Peru was losing its opportunity in the energy transition, leading investors to explore alternatives in other jurisdictions. Interest was heading north to countries like Canada and the US, known for their robust rule of law and policies promoting the development of critical minerals such as copper. Others seemed to look for stability in more regional options, such as Panama and Ecuador.

Interestingly, due to twists of fate and socio-political changes, it appears that the opposite scenario is now unfolding: There is a war against narcoterrorism in Ecuador, and protests in Panama shut down a mine from First Quantum Minerals. While potentially favorable for Peru in the short term, these events in Latin America may raise concerns among investors about the possibility of a long-term contagious effect.

Luquman Shaheen, president and CEO of Panoro Minerals, pointed out that Peru often faces misjudgments due to broader regional perceptions. North American investors tend to generalize their views of Latin American countries based on isolated incidents. “The stigma of being painted with the same brush as Panama poses difficulties for us to overcome. However, many investors understand the nuanced nature of the exploration story in Peru and Latin America,” said Shaheen.


During PDAC 2024, GBR interviewed the new Minister of Energy and Mines, Rómulo Mucho, who echoed Shaheen’s concerns and emphasized the need for Peru to take heed of the situation. “The Panama incident should serve as a warning to Peru, as it demonstrates that if we do not handle our laws and regulations properly and manage modern mining projects adequately, we could face similar situations,” said Mucho.

What happened in Panama was a hard blow for the whole industry, especially for First Quantum Minerals (FQM). This raises questions about how the Canadian producer will approach its two projects in Peru: Haqira and La Granja, a project in Cajamarca to be developed in a joint venture with Rio Tinto. Jorge Benavides, legal and corporate affairs manager – South America at FQM, explained that Haqira marked FQM’s initial entry into LATAM. However, the company prioritized Cobre Panama, allowing Haqira to progress cautiously. After a suspension period, FQM secured an access agreement with communities in the direct influence area by mid-2023.

Since September 2023, the company has been drilling at the Haqira East deposit to enhance understanding of the deposit and to increase its volume. Benavides said La Granja boasts resources of 4.32 billion t at 0.51% copper and has significant expansion potential: “Our current focus is on an extensive two-year drilling campaign initiated in October 2023. This drilling campaign, geared towards improving geological, metallurgical, and geotechnical knowledge, will enable the upgrading of inferred resources and their eventual conversion into reserves to allow the design of a mine plan,” he added.

Reflecting on the looming copper shortage, Benavides commented: “Copper deposits are few and far between, and all easy projects are already in operation. To deliver the increasing amounts of copper that the world needs, we must operate in increasingly complex environments that require more advanced technologies and techniques with consequently higher costs.”

Regardless of their size, mining companies have plenty to risk, from reputation to millions of dollars in investments. Per-



Andrew Thomson
President and CEO
PALAMINA

“
Peru’s copper potential requires hundreds of drills turning to move the needle. Instead, everyone is waiting for the shallow promises made by the government to actually be enacted.
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haps because of the complexity and intricacies of developing new mines, such as navigating complex jurisdictions and more challenging terrain, we are witnessing more partnerships in various forms for developing future mines in Peru, exemplified by the JV between FQM and Rio Tinto.

Peru’s permitting maze

On a global scale, permitting and miners have been at odds. If you ask any miner, regardless of their jurisdiction, every one of them will say that permitting takes too long. According to S&P, the average time it takes to bring a mine online continues to increase. Figures show that it now takes 17.9 years for mines to come online, compared to 12.7 years for mines that started up 15 years ago. Peru is no exception; its lengthy permitting processes have created bottlenecks in various projects in the pipeline.

When discussing this topic with Giorgio Albertini, general director – Peru of EV Resources, he explained that the permitting process in Peru is “incredibly” complex and “cumbersome”, primarily due to the dichotomy between mining concessions granting rights for exploration or exploitation of mineral resources and surface land ownership. “While a company may hold a mining concession, it does not automatically have rights over the surface land. Without reaching an agreement with the landowner, little progress can be made. Our success in navigating this complexity stems from our commitment to transparent and respectful engagement with local communities,” he pointed out.

EV Resources, an Australian-listed company, entered Peru through Jadar Resources, which owned the Yanamina gold project. Recognizing Peru’s rich mineral endowment and potential in copper, EV acquired the Don Enrique project in Junín and the Parag project in Lima. “Don Enrique marks our inaugural drilling project. Peruvian authorities have granted us drilling permits and the Environmental Impact Assessment approval. We are awaiting weather changes to commence an exploration program between 2,000 and 2,500 m validate

the concept. On the other hand, in Parag we have already completed 2,000 m of drilling, with samples undergoing laboratory analysis,” explained Gonzalo Lémuz, EV Resources’ exploration manager.

Andrew Thomson, president of Palamina, said: “Streamlining drill permitting processes and providing clarity on land ownership rights in Peru would greatly benefit exploration and development initiatives”.

Thomson strongly believes that Peru needs a reform and that the government should start taking decisive action on this issue: “Without significant reforms to issue drill permits in months instead of years, Peru’s mining sector will continue to face serious challenges in attracting investment. Peru’s copper potential requires hundreds of drills turning to move the needle while everyone is waiting for the shallow promises made by the government actually to be enacted,” concluded.

Who will pay for the energy transition?

At every international mining summit, discussions and round tables pretty much revolve around the energy transition and the critical role minerals like copper and silver play in it. As we move closer to 2050, the importance of these minerals only grows. We cannot rely on new mines coming online merely on the sheer strength of commodity prices. Different pieces of the puzzle are required to stimulate this. Regulatory environments, enthusiastic investor support, technological advancements, and geopolitical stability, as well as high prices are all

equally required to incentivize more exploration. But, how “high” is high? How much higher must prices go to incentivize new mines and exploration?

Indeed, the saying “Ask three different people, and you’ll get three different answers” seems fitting here. Goldman Sachs suggested that a long-term copper price near US\$10,000/t (US\$4.53/lb) is necessary, while Olivia Markham of BlackRock commented that copper would need to reach US\$12,000/t (US\$5.43/lb) to spur such investments. On the other hand, Robert Friedland, founder of Ivanhoe Mines, stated that copper should reach US\$15,000/t (US\$6.79) and remain at that level for the long term to activate new mines. While we are still far from seeing the prices forecasted by Friedland, copper prices in recent months have been flirting with record highs, surpassing the US\$4.53 suggestion from Goldman Sachs. For now, we have to wait and see if this trend continues.

In this context, what do Peruvian junior’s C-executives think? For Graham Carman, president and CEO of Tinka Resources: “There is a glaring disparity between the energy transition discourse and the investment trends for junior mining firms. This highlights the need for increased investment in new mine development. While the current market conditions may seem bleak, I believe we are at the bottom, and there is a promising outlook for the future.”

Joanne Freeze, president and CEO of Alta Copper, stated that many investors are now trading commodities through ETFs rather than directly investing in companies: “This trend



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Highlighted Projects



John Black, CEO, Regulus Resources

"Our agreement with Coimolache (CMC) is a big step towards evaluating the true potential of the integrated AntaKori project. At Tantauatay, CMC is mining the oxide gold cap over the top of the same copper-gold sulphide deposit that we own part of. Our studies show that integrating our claims with our neighbours results in a very large, high-grade copper-gold deposit with a low strip ratio that bodes well for potential economics. We are in a brownfield setting – it is much easier to develop a mine which is an expansion of an existing operation."



Richard Osmond, President and CEO, Element 29

"Flor de Cobre boasts a 322 million-ton resource based on relatively minimal drilling of approximately 14,000 m. Although we have released a preliminary resource estimate to attract institutional investors, it does not fully capture the extensive potential of the project. With drilling depths reaching 1 km, we remain confident in expanding resources vertically and to the south, where topography supports pit extension. This extension maintains an exceptionally low strip ratio of 0.7 to 1, far more efficient than the industry standard."



Patrick Elliott, President and CEO, Forte Minerals

"We obtained the DIA for Pucarini in September 2023, marking a significant milestone. Similarly, in December 2023, we secured the DIA for Esperanza. Both projects have well-defined drill targets and have long been on our radar, with no previous drilling, heightening their exploration potential. We are now working on acquiring a third permit, an FTA, for the Don Gregorio project in northern Peru, which shows significant promise as a porphyry copper-gold prospect."



Lars Dahlenborg, President, Hannan Metals

"At the San Martin copper-silver project we are initially targeting Tabalosos, an area that spans about 8 km in length and 4 km in width, hosting a continuous and relatively flat layer of mineralization. Surface mapping and sampling have been extensive, revealing an average width of 0.9 m, copper grades averaging 2.1%, and 30 gr of silver across over 100 channels. The first phase of drilling will cover approximately 2 km of strike length and 800 mts of width and will be funded entirely by our JV partner, JOGMEC."



Álvaro Espinoza, CEO, Silver Mountain Resources

"We are in the first phase of a two-stage strategy to revive the Reliquias underground mine and commence operations at the Caudalosa plant, where we aim for a daily production of 2,000 tpd. The Reliquias mine has over 25 kilometers of tunnels. It has undergone substantial rehabilitation, with 15 kilometers refurbished to accommodate 25- to 30-ton vehicles equipped with complete air supply, lighting, water, and electricity facilities."



Peter Dembicki, President and CEO, Tier One Silver

"In previous drill cycles at Curibaya, we achieved grades of over 300,000 grams/ton silver and 980 grams/ ton of gold, and over 80 samples with over 1,000 grams/ton silver and 2.5 grams/ton gold. These grades, emanating over the 5 square kilometer footprint, are remarkable and unparalleled. 40% of drill holes hit high and bonanza grade. When we were ready for the second round of drilling, the markets turned. Curibaya is fully permitted. Our targets are identified and ready to hit the ground running once investments return."

51 >>

has resulted in retail investors having less influence over management decisions within companies. The shift towards ETFs means investors are more focused on commodities' broader market trends rather than the performance of individual firms," she explained.

Alta Copper (formerly Candente Resources) published a new PEA in 2024. In this report, Alta built upon the ESG components from the 2022 PEA, enhancing sustainability by transitioning to dry-stack tailings, eliminating the need for a dam, and selecting a commingled facility location far from communities. "We plan to produce 120,000 t/d, with an annual production of 158,000 t/y for the first 10 years. The pre-tax NPV stands at US\$4.1 billion with a 32.4% IRR. After-tax, using an 8% discount rate, the NPV is US\$2.3 billion with a 24.1% IRR," concluded Freeze.

Patrick Elliott, president and CEO of Forte Minerals, a company focusing on copper and gold projects at an earlier stage in the value chain with its Pucarini, Esperanza, and Don Gregorio projects, believes that the mining industry can uncover new reserves and bring them into production by expanding exploration budgets and investing in new technology: "While higher copper prices may incentivize the development of certain lower-grade deposits, sustained exploration and resource development efforts are essential to ensuring long-term supply stability," commented Elliot.

Forte obtained the DIA for Pucarini in September 2023 and, later, the DIA for Esperanza while still working on acquiring a third permit, an FTA for Don Gregorio. "We anticipate commencing drilling activities sometime in 2024, aligning with our strategic planning and commitment to responsible resource development," stated Elliot.

The company acquired the Alto Ruri, a high sulfidation epithermal gold prospect in central Peru, along with the Cerro Quillo porphyry gold-copper-molybdenum prospect from GlobeTrotters Resources, a strategic project-generation partner.

Within the same 'strategic partnership' umbrella under GlobeTrotters, we find Element29, a company positioned as more advanced than Forte. Richard Osmond, chairman and CEO of Element29, shed light on the market dynamics in Peru, noting that while the company once boasted a market cap of CAD\$50 million during favorable times, shifts in market conditions have led to a drop in the market cap to between CAD\$15-20 million. This underscores the necessity to cut costs and safeguard capital. "With GlobeTrotters in place, we identified an opportunity to consolidate our infrastructure, allowing us to share the same administrative team. This consolidation aims to reduce costs by a factor of three, targeting a decrease in our monthly burn rate from nearly US\$200,000 to less than US\$100,000," explained Osmond.

Lithium and uranium

Lithium has emerged as one of the hot commodities in recent years. Many countries list it as a critical mineral due to its significance in lithium-ion batteries for electric vehicles (EVs). In LATAM, the lithium focus is on the Lithium Triangle, an area shared by Bolivia, Argentina, and Chile.

According to different sources quoting the USGS, this area is thought to hold more than 50% of the world's lithium resources. Due to its hard rock nature, lithium in Peru differs from the brines found in Bolivia, Argentina, and Chile. However, Peru's



Keith Henderson President and CEO LATIN METALS

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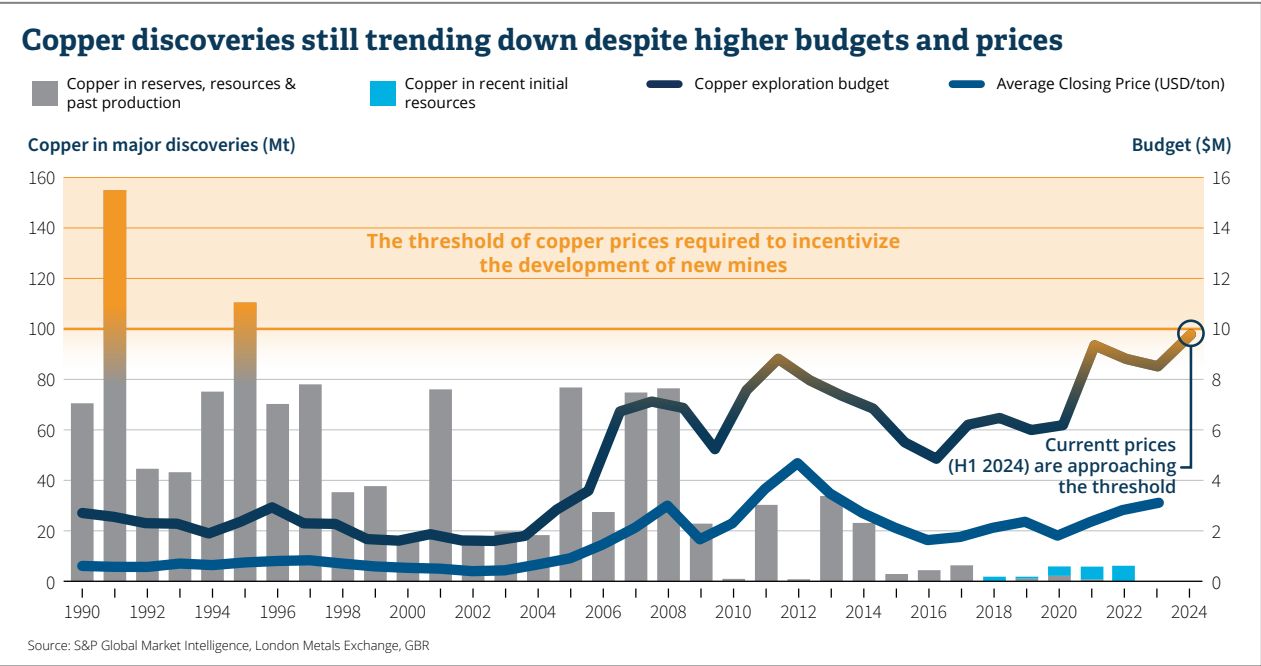
Prospect generators are a longer-term investment that do not attract the investors who want quick returns. Instead, they attract those with a more patient, long-term perspective. As such, prospect generators have the potential to organically evolve into royalty companies without the need to dilute shares.

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lithium story is unfolding with the publication of a 2024 Preliminary Economic Assessment (PEA) for the Falchani project by American Lithium. The PEA, released in January 2024, increased the measured and indicated categories by 476%. According to this economic analysis, Falchani is projected to produce over 85,000 t/y of lithium carbonate. "We saw a tripling in NPV from the prior economic analysis; it grew from US\$1.5 billion to US\$5.1 billion, showing the scale and purity of the project. Operating cost will be approximately US\$5,100/t, placing it in the lower quartile of the global cost curve," commented Simon Clarke, CEO of American Lithium.

Following President Biden's approval of the Inflation Reduction Act (IRA), several reports indicate that lithium demand for the US energy transition will be 15% higher by 2035 than initially projected previous to the IRA. Despite the US trying to achieve lithium self-sufficiency with projects on the brink of production, it is suggested that the US will need to rely on allies. This holds particular significance for Peru, as both countries share a free trade agreement, and the type of rock mined in Peru will not be shipped to China. "This makes it unique among hard rock deposits. Battery-grade lithium products will be produced on-site at Falchani without the need for beneficiation overseas and reducing reliance on China for processing," explained Clarke.

In addition to Falchani, American Lithium also owns the Macusani uranium project, another mineral not commonly found in Peru. Clark suggested that the escalating tensions between Russia and the West and a tightening supply from Kazakhstan, coupled with the world's shift towards the green transition, further emphasizes the increasing demand for uranium, which Macusani is poised to meet. "Our Macusani uranium project has a relatively simple flowsheet and low CapEx at US\$300 million. With the ability to produce 6-7 million lb/y of U3O8, this is a top tier asset that will significantly contribute to annual global uranium supply," said Clarke.



Silver and manganese

Silver is an attractive commodity, yet overshadowed. On the one hand, it serves as a haven during an economic crisis but does not exhibit the same interest as gold. On the other hand, it plays a crucial role as an industrial metal but does not receive the same attention as copper, particularly in the energy transition context.

When discussing this with Peter Dembicki, president and CEO of Tier One Silver, he complained about silver being thought of only as a byproduct of copper production, adding that there are very few true silver producers. “Silver has outperformed gold by a large margin in the eight previous bull markets. When it is silver’s time, it shines brighter and moves higher and faster than gold,” he emphasized.

Like many junior companies, Dembicki explained that Tier One Silver has faced unfavorable market conditions, making 2023 a “humbling year” for the company, as it could not drill its Curibaya project. However, Dembicki asserted that Curibaya holds great potential: “The grades are unparalleled. In previous drill cycles, we achieved grades of over 300,000 g/t of silver and 980 g/t of gold, and over 80 samples with over 1,000 g/t of silver and 2.5 g/t of gold,” he added.

Silver Mountain Resources is a more recent entrant into the Peruvian exploration segment, capitalizing on silver’s fundamentals. Since going public in 2021, the company has been focused on rehabilitating the Reliquias mine in the Castrovirreyna district, with over 35,000 m drilled. “It will be an underground mine, and we are in the first phase of a two-stage strategy to revive Reliquias and commence operations at the Caudalosa plant, where we aim to achieve a daily production of 2,000 t,” commented Álvaro Espinoza, CEO of the company.

Also, in Huancavelica, we find Kuya Silver’s Bethania project, which spans over 4,000 hectares and includes the Santa Elena concession. Like Silver Mountain Resources, Kuya Silver has rehabilitated the underground infrastructure and refurbished the past-producing mine. In May 2024, Kuya Silver began recovering mineralized material from the Española vein system.

“We have strategically adapted our business model to commence operations through a maquila arrangement, initially leveraging outsourced facilities. This decision mitigates project risks, accelerates the learning curve, and expedites our journey toward full-scale production, targeting 350 t/d,” commented Christian Aramayo, COO of the company.

The Spanish saying “Vine buscando cobre y encontré oro” translates to “I came looking for copper and found gold.” While Aftermath Silver was searching for copper and silver in its Berengula project, it did not come across gold; instead, it discovered manganese. Ralph Rushton (president and CEO) and Mike Parker (CEO) explained to GBR that the potential for recovering silver and copper from Berenguela has been widely recognized for the past two decades. Thus, in the last months, the company has shifted its attention intensely towards the manganese side of the story.

Their goal now is to produce high-purity manganese sulfate. They have successfully tested this process in a small-scale laboratory setting and are now looking to upscale it to the pilot plant level. “The goal is to develop the metallurgical flow sheet into a basic process design, enabling engineering work for cost estimation and preliminary project economics. We aim to achieve this by the fourth quarter of this year, although industry uncertainties make setting precise dates challenging,” commented Rushton. During discussions on the significance of manganese in today’s era, particularly in the context of the electric vehicle (EV) transition and increased demand, alongside Peru’s potential in copper and lithium production from the previously mentioned Falchani project, Parker emphasized the strategic importance of producing manganese sulfate. Doing so could establish Berenguela as a critical player in the global manganese sulfate market outside of Asia and further solidify Peru’s pivotal role in the industry. “The nexus between Peru’s manganese production and lithium projects could pave the way for a focused battery industry. Such a development would be highly beneficial, aligning with Peru’s strategic position in the battery metals market and contributing to the country’s economic growth,” concluded Parker. ■



Simon Clarke
CEO
AMERICAN LITHIUM

INGEMMET and MINEM challenged the Superior Court’s ruling on the 32 disputed concessions in December 2023. How will American Lithium mitigate impacts on development timelines and investor confidence?

These 32 concessions represent approximately 18% of the 178 concessions on the Macusani plateau owned by American Lithium, and the process launched by INGEMMET and MINEM would appear to be a final last gasp attempt to overturn the prior unanimous ruling in our favour from the Superior Court. We do not believe there are grounds for this challenge to succeed and we will continue to vigorously oppose any challenges to our title to these concessions.

Can you provide highlights from the Falchani’s January 2024 PEA?

The updated PEA on our Falchani lithium project is part of the move to drive the project to prefeasibility in mid-2024. I commend our team in Peru for significantly advancing the Project despite the political backdrop of recent years, especially during the prior Regime. The cur-

rent government has a stronger focus on the economy, driving mining forward, and securing mining investment. We are starting to see the backlog in permits diminish and normalization of the sector, which provides a strong base to continue to drive the project forward.

We filled our EIA early, which will help to streamline permitting and position us to secure mine permits as quickly and efficiently as possible once pre-feasibility is complete. This also enabled us to perform significant drilling during 2023, driving a major resource increase; the measured and indicated category grew 476%, and fed into the updated PEA. We saw a tripling in NPV, growing from US\$1.5 billion to US\$ 5.1 billion, showing the scale and purity of the project. Operating costs will be approx. US\$5,100/t, placing it in the lower quartile of the global cost curve.

Falchani is projected to ultimately produce 85,000 t/y of lithium carbonate a year, making it one of the largest projects globally. Battery grade lithium products will be produced onsite at Falchani, reducing reliance on China for processing. ■



RR



MP

Ralph Rushton and Mike Parker

RR: President and CEO
MP: COO
AFTERMATH SILVER

How has Aftermath Silver been advancing the metallurgical test work for the Berenguela project?

RR: Our focus in the current round of metallurgical test work was to attain high-purity manganese sulfate monohydrate, a top-tier manganese product. We aimed to showcase the feasibility of producing battery-grade manganese sulfate from high-grade manganese ore. Although conducted on a small

scale in a laboratory setting, the results were encouraging, leading to the successful production of manganese sulfate.

What are some other findings discovered at Berenguela?

MP: After obtaining magnetic data from six years ago and analyzing it, we pinpointed promising areas in the southwest of the property where a significant intrusive was known to exist. This intrusive contains known copper occurrences and interfaces with the limestone hosting Berenguela. Such geological conditions are conducive to forming significant mineralization, reminiscent of other deposits in Peru like Las Bambas. Encouraged by positive rock sampling results and promising exposures in the area, we plan to focus some of our upcoming campaigns on this region. While detailed geophysical surveys are yet to be conducted, the area seems suitable for magnetometry and induced polarization surveys. This initiative aligns with our ongoing efforts to unravel the relationship between Berenguela’s mineralization and its geological source, potentially leading to discoveries in this captivating geological setting.

How could lithium and manganese be a game-changer for Peru?

MP: We are not planning to export concentrate or any intermediate product; instead, we hope to produce and export the final products directly from Peru. This distinction is crucial because it means Peru will capture the most value-add in the production chain. Additionally, the nexus between Peru’s manganese production and lithium projects could pave the way for a focused battery industry. Such a development would be highly beneficial, contributing to the country’s economic growth. ■



Engineering, Construction and Consultancies

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New technologies and innovation are critical to the long-term sustainability of the industry because the challenges are greater from a geological, infrastructure, supply chain and regulatory perspectives, reflected in increasing capital costs.

”

Marcello Pirri
Peru Country Director
WORLEY

GBR Series • PERU MINING 2024

Image courtesy of Sierra Metals

Engineering, EPCM and Consultancies

A more positive sentiment for 2024

There is a consensus among engineering and consulting firms that 2023 started off slow. However, as the year progressed, mining activity gradually increased. This upturn enabled engineering and EPCM companies to enter 2024 with a positive outlook, fostering a more optimistic environment.

According to Gustavo Bravo, Peru's managing director at WSP, the company had to realign its strategy in response to market signals to strengthen its position in the mining sector. This involved collaborating with key clients who had been redirecting investments toward brownfield projects, focusing on operational enhancements. "Above-expectation metal prices predict a promising year. However, challenges are expected in talent attraction and retention, as well as in developing new technologies for maximum positive impact on our clients," added Gonzalo Covarrubias, managing director for Peru and Mexico of WSP.

In line with Bravo, Paul Murphy, Mining Plus' South American office manager, commented that in 2023, juniors faced a challenging economic environment in securing investment to continue developing their projects. As a result, much of the demand for Mining Plus' services during the last few months came from already operating mines seeking optimization. "I believe that meeting the demand for copper will likely depend


heavily on brownfield exploration and expanding existing operations. One key driver for this scenario is the presence of existing infrastructure, which should streamline the permitting process and significantly reduce the required CapEx for production expansion or extension," stated Murphy.

Brownfield projects in Peru serve as the heart pumping oxygen to the rest of the value chain. While bottlenecks in greenfield projects present long-term concerns, current operations seem robust enough to enable continued growth for engineering and EPCM firms. These firms have conducted studies like MEIAs or EIAs to help their clients adopt new technologies and optimize their mining plans.

Such is the case of Stantec. When interviewing Alberto Coya, Stantec's country manager for Peru and regional lead for Latin America, he expressed that the company was the primary consultant for the MEIA of Antamina life expansion to 2036, which was approved at the beginning of 2024. He described the process as lengthy and resource-intensive, spanning nearly four and a half years.

AtkinsRéalis (previously known as SNC-Lavalin) supported Stantec with the MEIA. According to Daniel González, the com-

>> 60



We are the world's leading professional engineering services firm and are positioned as a strategic partner to mining companies in Latin America and Peru.

In addition to engineering, we offer consulting, mining, project management, mine waste, water and socio-environmental services, focused on sustainability and our clients complex challenges.

We know that the challenges of recent years require integrated services that carry our Future Ready® vision.

We have the capacity to accompany our clients in this context of increased demands, challenging the status quo and preparing for the future.

#WeAreWSP #WSPmining





Gustavo Bravo & Gonzalo Covarrubias

GB: Mining Director for Latin America and the Caribbean
GC: Managing Director for Peru & Mexico* WSP

*Until July 31 2024

How did WSP overcome the initial challenges posed by regional turmoil in 2023 to achieve growth in the mining industry?

GC: In 2023, we grew substantially, consolidating our leadership in mining waste management and expanding our services. Simultaneously, we grew our area in strategic advisory and consultancy, surpassing growth expectations in the Peruvian market. Despite a modest start, favorable conditions and stability allowed us to enhance our work at major mining projects, markedly improving and broadening our engagement.

GB: We navigated through regional challenges as 2023 commenced, with instability in various jurisdictions, impacting investments. Yet, as months unfolded, the situation stabilized, unveiling notable growth in the mining industry, especially in Chile, Peru, and Brazil. We emphasized the consolidation and fortification of long-term relationships with key clients in the mining sector, underscoring our steadfast commitment to strategic partnerships.

Does WSP's 2023 performance raise the expectations for 2024?

GC: Above-expectation metal prices predict a promising year. However, challenges are expected in talent attraction and retention, as well as in developing new technologies for maximum positive impact on our clients.

GB: In response to market signals, mining companies redirected investments towards brownfield projects, emphasizing operational enhancements, overcoming bottlenecks, and sustaining capital. WSP aligned its strategy with this trend, consolidating its position in this mining subsector and delivering significant outcomes through collaborations with key clients.

What does WSP's Future Ready methodology entail, and how do you integrate considerations for the impact of global warming into your projects?

GC: Our commitment to design and to consultancy is reflected in projects spanning up to 40 years, acknowledging the perpetual evolution in social and environmental domains. Our global Fu-

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In 2023, we grew substantially, consolidating our leadership in mining waste management and expanding our services.
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ture Ready Program seamlessly incorporates these trends, proactively addressing continuous changes. In anticipation of evolving influences on our client's projects, we have implemented a methodology aligned with our design criteria. This approach enables us to analyze diverse variables, emphasizing their impact on the project and concentrating on ESG factors. Our focus extends beyond green energies to include aspects like constructability, the complete lifecycle of assets, closure plans, and mining infrastructure, ensuring a holistic and sustainable vision.

GB: WSP's assessment of water resources and tailings storage facilities design integrates critical elements related to temperature change, water conditions, and the impact of climate change from the project's outset. This perspective is deemed essential from day one of any project. The heightened awareness of climate change's impact on mining design has resulted in increased client demand for the inclusion of these parameters.

What innovative technologies is WSP exploring in the realm of tailings dam management?

GB: WSP has collaborated extensively with an important client to develop innovations, like the Hydraulic Dewatered Stacking (HDS) tailings disposal technology. Following successful pilot and concept tests, we anticipate its imminent adoption in new mining operations. This technology utilizes naturally generated sands during production, particularly in metal extraction like copper. Through a logical and sequential construction method, layering tailings and sands facilitates more efficient water drainage, significantly reducing the total volume of water content. Beyond addressing reservoir volume reduction, this technology positively impacts capital costs by leveraging existing mine material: sand. This project is interconnected with another initiative, Coarse Particle Recovery (CPR), crucial in HDS development and related to the mentioned sands.

Can you elaborate on the role of WSP in supporting sustainability and long-term strategic management throughout the lifecycle of mining operations?

GC: We actively provide comprehensive support throughout all project phases, including the critical aspect of managing community relations, ensuring positive engagement with local communities. Our vision extends beyond technical execution, emphasizing our dedication to sustainability and the harmonious integration of mining projects into their social and environmental surroundings. The consolidation of our strategy at WSP is evident in our role as a multidisciplinary engineering and consulting firm dedicated to supporting clients through various project phases. While excelling in specific areas, our commitment to delivering a consistent level of quality extends across different project stages. This effective strategy is reflected in WSP's acquisition of diverse companies, enabling establishing a service platform that spans not only a sector or service but several. ■



Dan Etheredge
VP South America
KLOHN CRIPPEN BERGER

“Filtered tailings used to be discarded almost immediately due to the increased cost, but they are now increasingly valued. They are more prevalent nowadays, and I think this will continue to become more common.”

58 >>pany's business development manager, this has been a joint effort in navigating project modifications. Currently, AtkinsRéalis is engaged in project Nazareth for Minsur, an exploration project adjacent to the San Rafael mining unit. “We secured a significant study with Minsur, observing a trend where companies, despite potential delays, are advancing studies for future execution readiness,” said González.

Despite the bottlenecks, there have been some advancements in greenfield projects. Zafranal is one of Peru's few greenfield projects in the pipeline. At the feasibility stage and expected to be executed in 2025, the project has an estimated investment of US\$1.26 billion. Knight Piésold Peru was the company that helped Glencore-Antapaccay to get the approval of this MEIA. “This was a moment of significance for Peru,” according to Guillermo Barreda, Knight Piésold Peru's general manager.

At a much earlier stage, we find the Falchani lithium project by American Lithium, which updated the PEA of the project in January 2024. Stantec's US offices participated in this preliminary economic assessment because of their specialized knowledge in lithium. “Falchani distinguishes itself as a unique deposit—it is not brine but rock, presenting distinctive characteristics, measurement methods, and operational nuances. The mineralogical complexity adds an extra layer of challenge, an arena where a globally connected firm like Stantec excels,” pointed out Coya.

The words of Coya ring true. Companies can benefit from tapping into the expertise across various offices worldwide. However, Peru is also a well-established mining hub, and these global firms have long used local know-how and expertise for projects in other regions. This was evident between 2022 and 2023, marked by reduced mining activity in Peru and as attention shifted to neighboring countries like Ecuador. Dan Etheredge, VP of South America at Klohn Crippen Berger (KCB), commented that while the company's growth in Ecuador significantly outpaced that of Peru, it still relied on Peru: “Since Ecuador's labor workforce lacks engineers with experience in mining, we had to rely on Peru, bringing many experienced Peruvian engineers to Ecuador.”

As a mining hub, Peru has both international engineering and consultancy and local firms, which are equally important. In this context, and considering the earlier discussion on leveraging international expertise, what factors would lead a mining company to weigh the balance between a global engineering and consultancy firm with a widespread presence and a local firm?

For Julio César, general manager of JCI Ingeniería & Servicios Ambientales (JCI), the key is having a team of engineers with diverse specialties that allows the company to address clients' needs quickly. “We operate in a highly competitive consulting and engineering market in the mining sector. Our commitment is to provide high-quality services backed by direct field experience and a responsive and practical approach to sector needs in any region of Peru,” he concluded.

Cost-effective technologies

Gustavo Bravo, the mining director for Latin America and the Caribbean - WSP, highlighted that technological advancements have made new solutions more cost-effective and explained that WSP is introducing Hydraulic Dewatered Stacking (HDS) for tailings disposal, a technology that efficiently reduces water content by layering tailings and naturally generated sands in mining. “Beyond addressing reservoir volume reduction, this technology positively impacts capital costs by leveraging existing mine material: sand. This approach provides a notable economic advantage compared to conventional technologies like press filters,” explained Bravo.

While many companies focus on maximizing space and minimizing tailings disposal, others take a different approach by exploring reprocessing methods to extract minerals. GEMIN Associates is one such company. Marco Zavala, the general manager, revealed to GBR that they are collaborating with Sierra Sun to develop new methods for reprocessing the tailings of Sumaq Rumi. “The initial process involves rigorous agitation and cleaning equipment, followed by chemical agents for mineral recovery and flotation or gravity-based equipment for mineral separation,” he explained.

GEMIN serves both open-pit and underground operations. Regarding the latter, GEMIN collaborated with the Canadian contractor Redpath Mining to deliver the detailed engineering for the underground infrastructure of the Chaquicocha mine, the underground development of Newmont's Yanacocha sulfides project. “This major project transitioned into an underground mining operation due to resource depletion and deepening excavations. Meeting the exacting standards of both Newmont and Redpath marked a pivotal achievement for us,” commented Zavala.

Another engineering firm helping optimize its clients' operations in the production process in tailings is ByV IESEMIN. “At Trafigura's Catalina Huanca mine, we identified the opportunity to recover up to 2% of the mineral from the tailings. We could help accomplish this by enhancing comminution with a higher capacity mill to process ultrafine particles more effectively,” explained Jordan Barja, the company's general manager.

The Peruvian company specializes in metalworking, focusing on flotation. According to Barja, introducing multiple flotation cells can enhance efficiency and speed in the recovery pro-

>> 64



Guillermo Barreda
General Manager
KNIGHT PIÉSOLD PERU

“From Peru, we aspire to expand our operations to other countries, taking our expertise and commitment to new frontiers.”

As Knight Piésold marks a century globally and three decades in Peru, could you highlight key milestones shaping the company's distinguished legacy?

Our ongoing objectives include disseminating world-leading services in tailings dams design and management, where we have solidified our position as industry leaders. Additionally, Knight Piésold excels in water resource management and dam break analysis, contributing to drafting those CDA guidelines that have achieved global reference status. From Peru, we aspire to expand our operations to other countries, taking our expertise and commitment to new frontiers.

How has Knight Piesold performed recently?

In 2023, we fortified our technical expertise, achieving consistent growth across diverse projects. We provided design services within our engineering domain in office and field settings. Noteworthy accomplishments in office settings encompassed excelling in tailings management and EoR services. We maintained adherence to stringent international standards, surpassing multiple global panels and peer reviews.

Could you share some projects and technologies Knight Piésold introduced in Peru?

On the engineering front, we worked on key projects like San Rafael, Marcobre, and Yanacocha, where we implemented cutting-edge technologies and standards to achieve client objectives. For instance, we conducted geotechnical research in Yanacocha and evaluated a tailings deposit within a leach pad. Introducing the Nuclear Magnetic Resonance (NMR) equipment to gather detailed

information on mineral characteristics was a groundbreaking initiative, marking a first in the country. This technology played a pivotal role throughout 2023 in informing our designs. The NMR equipment in correlation with other techniques, enabled us to assess moisture and mineral saturation at depth, a critical aspect of stability analysis. Understanding the saturation of the structure was essential for accurately modeling operational feasibility.

How does Knight Piésold assess potential renewable energy uses for mining projects?

While the mining industry is moving towards integrating renewable energy into its lifecycle, widespread adoption is not yet evident. Knight Piésold, especially in its Canadian office, stands out for its focus on renewable energy. The company conducts assessments of potential renewable energy uses for mining projects, offering recommendations ranging from established technologies to proposals for emerging technologies like Pumped Storage. Such solutions are crucial in addressing the multifaceted issue of climate change, necessitating measures across all aspects of mining activity.

How do you adapt water management strategies to the unique climatic conditions in diverse environments in Peru?

Our experience spans diverse environments in Peru, each with unique climatic conditions. For example, in northern projects, it is crucial to factor in the impact of the El Niño phenomenon. This phenomenon, unique to this region, leads to excess water, a factor that all mining projects must incorporate into their planning. Addressing the El Niño effects should be a priority from

the project's outset. Instead of reactive measures, like determining the location of the main mine infrastructure, it is advisable to adopt preventive solutions. In other projects, like in southern deserts of Peru, we focus on conserving and optimally utilizing available water, prioritizing reuse to contribute to sustainability.

Could you elaborate on the specific actions and models developed by Knight Piésold in response to the growing emphasis on air quality?

The initial challenge lies in recognizing that the environmental aspect extends beyond permit acquisition, involving the development of environmental engineering—a central focus at Knight Piésold.

In the Peruvian context, perceptions regarding the use of surface water and groundwater have always been critical, and recently, there has been a growing emphasis on issues related to air quality, a concern gaining significance in the national industry, where Knight Piésold is leading it's evaluation using rigorous modelling. In both cases, a risk assessment is required, as well as the implementation of actions with the development of corresponding models and designs. Air quality is intrinsically linked to dust, generated, for example, in mining operations during pit exploitation, blasting, construction, and earthworks which could impact surrounding communities. Evaluating air quality in the early stages, even before project development, is crucial to prevent air quality pollution. This can be done by the use of computational modeling where results can suggest adjustments on construction planning, necessary to minimize environmental impacts. In ongoing operations, continuous adjustments can be made to calibrate changes and reduce potential impacts on air quality. ■



MB



DG

Maria de Lourdes Bahia and Daniel González

MB: VP Minerals & Metals LatAm

DG: Business Development Manager
ATKINSRÉALIS

How does AtkinsRéalis distinguish itself in Peru's market?

MB: Unlike many competitors, we boast a robust team specializing in environmental and community aspects from project inception. This allows us to support clients in engineering or construction supervision and crucial environmental considerations. Our capability to handle everything from obtaining permits to project execution and construction supervision sets us

What are AtkinsRéalis' goals for the next 12 months in Peru?

MB: We aim to strengthen our presence in Peru, focusing on engineering, environmental services, and construction supervision. We are committed to sustaining growth in the mining sector over the next 3-4 years to cover Latin America by leveraging our established hubs in Brazil and Peru. ■

apart, whether it's a "pit to port" project or any other scope. We strongly emphasize incorporating ESG principles into our clients' projects.

What challenges do your clients face in tailings management?

DG: There is a notable industry-wide push towards adopting technologies facilitating the transition to dryer tailings. One method under exploration is commingling, involving mixing tailings with waste material to achieve a more compact consistency with reduced water content. Additionally, we are researching the application of geotubes, a promising technology where tailings are contained within geotextile tubes, allowing water to drain out and resulting in significantly drier tailings suitable for stacking.

How does AtkinsRéalis assess the impact of global warming on current operations?

DG: It is critical to understand and mitigate the impacts of global warming on our operations to ensure their sustainability and resilience. We design adaptive and resilient solutions that are robust enough to withstand future climate scenarios. Central to this effort is our global team. This diverse group works in concert, fostering seamless knowledge transfer and ensuring that we remain at the cutting edge of developing operational strategies in the face of global climate challenges.



Alberto Coya

Country Manager - Peru &
Regional Lead - Latam
STANTEC

How has the conversation around ESG initiatives evolved in Peru over the past few years?

Peru is trailing in this aspect, but some strides are being made. Local and transnational mining companies are now setting goals and committing to protocols to establish their baseline and define targets for carbon reduction over the next 10, 15, or 20 years.

What is the status of the transition to dry tailings in mining technology?

The technological shift from wet tailings to dry ones is undoubtedly true and underway. However, the current production rates of dry tailings do not meet the treatment volumes required for a large mine in Peru or globally. The systems still operate at smaller scales than mines generating wet tailings, making them economically unavailable yet. There is still a technological gap to bridge in this regard.

Consequently, we explore numerous intermediate solutions between fully dry and thoroughly wet tailings. If avoiding wet tailings is not feasible, we investigate

alternatives before achieving entirely dry tailings. One such approach is co-disposal, where rock and tailings are disposed of in the same physical area, providing a semi-dry and stable system that optimizes space utilization. We are implementing these in various projects, assessing trade-offs, and addressing concerns related to initiation, conversion processes, safety, and stability. These technically intriguing solutions are now being presented to clients in Peru.

What is Stantec's strategy for exploring business opportunities in Latin America?

We aim to continue growing and expanding our services to more clients, which will always be a priority in Peru and Chile. In Argentina, we are currently in a wait-and-see mode, awaiting economic stabilization, and we hope this will occur by the second semester of this year. Once stability is achieved, we plan to explore opportunities there and in other countries in Latin America to leverage our existing knowledge and expand our regional presence. ■

Andrew Roy and Marcello Pirri

AR: President Latin America

MP: Peru Country Director
WORLEY



AR



MP

How does Worley benefit from the local Peruvian market?

MP: In 2023, we saw a positive balance in Worley's activity in Peru. Our team has grown by 67%. We forged long-term relationships with customers, strengthening our delivery capacity in various large and medium-scale mining projects using local and international resources. We also solidified our Consulting business, which continues to grow in water, environment and ESG. We also support international projects by developing projects in other geographies such as Indonesia, Canada, and other Latin American countries.

What has Worley focused on after acquiring Minera Mining Technologies?

AR: Following the acquisition of Minera Mining Technologies we have formalized partnerships with various entities and institutes, such as Australia's CSIRO. These collaborations aim to pioneer new leaching, concentration, and tailings technologies, focusing on reducing water consumption, minimizing energy usage, contributing to decarbonization efforts, and enhancing metal recovery in various processes. This strategic move is in response to the current regulatory landscape in Chile and Peru, aligning with existing laws and fostering a stronger business case for our customers.

How does Worley contribute to reducing carbon emissions in the mining sector?

MP: Worley has the capabilities to develop energy projects such as green hydrogen and transformation of vehicles and electric mining units, among others. New technologies and innovation are critical, as an innovation that enables cleaner, more efficient, and lower-cost copper mining and refining could help increase supply directly.

AR: Consequently, companies embracing such technologies and prioritizing sustainability are positioned for better pricing advantages than their counterparts.

How does Worley prioritize social factors in addressing local challenges,

particularly in Peru?

AR: Challenges are commonly encountered and shared at the local level. While slight variations may exist, the ultimate goal remains to develop a product economically, sustainably, and without adverse social and local community impacts. In Peru, the social factor holds particular sensitivity, but an integral aspect of Worley's value lies in appropriately recognizing and valuing these communities.

What is Worley's strategic vision for 2024?

MP: We perceive unprecedented opportunities in the energy transition and battery usage segment. Mining projects will be increasingly challenging and business cases will require an optimal and differ-

entiated technical and economic solution according to the restrictions of each project. The development of technically solid projects that consider technological and safe solutions, with a robust execution schedule, and with a sustainable and innovative approach that promote a circular economy, will be perceived by stakeholders positively and will be an advantage. Our main objectives in 2024 focus on the growth of our local operation in a sustainable manner, attracting and retaining the best talent to fulfill the purpose and ambition of Worley aligned with the needs and objectives of our customers as strategic partners and on establish ourselves as a Worley Central Hub to also provide mining services (open pit & underground) in our global operation. ■



Focused on the future of mining

Mining's future will look very different from what we see today. We combine our mining experience with our expertise across digital, sustainability and new energy to help our customers find the most economic solutions to reduce CO2 emissions while unlocking new supply.



cess, facilitating almost instantaneous results. Barja noted that along with Minsur’s San Rafael operation, they are currently conducting a feasibility study to install an SK-80 flotation cell.

“This cell will allow for quick mineral recovery, eliminating the need to pass through multiple circuits and directing it straight to concentration,” he concluded.

Biomining and ecomining

Worley is an Australian firm offering sustainability-focused services in Peru. In discussions with Marcello Pirri, Peru’s country director, and Andrew Roy, president for Latin America, they explained that Worley possesses the expertise to develop energy projects, including green hydrogen and converting vehicles and mining units to electric power, and shared two interesting insights on the costs associated with energy. For Pirri, new technologies are critical for the long-term sustainability of the mining industry: “Innovation that enables cleaner, more efficient, and lower-cost copper mining and refining could help increase supply directly.”

For Roy, there will likely be a premium for companies that adopt decarbonization solutions: “Companies embracing such technologies and prioritizing sustainability are positioned for better pricing advantages than their counterparts,” he pointed out.

According to Pirri, Worley has experience with various technologies for low-grade ore reprocessing, ore-sorting, and tailings dewatering, among others. To offer such a wide array of services and technologies, Worley has undergone multiple mergers and acquisitions, the most recent being with Min-

era Mining Technologies in 2022. Additionally, the Australian company leverages partnerships with organizations such as Australia’s CSIRO (Commonwealth Scientific and Industrial Research Organisation), an Australian government agency responsible for scientific research. “These collaborations aim to pioneer new leaching, concentration, and tailings technologies, focusing on reducing water consumption, minimizing energy usage, contributing to decarbonization efforts, and enhancing metal recovery in various processes,” added Roy.

Roy mentioned the focus on new leaching technologies, as the demand for more sustainable solutions increases, and bioleaching has emerged as a promising alternative. “This method is less polluting than the traditional use of chemicals. Additionally, unlike physicochemical processes, the microorganisms involved in bioleaching can generate their own energy. Paradoxically, some species can capture atmospheric CO₂, helping reduce the operation’s carbon footprint,” explained Marcos Garayar, general manager of Helix BioS, a company that has been using its knowledge in the biotechnology industry to apply it in mining.

Helix BioS has been conducting pilots with different mines in Peru, like the Anama Mine from the Aruntani Group, focusing on its closure. “We are conducting pilots with several mines in Peru, and the results are very promising. We have already received proposals from Argentina, Brazil, and Mexico. Perhaps we are one of the three companies in the world applying metagenomic and ecosystem functionality studies in biotechnologies focused on mining,” concluded Garayar. ■



Environmental and Tailings Management

No cocoa or copper

In February 2024, cocoa prices surged to an all-time high, reaching US\$5.41/lbs on February 7, making it more expensive than copper. A combination of factors, including climate change’s impact and El Niño’s effects, triggered heavy rainfalls and higher temperatures, undermining cocoa production at major global suppliers in West and Central Africa.

According to Javier Arenas de la Cruz, director of Trade Promotion and Articulation of Sierra y Selva Exportadora, an institution attached to the Ministry of Agrarian Development and Irrigation, Peruvian cocoa producers should capitalize on these prices, which are projected to continue rising in the long term. The fact that cocoa prices surpassed those of copper was paradoxical. Copper needs higher prices to bring more new mines online and offset the looming supply gap, which is crucial for supporting the green technologies needed for mitigating climate change, —which, ironically, are the same factors driving up cocoa prices.

In this context, consultancies and engineering firms are valuable allies for mining companies. When addressing the implications of climate change and the El Niño phenomenon, Guillermo Barreda, the general manager of Knight Piésold Peru, emphasized that relying solely on reactive measures is not enough. “In northern projects, it is crucial to factor in the impact of the El Niño phenome-

non. This phenomenon, unique to this region, leads to excess water, a factor that all mining projects must incorporate into their planning. Addressing the El Niño effects should be a priority from the project’s outset.”

Considering the potential negative impacts on production, mining companies cannot afford to postpone addressing the effects of climate change on their operations. As highlighted by Barreda, the challenge lies in the industry’s recognition that the environmental aspect of operations goes beyond permit acquisition. A comprehensive risk assessment is necessary, along with the implementation of actions supported by the development of corresponding models and designs.

Comprehensive risk assessments and forward-thinking strategies are paramount, requiring the integration of a holistic vision. WSP has been working on this through its Future Ready Program, a methodology that analyzes diverse trends and variables like climate change, society, and technology, emphasizing their impact on projects. “Our focus extends beyond green energies to include aspects like constructability, the complete lifecycle of assets, closure plans, and mining infrastructure, ensuring a holistic and sustainable vision,” commented Gonzalo Covarrubias, managing director for Peru and Mexico of WSP.

An appetite for R&D

While northern Peruvian mining operations may have to cope with challenges related to excess water, climate change is also expected to cause droughts. In January 2024, the Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres (CENEPRED) identified 277 districts at very high risk of water stress. Notably, most of these districts are key hubs for mineral production in Peru.

Considering a less optimistic future for water, mining companies are actively reducing water consumption, particularly in tailings, by shifting from traditional methods to drier alternatives to achieve enhanced risk management and decreased water usage. Additionally, companies worldwide are aligning with the Global Industry Standard on Tailings Management (GISTM), introduced in 2020, and following recommendations from the Canadian Dam Association.

Maria de Lourdes Bahia, the minerals & metals VP for Latin America at AtkinsRéalis, noted that following disasters worldwide, the awareness regarding the impacts of tailings on the environment and society has increased and involves focused attention and innovative solutions. “Stringent legislation now focuses on concerns about water contamination and community welfare, leading to a global reevaluation of tailings management practices,” she commented.



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- Design of tailings dewatering plants.
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AtkinsRéalis is researching the application of geotubes, a technology in which tailings are contained within geotextile tubes, allowing water to drain out and resulting in drier tailings suitable for stacking.

Also related to water, Óscar Navas, the business development director of the Andean Region at Techint Engineering & Construction, mentioned the possibility of Peru following Chile's example in using desalinated seawater and pumping systems for mining projects in mountainous regions. "While the CapEx increases, the value lies in social and community engagement, enabling projects to progress. This embodies the concept of ESG applied to these initiatives. Rather than viewing it as an add-on, we should consider it an integral part of the business," said Navas.

This is a trend that Peru was also beginning to adopt. For example, Southern Copper initially proposed a desalination plant for Tía María. However, in its Q2 results in 2022, the company proposed the construction of the Paltiture Dam to the government instead of proceeding with the original desalination plant. On the other hand, one of the latest projects brought online in Peru, Marcobre's Mina Justa, utilizes seawater but without desalination.

When will all the above-mentioned changes take place? The mining industry, on a broader scale, seems resistant to change. "The culture in the mining industry can be characterized by the phrase 'I want to be first to be second.' The industry tends to avoid risk and remains somewhat resistant to unproven initiatives," commented Paul Murphy, Mining Plus' South American office manager.

Murphy noted, however, that this trend is gradually changing, and mining companies exhibit a growing appetite for research and development: "In some cases, there are signs of a more flexible contracts and procurement process that accommodates innovators who may not align perfectly with traditional procurement requirements," he said.

At least in tailings management, Alberto Coya, Stantec's country manager for Peru and regional lead for Latin America, highlighted that there is still a technological gap to bridge: "The current production rates of dry tailings do not meet the treatment volumes required for a large mine in Peru or globally. The systems

still operate at smaller scales than mines generating wet tailings due to space, technology, and energy demand, making them economically unviable yet."

Javier Mendoza, Anddes Peru's general manager, shared Coya's view, affirming that small mines are increasingly adopting dry stacking, even if this method comes with around 20% higher upfront costs than traditional tailings ponds. Despite this, he stated that it is not feasible for investors seeking quick returns to wait up to a decade to go through the regulatory demands and lengthy permit acquisition process for conventional tailings.

Mendoza elaborated: "Local communities play a crucial role in decision-making on mining projects, and since choosing dry tailings practically eliminates the risk of landslides and floods, this significantly speeds up the permit acquisition process and project advancement. Although dry stacking may have higher OpEx, the speed at which permits are obtained and the progress of the project outweigh this concern. Several projects, including Corani and San Gabriel, have already adopted this technology. Even some mines that operate with conventional tailings are transitioning to dry stacking, like SPM's Condestable and Pan American Silver's Huaron, demonstrating how even smaller mines can adopt this practice to enhance their environmental impact and operational efficiency."

There is strength in numbers

Inti Mining Smart Solutions (IMSS) is a Peruvian-funded company that, after having worked with most of the tier-one companies in Chile and Peru, like BHP, Glencore, Teck, Codelco, or Capstone Copper, is planning to venture into Australia. Christian Ossorio, in a discussion with GBR, pointed out that the mining industry is moving towards the concept of mining 4.0. According to him, the constant change in mining's physiology and a more demanding market will lead to a more collaborative approach between companies: "I believe it will be key to forge collaborative alliances among diverse specialized companies to provide the industry with a fresh, more integrated, and collaborative approach compared to previous years, which were marked by greater segmentation."

Embracing this collaborative approach, we find RDZ Consulting. Fernan-

do Rodríguez, RDZ's general manager, explained that he and two colleagues from other companies formed the Quarsus Consortium (which stands for "Quality, Reliable, and Sustainable Solutions") to leverage different synergies and strengthen expertise in safety, health, compliance, and sustainability: "Our goal is to offer comprehensive services that include due diligence processes, certification, and implementation of international standards, as well as strategic reviews of environmental management practices, including health and safety. Quarsus will provide assessments and support to companies looking to enter the Latin American market, strengthening the work that RDZ already carries out in this area," commented Rodríguez.

When Rodríguez was asked how Peru compares with other Latin American countries in terms of environmental regulation, he mentioned that there is a solid regulatory framework, but one aspect where there is room for improvement is the timeframes for obtaining environmental permits in Peru: "Throughout the mining lifecycle, that needs to improve if Peru wants to stand out as a preferable mining investment jurisdiction," he concluded.

Ana Villegas, general manager of Yaku Consultores, noted a rising trend in the proliferation of new regulations. While acknowledging that some are necessary, she cautioned that others impose an unnecessary burden: "Excessive regulation could deter investment, potentially driving it to more favorable jurisdictions, while inadequate environmental standards neglect our responsibility to safeguard the environment. Thus, finding a harmonious balance is essential for the country's well-being," she asserted.

Talking about overregulations, Alfredo Huamani, Global Yaku Consultores' general manager, shared an illustrative case in which the national legislation required the closure of an abandoned mine in Huancayo. However, Huamani explained that at the mine there was a neutral water flow suitable for irrigation, which the local community used for its avocado plantations. The mine was closed, and Huamani reflected: "In situations like this, we should improve legislative criteria, adopting other approaches that benefit the community and not be biased by regulations that do not consider the whole system holistically." ■



José Luis Lara

General Manager
LARA CONSULTING

What have been the most notable milestones for Lara Consulting in recent months?

Lara Consulting has distinguished itself through its commitment to unique global projects, particularly in the management and design of tailings storage facilities. Iconic projects with Nexa Resources, Buenaventura, Minsur and Antamina showcase our leadership in this field. Additionally, we have expanded our operations to Chile, Mexico and the United States, maintaining and growing our international client portfolio from Peru. Our workforce has grown to nearly 150 people, and in 2024 we plan to expand further, driven by market demand. We are also about to start our most ambitious project: a laboratory and research center that will serve local and international clients, marking a milestone representing our vision for growth and excellence in service. Despite bureaucratic challenges, we are close to realizing this initiative.

What are the emblematic features of projects with Nexa or Antamina?

Projects with Nexa are noted for their focus on research and technological development to ensure high environmental and social management standards in the combination of tailings storage facilities and dewatering plants. Investment in research and experimental testing has been crucial, given the lack of similar global benchmarks. We have

worked with Nexa on these projects for five years.

Projects with Antamina are similar to those of other mining companies such as Hudbay, Las Bambas, and Cerro Verde, which have production exceeding 100,000 t/d, driving the simplification of mining operations by reducing processing equipment. Equipment is becoming larger because it is not attractive for producers to acquire, for example, 40 units of the same filtering equipment for large-scale tailings management. This challenge encourages suppliers to develop technology for higher tailings tonnages. Thus, Lara Consulting is positioned to learn and apply these advances in our consulting and engineering services. The success of projects like Antamina sets a standard in the industry, attracting clients who seek to replicate these achievements with our support.

Additionally, participation in unique global projects reinforces our reputation and commitment, making us a benchmark in the field. The focus on these projects in Peru highlights a significant shift in the mining industry, with the country becoming a hub for technological innovation. Peru could emerge as a global leader in technology in the years to come.

What technologies or equipment are used in the Nexa and Antamina projects?

Nexa and Antamina are adopting increasingly advanced technologies to address

large production tonnage challenges. This has led to the development of more extensive and more efficient equipment, such as the world's largest filter press, operational at the pilot level by Southern Copper in Quebrada Honda. Although equipment for 15,000 t/d for tailings filtering was a technological challenge a few years ago, successful prototypes now handle 10,000 to 12,000 t/d in Peru. This technological evolution has enabled the industrial implementation of these solutions, turning what was once only conceptual into a viable and scalable reality.

Considering the potential environmental and community benefits, how do investors evaluate the more expensive technologies for obtaining drier tailings?

The catastrophic consequences of potential failures in tailings storage facilities justify investment in more expensive technologies for obtaining drier tailings. These failures can result in significant reputational damage for mining companies, with stock prices potentially plummeting and, in some cases, leading to bankruptcy. Therefore, investing in advanced technologies safeguards the company's value and stability. Also, securing facilities can reduce operational costs by lowering insurance premiums and increasing stock value.

What are Lara Consulting's goals for the second half of 2024 and 2025?

We aim to have our laboratory operational, establishing it as a center of excellence and research for us and our clients. This investment demonstrates our commitment to local investment and development in our country. We are also enhancing our management and administration skills for large projects to tackle future, more significant, and complex initiatives.

Also, equally important, we want to expand our presence in the international market, strengthening relationships and exploring opportunities in other countries. While we contemplate the possibility of establishing offices abroad in the long term, our immediate focus is on consolidating our position in the local market and providing exceptional service to our current and future clients. The pandemic has altered our perspective on the necessity of physical offices everywhere, allowing us to focus on strengthening our operations in Peru. ■



“ Our goal is to integrate artificial intelligence to streamline data processing and habitat recognition, thus improving the efficiency and quality of our services. ”

Gonzalo Morante

General Manager
WALSH PERU

This 2024 Walsh celebrates its 30th anniversary. What are the company's perspectives for this year?
2023 was successful despite its slow and challenging start. As the year progressed and the situation normalized, we experienced a 20% growth and achieved various goals, including the approval of the MEIA of Inmaculada from Hochschild Mining. Additionally, we initiated the MEIA of a greenfield project for Cultinor and continued with the brownfield projects we had in our portfolio. On the other hand, we focused considerably on the renewable energy and transmission lines segment, often linked to the development of mining projects. Regarding our staff, we have grown by 10%.
This 2024, we will celebrate our 30th anniversary, a milestone of which we are very proud, considering the Peruvian business landscape. I believe we were pioneers in environmental consulting, as when we started, few companies were dedicated to what we do.
Looking ahead to the rest of 2024, we have managed to accumulate a portfolio of significant projects that ensures a growth of between 15% and 20%. While 90% of our income has historically depended on mining, we also provide services to infrastructure projects that have a transversal impact on mining, such as the Port of Chancay and the Marcona Port Terminal.

What is Walsh's focus and added value in renewable energies?
We have been dedicated to obtaining environmental permits and environmental management instruments and monitoring tasks in the field of renewable energies. We have participated in various unconventional renewable energy projects,

including solar installations in the south and wind farms in the north. A noteworthy project is the Bayóvar Wind Farm and another solar project in Moquegua, which reflects significant growth in this segment, driven by the energy transition and the search for a cleaner matrix, especially in the mining industry.

How have environmental standards in renewable energies evolved in recent years?
The regulation of renewable energies is fully established, although it is subject to a constant evolution process. Environmental standards vary as new practices emerge and projects progress, which may result in more stringent requirements in certain aspects and more flexible in others. The demand for these energy sources, particularly by the mining industry, which has high environmental standards, is notable. Consequently, mining companies demand the same standards from their suppliers. Additionally, since many renewable projects require financing, conducting thorough environmental studies becomes crucial to ensure the necessary financial backing.

What are the key strategies to gain and maintain the trust of local communities?
Our community relations department, composed of 30 professionals, offers a wide range of services, from baseline and cadastral work to community relations management and compensation negotiations once the environmental impact studies are approved. It is essential to gain and maintain the communities' trust, which involves solid commitments and timely execution of

concrete objectives to establish long-term credibility.
The mining activity, often located in remote areas lacking infrastructure, requires a balance between the state's responsibility, the mining industry's objectives, and the needs of local communities. Furthermore, the past and historical management of mining in Peru has left marks, including environmental liabilities. External groups sometimes use these factors to influence local communities for their own benefit. I believe the most crucial part is to keep as much information as possible about what is being done, be transparent and consistent, and demonstrate that there are contingency plans to minimize risks.
On the other hand, there is the issue of the "second belt." The "second belt" challenge presents a complex situation in the communities adjacent to the mines. They often do not experience the same level of direct impact but observe improvements in their closer neighbors. The key lies in ensuring that these communities also benefit, whether through the mining canon or other systems. Although it is a difficult challenge, it is essential to address it, especially considering Peru's mining nature.

How does Walsh plan to integrate Artificial Intelligence into its services?
In 2023, we began our digitization process, an initiative we will continue to focus on in 2024. Our goal is to integrate artificial intelligence to streamline data processing and habitat recognition, thus improving the efficiency and quality of our services. Once implemented, we plan to offer a joint platform to our clients for closer collaboration. ■



Javier Mendoza

General Manager Peru
ANDES PERU

What recent developments or shifts have you noticed in the preferred methods of tailings management among your Peruvian mining clients?
The mining industry is currently gravitating towards dry stacking as a preferred method. This shift is primarily motivated by regulatory requirements rather than financial factors. Local communities play a crucial role in decision-making on mining projects, and since choosing dry tailings practically eliminates the risk of landslides and floods, this significantly speeds up the permit acquisition process and project advancement. Although dry stacking may have higher operational expenses, the speed in obtaining permits and progressing the project outweighs this concern. In Peru, several operations, including Corani and San Gabriel, have already adopted this technology. Even some mines which operate with conventional tailings are transitioning to dry stacking, indicating a significant shift in the industry. Examples like Condestable (Southern Peaks Mining) and Huaron (Pan American Silver)

demonstrate how even smaller mines can adopt this practice to enhance their environmental impact and operational efficiency.
A dry tailings deposit entails a higher initial cost than a conventional one, approximately 20% more. However, waiting for environmental permits for a conventional tailings deposit can take up to 10 years, which is not feasible for investors seeking quick returns.

How has Anddes progressed in its geographical expansion efforts?
Around a year ago, our company decided to expand in a more strategic and orderly manner, establishing operations in Mexico and Ecuador. Although Mexico is not known for its mining industry, we believe it has significant potential due to its GDP and economic activity. Furthermore, we have a significant operation in Argentina that provides support. We anticipate that within approximately two years, our company will evolve into a consolidated regional corporation, characterized by a more corporate structure rather than localized operations. ■



Pamela Florián

Country Manager
HATCH PERU

What are Hatch's key services related to decarbonization?
Our key services include developing decarbonization strategies and roadmaps and implementing solutions, including decarbonizing mines and concentrators in Peru, particularly open-pit operations with high carbon content. We focus on electrifying mining fleets and simulating conditions to fully achieve green operations.

What other services related to innovation and water management that Hatch offers?
Change is constant, and we must continuously innovate by incorporating technology and digitalization, such as digital twins and AI, into our solutions. As teams and succession lines renew, minimizing human presence in operational units is crucial.
Young professionals prefer remote work while making impactful decisions, posing challenges in talent retention and change implementation. Our top priorities are innovation, transformation, and technology integration, and we are committed to defining and supporting these solutions for our clients.

We also provide solutions for very complex water problems. Some mining units deal with various types of water, including acidic and industrial waters with sediments.

What are Hatch's priorities for the following years?
We have a significant agenda concerning electrification and decarbonization, and one of our main objectives for this year is to continue contributing impactful solutions to our client's needs, especially those requiring expert knowledge to define profitable business cases.
Another objective is to maintain and further develop our operations safely. We have had no disabling accidents for a considerable period, and we aim to continue supporting our clients by resolving their most challenging issues.
As part of our 2024 agenda, we have already organized a roundtable on energy transition in Lima. The goal is to transfer knowledge from major projects and initiatives outside Peru directly to our clients, providing them with firsthand insights into what the world is currently doing to ensure more efficient, sustainable, and humane operations—a demand the world is increasingly making. ■



Julio César

General Manager
**JCI INGENIERÍA & SERVICIOS
AMBIENTALES (JCI)**

How many years of experience does JCI have in Peru?

Over the years, the company has consolidated its presence in the mining sector by managing environmental permits and developing environmental management instruments for exploration, exploitation, and closure projects. Throughout our engineering and environmental services activities, we have served various clients, including Cerro Verde, Southern Peru, Pan American Silver, Volcan, Minsur, Nexa, and Minera Antofagasta.

In recent years, we have been meeting requirements for Environmental Impact Statements, Substantive Technical Reports (ITS), Environmental Impact Studies and their Amendments, and Closure Plans, among other vital services in extractive sectors.

What challenges arise from strained relations between mining companies and local communities?

It is crucial to balance the interests of communities and the needs of mining operations, closely involving communities in control processes and transparently disclosing environmental results. Furthermore, it is important not to lower the expectations of mining operations; expanding production and reducing the lifespan must be approached responsibly, projecting medium-term well-being in populations near operations and ensuring sustainable development of local communities. ■



Fredy Alejandro

Country Manager Peru
ARCADIS

Can you provide an overview of Arcadis' performance and activities in the last months?

Our Peru office has begun providing engineering support to various countries, such as Chile and the US. We have also diversified our client base with significant projects for companies like Chinalco and Antamina. We have maintained our relationship with Minsur, one of our main clients in 2023, by working on projects in all their mining operations. We successfully implemented a water transportation system through a 130 km pipeline from Ilo to the Toquepala operations. We continue to develop projects such as tailings dams and metallurgical and electromechanical processes. We have also diversified our service portfolio while maintaining our focus on the mining industry.

What can we expect from Arcadis in 2024?

In 2024, our primary goal at Arcadis Lima is to successfully integrate into GBA, our new global organization. While there are no major greenfield projects in the Peruvian market this year, we have received several requests to assist mining clients with tailings management at various stages. We are strengthening our team of Tailings Management Studies. ■



Christian Osorio

General Manager
**INTI MINING SMART
SOLUTIONS (IMSS)**

What is the primary focus of IMSS?

We offer geology, resource estimation, geotechnics, and geometallurgy services with a team of specialists and collaborators for large-scale projects. Our recognition in 2023 as the best consulting firm supporting mining projects in Peru during 2022 testifies to our commitment and excellence in the field.

What trends is the mining industry experiencing in terms of technology and sustainability?

Major mining companies are adopting trolley systems and electromobility as part of their approach to environmental sustainability.

What factors are driving openness in the mining industry today?

We observe a notable openness in the mining industry, primarily driven by the rise in commodity prices, such as copper, which are experiencing significant increases. This price rise acts as a catalyst for the adoption of new technologies, as well as for the exploration and execution of projects that were previously on hold. We expect exciting expectations for brownfield and greenfield studies during 2024 and the coming 2025. Consequently, we anticipate a significant expansion of metallogenic projects in southern South America, with possible global repercussions. ■



Construction and Contractors

Thriving in a more demanding market

In March 2024, the MINEM updated the mining investment portfolio. The updated document has 51 projects with a total investment of US\$51.55 billion. Around 70% of that budget, totaling US\$38.88 billion, is estimated for open-pit projects like Antamina's life extension from Minsur or Zafranal from Glencore-Antapaccay. However, only 29% of the US\$51.55 billion are for brownfield projects.

Now, if we take a look at the statistics of 2023 provided by the MINEM, the ex-

ecuted investment in that year was just US\$4 billion. That is a big difference between what Peru has in the pipeline and what is happening. In the eyes of contractors, this might not look like good news, especially considering that there is a general perception that no new greenfield projects are coming online soon. As projects do not move as fast as the industry would like to, and budgets shrink, contractors have gone the extra mile to provide more comprehensive services to their clients.

John Tamayo, executive vice president of STRACON, commented that the company grew both organically and inorganically by leveraging operations in Canada, the US, Mexico, Colombia, Chile, and Peru. "Our strategy has been to broaden the range of the services we offer. We are developing a water plant for Gold Fields. Technology-wise, we are working with Hudbay in Peru and Anglo American in Chile. We work with different clients, but they all know

>> 75



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“

We continue with our long-term commitment to Peru, actively seeking bids for the limited greenfield projects in the country.

”

Rafael Ríos

Country Manager
CONSTRUPLAN

How has the last year been for Construplan?

After a 2022 filled with B2B meetings, brand positioning, company procedure regionalization, and the establishment of our Peruvian branch in March, we successfully secured Construplan's first project in Peru with Nexa Resources in January 2023. This project initially had an eight-month duration but has been extended to 2024 due to additional awarded works and disruptions from the local community.

Can you provide details about your activities with Nexa Resources?

We secured a contract for the construction of a waste dump and a departmental variant at Nexa's mining unit El Porvenir. Additionally, in the mining unit Atacocha we obtained a contract for a 1.5 km crest channel. These two mining units in Cerro de Pasco are part of Nexa's integration plan and are approximately 35 minutes apart.

In terms of the timeline, we initiated the project in January 2023, mobilized our team in February, and began construction in March. Community disruptions occurred during the first week of construction, lasting seven days. In July and August, we faced two more community disruptions. Through collaboration with the community and the client and leveraging the expertise of our project-hired individuals, we have successfully addressed social challenges and are currently working harmoniously.

How many collaborators are involved in the project?

Due to engineering and client infrastructure needs, we have grown to 850 people. Managing this team from our relatively small Peruvian branch is a chal-

lenge, but we are handling it efficiently with support from Mexico. We anticipate further team growth for upcoming projects with different clients.

How do you view the current socio-political situation in Peru?

We experienced challenges in 2021, including the political change with Pedro Castillo and the subsequent coup in Peru, and we also face uncertainty regarding the 2026 elections, but we maintain our long-term commitment to Peru and its mining industry.

Can you tell us more about Construplan's relationship with local communities?

Approximately 60% of our workforce is from local communities, encompassing both skilled and unskilled labor. This provides us with the opportunity to develop these individuals in various aspects, including project-specific tasks, soft skills, and safety. Safety is particularly important, as community members may not be accustomed to incorporating safety awareness into their work.

Can you elaborate on Construplan's safety approach?

Construplan already has a deeply ingrained safety culture. While safety legislation in Mexico may not be as stringent as in Peru, our safety and environmental management system was nearly ready for operation in Peru when we regionalized processes and analyzed Peruvian legislation. We only had to make minor adjustments to specific processes.

We have trained personnel and receive regular visits from our Mexican headquarters in Soma. Our company's leadership, both at the central office and the project site, includes Peruvian

individuals with extensive experience in different mining projects. This provides us with strong control over our safety management, and we are certified with ISO 14001 and 45001 standards.

What role does technology play in your projects?

Technology is crucial for achieving ideal control in project management. We have a system called PATOOS, comprised of administrative, technical, and operational procedures focused on safety. The purpose of these procedures is to identify and manage key operational risks at the start of each project. We mitigate these risks through specific training. We have introduced this practice in Peru, supported by a specialized training school. All of this is underpinned by an ERP system called IGOPLAN, developed in-house, enabling online safety control. We even offer clients access to the system to review the main accident rates in the projects.

What can we expect from Construplan in the remaining months of 2024?

We continue with our long-term commitment to Peru, actively seeking bids for the limited greenfield projects in the country. We have participated in tenders with prominent companies such as Buenaventura, Minsur, Shougang, and Chinalco. For 2024, our goal is to maximize participation in mining tenders. We aim to secure new projects and diversify our client base and, in the long run, obtain an open-pit mining project. We want the name Construplan to be recognized and respected in Peru for our expertise in open-pit mining and construction, backed by over 43 years of successful projects. ■

“

We leverage our experience in Chile, where we work on the ongoing construction of desalination plants and water pumping systems.

”

Óscar Navas

Business Development Director – Andean Region
TECHINT ENGINEERING & CONSTRUCTION



What significant projects has Techint undertaken in Peru?

Techint entered Peru in 1976 to construct the north Peruvian pipeline, one of Peru's main engineering projects, spanning over 1100 km. Since the beginning, we have been an EPC company, covering the full value chain of a project, from concept to feasibility, engineering, procurement, construction, commissioning, and startup. We also have a division dedicated to operation and maintenance.

In the mining sector, we have contributed to significant projects such as Chinalco's Toromocho mine, where we held essential responsibilities in various systems and the concentrator plant. We also worked on Marcobre's Mina Justa, which involved building water transportation and electrical transmission systems. More recently, at Quellaveco we constructed a freshwater pumping system for mining operations, comprising an approximately 80-km pipeline. At the same time, at a large mining Peruvian company, we engineered a project for tailings and ore transportation from the mine. We leverage our experience in Chile, where we work on the ongoing construction of desalination plants and water pumping systems for Codelco's Radomiro Tomic district and the water pumping and transportation system for Collahuasi's desalination solution.

What emerging trends will shape Peru's mining industry in the following years?

Sustainability, which involves meeting current needs without compromising the ability of future generations to meet theirs, is fundamental in all our projects. This is especially true for our mining sector clients. We have implemented sustainable solutions for industrial pro-

cesses that protect the environment by preserving scarce freshwater resources and safeguarding ecosystems.

In this context, one of the trends concerns using desalinated water, a practice already embraced in Chile. It is plausible that Peru will follow suit, finding viability in mining operations in mountainous regions through desalinated seawater.

The second consideration pertains to the Early Contractor Involvement (ECI) concept, wherein some mines engage potential contractors in early-stage pre-engineering or even earlier phases to integrate crucial insights into maintainability, reliability, and constructability, which is vital for project success. We partnered with a major Peruvian mining company during a critical material handling project development, contributing our expertise as engineering developers and constructors. This encapsulates the essence of being an EPC specialist—contributing not only from an engineering and procurement perspective but also from construction, thereby maximizing value throughout the project lifecycle.

Desalination plants add an extra cost: does it prime CapEx or social license to move the project forward?

Indeed, it is an additional structure compared to what existed previously. Now, considering the social license sought by mining companies and the costs associated with shutdowns, controversies, permit delays, lack of acceptance, and more, it is worth calculating those amounts. In that context, while the CapEx increases, the value lies in social and community engagement, enabling projects to progress.

What distinguishes a company suitable for an EPC model from one suitable for EPCM?

Choosing between an EPC model and an EPCM approach depends on an organization's ability to manage and oversee project outcomes effectively. Many of our clients are established mining companies with the expertise and resources to handle EPC projects, as they ultimately become owners of the asset and desire complete control over outcomes. An EPC model suits mining companies that can comprehend the product they receive and establish priorities for its delivery.

Conversely, an EPCM approach may be more suitable for newer, smaller companies seeking expert guidance on project solutions. While our specialization lies in EPC, we recognize the value of the EPCM model for specific clients. In such cases, we work closely with EPCM specialists, serving as strategic allies to ensure successful project execution.

What factors does Techint believe are essential for Peru's growth in the next five years?

Peru holds immense potential, and we believe that unlocking this potential lies within the supplier ecosystem. If investors perceive a conducive environment for translating investments into reality, Peru should experience significant growth in the coming years.

We closely monitor developments concerning Antamina's life extension and are eager to contribute value. Additionally, our attention is on Antapaccay's expansion with the Coroccohuayco project. We are also exploring opportunities arising from projects like Chalcobamba in Las Bambas. Furthermore, we see new mining projects such as Zafranal and Tia Maria positively, leveraging our expertise in pipeline and material handling and our ability to construct complete mining plants. ■



Luis Flores

General Manager
MUR

What helped MUR achieve 15% growth in 2023?

Despite the economic and sociopolitical challenges in Peru that affected the country's growth, we have seen a positive impact from the organizational and structural transformations implemented at our company in 2022. In 2023, we achieved a significant 15% increase in sales compared to the previous year. Recent accomplishments include expanding to new clients like Buenaventura and solidifying our operations in Las Bambas, securing an additional contract for maintenance and repairs.

For 2024, we have set an ambitious growth target of 15%, with plans to enter new operations. Our strategy involves consolidat-

ing existing operations, fostering organic growth, and diversifying our portfolio through projects like Quellaveco, Zafrañal and Shougang. Additionally, we aim to strengthen our sales team further to establish our presence in the dynamic Peruvian market.

What are MUR's business units, and which one has grown the most?

We operate across five business areas, with mining contributing 70% of sales. In infrastructure, our work on the Chimbote bypass with Acciona is nearly complete, and we're considering expansion into presses and mining infrastructure in 2024. Our service line grew by 100% from 2022 to 2023, reaching almost US\$12 million, focusing on equipment maintenance for Chinalco, Southern, Las Bambas, and Shahuindo. The transportation line, targeting the heavy-duty cargo market, offers leasing services with a fleet of about 350 units leased to contractors like Cosapi and San Martín. Our strategic diversification and growth in service and repair underline our commitment to innovation in the competitive mining industry.

Where does MUR's specialization lie in the mining industry?

We specialize in open-pit mining, offering complete services from operations to drilling, blasting, and road maintenance. Simultaneously, we aim to enhance our footprint in underground mining.

What are the main challenges facing the mining industry in Peru?

With 23 years of mining industry experience, MUR began as part of the Guido del Castillo companies, initially servicing mines within the group. Since 2015, MUR has expanded its services to external clients, including Buenaventura, Gold Fields, Antamina, Minsur, Pan American Silver, Las Bambas, and Southern.

A significant challenge in the Peruvian mining industry revolves around social responsibility, affecting mining companies and sector contractors. MUR addresses this challenge through a social outreach plan, integrating communities into development and operations. We take a direct approach by actively involving ourselves and implementing projects with substantial participation from local communities' operational personnel. Comprehensive training and support enhance their skills, contributing to joint development with mining activities.

What is limiting contractors from adopting green solutions for mobility?

Despite consistent communication with equipment suppliers, testing electric dump trucks remains impractical due to the lack of developed technology. I anticipate technological advancements in 2024, primarily for sea-level projects, as high-altitude testing remains challenging.

In drilling and blasting, our commitment to advanced technology is evident. We use equipment with integrated systems for improved control and safety. Implementing telemetry and fleet control underscores our focus on efficiency and safety across all mining operation phases.

What is MUR's approach to safety?

Minsur has acknowledged our exceptional safety management, an accolade we accept with pride and humility, motivating us to raise our standards further.

We implement action plans that include regular training and enhancements to personal protective equipment (PPE) and technological advancements in our fleet, incorporating anti-drowsiness and anti-fatigue systems in our dump trucks and equipment. ■

71 >>

our reputation and values, making introducing new products much easier," said Tamayo.

STRACON focuses on open-pit projects and was recently awarded with the closure of Barrick's Pierina mine. In line with sustainability and the importance of helping foster positive relationships with local communities, Tamayo shared that they help their clients to create social peace: "We do not feel that it is an obligation, but rather a duty, because one of our purposes is to continue building responsible and sustainable mining, integrating all stakeholders, and generating the greatest benefit for society," concluded Tamayo.

Luis Flores, the general manager at MUR, a Peruvian contractor focused on open-pit operations, also acknowledged the substantial challenge in the industry concerning social responsibility. In response, MUR has implemented an outreach plan, integrating communities into its operations. "We strongly advocate for close collaboration between mining companies and contractors as a pragmatic and streamlined method to foster positive relationships with local communities. Contractors are now recognized as vital stakeholders committed to efficient operations and the sustainable development of impacted communities," said Flores.

When asked about how a company can grow in a competitive market like Peru's, Flores emphasized the importance of diversification. For instance, in 2023, MUR gained Buenaventura as a client and further solidified its operations at Las Bambas, where it secured an additional contract for maintenance and repairs. "Our service line grew by 100% from 2022 to 2023, reaching almost US\$12 million, focusing on equipment maintenance for Chinalco, Southern, Las Bambas, and Shahuindo. The transportation line, targeting the heavy-duty cargo market, offers leasing services with a fleet of about 350 units leased to contractors like COSAPI and San Martín," continued Flores.

Javier Amézaga, executive president and general manager of COSAPI, noted that the political situation in Peru has led to a reduction in investment and making the market more demanding. "Clients are becoming increasingly sophisticated, and projects are becoming more complex over time," he expressed.

In 2023, the Peruvian authorities gave Chinalco the green light to move forward with the plant expansion at the Toromocho copper mine, and COSAPI was awarded a contract. "We are in charge of civil and electromechanical works for the second phase of Toromocho's expansion. Although it is not a large project, it is significant for us given the current situation in the Peruvian mining industry, where investment is focused on maintaining existing operations," added Amézaga.

EPC

There are two types of construction contracts: EPC and EPCM. Mining companies must decide between hiring a big company to handle the engineering, procurement, and construction management (EPCM) or dividing the projects into small chunks under an engineering, procurement, and construction package (EPC). For Óscar Navas, business development director of the Andean Region at Techint Engineering and Construction, whether to opt for a specific approach depends on the organization's ability to manage and oversee the project's outcomes. "Many of our clients are established mining companies with the expertise and resources to handle EPC projects, as they ultimately become owners of the asset and desire complete control over outcomes. An EPC model suits mining companies that can comprehend the product they receive and establish priorities for its delivery. Conversely, an EPCM approach may be more suitable for newer, smaller, or just companies seeking expert guidance on project solutions," he explained.

Techint has worked on several projects in Peru and Chile, such as the water transportation and electrical transmission systems at Marcobre's Mina Justa or the freshwater pumping system for mining operations at Quellaveco. When asked about the trends that will shape the industry in the upcoming years, Navas answered that the term "Early Contractor Involvement (ECI)" will gain momentum. ECI is a specific construction contract where the principal contractor engages in the early stage of the project to provide insights during the design phase. "This encapsulates the essence of being an EPC specialist—contributing not only from an engineering

and procurement perspective but also from construction, thereby maximizing value throughout the project lifecycle," added Navas.

Another EPC specialist is Grupo JJC. The company has been working at Marcobre's Mina Justa, implementing what the company titles as "Execution of Miscellaneous Works" of civil works and electrical installation for support projects in sulfide, oxide, and infrastructure plants. According to Sebastián Martín, Grupo JJC's general manager, the company offers this service to assist with maintenance and unforeseen emergencies in operations. "Although new, it is gaining traction in the industry, particularly among companies with a preventive culture. We have been meeting with various mining units to emphasize its benefits. Companies must prepare adequately as it demands personnel profiles different from traditional contracts," he emphasized.

Why Peru?

Peru is a mature mining jurisdiction, boasting mines with years of operational history and a diverse array of local contractors capable of servicing large-scale projects such as Quellaveco, Las Bambas, Antamina, and Minsur. With few greenfield projects on the horizon, one might wonder why a company would establish itself in Peru. However, despite the competitiveness of the local market, a few companies still see potential in the Andean country.

Construplan, a Mexican contractor, placed its bet on Peru. "Construplan has made a long-term commitment to Peru, as reflected by our investment in our Peruvian branch. This commitment remains steadfast regardless of macroeconomic and political situations somewhat beyond our control," commented Rafael Ríos, Construplan's country manager.

The company secured its first contract in Peru in 2023 with Nexa Resources' El Porvenir mining unit. Furthermore, Construplan obtained a contract for a 1.5 km crest channel in Atacocha as part of Nexa's 'Integración Project,' which integrates both operations into one cohesive initiative. It proved the right call to bet on Peru, considering Construplan's specialization in open-pit mining. In February 2024, Mexican President Andrés Manuel López Obrador introduced a series of constitutional reforms to the par-

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liament, including a proposal to amend Article 27 to prohibit open-pit mining.

In 2022, Milicic, an Argentinian contractor, ventured into Peru. María de los Ángeles Milicic, the company's general manager, told GBR that Milicic engaged in its first contract in Peru with the Besalco-Stracon Consortium and the Authority for Reconstruction with Changes (ARCC). The contract is aimed to execute public works and fortify infrastructure against the impact of El Niño induced weather anomalies. María de los Ángeles emphasized: "We want to increase our presence in Peru and prepare for forthcoming projects. Some of these may not be immediately executable but hold promise for the medium term, including greenfield projects requiring significant capabilities. This journey has been enlightening, revealing a more mature and developed market than the Argentinian one. The insights gained serve our Peruvian operations and enrich our approach in Argentina, leveraging differences to enhance efficiency."

Indeed, Peru's pipeline of projects presents opportunities for contractors to expand their portfolios and expertise and acquire valuable knowledge and skills that can be applied globally.

Modular construction and engineered solutions

Tecno Fast Peru specializes in fabricating, selling, and renting modular facilities primarily made of wood, aligning with the principles of the circular economy. "The airtightness provided by wood contributes to greater energy efficiency and a longer structure lifespan. The future of construction is modular,

and in many countries, using wood is a common practice. It is important to challenge the rooted paradigms in Peru, where concrete construction is considered the only safe option," commented Viveca Luna, commercial submanager of the Peruvian company.

Tecno Fast Peru has worked on different projects across Peru and has provided modular solutions to Newmont's Yanacocha Sulfides project, where it built the site camp for up to 4,000 people. More recently, it engaged with Buenaventura to construct the camp at San Gabriel, designed to accommodate 1,440 people.

Maccaferri of Italy, the company that invented the gabion in the 19th century, has been in Peru, providing its products like gabions, nets, and metallic fibers to mining operations. The Italian company aimed to introduce its geosynthetics line to Peru and begin national production. However, according to César Torres, the company's Mining Sector manager for LATAM, they still have to rely on imports from Brazil. Torres elaborated on how the company has managed to keep its relationships with mining clients like Cerro Verde, Antamina, and Buenaventura: "We understand the importance of establishing long-term relationships with our mining clients. Beyond simply providing solutions for specific projects, we aim to offer a comprehensive service and maintain a continuous presence in the mining operations, including deploying our company's technical personnel to work closely with the mining engineering teams."

Maccaferri will launch this year HelloMac, an alert system to monitor rockfalls. ■





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Jordan Barja
and Alberto Alta

JB: General Manager
AA: Central Manager
BYV IESEMIN

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In the Peruvian mining context, solid companies like the Volcan Group and Minsur constantly demand maintenance services for their operations and plants.

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How has the range of services offered by ByV IESEMIN evolved over its 18 years of experience?

JB: ByV IESEMIN has excelled in engineering, metalworking, and manufacturing spare parts for concentrator plants. Our expertise is reflected in expanding services towards a comprehensive offering, incorporating civil and electromechanical aspects and the capacity to develop engineering from the conceptual stage. Our strength lies in our responsiveness to complement clients' ideas with our expertise. We are highly adaptable to market needs, especially during mineral price upticks when clients seek to optimize and expand their facilities.

How did ByV IESEMIN address the needs of Catalina Huanca's unit?

JB: To meet the needs of the Trafigura group unit, we designed and manufactured a mill. This approach allowed us to create the equipment, install it, and ensure the supply of consumables once it was operational. In the case of the expansion of the Catalina Huanca plant, we were awarded an EPC-type contract, developing a project that included the installation of a washing plant to overcome the complexity of the existing operation. The result was a significant increase in the daily processing capacity, from 2,300 to 2,600 tons per day.

What is ByV IESEMIN's market approach, and what niche has it developed?

AA: In the Peruvian mining context, solid companies like the Volcan Group and Minsur constantly demand maintenance services for their operations and plants. BYV IESEMIN has established its expertise in this field, providing maintenance services in various units of Minsur, such as Raura and San Rafael, as well as in Volcan. This specialization has created a market niche that supports our activity and promises ample growth potential. Additionally, we focus on serving mainly medium-sized mining companies. In our workshop, we are venturing into manufacturing spare parts and consumable components, such as valves, which provide us with a solid foundation for expansion. However, we aim to progressively diversify our portfolio of services and clients, aspiring to be prepared to take on large-scale mining engineering projects. ByV IESEMIN has evolved significantly in the past five years to meet the growing demands of mining companies, adapting to the sector's most demanding quality standards. Thus, we are committed to maintaining a high level of modernity in our services. This constant adaptation is crucial to maintaining relevance and competitiveness in an increasingly demanding business environment.

Could you tell us more about the flotation cell you manufacture for San Rafael?

JB: At San Rafael, Minsur, we face the challenge of installing a rapid flotation cell SK 80 for efficient recovery. Before installation, we have to conduct a feasibility study followed by the necessary engineering. The cell will allow for quick mineral recovery, eliminating the need to go through multiple circuits and directing it directly to concentration. Collaboration between our mechanical team and metallurgists is crucial to sizing the cell capacity and selecting the discharge pipe diameter. On the other hand, automatic control plays a vital role in the final recovery, especially when the mineral presents this head grade, requiring an assessment along with the discharge system. Implementing various flotation cells ensures efficiency and speed in recovering valuable particles, allowing for almost instant work in fractions of seconds.

How can you help process tailings?

JB: We identified the opportunity to recover up to 2% of the mineral contained in the tailings, especially in the fraction of ultrafine particles, at Trafigura's Catalina Huanca mining operation. This would be achieved by increasing the degree of comminution by implementing a higher-capacity mill capable of processing these particles more efficiently.

What projects does the company have in its pipeline for 2024?

JB: ByV IESEMIN has ambitious projects underway for 2024. At Catalina Huanca, we aim to conclude the plant expansion to increase daily capacity to 3,000 t/d. In partnership with Micronics, we are also developing a filtered tailings treatment plant project at the Cobriza mine, where ByV IESEMIN is responsible for engineering, civil construction, assembly, and installation. Likewise, we plan to implement ore sorting technology at Minsur, which allows for the classification of higher-value ore before processing. This approach requires the metalworking construction of equipment and the installation of conveyor belts. It is in advanced stages at the Raura mine, with implementation plans also at Catalina Huanca. ■



Sebastián Martín

General Manager
GRUPO JJC



Javier Amézaga

Executive Vice President and
General Manager
COSAPI



María de los Ángeles Milicic

General Manager
MILICIC

What is the importance of mining for Grupo JJC?

Grupo JJC is a construction company with nearly 70 years of experience and over 3,000 employees. It participates in large-scale projects in Peru and is expanding operations to Chile and Colombia. In the mining sector, we offer various services, from earthworks to dam construction, civil works, and electromechanical installations in EPC projects and miscellaneous services. Mining currently represents the most essential core of our activity, including the highly complex projects in which we have specialized.

How does the current state of Peruvian mining affect Grupo JJC?

Following the completion of the last greenfield project, Quellaveco, where we contributed to the transportation system and tailings dam, Peru has not initiated new projects of this scale. Consequently, we have had to explore strategies such as internationalization and diversification into other sectors. While there are expectations for new mining projects, these remain uncertain and based on future promises. Meanwhile, there are some brownfield projects, but their volume does not reach the levels of greenfield projects. ■

Could you comment on the contract awarded for the expansion of Toromocho?

For the second phase of Toromocho's expansion, we are in charge of civil and electromechanical works for the plant's wet and dry parts. Both projects, with a total value of US\$40 million, are nearing completion. Although they are not large-scale projects, they are significant for us, given the current situation where Peru's mining investment is focused on maintaining existing operations.

In addition to Toromocho, we are developing critical projects for Quellaveco and the San Gabriel project plant in Buenaventura.

We also have a presence in Chile, where we have completed work for the new concentrator plant of Quebrada Blanca and a project for the definitive road Tranque el Mauro of Minera Los Pelambres.

What challenges and opportunities does COSAPI face in Peru?

In Peru, the political situation has decreased investments, impacting the construction sector. On the other hand, the market has become more demanding and has sophisticated clients requiring increasingly complex projects. ■

How does the Peruvian mining industry's current health present challenges and opportunities for Milicic?

When we began exploring Peru in 2022, it preceded the political upheavals that later affected project developments. While immediate greenfield projects may not be evident, Milicic's commitment to Peru's development spans the medium and long term. We recognize Peru's potential and the consequent developmental opportunities it presents.

Meanwhile, we are diligently building our operational capacity in Peru. This gradual process aligns with the evolving business landscape. We aim to bolster our presence in Peru and prepare for forthcoming projects.

What is Milicic's objective for the end of 2024 in Peru?

Our goal is to secure a second contract in Peru by the end of 2024, concurrently investing in the development of infrastructure and equipment. This strategy underscores our commitment to self-reliance and resilience, enabling us to adapt to evolving circumstances and seize emerging opportunities. By strategically enhancing our capabilities and resources, we fortify our position in the Peruvian market while upholding our standards. ■



Underground Contractors

Culture and technology

In Peru, a significant portion of mineral extraction is mined through open-pit operations. However, there is an imminent transition towards underground mining, primarily driven by two key factors: declining ore grades and the environmental impact of open-pit operations. Society is increasingly scrutinizing mining activities, prompting a shift towards less invasive mining practices. For example, Antamina, the leading silver and zinc producer and the second-largest copper producer

in Peru, is poised to transition to underground mining in 2031, start production in 2036, and reach full capacity by 2039.

On the other hand, current underground operations are going deeper; for instance, Sierra Metals' Yauricocha mine now plans to mine below the 1120 level. Another example is Newmont's Yanacocha mine and its sulfides project. Unfortunately for Peru, Newmont postponed the construction of this underground development, which is part of the mine's

transition from oxides to sulfides and whose CapEx amounts to US\$2.5 billion. The first phase of this transition will focus on the Yanacocha Verde and Chaquicocha deposits.

At the Chaquicocha deposit, AESA had been actively working even before Newmont decided to halt the project. In 2023, AESA achieved a 15% revenue growth compared to 2022 despite the intense competition in the segment. Guillermo San Miguel, AESA's new CEO, attributes

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AESA is one of the largest companies in Peru specialized in the development of mining infrastructure and civil works. AESA is part of Breca, a diversified business conglomerate with presence in Peru, Chile and Brasil.

We have joined our clients towards sustainable underground mining for more than 33 years of success. This allows us to have the best specialized professionals, trained and qualified to handle highly complex and specialized processes, while we promote local employment, inclusion, social diversity and well-being in communities around our area of influence.

Over the years we have developed ambitious projects for national and international clients, developing business lines such as:

- **Land preparation:** Which includes sterile removal activities, landfilling, leveling, excavation, drainage, hauling system, among others.
- **Development of mining preparation and infrastructure:** Construction and remodeling, galleries, crossings, ducts, access roads, ramps, chimneys, loading areas, shotcrete, support, among others.
- **Maintenance and conditioning of mining infrastructure:** Maintenance of authorized installations, which includes ventilation systems, road maintenance; among others that guarantee a safe and optimal infrastructure for access and subsequent exploitation.

All our work is based on sustainable development and our most important value: safety. That is why AESA's path is to take care of our safety and the well-being of the people around us.

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this success to the company's close relationships with its clients, which enabled it to renew its contract with Chungar for another four years in July 2023.

The latest MINEM statistics show no consistent trend in the annual number of fatal mining accidents over the past few years. In 2020, there was a minimum, likely due to pandemic-related mining restrictions. In 2021, incidents increased to 63, decreased to 39 in 2022, and rose to 51 in 2023.

Safety is paramount in every aspect of mining, not just for underground operations. Contractors must incorporate new technologies to enhance safety, but maybe the most important factor is balancing these developments with a safety culture. Although the mining industry in Peru has a sufficient number of miners, it experiences high turnover, which makes it challenging for newcomers to adapt to a company's safety systems and protocols. "A key phrase in our company is 'I take care of you, you take care of me', reflecting the need to create a virtuous circle in safety and reinforce it among colleagues. Recognizing that our safety needs may differ from those of other companies due to higher staff turnover, we have designed our safety system to adapt to these particularities," explained AESA's CEO San Miguel.

When asked about the value of automation, San Miguel responded that while they are currently observing trends in this area, including remote operations, their primary focus is on automating the management of data generated by mining equipment. "Our goal, in the near future, is to automate data collection to understand equipment performance better and optimize its operation. Once this process is established, we can identify improvement opportunities and develop business cases with our clients," concluded San Miguel.

Another established underground contractor is INCIMMET. Eduardo Cossio, INCIMMET's CEO, informed GBR that in February 2023, it closed another contract to provide Compañía Minera Raura with comprehensive services for Cemented Rock Fill (CRF). Regarding safety, INCIMMET has won an acceleration process for the FreeRocks technology in Chile: "FreeRocks is a system that utilizes a drone, a thermal camera, and an advanced intelligent algorithm to predict and prevent

>> 82



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We have developed two major services in recent years: shotcrete application, and mineral and waste transportation within the mine.

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Guillermo San Miguel

CEO
AESA

Can you provide an overview of AESA's activities over the past year?

During the past year we have been rethinking many strategies and priorities, particularly focusing on enhancing the safety and well-being of our workers. Throughout the year, we focused on improving safety, productivity, and the quality of our services. We achieved a record-breaking revenue growth of 15% compared to the previous year, thus closing the best financial year since the onset of the pandemic. This achievement reflects the resilience of our organization and its ability to overcome adversities.

What were the key factors contributing to your growth?

We maintain a very close relationship with our clients. This has allowed us, for example, to renew our contract with Chungar, which ended in July 2023, extending it for an additional four years.

How has the integration with Redpath Mining developed?

We were observing a significant trend of migration from open-pit mines to underground mines in Peru. This requires specific expertise and technologies, especially in terms of automation and project development. Redpath had this experience, which led us to form a 50-50 joint venture called ARM.

This company was mainly formed to participate in the bidding process for Newmont's Chaquicocha underground mine. We won the bid in 2021 and began engineering and development work for

the new mine in collaboration with Newmont. As AESA, we had already drilled and developed tunnels on this project, so we were familiar with the local environment. Redpath contributed its expertise in automation and integrated management. Although the Chaquicocha project has been halted, we continue to seek new projects to apply our combined knowledge.

What were AESA's most demanded services over the past year?

AESA's core services continue to be in high demand. These include the development and preparation of mining infrastructure, such as tunnel construction and support. We have also developed two major services in recent years: shotcrete application, and mineral and waste transportation within the mine. We have a fleet of over 70 dump trucks currently operating in various mines.

How are you reinforcing safety at AESA?

Our safety management system is based on several fundamental pillars, one of which is a training and integration process for our personnel, both newcomers and those with more experience. A key phrase in our company is "I take care of you, you take care of me", which reflects the need to create a virtuous circle in safety matters and to reinforce safety among colleagues.

In 2019, we achieved certification for our safety management system under the ISO 45001 standard, and we have committed to renewing it annually to

incorporate the best international practices. Recognizing that our needs may differ from those of other companies due to higher levels of staff turnover, we have designed our safety system to adapt to these particularities.

We have implemented innovative technologies, such as virtual reality and simulators, to enhance the training of our operators. Additionally, we launched the "Kuntur" project, focused on improving safety and productivity through specific assessments and training aimed at closing identified gaps in accidents and productivity. Another key factor is visible leadership. It is essential that our leaders exemplify safety behaviors not only at work but also in their daily lives, thus promoting a comprehensive mindset.

What is AESA's strategy regarding automation and remote operations?

Our goal is to automate data collection to better understand equipment performance and optimize its operation. This data gathering will allow us to develop metrics and analyze data to improve productivity and safety standards. Once this process is established, we can identify improvement opportunities and develop business cases with our clients.

What are AESA's objectives for 2024?

Our main objective is to ensure the safety and well-being of our workers. We seek to add value to the customer by being more productive, efficient, and maintaining high standards of quality, especially in a context of tight prices. ■

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- ▶ Shotcrete for vertical excavation
- ▶ Mine development
- ▶ Ore exploitation
- ▶ Mine backfill (hydraulic / paste / cemented / cemented rock fill)
- ▶ Cable bolting
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- ▶ Ancillary services
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- ▶ Hauling and transport



INCIMMET Peru - Headquarters

Av. Manuel Olguín 211 Of. 1401 – 1404 Santiago de Surco Lima 15023
+511 714 7300 | Comercial_peru@incimmet.com

INCIMMET Colombia

Carrera 43A #5A – 113 Oficina 805 Medellín, Antioquía
Comercial_colombia@incimmet.com

INCIMMET Mexico

Av. Insurgentes Sur N° 1863, Oficina N° 304, Colonia Guadalupe Inn,
Alcaldía Álvaro Obregón, Ciudad de México
Comercial_mexico@incimmet.com

INCIMMET Chile

Calle Bombero Núñez N°181, Rol: 281 - 30,
Comuna de Recoleta, Región Metropolitana, Ciudad de Santiago
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80 >>

rockfalls in underground mines. Our technological developments, made in-house, are in the process of obtaining patents to make them available to the entire industry across various countries," said Cossio.

INCIMMET celebrated its 30th anniversary in 2023. When asked what distinguishes INCIMMET in the national and regional markets, Cossio highlighted that mine backfill is one of the company's most specialized services. Mine backfill involves depositing the tailings generated from processing minerals back into the mine rather than leaving them on the surface. "The process consists of classifying and processing the tailings so that, when mixed with water or cement, they become a material that can be used as fill inside the mine. We also developed the cemented rock fill (CRF) in Peru and Colombia, which is the classification of fracture rocks from the blasting process mixed with cement. All these fillings contribute to the support the underground mine," explained Cossio.

JRC is another underground contractor that has established ties with a Chilean technology development firm to leverage technological disruptions within the mining industry. By integrating innovative technologies into its operations, JRC seeks to persuade clients to centralize or streamline their processes under a single contractor to reduce costs. "Every company must seek out unique differentiators to stay ahead in today's competitive landscape, and technology has become indispensable," commented Manuel Ruiz-Conejo, executive president, JRC Ingeniería y Construcción.

Conversating with Ruiz-Conejo regarding market dynamics and how prices affected the underground segment between 2022 and 2023, he commented that JRC had to focus on consolidating its operations to keep costs in check to remain competitive. As a priority, the company decided to restructure and transition from a family-managed company to one with the family solely involved in the board.

The lack of new projects in the underground segment has led many players to seek new incomes through regionalization and venturing into new mining jurisdictions. For instance, INCIMMET ventured into Colombia in 2023 and has ambitious plans for Chile and Mexico. In the case of JRC, the company is undertaking some projects in Mexico and Canada. ■



Eduardo Cossio Chirinos

CEO
INCIMMET

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Mine backfilling plays a crucial role in increasing production speed.

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Can you elaborate on the benefits of mine backfilling?

Mine backfilling plays a crucial role in increasing production speed. If the empty spaces resulting from mineral extraction are not adequately filled, the production cycle cannot continue. Furthermore, this approach allows for the reuse of waste generated during extraction, reducing the need for the expansion and construction of new tailings dams, thereby reducing associated costs and procedures.

Can you tell us about the innovation awards you won in 2023?

Last year, we won awards from the National Society of Industries and the National Society of Mining and Petroleum. We also won an acceleration process for our FreeRocks technology in Chile, as if it were a startup. FreeRocks is a system that utilizes a drone, a thermal camera, and an advanced intelligent algorithm to predict and prevent rockfalls in underground mines. Our technological developments, made in-house, are in the process of obtaining patents to make them available to the entire industry across various countries.

In the first half of 2024, we will launch an open innovation program, allowing participants in the mining industry worldwide to collaborate with us to address security and productivity gaps in the industry through technology.

What can we expect from INCIMMET in 2024?

We expect to secure our first contracts in Chile and Mexico, alongside further opportunities in Peru and Colombia. In Peru, we expect to reach a cruising speed with our new contracts while consistently driving internal innovation projects to remain cost-competitive. In 2024, we will encounter further challenges arising from the political situation in Peru. Although the conflict is dormant now, the potential for eruption persists, which can cause instability in the mining sector. Despite social and political challenges, we remain optimistic about the future and are accustomed to navigating complexities. ■

How did the past year unfold for INCIMMET?

In December 2022, we secured a contract with Minera Poderosa to construct a 7 km tunnel through horizontal excavation. In February 2023, we closed another significant contract to provide Compañía Minera Raura with a comprehensive service for Cemented Rock Fill (CRF), our company's specialty.

In the early months of 2023, we experienced political and economic turbulence in Peru, and heavy rainfall caused by the Yaku cyclone affected some of our operations. However, in 2023, we developed over 40 km of mine development and 1 km of raiseboring. We also successfully sold four specialized consulting services related to mine backfill, and we aim to strengthen this area in 2024.

How has the company's international expansion progressed?

In Colombia, we have been forced to navigate significant instability and volatility. The mining sector in this country has great potential but is relatively small, with few participants, making it susceptible to political issues. In 2023, the mining industry was affected by political instability and a lack of clarity in government policies regarding natural resources, leading to a decline or delays in investments by mining companies. However, for 2024, we anticipate a posi-

tive change as foreign investments learn to adapt to political uncertainty.

In 2023, we adopted an aggressive strategy in Chile and Mexico. We have established a strong presence in these markets with a consolidated business structure and full-time commercial advisors and anticipate an increase in leads for 2024.

Can you remind our audience of the concept of mine backfilling?

Mine backfill is one of the most specialized services in our portfolio and involves hydraulic fill, hydraulic cemented fill, paste fill, and cemented rock fill. When minerals are processed, tailings are generated as byproducts. Traditionally, these waste materials are deposited in surface tailings dams. However, our specialty involves taking these tailings into the mine instead of depositing them on the surface.

The process involves classifying and processing the tailings so that, when mixed with water or cement, they become a material that can be used as fill inside the mine. We also developed the cemented rock fill (CRF) in Peru and Colombia, which is the classification of fracture rocks from the blasting process mixed with cement. All these fillings contribute to the support and fortification of the underground mine. Depending on the mixture of materials, it can acquire

Raise Boring and Shotcrete Specialists

Underground is everything but boring

As the low-hanging fruit for open-pit operations and “not-so-deep” underground mines become depleted, a growing requirement exists to enhance technological adoption in the underground mining segment. Furthermore, these challenges are exacerbated by the current escalating costs within the industry. In this context, Belisario Tijero, Peru’s general manager at Master Drilling, commented that automation is the elixir to the above-mentioned challenges. “Elevating automation levels is not just about technological advancement; it is a proactive measure to improve reliability and efficiency, providing robust support to cope with market fluctuations,” he explained.

For Master Drilling Peru, 2023 was a year marked by two significant milestones. The first one is they brought to the country what Tijero defined as the “country’s largest and most powerful machine” in terms of raise boring: the raise borer RD5. “Its unique features provide better efficiencies and translate into shorter project durations and, consequently, reduced costs for our clients,” added Tijero.

The second was the decision to introduce another machine, the LP 200, which utilizes the blind hole drilling method, capable of creating vertical ascending holes of 1.5 m in diameter. “The optimized layout of the LP 200 requires less mine infrastructure, resulting in reduced expenses for the mine in terms of the space it allocates. In every aspect, it contributes to minimizing costs for the mine,” continued Master Drilling Peru’s general manager.

Master Drilling aims to revolutionize underground mining by eliminating explosives, and its approach involves implementing mechanized cutting techniques for various stages of the process. However, Tijero highlighted that adopting these

methods may take time in Peru due to the mines’ relatively “young” depth: “As mining operations deepen, common challenges arise, impacting efficiency and increasing costs. Moreover, the growing complexity of social issues in obtaining licenses necessitates innovative solutions. The ongoing efforts to mechanize and reduce the use of explosives address these challenges and add significant value to the industry,” he concluded.

Another established company in the raise boring segment is Tumi Raise Boring (Tumi). The company in 2023 celebrated its 25th anniversary, and Marc Blattner, CEO, commented that the company transitioned from being mere contractors to manufacturers of raise boring equipment, going from a 98% contract-based revenue to a more balanced 50-50 split. A pivotal milestone was the development of the SR technology: “This innovation revolutionized raise boring systems, making them mobile, self-anchoring, self-fitting, and self-moving, drastically reducing setup time from days to 45 minutes,” added Blattner.

Speaking of how political turmoil affected the industry and, consequently, raise boring contracts, Carlos Dellepiane, Tumi’s general manager, commented that the company persevered through international sales and operations in Brazil, with Nexa Resources at its Vazante mine where the SBM 21 BX is deployed, as well as venturing into Mexico. At a local level, he shared: “We initiated a macro-contract with Buenaventura, building upon our existing relationship and extending our presence across most of its mines. Our collaboration with Nexa remains intact, and we have also completed projects with Volcan. We are exploring opportunities with other ma-

jor groups like Minsur, which invited us to bid for projects in 2024.”

Many underground operations in Peru are characterized by narrow vein deposits, presenting challenges for both contractors and companies developing equipment for this segment. One of the main difficulties of these deposits is that they are small and dispersed, making it challenging to extract the mineral using large-scale equipment. As a result, contractors often rely on specialized equipment tailored to these specific conditions. “We are developing the SBM 300 SRS, tailored for boreholes and narrow vein mining. We aim to engineer a narrow vein mining production drill that seamlessly integrates modern technology with the proven methodologies embodied by our SR series,” shared Marc Blattner.

Also in the narrow veins segment, Robocon provides a full range of services, from shotcrete production and contracting to slick lines, and has worked with several mining companies, including Sierra Metals. Additionally, it has fabricated its own machines, the Tecnoshot and Tecnomix, which are deployed at Consorcio Minero Horizonte’s operations.

Enrique Sattler, Robocon’s CEO, commented to GBR that the company is closely monitoring the development of Bosch Rexroth’s solution, eLION, to adopt it and integrate electric mobility. Additionally, despite suppliers like Normet presenting Robocon with electric equipment for trials, incorporating these solutions is difficult due to higher costs. “The shift to electric mobility will depend on the sophistication of mine conditions. Operational costs are linked to the type of equipment used; for instance, an electric Mixer costs 40% more than its diesel counterpart,” concluded Sattler. ■



Belisario Tijero

General Manager - Peru
MASTER DRILLING PERU

What were some milestones achieved by Master Drilling in Peru by the end of 2023?

In Peru, we made two crucial decisions. Firstly, we opted to bring in the country’s largest and most powerful machine, the raise borer RD5. Throughout 2023, we successfully solidified the operation of this machine, offering the market a new opportunity for projects of greater diameter and length, allowing us to undertake projects beyond the constraints of local offerings.

The second significant decision in 2023 was introducing a machine employing a novel drilling method for the production or exploitation phase of underground mining— the LP 200, utilizing the blind hole drilling method. This machine, capable of creating vertical ascending holes of 1.5 meters in diameter, aims to replace the traditional drilling and blasting method used in producing slots for long-hole mining operations. We want to consolidate this service, offering our clients a safer operation with higher quality and perfectly defined profiles.

What is the goal of the Master School project initiated in 2024?

In 2023, we initiated partnerships with various educational institutions, such as technical universities, aiming to share the essence of the raise boring business like its purpose and contributions to mining. This approach serves to open doors for future generations entering the industry. Our collaboration has resulted in developing several projects across different company areas, generating valuable insights for our business. Young minds are starting to grasp the significance of our industry and find it appealing to work here.

For 2024, we have launched a new project called Master School. This initiative involves bringing fresh talent into the company and recent graduates who have joined Master Drilling embark on a journey to explore and develop their skills in various fields within the company. ■



MB



CD

Marc Blattner and Carlos Dellepiane

MB: CEO
CD: General Manager
TUMI RAISE BORING

What significant milestones has the company achieved during the years?

MB: Over the years, we transitioned from being mere contractors to becoming manufacturers of raise boring mining equipment. A pivotal milestone was the development of the SR technology, for which we still hold patents. This innovation revolutionized raise boring systems, making them mobile,

self-anchoring, self-fitting, and self-moving, drastically reducing setup time from days to 45 minutes. Another significant leap forward was our expansion from a 1,000-square-meter facility to a 38,000-square-meter establishment, consolidating Tumi’s presence in fabrication in Lurin. Our revenue structure evolved from 98% contract-based to a more balanced 50-50 split between machine sales and contracting revenue, showcasing our growth trajectory.

How was Tumi’s performance during 2023?

CD: 2022 and 2023 presented significant challenges for both Peru as a nation and our company, leading to a downturn in our workload. However, we persevered through international sales, which buoyed us during these trying times. As we transition into 2024, we observe a resurgence in the mining market, with investments returning and prospects improving. We initiated a macro-contract with Buenaventura, building upon our existing relationship and extending our presence across most of its mines. Our collaboration with Nexa remains intact, and we have also completed projects with In 2024, our targets include securing contracts with Minsur and Alpayana, further solidifying our position in the industry.

What technology trends do you find interesting?

CD: We are developing a comprehensive training program utilizing simulation technology to familiarize users with our products. Looking ahead, we see automation as a precursor to potentially integrating artificial intelligence into our operations. While automation streamlines processes, AI could play a pivotal role in decision-making, optimizing machine performance based on predefined parameters and formulas. However, our immediate focus remains on automating operations before considering AI integration. ■



Equipment and Technology

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Las Bambas' Integrated Remote Operations Center in Lima (IROC) uses Big Data, IoT and automation systems. These tools allow for real-time, data-driven decision-making, optimizing performance and correcting deviations.

”

Luis Ticona
General Manager Operations
MMG LAS BAMBAS

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Image courtesy of Sandvik



TECHNOLOGY OF TOMORROW, FOR TODAY'S MINING.

In Peru, Ferreyros has successfully launched the first autonomous trucks in our mining industry.

And in the world, Caterpillar already has the first 100% electric mining trucks.

Innovation that makes history in Peruvian and global mining.

LET'S DO THE WORK.™

www.ferreyros.com.pe



Mining Equipment

Heavy lifting to secure copper, gold, and silver medals

Lucintel, an American management consulting and market research firm, projects that the global mining equipment market will reach approximately US\$224.2 billion by 2030. Part of this growth is due to the expectations of new mines coming online in the upcoming years or the ramp-up of existing projects to help meet the demand for those minerals needed for the electricity transition.

At a local level, in Peru the mining equipment segment was one of the few that saw a budget increase in 2023, totaling US\$821 million, up 20.1% from 2022. This growth is mainly due to Antamina's investment surge of 703.2%. The copper producer entered into a major agreement with Komatsu-Mitsui Maquinarias del Perú (KMMP) to acquire a fleet of 20 Komatsu 980E-5SE haulage trucks. These trucks have a load capacity of 400 t and are equipped with 4,400 HP Cummins QSK95 engines: "The strategic agreement with Antamina entails the supply of 20 980E-5SE trucks featuring Cummins QSK95 engines and a commitment to deliver an additional 100 trucks over the next five years. In Q1 2024, we are fulfilling the initial order with the provision of 10 trucks, followed by the delivery of eight more in the second half, aligning with Antamina's mining planning and adjusting to their annual needs," commented KMMP's new CEO, Julio Molina.

Despite celebrating this contract, Molina highlighted the ongoing uncertainty in the Peruvian mining market, characterized by a lack of new greenfield projects, and emphasized that the agreement with Antamina is "exceptional." However, he noted that brownfield projects drive demand, focusing on the energy transition, fleet automation, and digitalization. "The energy transition and mineral demand drive brownfield

>> 91



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Our trucks operate in the largest open-pit mines in the country alongside giant electric shovels, hydraulic shovels, drills, and an extensive auxiliary fleet.

”

Gonzalo Díaz Pró

General Manager
FERREYROS

How has Ferreyros' business been evolving?

Last year, Ferreyros experienced double-digit growth, and in 2024, we have the ambitious goal of reaching US\$1.5 billion. We are focused on productivity, transformation, and sustainability. This can be seen, for example, in Peru's first fleet of autonomous trucks, in its third year of operation, the consolidation of CAT's giant electric drive trucks, the automation of our Spare Parts Distribution Center and the adoption of cutting-edge technologies in fleet support. We employ nearly 5,000 workers in the country.

In which mining operations is Ferreyros present, and with what equipment?

Our trucks operate in the largest open-pit mines in the country alongside giant electric shovels, hydraulic shovels, drills, and an extensive auxiliary fleet. I would like to mention the outstanding performance of our 400-ton electric drive trucks, the CAT 798, in six world-class Peruvian copper mines. This year, more units of this model have arrived, with more to come, reflecting our customers' endorsement and preference.

We generate value in the underground market with our CAT LHD loaders. We are preparing to introduce models such as the CAT R2900 XE, with a diesel engine and electric transmission, and the CAT R1700 XE, with batteries, for underground mining.

What have you learned from implementing autonomous fleets in Quellaveco?

Although initially complex, the implementation of autonomous fleets has required a comprehensive approach to route design and constant adaptation to changes in the mine. This process has

catalyzed the development of digital and agile skills both in our team and in the mining personnel at Quellaveco, anticipating a promising future with autonomous machines, which are safer, more efficient, and sustainable.

Could you tell us more about the MineStar platform and the Daris system?

MineStar, Caterpillar's technological platform, offers several modules. This has evolved from a module that analyzes the machine's health to include new fleet management, precision, and autonomy modules.

The Daris system, developed by Ferreyros, centralizes data collection from operating machines in Peru's mines. It constantly manages crucial information, such as speed, fuel consumption, location, machine alarms, and payload. Daris allows us to provide our customers with faster and more effective service while providing valuable inputs to optimize asset management.

What was the result of the Spare Parts Distribution Center automation project?

Last year, we completed the robotization in our Spare Parts Distribution Center, which supplies Ferreyros' national network of warehouses directly to customers. This artificial intelligence project with robotization allowed us to automate the processes of input and output of minor spare parts. 100% of the minor spare parts in the CDR are under the automated management of 25 robots, pioneering in our field.

How would you rate the health of the Peruvian mining industry?

Peruvian leaders recognize the possibility of increasing mineral production,

especially in copper, through two approaches: launching new projects and optimizing brownfield operations, which are easier, faster, and socially less challenging. Ramping up these operations could increase production by 10%. Implementing this strategy requires short-term and long-term planning, a vision that the Ministry of Energy and Mines has understood and promotes.

I would like to witness the birth of a new mining project and see how it starts with agreements with both the community and the state. Although the process can be long and despite the difficulties, bringing new projects online is feasible. From Ferreyros, we can contribute by providing confidence to our customers so they know that we will be with them to ensure the success of their operations. We have showcased our capability by launching operations at Quellaveco and Mina Justa practically simultaneously, tackling complex challenges head-on.

Do you have a final message for GBR's readers?

I would like to highlight the fundamental importance of Ferreyros' main represented brand, Caterpillar, a world leader in machinery, which we have distributed for 82 years. We are proud of its transformative role in our field, promoting progress, its passion for innovating the industry in search of positive impacts, and the very high standards that characterize it.

We had the honor of receiving the "Top Dealer Recognition" of the Apex Award from Caterpillar for our performance in mining last year. Likewise, in Caterpillar's Excellence Programs, we obtained five gold medals in all categories in which we were evaluated: after-sales service, spare parts sales, rental services, marketing and sales, and digital transformation. ■



“Conversations once centered around production and costs now encompass energy transition, fleet automation and digitization.”

Julio Molina

CEO
KOMATSU-MITSUI MAQUINARIAS DEL PERÚ (KMMP)

With two consecutive years of record-breaking sales, what expectations does Komatsu-Mitsui hold for 2024?

2023 presented initial challenges with events in Las Bambas, Antapaccay, and the southern corridor affecting mining customers and also our company. Despite these hurdles, we successfully secured a deal with Antamina, supplying them with 20 980E-5SE trucks and potentially expanding to 100 trucks over the next five years. We integrated Komatsu Mining Corp Peru (KMCP) with Komatsu-Mitsui, anticipating enhanced collaboration as a single legal entity in 2024. We achieved record-breaking sales of US\$650 million, marking a second consecutive year of success and KMCP also achieved outstanding sales of US\$180 million.

In 2024, we aim to surpass the US\$900 million mark in sales working together, reaffirming our status as an integrated company.

What is the current scenario for the Peruvian mining industry?

Uncertainty persists in a Peruvian mining market marked by the absence of new greenfield projects, but the energy transition and mineral demand drive brownfield expansions. Key clients such as Cerro Verde, Southern Peru, and Las Bambas focus on increasing production and exploring new technologies. The

current mining landscape is defining its future, addressing decarbonization goals, and meeting the global aim of carbon neutrality by 2050. Conversations once centered around production and costs now encompass energy transition, fleet automation, and digitization, highlighting significant challenges for the Peruvian and global mining industry.

What distinctive features render the 980-5SE an optimal choice for the mining industry?

With its 4,400 HP Cummins engine, this truck guarantees optimal speed on steep terrains in deep pit applications. This efficiency translates to heightened productivity and a substantial reduction in emissions, which is particularly beneficial for clients with deep pits and extended ramp times in mining operations across Peru and Chile. Tailored to the unique physical conditions of mining operations in both regions, these trucks deliver exceptional performance and are also designed for adaptability to autonomy and trolley systems.

Can you provide examples of specific solutions or initiatives that Komatsu is exploring in the transition to fully electric trucks?

The transition to electromobility is unfolding in phases, commencing with the shift toward fully electric trucks. The Komatsu truck, currently being tested in

Tucson, marks a significant leap forward by converting diesel energy to electric power by substituting the diesel engine with an electric battery pack. However, the challenge of charging these electric trucks necessitates adapting the trolley system. We have a fully electric truck operational with this charging system, and we are assessing its performance in terms of power and productivity.

Energy management is another key challenge, as sustainable mining requires green sources. This raises questions about the availability of green energy at a national level.

Can you provide more details on the nature of General Motors' partnership and how it contributes to Komatsu's goal of implementing hydrogen cells in the future?

We envision hydrogen cells as a future energy alternative, foreseeing their full implementation in approximately five to six years. Tackling the challenge of transforming the energy matrix, Komatsu is engaging in strategic agreements, including collaborations with General Motors among others for hydrogen cell development. The long-term viability of both technologies hinges crucially on the supply of green hydrogen, inherently linked to the availability of green energy for its production. Our objective is to introduce a hydrogen-based truck by 2030, targeting mines equipped with this specific energy source.

How is Komatsu focusing on automation and other solutions for the industry?

Autonomous solutions are not new at Komatsu, since our first fleet dates back to 2007. However, in its continuous search for innovation, Komatsu continues to take significant steps in terms of autonomy by also including auxiliary equipment with the capacity from the factory to interact with these systems. A strategic collaboration with Toyota stands out there. This agreement covers the comprehensive design of pick-up trucks with systems so that they can operate efficiently within an autonomous mining environment.

As Komatsu-Mitsui, we actively pursue strategic partnerships, exemplified by our collaboration with Ceibo to tackle the environmental challenge of dust in mining. This proven solution, initially tested in Chile, is currently under evaluation in Peru. ■



Yuji Tanaka
General Manager
ZAMINE PERU

“While backhoe configuration is common in Australia, it is not in Peru despite offering a bucket with greater capacity and higher productivity. This change requires adaptation by the operators through the training we provide, as they are familiar with the front loader's operation.”

88 >>

expansions. Key clients such as Cerro Verde, Southern Peru, and Las Bambas focus on increasing production and exploring new technologies. The current mining landscape is defining its future, addressing decarbonization goals, and meeting the global aim of carbon neutrality by 2050,” continued Molina.

The focus on the energy transition has shifted the paradigm in the machinery segment, which previously centered solely on production costs. Now, mining companies aim to incorporate a “greener” component into their operations, advancing fleet automation and digitization to enhance safety. In this context, KMMP's CEO noted that the transition to electromobility is unfolding in phases. Komatsu is currently testing an electric truck in Tucson, Arizona, and has also partnered with General Motors to develop hydrogen cells. “We aim to introduce a hydrogen-based truck by 2030, targeting mines equipped with this specific energy source. This strategic approach aligns with our vision to proactively anticipate and adapt to emerging energy transformations in the mining sector,” concluded Molina.

When GBR met with Erick Ruiz, Cummins Peru's general manager, he commented that while the new QSK95 engines (like the ones used by KMPP in Antamina's order) count now with the Modular Common Rail System (MCRS), Cummins is focusing on progressively upgrading the HPI technology from the QSK60 and QSK78 engines with the MCRS. “The HPI technology operates via mechanical fuel injection, while the MCRS offers distinct advantages, including an extended engine lifespan of nearly 10% and reduced fuel consumption” he explained.

Ruiz revealed that the company broke records in sales performance, with Cummins Peru achieving nearly 21% growth compared to 2022. This resulted in a year-end close of approximately US\$163.5 million and a gross profit increase of over US\$5 million. On the subject of sustainability, Ruiz noted that Cummins Peru aims to capitalize on Peru's “greener” gas

energy mix to help its clients enhance environmental stewardship. He remarked that MCRS engines, which consume less diesel, inherently produce lower emissions, thereby further contributing to reducing greenhouse gases. “We have recently launched the “Near Zero” line, featuring groundbreaking combustion technology in our gas engines, resulting in emissions nearly equivalent to those of electric engines. We are testing this new engine with one of our clients in Lima, and we anticipate showcasing its performance to attract further adoption across the country.”

Changing paradigms

Ferreiros, the Peruvian distributor of Caterpillar, had an exceptional year in 2023, boasting double-digit growth. According to Gonzalo Díaz Pró, Ferreyros' general manager, this success has set ambitious plans to reach sales of US\$1.5 billion in 2024. In a conversation with Díaz Pró, he highlighted the outstanding performance of the CAT 798, a 400-t model deployed across six mines in Peru. Notably, they have introduced several units of this model in 2024, further solidifying their position in the market.

In Peru, Ferreyros made history by being the first company to gradually introduce autonomous trucks at Quellaveco. After almost two years, one may wonder what lessons did Ferreyros learn from that experience that could be applied to other operations. In this context, Díaz Pró noted that, initially, this journey was complex and required a comprehensive

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approach to route design and constant adaptation to changes at the mine: “Automation in mining presents an exciting opportunity that requires not only technological innovation but also a cultural shift and the acquisition of new skills by workers, leading to new profiles. The potential benefits are substantial, including increased safety, efficiency, and productivity,” he commented.

Armando Sugobono, the general manager of Sandvik Peru, remarked that automation, like the transition towards electric-battery-powered equipment, constitutes a dual progression with distinct phases. It begins with remote control capabilities and advances towards fully automated equipment. Additionally, as Díaz Pró emphasized, this evolution represents a learning journey for operators unfamiliar with remote control operations.

Sugobono explained that despite operators’ initial unfamiliarity with remote operations, they benefit from enhanced visibility and environmental awareness facilitated by sensors that provide precise distance indications: “Keep in mind, though, that, like a car, the original equipment has blind spots. However, from a remote operation, operators are assisted by multiple cameras, giving them a 360-degree view. In the control center, operators have three large screens that allow them to see every angle of the equipment. The visibility when teleoperating equipment is better than being in the actual equipment.”

For Sandvik, 2023 was a transformative year in terms of visual identity, but more importantly, they introduced the DL2710 and the Leopard D1650i down-the-hole surface drill rig to the market.

There is a lot of buzz on how automation and automated machines are changing the way mines operate, especially regarding safety and production. This “automation revolution” can be seen as a part of a significant global shift to increase safety standards and production outcomes. Setting aside safety in the discussion, are there alternative adjustments within Peru’s machinery sector that could enhance production without necessitating significant time or capital investment? Yuji Tanaka, the general manager at Zamine Peru, firmly believes in exploring alternative strategies.

For example, he advocates for transitioning from front shovels to backhoe configuration. Tanaka shared with GBR that in 2023, a significant milestone for the company was implementing this change at a mine in Áncash. Now, the company aims to encourage other clients to adopt this approach. “While in countries like Australia, the backhoe configuration is

common, in Peru it is not, despite offering a bucket with greater capacity, which leads to higher productivity. This change requires adaptation by the operators through the training we provide, as they are familiar with the front loader’s operation,” Tanaka emphasized.

Zamine, a distributor for Hitachi, has been striving to solidify its market presence in excavators, particularly with models like the EX1200-7 BH. Tanaka attributes the increased demand for this model to the evolving needs of mining contractors, as they are now seeking larger excavators for bigger contracts and more rigorous project requirements. This has fueled Zamine’s expectations: “We have gradually increased our fleet of Hitachi trucks in Peru, and we remain steadfast in catching up to competitors such as Caterpillar and Komatsu despite our relatively new presence in the mining market,” confessed Zamine’s general manager.

Lubricants: key to reducing energy consumption and gas emissions

While the transition toward BEVs in large-mining Peruvian operations is still not feasible due to the operations’ geographical and altitudinal nature, many solutions fall between BEVs and traditional diesel engines to reduce GHG emissions. “Well-lubricated equipment can profoundly impact energy efficiency, whether in terms of electricity or fuel. An adequately lubricated component consumes less energy, showcasing lubrication’s pivotal role in energy optimization,” commented Daniel Rochon, deputy general manager at TotalEnergies Peru, which offers the Rubia line for the Peruvian market: “One notable advantage is its low carbon footprint, as these lubricants neither combust nor produce significant harmful residues,” added Rochon.

For its part, Terpel, with ExxonMobil, developed the Mobil Delvac Modern line of lubricants, which is tailor-made for the Chilean and Peruvian mining industry. According to Luciano Macías, general manager at Terpel Peru, with this line, there is no need for equipment downtime for oil changes, extending working periods up to 1,000 hours: “The significant impact will manifest in three to four years as equipment engines, typically maxing out at 20,000 hours, will exceed 25,000 hours,” he claimed.

For 2024, the company has allocated a US\$3 million investment budget to enhance the lubricant plant in Callao. One key initiative includes installing an in-line blender. Unlike conventional methods that involve pre-mixing additives in a separate tank before blending, the in-line blender will facilitate the simultaneous blending of base oils and additives, resulting in an instantly mixed and homogenized final product.

When asked about other innovations Terpel is exploring, Macías revealed that a project generating interest from various OEMs involves onboard oil changes coupled with simultaneous oil filtering, all while the equipment is operational: “The challenge arises from the rugged conditions of mining equipment operation, marked by uneven terrain and high vibration levels. We are in the testing phase of a prototype in Chile designed to withstand these harsh conditions. We plan to scale up and introduce it in Peru, ensuring optimal performance in demanding environments,” he explained.

>> 96



Alfredo Bertrand

General Manager –
Andean Region
EPIROC

How do you foresee the advancements in technology, safety enhancements, and gender equality influencing the overall landscape of the mining industry?

Recently, Geotec and Las Bambas announced the creation of the first all-female drilling team made possible by Epiroc’s equipment. There was an equality issue in the sector due to regulations setting weight limits for men and women in drilling operations. Epiroc’s equipment address this issue by allowing the automatic addition of rods, enabling the use of lighter tubes, and reducing lifting distance, as the machine automatically positions the rod towards the equipment.

What added value could Epiroc offer to companies considering upgrading their equipment?

Our strategy is built on three pillars: automation and remote operation, electrification, and tracking/security systems for workers. For instance, in 2023, Epiroc acquired a South African company, Mernok, who have one of the highest-level safety technologies that enables equipment to take control in potential collision or run-over situations through AI and sensors.

Furthermore, we have focused on providing customer-agnostic solutions. This allows customers to choose equipment without pressure and avoids requiring complete fleet replacements due to a single change, contributing to circular economy principles and waste reduction. We are also pioneers in offering kits to transform combustion-powered equipment into battery-powered.

How does the shift towards automation in mining operations impact the talent pool?

The idea that autonomy will lead to job reduction is a myth. We will witness a shift in the job landscape, with roles like operators or electricians being replaced by programmers or mechatronics specialists, necessitating a significant increase in the workers’ knowledge levels. It is also crucial to highlight that the priorities of new generations of workers have changed. While money was the primary motivation 20 or 30 years ago, the value of living new experiences is also highly regarded today. Therefore, mining companies and suppliers must adapt to attract talent. ■



Erick Ruiz

General Manager
CUMMINS PERU

What were the key drivers behind Cummins Peru’s sales growth in 2023?

In 2023, we experienced tremendous success, breaking records across all levels.. Among all the markets we operate in—mining, automotive, energy, and maritime—the mining sector stood out with the most significant impact on growth and sales, securing substantial contracts, particularly in engine sales.

What are the latest engines Cummins introduced to Peru?

The QSK95 is the latest engine we introduced for open-pit mining. Boasting 4,400 HP, its remarkable performance at high altitudes, exemplified by its deployment at Antamina, underscores its capability to significantly reduce daily operational cycles, optimizing costs for our mining clients.

What benefits do gas engines offer?

We have recently launched the “Near Zero” line, featuring groundbreaking combustion technology in our gas engines, resulting in emissions nearly equivalent to those of electric engines. We are testing this new engine with one of our clients in Lima, and we anticipate showcasing its performance to attract further adoption across the country.

Moreover, Cummins has spearheaded the development of electrolyzers to produce green hydrogen.

What are the pillars for Cummins’ growth in the following years?

In terms of expansion, we anticipate a sales growth of more than 8.5% and a gross profit increase of over US\$6 million. Collaboration with our clients remains essential as we strive for a greener environment and to offer solutions to enhance efficiency and cost reduction. By 2028, we aim to reach US\$200 million in revenue, yet given our current trajectory, I believe we will achieve this milestone by 2025. Our human capital stands as the cornerstone of business advancement, intricately linked with the principles of safety and integrity. ■



“We have seen significant growth, expanding our presence among mining contractors and within the mines.”

Luciano Macías

General Manager
TERPEL PERU

What were the major economic challenges faced in 2023?

In 2023, Peru's economy contracted, with growth staying below 0%. Mining initially boosted the economy, but this momentum slowed in the second half of the year. Other sectors witnessed declines, further contributing to the downturn. The fuel market contracted by nearly 14%, while lubricants saw a 7% decrease.

Amidst this backdrop, Terpel in Peru had a favorable year. We expanded our market share, particularly in the lubricants sector. In fuels, we fortified our wholesale business for B2B consumers, emphasizing enhanced service delivery. While we have not ventured into mining wholesale due to supply and storage needs, we are progressing. Our trajectory aims to start small and medium-scale mining operations before advancing to large-scale mining within five years, leveraging our regional expertise.

What are the main focuses of investment in the lubricant plant in Callao for 2024?

For 2024, we have allocated US\$3 million for automation, transitioning to a new energy matrix, and refining our blending process. These upgrades aim to double our production capacity to meet local demand and expand into neighboring countries.

We are installing an in-line blender, poised to revolutionize our mixing procedures. Unlike conventional methods involving pre-mixing additives in a separate tank before blending, our in-line blender facilitates simultaneous blending of base oils and additives, resulting in an instantly mixed and homogenized final product. This innovative approach eliminates the need for intermediate storage, significantly streamlining operations.

Our investment also includes robotics for packaging, eliminating manual intervention, and automating storage processes for seamless loading onto trucks. Beyond cost reduction, automation ensures a safer working environment by minimizing human error and associated losses.

How did the company's growth manifest within the mining sector?

We have seen significant growth, expanding our presence among mining contractors and within the mines. A strong product offering and service arm drive this success. Interestingly, as our presence in some mines grows, the volume of lubricants used may decrease due to extended oil life processes or the adoption of advanced lubricants. This reduces environmental impact and ensures safer and more energy-efficient operations.

Within these mining environments, we have established comprehensive in-house operations. Here, we oversee lubricant dispatch and provide lubrication services for timely application. We also manage oil analysis through laboratory facilities at our Callao plant and on-site laboratories at select client sites. This analysis is a valuable diagnostic tool, revealing machine condition, wear levels, and remaining oil life. It enables us to optimize oil change intervals based on machine needs rather than predetermined schedules.

How does Mobil Delvac Modern benefit the mining industry?

We have fostered strong partnerships with OEMs and launched our specialized line, Mobil Delvac Modern, which caters to the mining sector and is specifically designed for the Chilean and Peruvian industries.

With Mobil Delvac Modern, machines no longer need downtime for oil changes.

Instead of the usual 500 hours, we can now extend it to 1,000 hours. The significant impact will manifest in three to four years as equipment engines, typically maxing out at 20,000 hours, will exceed 25,000.

Which innovations is Terpel currently working on in the mining industry?

Our main focus centers on transmissions and differentials, where significant energy losses occur. Our efforts extend beyond improving lubricants; we also enhance oil quality through cleaning services, potentially slashing energy consumption by up to 6% and resulting in significant cost savings.

One of our projects involves onboard oil changes for equipment and simultaneous oil filtering during operation. This initiative has garnered great appreciation from OEMs, given that oil contamination is a significant concern in the mining industry. Contaminated oil accelerates wear levels, which is particularly problematic in high-altitude open-pit mines. Implementing onboard filtration systems effectively addresses this issue. However, the challenge arises from the rugged conditions of mining equipment operation, marked by uneven terrain and high vibration levels. We are in the testing phase of a prototype in Chile designed to withstand these harsh conditions. We plan to scale up and introduce it in Peru, ensuring optimal performance in demanding environments.

What are Terpel's goals for 2024?

On the production front, we are focused on maximizing the efficiency of the in-line blender in Callao, which will significantly reduce operational costs. Our wholesale division is poised for exponential growth in the fuels sector, aiming to double its performance from 2023. ■



Armando Sugobono

General Manager
SANDVIK PERU

What were the highlights of 2023?

During 2023, we achieved our proposed objectives in terms of sales, market share and the marketing of our products to both new and existing customers. We successfully introduced the DL2710 and the Leopard DI650i down-the-hole surface drill rig to the market. We also began to reintroduce the Toro brand, including the Toro LH515i and the LH517i for underground mining, which all are including in our new product range. We also went through a series of acquisitions powerful for our core business.

Why has Peru lagged other countries in its adoption of battery powered equipment?

Currently, no Peruvian customer has opted for our battery powered equipment. The fundamental reason is that the size of underground mines in Peru are smaller than those in Chile, Australia, or South Africa. Sandvik is working to complement its technology and battery-powered equipment portfolio across the entire size range and market, but it is a gradual process.

How does Sandvik envision the mining of the future?

Sandvik will maintain the same strategy as the past, yet our future is based on three pillars: digitalization, automation, and electrification. To be leaders in mining technology, we have incorporated companies to integrate our current portfolio with new technologies.

How does Sandvik help its operators transition to remotely operated equipment?

We mainly transfer existing operators to remote operations. They are taught how to operate the equipment from a chair with the same controls as in the original. We give them all that is needed to visualize the original cabin. Like a car, the original equipment has blind spots. However, from a remote operation, operators are assisted by multiple cameras, giving them a 360-degree view. In the control center, operators have three large screens that allow them to see every angle. The visibility when teleoperating equipment is better than being in the actual equipment. ■



James Valenzuela

CEO
RESEMIN

What contributed to Resemin's success in 2023, and how does it shape expectations for 2024?

In 2023, Resemin sustained its upward trajectory, maintaining the growth trend observed in 2022 with a 20% average expansion. This momentum persisted, driving total sales beyond US\$100 million, reaching US\$112 million. Notably, 65% of these sales came from international exports, confirming my earlier foresight about the gradual shift in the coming years.

During 2023, we spent several days in Ankara, Turkey, exploring potential opportunities. We firmly believe Ankara is a suitable location to manufacture our equipment and cater to the African and Asian markets. Simultaneously, we plan to serve the American market from Peru. A decision is anticipated in 2024, and if affirmative—given the required investment—we plan to execute the project in 2025.

What are the benefits of Resemin's new scaler options?

Resemin is excited to introduce the SCALEMIN HYD; this hybrid scaler can

operate by electrics connected to power, like any jumbo, and by a diesel engine like the current scalers in the market. It is set to commence operational deployment in Brazil within Q2 2024. This is a crucial innovation in the mining industry since it offers a clean environment where the contamination of current scalers is critical in the tunnel's end sites. Miners report that scalers even contaminate more than loaders because these come and go instead of scalers, which stay there.

Another major innovation this year is the SCALER BOLTER. This machine performs two tasks: scaling and fully mechanized roof bolting. The implications of this machine are huge since all miners want to reduce the number of machines underground and the crew. Less CapEx and more productivity are achieved through a shorter mining cycle because the two tasks are completed one after the other without disconnection from power. The machine is also hybrid, which has all the benefits of a cleaning environment. In other words, this state-of-the-art equipment represents a groundbreaking innovation in the mining industry. ■

Underground mining equipment

In 2023, not only did many OEMs in Peru experience record-breaking sales and growth, but it also proved to be a transformative year for the leading OEMs in the country. With Alfredo Bertrand appointed the new general manager of the Andean region, Epiroc entered a reassessment period: “Upon returning to Peru, I encountered a mining sector amid modernization, with a growing demand for cutting-edge equipment. Several mines are contemplating the automation of their hauling fleets. If this transition is successful, the potential for suppliers like us will double overnight,” he said.

Automation not only enhances safety but also has the potential to broaden access to the female talent pool. In Peru, females currently represent only 7.1% of the mining workforce. “Geotec and Las Bambas announced the creation of the first all-female drilling team, which was made possible by Epiroc’s equipment. Several exploration companies want to introduce new automated equipment to form female work teams,” commented Bertrand.

On the other hand, battery-powered equipment is a hot topic, primarily due to its notable benefits in energy efficiency and improving workers’ health conditions, particularly in underground operations.

McKinsey & Company suggests that mining companies could reduce their energy costs by at least 40% by adopting electric vehicles and equipment. Bertrand stated that Epiroc is a pioneer in offering kits to transform combustion-powered equipment into battery-powered ones and has successfully implemented this technology in Canada and Mexico, while customers in Peru are also showing their interest in such kits.

Despite the initial higher costs associated with electric equipment, Bertrand emphasized the substantial long-term savings and benefits it brings, especially in terms of ventilation costs and workers’ health and safety. “From a business perspective, transitioning to electrification and replacing coal fuels brings substantial benefits, as stock exchanges reward companies with medium to long-term projects,” concluded Bertrand.

Sandvik’s general manager, Armando Sugobono, noted that no Peruvian clients have adopted Sandvik’s battery-powered equipment. The smaller size of underground mines in Peru is cited as a critical factor. “There are only two mines in Peru — Cerro Lindo and El Brocal— that can fit this equipment size. Sandvik is working to complement its technology and battery-powered equipment portfolio across the entire size range and market, but it is a gradual process,” he explained.

Sandvik reintroduced the Toro brand in the underground segment, including the Toro LH515i and the LH517i.

Crafting solutions for narrow vein mining

During a discussion on automation and battery-powered equipment with James Valenzuela, Resemin’s CEO, he made an interesting point by mentioning that the company’s philosophy is to “use only what is necessary.” Despite this, as the trend gains momentum in the industry, Resemin is gradually incorporating more automation. However, when it comes to battery-powered equipment, they are exploring it in the loader segment but at a slower pace. Why? Valenzuela affirmed that the market is not yet ready: “A mine opting for an all-battery

approach must be prepared for the considerable expenses of employing battery-powered equipment. It must be an exceptionally rich mine with high grades that justify the elevated costs associated.”

Resemin, a local OEM, exemplifies the maturity and innovation of the Peruvian mining industry, showcasing the country’s capacity to export talent and technology. In 2023, Resemin expanded its horizons by exploring potential opportunities in Ankara, Turkey, to establish a manufacturing facility to produce equipment tailored for the African and Asian markets while maintaining Peru as a hub for the Americas. “A decision is anticipated in 2024, and if affirmative—given the required investment—we plan to execute the project in 2025,” said James Valenzuela. “The challenge stems from being the “new kid on the block” in a well-established and conservative segment. Although we measure up, convincing customers about this particular product proves to be an uphill task,” he concluded.

Among recent innovations, Resemin has revamped the Raptor 7 into the Raptor 7X, now equipped with a Montabert HC 112HP drifter with 30 kW power and hydraulic back hammering. It is designated for drilling depths up to 50 meters with diameters reaching 102 mm. Additionally, Resemin introduced the Scaler Bolter, a hybrid between a scaler and a fully mechanized roof bolter: “The implications of this machine are huge since all miners want to reduce the number of machines underground and the crew. Thus, the CapEx is lower, and they can achieve more productivity by a shorter mining cycle because the two tasks are completed one after the other without disconnection from power,” continued Valenzuela.

Luis del Solar, the general manager of Overprime Manufacturing, another local manufacturer of narrow vein equipment, highlighted that major brands such as Epiroc or Sandvik often overlook this niche market because the demand for narrow vein equipment primarily concentrates in specific regions like Peru, Bolivia, and certain mines in Mexico and Chile, resulting in lower overall demand than larger-scale mining equipment. However, Overprime faces tough competition in Peru, particularly from Chinese equipment manufacturers. “The Chinese often enter the market at considerably lower prices, possibly through dumping practices [...] Competing with them is challenging as their prices are typically one-third of ours, undermining fair competition.”

The Peruvian OEM has been working with various mining companies in Peru, such as Southern Peaks Mining (SPM), where the company recently secured a new contract for four scalers tailored precisely for SPM’s Condestable mine. Additionally, with Volcan, Overprime has been focusing on equipment remanufacturing.

Overprime manufactures two-ton loaders and dumpers up to six tons. Del Solar told GBR that the company reached an agreement with Aramine, a French manufacturer, in which Overprime would sell some of its equipment and vice versa: “We have a strategic partnership to optimize our product offering. Aramine fabricates loaders of up to four-ton capacity, and we have agreed to sell their one-ton loader, their 15/18-ton dumper, and its four-ton loader. Aramine, through its global network, sells our two-ton loaders and six-ton dumpers.

Construction and auxiliary equipment

During separate interviews, both Scania’s managing director, Eronildo Barros, and Volvo Peru’s general manager, Jorge Masías, agreed that, despite having electric alternative trucks in other Latin American countries, they could not introduce them in Peru due to operational parameters that do not align well with the conditions of Peruvian mining. In the meantime, both companies have been developing different configurations, demonstrating their commitment to supporting the mining industry in Peru despite the limitations posed by current technology constraints.

Like other OEMs, Scania sees the future in electromobility and women’s empowerment. Its Women Drivers Program trained 12 women as Scania bus experts, with plans to expand to trucks in 2024. Commenting on electric alternatives, Eronildo Barros, Scania Peru’s managing director, noted: “In Peru, adopting these solutions relies on a collaborative commitment involving us as providers, the government, and infrastructure stakeholders. While anticipating nationwide adoption, considering the available energy matrix, we present alternatives such as natural gas, emphasizing the potential of biomethane and biogas in the Peruvian context.”

Scania’s flagship truck is the Heavy Tipper, with 6X4, 8X4, and 10X4 configurations: “This model stands out for its 20% higher payload capacity than conventional ones. Among the options, the Heavy Tipper G540 8X4 leads to preferences due to its versatility, efficiency, and lower fuel

consumption, making it the most sought-after choice. 59% of our sales of this model are destined for mining,” concluded Barros.

For its part, Volvo’s growth in the mining sector was driven by the FMX Max: “Our FMX Max stands out as the heaviest mining dumper in our lineup, demonstrating exceptional performance and earning strong market recognition. The FMX Max, compared to the traditionally sold FMX, boasts an additional six-ton load capacity and is utilized by clients with a 24 m³hopper instead of the standard 20 m³,” added Masías.

In 2023, Volvo ventured into the compact equipment niche in Peru, something the company had not previously done. At Perumin, the company unveiled its new ‘green’ lineup, which includes mini-loaders and mini-excavators, the L20 and the ECR25, respectively. Reflecting on the future of transportation, Masías commented that in the long term, mobility will be shaped by a combination of technologies. This includes electric trucks and vehicles powered by non-polluting fuels such as biogas: “Biogas operation guarantees a complete reduction in carbon emissions, unlike LNG, which only partially reduces emissions. While electric technology may be the frontrunner in widespread adoption, Volvo is actively exploring various alternatives to achieve carbon neutrality and fulfill our commitment to cease marketing vehicles with carbon emissions by 2040,” asserted Masías. ■



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97



Eronildo Barros

Managing Director – Peru
SCANIA

What features make the Heavy Tipper G540 8X4 the preferred choice among your customers?

We continue to thrive with our successful Heavy Tipper model, introducing variations in operations and configurations, including 6X4, 8X4, and 10x4. This model stands out for its 20% higher payload capacity than conventional ones. Among the options, the Heavy Tipper G540 8X4 leads to preferences due to its versatility, efficiency, and lower fuel consumption, making it the most sought-after choice. 59% of our sales of this model are destined for mining. Our other top-selling model for mineral outbound is the P450 A 6X4, solidifying our position as leaders in mineral transportation in Peru. The well-known fuel efficiency of Scania vehicles reflects our commitment to sustainability, providing tangible economic benefits for our customers.

Can you delve into the functioning of Scania Connect systems?

The Scania Connect system functions like an aircraft's black box, establishing continuous 24/7 connectivity between the operational fleet and our control centers in Sweden. This technology

provides real-time performance data, enabling constant monitoring. As the sole brand in the Peruvian market offering flexible maintenance plans, the vehicle alerts about the optimal time for maintenance, thereby optimizing operational efficiency.

While Scania Connect was initially introduced in Peru in 2017, its relaunch in 2023 underscores our commitment to maximizing its benefits for all operators. Over 5,600 vehicles in Peru are connected to this system.

Can you elaborate on the challenges and opportunities in promoting electrification in Peru?

We are already leading in electrification in Latin America, with electric buses and trucks prominent in Mexico, Colombia, and Brazil. In Peru, adopting these solutions relies on a collaborative commitment involving us as providers, the government, and infrastructure stakeholders. While anticipating nationwide adoption, considering the available energy matrix, we present alternatives such as natural gas, emphasizing the potential of biomethane and biogas in the Peruvian context. ■

How did Volvo Peru perform in 2023?

Specifically in the truck sector, we achieved a remarkable market share of 26.3% and came close to reaching 2,000 units destined for the Peruvian market. The bus market also witnessed growth, which we actively accompanied. Additionally, we placed nearly 150 yellow machines in the machinery sector, marking a record for Volvo in Peru.

Our growth has primarily been driven by the mining sector across various segments. In production, our FMX Max stands out as the heaviest mining dumper in our lineup, demonstrating exceptional performance and earning strong market recognition. The FMX Max, compared to the traditionally sold FMX, boasts an additional 6-ton load capacity and is utilized by clients with a 24 m3 hopper as opposed to the standard 20 m3. Its 20% increase in productivity, Volvo's product reliability and quality, and outstanding after-sales service positions it as the most available truck in the market. Furthermore, our presence in the southern Peruvian mining corridor received a significant boost with the introduction of the FM Mining, tailored

for the demanding mining conditions of the region, garnering positive feedback from clients.

Lastly, we launched our VM truck line in the auxiliary mining truck segment in 2023, designed for various auxiliary roles such as cranes, water tanks, and lubrication trucks, with upgraded drivetrains and Volvo engines.

What were the new offerings Volvo presented at Perumin 2023?

At Perumin 2023, we unveiled our "green" lineup of compact electric machines, comprising a mini-loader and mini-excavator, the L20, and the ECR25, respectively. This marked our entry into a new niche. Additionally, we announced our range of liquefied natural gas (LNG) trucks, which contribute positively to emission reduction.

What are the potential future options for truck operations to achieve carbon neutrality?

The future landscape will likely comprise a blend of technologies, including electric trucks and internal combustion engine trucks powered by non-polluting fuels like biogas. ■



Jorge Masías

General Manager
VOLVO PERU

Comminution and Material Handling

Preventing unexpected downtime

The recent uptick in metal prices might suggest an increase in mining activity. However, the rising costs of metal production present a counterbalance. In this context, maximizing recovery and minimizing downtime are critical for reducing operational expenses (OpEx) and enhancing Return on Investment (ROI). This dual advantage is particularly crucial in Peru, where obtaining new permits to accelerate new projects has become challenging.

Conveyors are crucial in carrying materials from the mine to the processing plant, and downtime can result in significant financial losses. In this context, conveyor belt providers are focusing on preventive and predictive maintenance.

Fernando Barrio, general manager of Tecnomina, commented: "Clients recognize investment in predictive solutions as an effective means to avoid unplanned shutdowns, shifting the focus from corrective to predictive and preventive measures and anticipating potential issues in the medium and long term."

Tecnomina has service contracts with Southern Copper's Cuajone and Toquepala, Anglo American's Quellaveco, and Miski Mayo, and offers dynamic radiography for steel cable conveyor belts and electromagnetic scanning. Both methods eliminate the need for traditional inspections with operators near the belt. While the second option is more economical, it provides slightly less detail. "Clients can choose the machine based on their budget and schedule the scanning frequency, whether periodically or twice a week," explained Barrio.

According to Barrio, Tecnomina expects a 60% growth in service revenue and a 15% increase in product sales in 2024. To achieve this goal, the company has assembled a team of supervisors to replicate the model they used in belt maintenance and expand it to include lubrication management. "Our vision goes beyond simply expanding services

with Southern; we aspire to increase our market share with prominent clients like Las Bambas, Nexa Resources, Shougang, Cerro Verde, Antapaccay, Mina Justa, Volcan, Unacem and Antamina," concluded Barrio.

Like Tecnomina, Innomotics has provided its gearless drive technology for the two mill lines and the conveyor belt

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at Quellaveco. “We supplied all the drives and the automation system, pioneering the concept of digital mine. Gearless drive technology maximizes electrical efficiency, a crucial factor in mining and various industries,” commented Luis Baca, the company’s country manager.

Roxana Burgos, the general manager at Movitecnica, sees an opportunity in the industry’s growing receptiveness to new technologies. Although Movitecnica was initially renowned for its crane services, it has significantly expanded its presence in the conveyor belt segment over the past few years. “We have a presence in most mining units, including large-scale and medium-scale mining operations. The conveyor belt business units represent 35% of our business, and we represent top-tier brands such as Fenner-Dunlop and, more recently, Yokohama,” said Burgos.

Movitecnica ventured into Chile with the conveyor business and, according to Burgos, it has been a success given the “scarcity of labor and conveyor belt services” in the neighboring country. However, expanding its presence to Colombia proved to be challenging. “We believe we have a differentiating offer that helps us gain customers’ trust. For this reason, as a strategy, we have defined that the entry into any country will be through acquiring a company to shorten the learning curve,” added Burgos.

Unpredicted shutdowns are a mining company’s worst nightmare, while energy consumption poses another concern. Javier Schmal, Latin America vice president for Martin Engineering, explained: “Material that escapes or adheres to the belt and

begins to spill and stick to the idlers and pulleys results in increased energy consumption. Similarly, when chutes become filled with material due to moisture or special characteristics, failure to prevent material buildup at the transfer point can also result in excessive consumption, damage, or a plant shutdown.”

In 2021, the German company FAM, known for its expertise in transportation systems and cargo technology, established a new office in Peru as part of its organic growth strategy. Following this, in 2022, FAM was acquired by Beumer Group, a global leader in manufacturing logistics systems for transportation and loading. “By integrating FAM’s expertise in material handling and its robust product line, including large-scale conveyor belts, spreaders, bucket wheels reclaimers/excavators and ship loaders, we have significantly broadened Beumer’s capabilities,” commented Germano Ruggeri, CEO of Beumer Group Andina.

Ruggeri explained that the company faces intense competition from China, especially in what he labeled as “lower-value-added products such as steel structures.” To show the company’s added value, Beumer has been focusing on advanced technologies, including artificial intelligence and 3D visualization for maintenance.

Flotation and centrifugal separation

After being transported via conveyor belts, the ore undergoes a milling process before the mineral is extracted using various recovery methods. Companies want to optimize mineral recovery to extract every last milligram of minerals. Fernando Samanez, VP and head of minerals sales in South America at Metso, noted that following the pandemic in 2022, clients acquired new products that were inaccessible during the crisis. Subsequently, in 2023, there was a decrease in transactions exacerbated by turmoil and inflation. However, Joe Pezo, VP of services Andean area, highlighted that it was a successful year for Metso Peru, which was attributed to strong after-sales services. “We experienced 70% growth in consumables and around 30% in components and spare parts. Amidst the absence of new projects, this growth is credited to the active participation in key field services in the market, which achieved outstanding results in terms of safety and quality in the first place, and to strategic investments by mining companies in the second place, aiming to optimize processes, improve recoveries, and increase tonnage,” he added.

Just as miners aim to extract every last milligram of mineral, they also want to minimize tailings as much as possible. For instance, Anglo American is constructing a Coarse Particle Recovery (CPR) plant at Quellaveco. This will allow the company to recover more copper without additional water since it would be recycled from the same tailings. While CPR has garnered recognition for its efficacy, the flip side of this involves the intricate challenge posed by ultra-fine particles.

In this context, Metso has been leading the way. One of the company’s recent innovations is the Concorde Cell Technology, specifically designed for the flotation of fine particles. “Challenges arise with tiny clay minerals, such as those measuring 5 microns, which are difficult to float without applying fine and ultra-fine flotation. This becomes particularly valuable in recovering minerals previously lost in tailings, potentially result-



Fernando Samanez and Joe Pezo

FS: VP & Head of Minerals Sales South America
JP: VP Services Andean Area
METSO

What recent advancements has Metso implemented to enhance equipment efficiency?

FS: Metso maintains its innovative momentum, showcasing the introduction of 100 products in 2022. These encompass modifications to existing products and new additions, all aimed at boosting equipment efficiency within our distinctive “Planet Positive” portfolio. This approach prioritizes environmentally efficient technologies to meet our customers’ sustainability demands.

Among our latest innovations, we find the Concorde Cell technology for efficient flotation of fine particles. Simultaneously, we upgraded the cone crusher HP line into the E line through comprehensive modernization. We anticipate launching our first HP200-E in the Peruvian market within this evolved line. We also emphasize our digital solutions, such as GeminiX, a metallurgical digital twin implemented globally in several plants. These solutions facilitate real-time comparisons between actual operations and simulations, allowing immediate adjustments. This process’s partial or complete automation ensures stable efficiency, eliminating abrupt fluctuations in the plant and providing advanced and precise management.

How does Metso’s pilot project strategy advance the testing and commercialization of new technologies in the mining industry?

FS: Introducing pilots into the market facilitates testing and subsequent commercialization. At Quellaveco, our commitment to innovation is evident through pilot projects, including tailings dewatering. Regionally, we collaborate with several customers on tailings projects in Chile, conducting pilots for Concorde cells with plans for the technology’s introduction in Peru. Additionally, we aim to implement a pilot plant for flotation in Peru. This pilot strategy facilitates the introduction of new technologies by connecting directly to existing circuits, enabling real-time testing and eliminating the need for laboratory samples.

This approach simplifies technology scalability at an industrial level and allows customers to verify efficiency. We also establish strategic partnerships to address specific challenges, such as developing HRC (HPGR) technology.

“Introducing pilots into the market facilitates testing and subsequent commercialization.”

What are Metso’s recent investments and approach to the Peruvian market?

JP: Metso stands out for its bold investments, guided by its criteria rather than the country’s sociopolitical and economic situation. A notable example is the recent establishment of a pump assembly plant in Lurín during a governmental transition, defying the hesitancy of others to invest. The Arequipa service center has reached maximum capacity, prompting an approved expansion investment with equipment expected to arrive by mid-2024. The new infrastructure will allow us to increase the offering for Metso & Non Metso equipment to cover not only Crushers, Ball Mills repairs but also the repairs of screen machines, shovel buckets, truck bodies among others. Efforts to enhance dump truck bodies are ongoing, offering weight advantages and sustainable lining to reduce noise, positioning them as competitors against OEMs.

How does the services sector contribute to the Peruvian mining industry?

JP: In the face of an economic downturn, the mining sector remains a strong backbone supporting the Peruvian economy. Despite our indirect role, the interconnection between services and mining operations underscores the vital importance of this industry in maintaining economic stability during challenging times.

What are Metso’s goals for carbon footprint reduction in South America?

FS: In 2023, we reduced our carbon footprint in South America by 10%. Our ambitious goal for the upcoming year is a 20% reduction.

What are Metso’s goals for 2024?

FS: In 2024, our ambitious projection is to maintain our sustained revenue growth of 10% in the region. Our strategy explores innovative “out-of-the-box” projects. We plan to extend our operations beyond consultation, seizing promising opportunities in this domain. This forward-thinking approach underscores our steadfast commitment to expansion and adaptability in response to the evolving dynamics of the market.

JP: Andean Countries’ aftersales must be around 200 million EUR with sustainable solutions for mining, that is the goal for our Team in 2024. Despite our initial hesitation in entering the port sector in Peru, the growing investments in the country’s ports prompt us to enhance our presence in key sectors like cement and hydroelectric. Additionally, we aspire to solidify our international footprint, constituting over 10% of the total sales volume in the region. Aiming to increase to 20%, we will focus on mining projects in Ecuador and capital initiatives in Bolivia, Colombia and Suriname. This strategy underscores our dedication to global expansion and operational diversification, ensuring sustainable growth. ■

Every mine is different. Each mine presents unique challenges; our tailored solutions are designed to meet these diverse needs.



Alvaro López

General Manager
WEIR PERU

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In mines with an established history, the challenge lies in balancing continuous improvement of efficiency and sustainability with maintaining daily operability and performance results.

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How were Weir Peru's activities in 2023, and how is the first half of 2024 going?

The closing of 2023 was positive, driven mainly by the stability of copper prices and sustained growth in production. Despite external challenges, such as the political and climatic situation in Peru, we managed to maintain our long-term commitment to the mining industry.

Regarding the first half of 2024, we have seen a notable increase in the price of copper, reaching levels not seen for several years. This has prompted our mining clients to increase production to take advantage of this surge in mineral prices, which is a positive sign for the Peruvian market and our company.

What equipment has the company been focusing on lately?

In recent months, Weir Peru has focused on strengthening several leading product lines and our renowned Warman pumping equipment. Highlights include our Lineatex linings and comminution equipment such as HPGR mills, crushers, hoses, mill linings, and valves. These products are increasingly in demand in the mining market. Our Enduron brand HPGRs are a prime example of our innovation. This equipment reduces energy consumption by up to 35% compared to conventional technologies and decreases water usage through its dry grinding process. This advancement optimizes operational efficiency and contributes to sustainability by minimizing carbon emissions and envi-

ronmental footprint. We recently installed one of these systems at a mining site in the northern part of the country and have several ongoing projects.

In which other segments are Weir Peru present with innovative technologies?

Regarding our innovative technologies, we highlight two critical solutions in different segments. First, our Coarse Particle Flotation (CPF) solution optimizes the mineral recovery process by significantly reducing water and energy consumption during initial crushing. With CPF, we achieve up to a 40% reduction in crushing power, a 15% decrease in fine tailings generation, and a 20% decrease in energy consumption for dewatering while recovering up to 85% of the water used.

In waste management, our TerraFlowing solution revolutionizes tailings transformation by reducing water consumption by 50% and minimizing water storage, which is crucial in contexts like Peru.

How difficult is it to implement these technologies and equipment in mining operations?

Implementing advanced technologies in existing mining operations presents significant challenges, especially compared to greenfield projects that can integrate these innovations from the outset. In mines with an established history, the challenge lies in balancing continuous improvement of efficiency and sustainability with maintaining daily operability and performance results. We understand these barriers and work closely with our clients to facilitate a gradual transition to these new technologies without compromising operational stability.

Furthermore, we recognize that resistance to change is natural in a sector where operational continuity is crucial.

A standout example of our innovation is Synertrex Intelligence, an intelligent platform that optimizes equipment performance by capturing and analyzing real-time data. This technology enables predicting anomalies and minimizing downtime, thereby maximizing non-intrusive productivity by incorporating sensors and advanced analytics.

Could you highlight any specific cases in recent months where Weir Peru has contributed to improving operations?

In recent months, we have strengthened our position as leaders in the large and medium mining market, significantly enhancing our product mix and installed capacity. Our contribution has focused not only on our renowned pumps, but also on advanced solutions for comminution and other critical aspects of the mining production cycle. Through our expertise and our client's trust in us, we have reinforced our commitment to proximity, reflected in our service centers in Cajamarca, Moquegua, and the investment in the new improved Center in Arequipa that will be inaugurated in August.

What can we expect from Weir in the second half of 2024, and what goals would you like to achieve for next year?

For the second half of 2024 and next year, we expect to focus on our efficiency, productivity, and sustainability solutions. This focus is crucial for us and is reflected in promises and our concrete actions. Our equipment and engineering support these principles, and we are committed to delivering solutions that help our clients enhance their production processes, especially in this favorable cycle with mineral prices. ■



Daniel Bacigalupo

Managing Director
Spanish Speaking Latin America
WEIR ESCO

Can you elaborate on ESCO's focus within the mining industry and how it differs from the Mineral Division of the Weir Group?

Weir ESCO, a global division of the Weir Group, primarily focuses on manufacturing essential wear parts for mining and construction operations. ESCO produces Ground Engaging Tools (GET), buckets and other cast wear protection materials used in shovels, loaders, auxiliary equipment, and reception-transportation systems within mines shafts, pits and in mineral beneficiation plants. In addition to manufacturing buckets and hardware components, the division produces truck hoppers and develops technology for the linings of these structures. ESCO also excels in manufacturing linings with special alloys designed to withstand impacts in critical areas commonly found in crushing areas.

In Peru, we support the market and fulfill consumable demands. We serve our customer by leveraging our foundries globally, particularly in the US and Chile. Our network extends to foundries in Europe and China, forming a global framework for optimal supply points and ensuring support in the face of complications in specific regions. The built-in global flexibility is essential for ensuring the continuity of the supply chain in any circumstance.

How does Motion Metrics, the artificial intelligence system, enhance operational efficiency?

This system adds value by identifying uncrushable materials such as GET loose that can end in the primary crushers, avoiding interruptions and safety complications. Also, the system provides granulometric metric profiles, boulder detections, volumes efficiencies and other applications in various areas like loaders, trucks, conveyor belts, and blasting. Motion Metrics comprises a system with a camera and a CPU installed either on the shovel arm or on a gantry, as exemplified by the Shovel Metric. This AI technology captures images, processes them through the CPU, and transmits alerts and information to the cloud, delivering essential real-time data on wear parts within other KPIs.

Motion Metrics has found a warm reception in Peru, establishing collaborations with key players including Las Bambas, Chinalco Toromocho, Antamina and Hudbay's Constancia, among others. Its significant value addition to the mining value chain allows for early issue detection, such as tooth loss in shovels, preventing disruptions and enhancing safety.

How does Weir's commitment to economic value per ton align with its goal of creating a smaller carbon footprint?

By optimizing machines for faster loading, and moving larger volumes in less time, there is a notable reduction in energy consumption during the mining process.

Weir also addresses these challenges through solutions like Motion Metrics, preventing unexpected mine shutdowns, and optimizing product classification before reaching primary crushing. This approach results in less material without proper size reduction, reducing downstream energy consumption. Internally, Weir implements significant improvements in its foundries, striving for efficiency and elevated emission standards to ensure more sustainable production. This enhanced efficiency reduces the carbon footprint and contributes to the company's sustainability.

Do you have a final message for GBR's audience?

Our focus extends beyond market growth as we strive to surpass 2023's results, with specific percentages pending the finalization of our plan. Additionally, we are committed to solidifying Motion Metrics' presence in large-scale mining in Peru, targeting adopting operational Metrics across all major mining clients. ■





“ Although Peru lacks new projects on the scale of Conga or Tía María, we identify expansion opportunities with companies like Chinalco, Las Bambas and Cerro Verde. ”

Fernando Barrio

General Manager
TECNOMINA

Which mining operations has Tecnomina worked in over the last few months?

In 2023, Tecnomina underwent significant expansion, marked by initiating a 4-year contract with Southern Peru Copper at Toquepala. Concurrently, we maintain service contracts with Southern Peru Copper at Cuajone, Miski Mayo and Anglo American Quellaveco, solidifying our foothold in the mining sector.

To enhance our coverage, we prioritize contracts involving a continuous personnel presence, ensuring skilled labor, and optimizing travel management. With 54 years of expertise in mineral handling, conveyor belt maintenance, and anti-corrosive coatings, Tecnomina has positioned itself as a specialized asset lubrication and maintenance company.

What changes did Tecnomina implement to expand into the lubrication and service units?

Acknowledging the technical competition in the market, we assembled a team of supervisors to successfully replicate the model we used in belt maintenance and expand it to include lubrication management. Our vision goes beyond simply expanding services with Southern Copper; we aspire to increase our market share with prominent clients like Las Bambas, Nexa, Shougang, Cerro Verde, Antapaccay, Mina Justa, Volcan, Unacem and Antamina.

How does Tecnomina grow in a market lacking new greenfield projects?

In contrast to rapidly growing yet unsustainable companies, we prioritize gradual growth, emphasizing stability over unchecked expansion. While our growth may not match the rates of other companies, it is more sustainable and intends

to remain so, even in a stagnant market. We adopt a solution-selling approach rather than merely offering products, marking a significant shift in market dynamics, particularly evident after Quellaveco was brought online.

Although Peru lacks new projects on the scale of Conga or Tía María, we identify expansion opportunities with companies like Chinalco, Las Bambas, and Cerro Verde, maintaining a robust presence in the market. Leveraging our position as a Peruvian family-owned company that transitioned to a corporate structure in 2018, we focus on operational excellence, supported by continuous audits from top-tier companies, to maintain the best possible reputation among customers and foreign investors.

Can you elaborate on Tecnomina's approach to safety?

Safety is a fundamental pillar for us, guided by the belief that while operational issues are correctable, accidents are irreversible. With nearly 300 field workers, we stress that safety is more than a corporate responsibility; it is a personal commitment for each worker. Acknowledging that a higher field presence raises the risk of accidents, our goal is to inspire our team to actively contribute to procedure development, instilling a sense of ownership and self-management to ensure their safety.

How is the industry migration from corrective to predictive and preventive measures developing?

In predictive maintenance, Tecnomina has implemented advanced technologies in our warehouses, such as dynamic radiography for steel cable conveyor belts. Since 2023, we have conducted scans in motion, eliminating the need for traditional inspections with operators

near the belts. These scans provide detailed reports of the internal structure within 10 days, reducing personnel exposure to direct contact with the belts. Additionally, we offer the option of electromagnetic scanning, a more economical alternative with slightly less detail. Clients can choose the machine based on their budget and schedule the scanning frequency, whether periodically or biweekly.

In collaboration with our supplier, Rema Tip Top, we are training to utilize ultrasonic thickness measurement (BTM) equipment on moving belts. This system eliminates the need for manual measurements, conducting a comprehensive scan from end to end and edge to edge, providing an extensive profile of the belt thickness.

The preventive and predictive approach gains significance as plant shutdowns cost up to US\$1 million per hour. Clients recognize the investment in predictive solutions as an effective means to avoid unplanned shutdowns, shifting the focus from corrective to predictive and preventive measures and anticipating potential issues in the medium and long term.

What are Tecnomina's goals for 2024?

At a national level, our goal is to achieve a 60% growth in service revenue and a robust 15% increase in product sales compared to the performance in 2023. This drive reflects our commitment to sustained development and operational excellence in the local market.

On the international front, we plan to expand our presence by establishing a subsidiary in another country within the region. This strategic move will enable us to supply skilled labor directly from Peru, solidifying our global position as leaders in providing services and expertise. ■



“ In today's mining landscape, conveyor belts incorporate advanced technologies such as antennas, sensors, and software to detect internal damages, facilitating scheduled replacements and avoiding unexpected downtimes. ”

Roxana Burgos

General Manager
MOVITECNICA

Can you give an overview of Movitecnica's main investments of 2023?

In 2023, we allocated US\$4.5 million for strategic investments, especially in our new 7,500m² plant and machinery. We acquired belt conveyor rollers and splicing machines to offer splicing services in the southern region of the country and in Chile, up to 120" wide. Additionally, this year we acquired the adjacent land to our 5,000 m² plant. While Movitecnica had a strong presence in cranes in the south, our focus on belts was primarily in the central-northern part of Peru. To address this, we strategically invested in specific machinery, allowing us to offer competitive prices and strengthen our presence in the south. In Arequipa, we established a 2,500 m² branch, serving as a focal point to efficiently address the needs and services of our customers in the region. Regarding sales, these experienced an increase of 8%, driven by the success of new business lines such as commercial and residential elevators, shovel cables, tower cranes, and Liebherr brand truck cranes.

What are key factors contributing to your market share growth in the conveyor belt segment?

As Movitecnica, we have a presence in most mining units, including large-scale and medium-scale mining operations. The conveyor belt business units represent 35% of our business, and we represent top-tier brands such as Fenner-Dunlop and, more recently, Yokohama. There are two main types of conveyor belts: fabric belts and steel cord belts. The latter requires substantial specialization and more expensive splicing services. We are already providing successful splicing services for steel cord conveyor belts due to the hiring of specialized personnel and the acquisition of equipment.

In what ways do current social issues in Peru act as obstacles to investment and affect Movitecnica's business?

Despite the current favorable metal prices, the lack of progress in stalled projects highlights a missed opportunity for Peru. The evident slowdown in investments in 2023 resulted in unmet goals for Movitecnica—not due to a lack of opportunities but because numerous clients paused their projects. It is crucial to recognize that the country has significant growth potential, but current social issues act as obstacles that deter investments.

The persistent unemployment rate and the failure to achieve pre-pandemic economic levels indicate an urgent need to revitalize projects and reactivate the government.

Can you provide insights into Movitecnica's strategy to tap into new regional markets?

In Chile, we have entered with the conveyor belt business unit,

and it has been a success due to the scarcity of labor and conveyor belt services. In Colombia, unlike Chile, we have entered directly, which has proved to be more challenging in achieving our objectives. However, we believe we have a differentiating offer that helps us gain customers' trust. For this reason, as a strategy, we have defined that the entry into any country will be through acquiring a company to shorten the learning curve. For 2025, we will focus on growing the markets in Colombia and Chile with this new business unit and in Peru due to the level of investments made.

What are Movitecnica's goals for 2024?

In 2024, we aim to achieve a 15% growth compared to 2023, thanks to new segments such as commercial elevators and shovel cables. ■

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ing in a 3-4% increase in production with significant economic value,” explained Samanez.

After particles have been floated, the remaining waste is discharged as tailings. However, in efforts to optimize water resources and promote reuse, various methods and equipment are employed to minimize the moisture content of the tailings. Flottweg is a German company offering tailings decanters “A centrifugal decanter uses high-speed rotation to separate solids and liquids. Tailings enter, solids move to the edge, and an internal screw discharges them while extracting the remaining liquid. Efficiency is around 75-80%, leaving tailings with 20-25% moisture,” explained Raúl Vargas, Flottweg Peru’s general manager.

Also, regarding solid-liquid separation, Servingsa, a Peruvian company, has been working on this front at Southern Copper’s Toquepala unit for the last 25 years. The company’s general manager, César Elias, commented: “Maximizing the recovery of ore grades in tailings is critical. Servingsa has imported specialized equipment to test and determine the presence of ore in tailings, aiming to process them and recover their value. In addition, we plan to implement classification equipment before tailings disposal, thus optimizing the separation process.”

Digital tools for wear parts

Whether it is the shovels at the beginning of the process or the milling equipment at the end, all equipment requires durable wear parts to ensure an extended lifespan. In this

segment, we find Weir ESCO, which is part of the global Weir Group. Daniel Bacigalupo, managing director – Spanish speaking Latin America at Weir ESCO, explained Motion Metrics, an AI system applied to machines for detecting operational issues: “The system provides granulometric metric profiles, boulder detections, volumes efficiencies and other applications in various areas like loader, trucks, conveyor belts, and blasting. This AI technology captures images, processes them through the CPU, and transmits alerts and information to the cloud, delivering essential real-time data on wear parts within other KPIs.”

Bacigalupo commented that in 2018, the company introduced the innovative lip and GET’s Nemisys model for draglines, and for 2024, ESCO anticipates the release of a new model focusing on maximizing efficiency, reducing material consumption, and enhancing extraction operations to increase tons moved per shovel and optimize economic value. “By optimizing equipment for faster loading, and moving larger volumes in less time, there is a notable reduction in energy consumption during the mining process,” he concluded.

A company specializing in meshes and metalworking that envisions a promising future for lithium in Peru is Arenas: “The mining sector in Peru foresees a surge in lithium exploitation projects due to abundant reserves in our territory. Arenas is proactively researching key parameters for manufacturing products aligned with optimal lithium classification,” commented Gustavo San Martín, general representative of the company. ■



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Javier Schmal
Vice President Latin America
MARTIN ENGINEERING

How was the mining market in Latin America affected at the beginning of 2024?

The fundamentals of minerals, primarily those crucial for the energy transition, remain strong. However, realizing the benefits of this transition in the mining industry hinges on Latin American governments supporting it, like counterparts such as Australia, which has specific funds allocated for this purpose.

This disparity highlights the need for Latin American governments to foster regulatory growth and advancement to catch up and align with global standards. By supporting the energy transition, Latin America can unlock significant industry growth and development potential, ensuring a sustainable future for the region and the mining sector.

What are the consequences of material escaping or sticking to conveyor belts?

When materials are fed onto the belt from equipment like crushers or shredders, they can stray from the intended path, causing spillage and sticking to the belt, idlers, and pulleys. This leads to increased energy consumption, premature wear, production loss, and additional maintenance. In severe cases, it can even cause plant shutdowns, affecting the reliability and availability of the conveyors.

Similarly, material buildup in chutes, often due to moisture or specific material characteristics, can result in excessive consumption, damage, or shutdowns if not appropriately managed. Keeping material within the process flow is critical. Even minor spillage, initially measured in grams, can accumulate to tons per day and hundreds of tons yearly, highlighting the importance of effective material handling and maintenance.

How much do physical inspections and worker-equipment interactions decrease with remote monitoring systems?

We have implemented a remote monitoring system for scrapers across various markets, which provides real-time insights into their status, remaining lifespan, and service needs, reducing the need for physical inspections and direct worker interactions with the equipment. We intend to expand this technology to additional regional countries, leveraging its benefits for more widespread efficiency and maintenance optimization. ■



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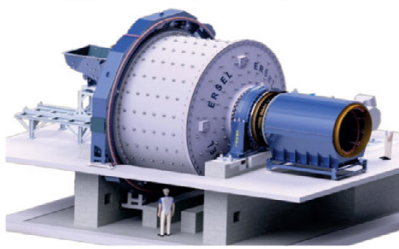
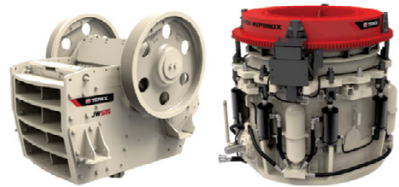
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César Elías

Director
SERVINGSA

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While filter presses are commonly used high-cost equipment, Servingsa has imported dewatering screens that function as a more economical and efficient alternative.

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In which mining process is Servingsa focused?

Servingsa is a Peruvian company established in 1990 that excels in mineral processing, focusing on operations such as concentrator plants and related processes in the mining industry.

Why is it essential for Servingsa to incorporate a metallurgical laboratory and software into its operations?

At Servingsa, we have taken a significant step by implementing a metallurgical laboratory and acquiring specialized software that allows our engineers with extensive experience to simulate, select, and optimize specific technical solutions, ensuring a favorable cost-benefit ratio that meets our clients' needs.

How does Servingsa compete in a segment where various international companies thrive?

We compete with international companies in the sector, especially in medium and large-scale greenfield and brown-field projects, where these companies install and operate equipment. However, clients seek alternatives when they do not achieve the expected results. Servingsa remains alert and in direct contact with clients, taking advantage of in-person visits, chambers of commerce, and international fairs to identify needs and propose solutions, whether to improve or change systems or components. When we participate in plant improvements in operation, this builds client confidence, and we demonstrate optimal results for customer satisfaction.

Could you tell us how long you have been working with Southern Peru?

Servingsa has successfully improved technical solutions in Southern Peru, specifically at Toquepala, for over two decades. Twenty-five years ago, we began studies to improve solid-liquid separation in thickeners.

What equipment have you introduced to help mining operators maximize mineral recovery?

For mining operators, maximizing the recovery of mineral values in tailings or areas with improvement potential is crucial. Servingsa has imported specialized equipment to conduct tests and determine the presence of minerals in tailings, aiming to process them and recover their value. Additionally, we plan to implement classification equipment before tailings disposal, thus optimizing the separation process. We have also introduced innovative equipment, such as pneumatic flotation cells for coarse particles, offering advanced technological solutions to improve mineral recovery efficiency.

We are focusing part of our efforts on the tailings disposal area, actively participating in innovative solutions for this process. While filter presses are commonly used high-cost equipment, Servingsa has imported dewatering screens that function as a more economical and efficient alternative. These dewatering screens reduce the concentrate's moisture and facilitate the disposal of tailings, offering an integral and cost-effective solution for mining operations. ■



Germano Ruggeri

CEO
BEUMER GROUP ANDINA

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Leading mining companies are transitioning from trucks to conveyor belt systems that are managed remotely from control centers, requiring minimal human oversight.

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Can you give some insight into the integration between Beumer Group and FAM Group?

Beumer Group acquired FAM Group to strengthen its presence in the mining sector by integrating the supply chain from the mine to the port. Previously, Beumer focused on the latter stages of the mining processes, specifically port equipments, and offered conveyor belts that were designed for other applications. By integrating FAM's expertise in material handling and its robust product line, including large-scale conveyor belts, spreaders, bucket wheels reclaimers/excavators and ship loaders, we have significantly broadened Beumer's capabilities. Additionally, Beumer's established line of airport luggage and automated storage management systems – a sector unrelated to FAM – will add a new market niche for our Group in the Peruvian market.

What have been Beumer Group's main milestones in Peru in the last year?

We strengthened our presence in the Peruvian cement industry, leveraging on Beumer's conveyors expertise.

Moreover, we strengthened our engagement with the mining sector and enhanced our presence in Peruvian ports, where we face significant competition from Chinese firms.

What is the added value of Beumer Group?

Beumer Group is focusing on advanced technologies, including artificial intelligence and 3D visualization for maintenance. Although we face strong competition from China, especially in lower-value-added products such as steel structures, Beumer's commitment to environmental sustainability and technological sophistication sets us apart. Our strong local presence also allows us to assist customers in optimizing equipment performance, reducing energy use, and providing lifecycle support for our products. We live and grow close to our clients, making them feel that we are always available to help them.

What are some of the current market opportunities that FAM is pursuing in Peru?

We are actively bidding for projects involving tubular belts in mines and cement plants located near populated areas, where their compact design and logistical efficiency are particularly beneficial in terms of capital and operational costs for our clients. Moreover, following the market changes in maintenance by some competitors that has left this service, we may see a significant opportunity to fill the gap in mining

equipment maintenance, a service in high demand in markets like Peru and Chile. We are also entering the port construction sector engaging with mining companies that are investing in these infrastructures.

How is Beumer Group contributing to a more sustainable mining industry through technology and innovation?

We are implementing strategies to reduce the energy consumption of our equipment and minimize atmospheric pollution. For instance, we have integrated solar panels to decrease energy usage for basic functions like lighting.

There is a noticeable shift in the industry from using gasoline-heavy trucks, which contribute significantly to environmental pollution, to adopting conveyor belts. These belts, especially when powered by green electricity, do not produce environmental pollutants. Our portfolio includes tubular belts, which are both cost-effective and environmentally friendly, and are becoming increasingly favored by our clients.

Leading mining companies are transitioning from trucks to conveyor belt systems that are managed remotely from control centers, requiring minimal human oversight. This shift is advantageous for us as our technologies incorporate artificial intelligence and data analytics, enabling predictive maintenance and the prevention of severe incidents. These advanced technologies not only boost production efficiency but also significantly reduce environmental and safety hazards by limiting the need for direct human interaction with the machinery.

What are the objectives and strategies of the Beumer Group in Peru?

In 2024, our primary goal in Peru is to drive sales growth. In the medium term, we plan to expand our after-sales services, starting with support from Chile and gradually incorporating local Peruvian teams to increase cost efficiency. We have already made quotations for a comprehensive maintenance plan to a major mine in Peru, and we plan to establish a local Peruvian team if we achieve this long-term contract. This would involve training Peruvian personnel under the operational model of FAM in Chile, where we combine a central office in Santiago with maintenance operations in Antofagasta. Our five-year vision is to establish a robust team in Peru, like the more than 200 employees in Antofagasta, dedicated to offering maintenance services to our clients. Finally, we aim to transition from basic labor to offering specialized services that ensure higher profitability. ■

Equipment Components, Instrumentation and Air Compressors

Pump it to keep it up

One might assume that the absence of new projects would negatively impact companies focused on equipment like air compressors. However, it seems that existing operations and brownfield expansions have helped sustain these businesses and contributed to their growth.

For example, Bosch Rexroth is a German OEM focused on hydraulics. Its Peruvian branch is managed by Kay Rothgiesser, who shared with GBR that the company decided to open a new service center of 1,700 m² in Arequipa. “The strategic choice of Arequipa is based on its appeal as a mining hub in Peru, offering ample space, proximity to the primary mining market, and advantages such as skilled labor, quality services, and infrastructure, along with lower operational costs compared to Lima. Despite the challenging global context in 2023, the approval of the expansion by the Bosch Rexroth group demonstrates its long-term commitment to Peru. It reflects confidence in the potential of the country,” commented Rothgiesser.

Bosch Rexroth recognized a niche in electromobility with its eLION portfolio. General manager Kai Rothgiesser noted that Bosch Rexroth is collaborating with two Peruvian manufacturers on building two prototypes. “We remain hopeful of announcing the system’s operation during Expomina if all plans proceed as expected,” he commented.

In 2023, Bosch Rexroth acquired HydraForce, a global manufacturer of insertable cartridge valves. This acquisition enabled Bosch Rexroth to expand into a niche market where HydraForce previously lacked a national presence, a move that, according to Rothgiesser, is gaining momentum: “While mounted valves are standard, the compact and insertable versions have generated significant interest across a broad market.”

Air compressors are another key component of mining equipment. Compressed air can power hydraulic systems or provide energy for pneumatic controls that manage the movements of machines such as shovels. In 2023, like

Bosch, Atlas Copco opened a new base in Arequipa to be closer to its southern mining clients and to serve as a training hub. The company, that works with companies like Antamina, Glencore’s Antapaccay, and Southern Copper, has introduced the GA-Flex lubricated screw compressor. “This equipment, initially operating at a fixed speed, offers the innovative option to convert into a variable-speed compressor in the future, providing flexibility tailored to customer needs,” commented Julio Hernández, general manager of compressor technique - Atlas Copco Andean region.

The most interesting part of the conversation with Hernández was that he highlighted a noticeable shift among clients moving away from generic-market solutions and instead opting for a model that emphasizes customized service plans. This approach allows clients to concentrate on their core activities while benefitting from tailored and efficient service offerings. “Customized service plans are also highly sought after. We offer a variety of plans ranging from spare parts sales to comprehensive solutions, assuming full responsibility and risk for the machine,” added Hernández.

When discussing this paradigm shift, in which companies are leveraging air compressors through leasing plans, César Villegas, general manager of Sullair del Pacífico, commented that he foresees a trend in equipment rental. Sullair has a specific program where clients pay for the use of air. However, Villegas emphasized that this approach might not be universally adopted in mining because companies require a robust financial structure to bear the associated expenses. “In smaller mining companies in the process of expansion, the cost associated with outsourcing may not be feasible at this time, leading them to opt for a traditional asset acquisition and maintenance model,” he said.

Sullair has also registered substantial growth in 2023, reflecting a 30% growth in the mining industry by providing its products to Southern Peru and Antamina.

Small but equally important for the OpEx

It is undeniable that new projects demand substantial CapEx. Still, established operations must minimize their OpEx: “Despite fewer projects, the Peruvian mining industry has a significant installed base. Consequently, mining companies aim to optimize maintenance and operations to reduce operating costs,” commented José Quiñones, general manager, Yokogawa Peru, a company that, among its products, offer a temperature detection system called DTSX Conveyor Belt to ensure uninterrupted operations. For his part, Villegas from Sullair agreed with Quiñones and added: “In mining, a compressor costing US\$25,000-US\$30,000 is essential despite being much cheaper than a shovel itself. Most Peruvian shovels have only one compressor, intensifying outage risk and highlighting the critical need to prevent downtime.” ■



César Villegas
General Manager
SULLAIR DEL PACÍFICO

“

An air compressor is crucial for high-value equipment like mining shovels, where downtime costs are significant. While many shovels now come with dual backup systems, most shovels in Peru have only one compressor, increasing the risk of interruptions.

”



Kai Rothgiesser

General Manager - Peru
BOSCH REXROTH

“

We acquired a 1,700 m² facility in Arequipa, destined to become a modern and more extensive service center than our facilities in Lima.

”

Can you update us on Bosch Rexroth's activities in the last few months?

In 2023, Bosch Rexroth faced challenges initially but successfully navigated them, resulting in revenue growth and securing attractive projects. Despite market price pressures in Peru leading to adjustments, a positive shift occurred towards year-end, hinting at significant activity in 2024.

At Perumin 36, we gained recognition for our innovation-focused booth, highlighting the implementation of Industry 4.0 in hydraulic teaching modules. We introduced a cost-effective sensor upgrade kit for manual technology modules applicable to various machines.

How is Bosch Rexroth advancing its eLION portfolio in Peru?

We are currently collaborating with Peruvian manufacturers on constructing two prototypes, generating high expectations for the future of eLION. However, the adoption of eLION faces challenges in reaching certain machinery manufacturers that do not serve major miners. Despite this, we remain hopeful of announcing the system’s operation during Expomina if all plans proceed as expected.

How does the acquisition of HydraForce enhance Bosch Rexroth's position in the Peruvian market?

In September 2023, we initiated marketing efforts in Peru for our HydraForce suite of products. HydraForce, the leading global manufacturer of insertable cartridge valves, has entered the Peruvian market in partnership with our company. While mounted valves are standard, the compact and insertable versions have generated significant interest across a broad market. With

HydraForce’s absence in the national market before this acquisition, our company is uniquely positioned to fill that gap, capitalizing on our status as the primary supplier of such valves. We will assume full responsibility for sales, replenishment, and after-sales service, establishing a solid presence in this dynamic market.

What factors led to the choice of Arequipa got the location for the new service center?

We acquired a 1,700 m² facility in Arequipa, destined to become a modern and more extensive service center than our facilities in Lima. The inauguration is scheduled for the second half of 2024. The strategic choice of Arequipa is based on its appeal as a mining hub in Peru, offering ample space, proximity to the primary mining market, and advantages such as skilled labor, quality services, and infrastructure, along with lower operational costs compared to Lima.

How does the paradigm shift towards carbon-neutralization plans align with Bosch Rexroth's sustainability goals?

We are proud to be among the few companies certified by the Ministry of Environment as 100% carbon-neutral, a milestone achieved in 2022 through an emissions offset system utilizing carbon credits to support reforestation projects. However, the current challenge in Peru revolves around the absence of national projects for issuing these offset credits, as state control has impeded private initiatives.

This fact is a noteworthy differentiator for our company, even though it is not yet a direct customer demand. Nevertheless, a paradigm shift is underway, with initiatives gaining traction

and major mining companies formally requesting their suppliers to submit carbon-neutralization plans. This approach is particularly relevant for larger mining companies, aligning with their internal sustainability goals.

What sets Bosch Rexroth apart from its competitors based on factual distinctions?

Our offerings extend beyond the quality of our products to the excellence of local services and implementing international standards. We excel in repair services, after-sales support, and project design, making a significant difference, coupled with our strong environmental commitment. Moreover, our technological expertise goes beyond Peru’s borders. As a global company, we can consult and collaborate with colleagues from various countries and technology centers. This constant flow of communication enables us to stay at the forefront, swiftly and efficiently introducing new technologies to the Peruvian market.

What should we expect from Bosch Rexroth in the upcoming months?

In 2024, our primary focus will be to sustain our growth and explore new expansion areas. With eLION and HydraForce we have identified sectors with significant growth potential. Furthermore, plans to introduce additional services have been hindered by space limitations. The future expansion of our facilities aims to address this constraint, enabling us not only to meet current demand but also to offer enriching services, contributing to solidifying our market position. This strategic move reflects not only our ambition for continuous growth but also our dedication to adapting and effectively responding to the changing needs of our customers. ■

Innovation and Technology

Digital Twins and AI: A crystal ball of modern mining?

What looked like something from *Star Wars* or any science fiction movie until a few decades ago is now the reality of the mining industry. After over 130 interviews with industry experts, recurrent terms across the mining value chain were digital twins, AI, and machine learning. As *millennials* prepare to take on executive roles and Gen Z enters the industry, robotics, automation, and technology are reshaping mining's present and future, moving away from the old-fashioned image of pickaxes. "It is also crucial to highlight that the priorities of new generations of workers have changed. While money was the primary motivation 20 or 30 years ago, the value of living new experiences is also highly regarded today," commented Alfredo Bertrand Epiroc's general manager of the Andean region.

In 2022, the consultancy EY published a report using the digital maturity index (DMI) to assess the digital maturity level of Peruvian companies and industries. Peru's DMI stands at a factor of 60.32. Mining is the second highest-scoring industry, with a rating of 68, surpassed only by the health-care industry, which scored 69.11 points. New mines have the latest state-of-the-art technology. However, in the words of Luis Baca, Innomotics' country manager, brown-field projects can also benefit from advanced solutions like digital twins, which can assess and enhance a mine's current productivity through operational analysis and conveyor belt speed evaluation: "By implementing control measures for material discharge at hoppers or crushers, we ensure uniformity, thus preventing overload on drive systems and motors," he added.

Digital twins, AI, and machine learning are "beautiful" technologies. But what exactly are they, and how reliable are they? In brief, they are mathematical models that use algorithms and data from specific activities. Once trained, these models can accurately represent those activities in a virtual environment. "In digital simulation models, factors like increased production and how they translate into maintenance or operational costs are crucial considerations. Simulating different scenarios allows us to assess the economic outcome before committing to a particular course of action," explained José Quiñones, Yokogawa Peru's general manager.

The word "outcome" makes one think about the consequences in the future, especially in the so-called "predictive maintenance". So, how reliable are these models? When asked this question, Quiñones answered: "In a plant, we understand that a pump behaves in a certain way and has associated mathematical equations. Thus, we establish a physicochemical model of the plant, adhering to rigid physicochemical laws. However, when we delve into the economic aspect, the model shifts because behavioral patterns come into play. There is no straightforward modeling process because operational costs may increase due to external factors like inflation. The part that fits into a rigid physicochemical

model is highly reliable. However, the behavioral aspect, such as economics, which does not adhere to established rules, introduces a margin of error."

New business models

MS4M, a Peruvian company, debuted its C4M Underground system in 2022, marking its entry into the underground mining market with a fleet management solution. Richard Balboa, MS4M's general manager, emphasized that the company had to transition from a typical technology provider model to one where it could adjust to the fluctuations in its clients' cash-flow situation. "Clients have two options: the traditional CapEx model of purchasing licenses and hardware to install on their equipment, or a more OpEx centric model of obtaining the system with minimal upfront cost followed by a fixed monthly fee on fleet size. Providing this sort of optionality enables smaller CapEx-sensitive operations to have a better ability to obtain the system, thus unlocking the value of our mature and evolving technologies."

Torsa, a Spanish firm, offers solutions for underground and open-pit mining, such as collision avoidance technology kits, and among its clients, we find Antamina, Marcobre, and Antapaccay. According to Alonso Quiñones, country manager of Torsa's Peruvian branch, the company is transitioning from a model based on selling equipment and technology to one focused on providing complete solutions. "With Antamina, we are moving toward a 'Solution as a Service' model, offering a comprehensive solution with software and hardware as a monthly rental service. This shift involves shared risk. Unlike some providers that operate without penalties, we are committed to delivering a practical solution that incentivizes positive outcomes," he shared.

The goal of technologies like those offered by MS4M and Torsa is clear: safety. Each technology, however, serves a specialized purpose. Installing these systems in various equipment can lead to electrical overconsumption, cable clutter, overheating, etc., resulting in substantial losses of mining assets. This led the company Sattel to develop the Protector of Auxiliary Devices (PDA) solution, which they are providing to Antamina.

The inception of the PDA originated in Anglo American's Mantoverde project in Chile back in 2010. "The PDA serves as an electrical distributor, consolidating power from a single authorized point designated by the owner or OEM. Consequently, all these technologies connect through our system to provide a secure and stable power source. While we can partner with companies like Torsa, Modular, Hexagon, or Motorola, we maintain an open platform since, in most cases, a single piece of equipment simultaneously accommodates up to eight technologies," explained Francisco Agüero, general manager of Sattel Peru. ■

The Mines of the Future

Executive insights on technology



Alonso Quiñones, Country Manager, Torsa

"We are moving from equipment sales to comprehensive, results-driven solutions, sharing risk to ensure positive outcomes. We foresee growth in payment-for-results models and aim to be leaders in this evolving landscape."



Pedro del Rosario, Deputy General Manager, Techbrand

"The pandemic accelerated digital transformation in mining, leading to increased tech investment. We offer RealWear, a voice-activated device for remote assistance and digital workflows, replacing paper checklists, improving operational efficiency, and enabling real-time guidance and documentation."



Francisco Agüero, General Manager, Sattel Peru

"Implementing new technological solutions can be challenging, even with all the buzz around innovation and technological revolution. Despite years of experience and previous successes, each project demands a customized approach and tailored case study."



Richard Balboa, General Manager, MS4M

"Offering CapEx and OpEx models de-risks our solutions in uncertain scenarios, such as shifting geopolitical realities and metal price fluctuations, where capital investments are constrained, and companies need flexible budget adjustments."



Luis Baca, Country Manager, Innomotics

"A digital twin can typically be implemented in under a year, with phased execution starting from a defined scope and advancing based on phase outcomes."



José Quiñones, General Manager, Yokogawa Peru

"AI models provide a blueprint for physical systems, but economic and behavioral factors introduce unpredictability. While physical laws offer precision, the variability in human and economic behavior means that some elements remain uncertain, requiring a blend of data and human insight."



Service Providers

“

“New opportunities are emerging in the Peruvian lithium sector, but this will require advanced technologies and extraction processes.

”

Erika Gabriel
General Manager
BIZALAB

GBR Series • PERU MINING 2024

Image courtesy of Dynacor

Drilling

Ceviche off, minerals on the table

S&P Global Market Intelligence states that, after reaching a peak in 2022, global drilling activity took a significant hit in 2023 due to reduced exploration budgets. In its 2024 PDAC edition for the World Exploration Trends, the financial and industry data provider stated that only 53,582 drill holes were reported world-wide across 1,514 projects, marking a drop of 23% and 13%, respectively. The decline in drilling activity can be directly linked to constraints and reductions in exploration budgets. One of the primary factors driving this budget reduction is the past performance of metals prices and limited access to capital. Though a crystal ball for predicting mineral prices would be a dream, the upward trend seen since the start of 2024, particularly in metals such as copper and gold, is a promising sign. This uptick suggests a potential turnaround for Peruvian drilling contractors, some of which experienced challenges related to disrupted contracts because of social unrest or others because of lack of financing in exploration projects.

Anticipating this turnaround, they are actively embracing new technologies, expanding their equipment inventory, and dedicating resources to training new talent, all in anticipation of the new cycle in copper and gold. Such is the case of Explomin, where Boris Quimper, Explomin's general manager, commented that the company observed a growing interest from companies eager to engage

in exploration projects: "This shift does not involve the immediate initiation of greenfield projects but focuses on laying the groundwork and foundation for potential future greenfield projects."

In anticipation of such a scenario, Explomin is set to invest more than US\$6 million in Peru in infrastructure and drilling equipment in 2024, surpassing the average investment of US\$5 million in the last three years: "On a global scale, our 2024 projections indicate that we will surpass US\$100 million in sales, a significant milestone," added Quimper.

Reflecting on the competitiveness of the Peruvian market, Daniel Santa María, MDH's general manager, exposed that while material costs and salaries have risen over the years, the prices of services have followed a contrasting trend. This disconnect has resulted in a consistent erosion of profit margins. "Local competition in Peru is intense, with numerous medium-sized and large companies, which has led global players to withdraw from the Peruvian market," he added.

MDH was awarded a contract from First Quantum Minerals to conduct a 50,000 m drilling campaign at the La Granja greenfield project. Santa María commented: "2024 so far has seen significant growth in exploration activity, presenting the challenge of securing sufficient equipment and personnel to meet increasing demand. With our entire fleet assigned to projects, we have acquired two new long-range rigs from

Boart Longyear to reinforce our operational capacity."

G&G is a Peruvian drilling contractor operating in Peru, and collaborating with Sierra Metals and Lundin Gold in Ecuador. In 2023, the company ventured into Colombia by opening a new office, setting the stage for potential projects in other jurisdictions such as Argentina, Brazil, and Mexico. In discussions with Marcos Garayar, G&G's general manager, it became clear that the key to remaining competitive lies in enhancing productivity through increased staff training and process automation: "Otherwise, medium- and long-term viability is compromised. I believe that, in the medium term, the market will naturally adjust prices with customers," he added.

Edgardo Laura, Energold Drilling Peru's general manager, echoed Santa María and Garayar's observations and emphasized the importance of maintaining low prices when working with junior companies. "Even a slight increase in costs per meter drilled could considerably impact their operations. We work closely with juniors, negotiating prices and subsequent exploration phases, as drilling is divided into multiple stages that require progressive financing," he explained.

Innovating in a competitive market

Jorge Granda, COO of AK Drilling, a company whose drilling share is around 70% in brownfield exploration, expressed regret over the decline in junior greenfield

exploration in Peru due to capital migration towards industries such as technology: "This decrease in junior projects is unfortunate, as they can later grow into mining operations. Every mining operation has started with exploration, so it is crucial to maintain a pipeline of projects for the future".

For Granda, maturity in the Peruvian mining industry is evident in clients not seeking the lowest prices but rather a balance between safety and price: "Our approach is based on controlling expenses to achieve the desired results, rather than obsessing over increasing revenues. Pressuring to increase revenues could lead us to sacrifice the quality of our work and jeopardize the stability we have built with our professionals."

In a conversation with Granda, he explained that customers in specific markets with complicated topographies want portable machines, but they also prioritize safety. Safety standards make manual handling of heavy loads challenging; on the other hand, transporting heavy components and handling hydrocarbons pose environmental risks due

to potential spills. The solution? Compact drilling equipment. "To address the needs of our customers while meeting safety and environmental standards, we have introduced these compact machines that can be transported autonomously and even operated remotely, eliminating the need for people to perform these tasks," concluded Granda.

In the meantime, Miguel Ángel Arenas, Goetec's general manager, emphasized that the company distinguishes itself in the market through its specialization in various services such as deep hole drilling (>1,500m) and directional drilling. Despite the market and the company reaching a certain level of maturity, this does not hinder the pursuit of new markets and innovative approaches. Such flexibility shows in a case shared by Arenas, where they are leveraging oil and gas technologies to drill water wells within mining pits without disrupting ongoing operations, facilitating simultaneous mine dewatering and enhancing overall efficiency: "This is unprecedented in our region, and we aspire to pioneer its implementation," proclaimed Arenas.

The company has acquired a new fleet of Epiroc Smart rigs capable of drilling within 360 degrees and to great depths. "We aim to use these rigs during downtime typically experienced throughout the day, such as during lunch breaks or overnight rest periods. This rig can operate autonomously during these intervals, completing at least one run, translating to an additional 3 to 6 meters of drilling," concluded Arenas.

When asked about what the industry should expect from Geotec, Arenas commented that while diamond drilling companies usually offer geotechnical services alongside their primary services, there is a need for companies that solely focus on significant engineering projects. To fill this niche, Geotec hired Augusto Hipólito to strengthen its team, laying the groundwork for a dedicated geotechnical division: "We anticipate growing our market share in geotechnical drilling, which will solidify our position as a key player in the Peruvian market while upholding our specialization in drilling services," he concluded. ■



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“We anticipate growing our market share in geotechnical drilling, which will solidify our position as a key player in the Peruvian market, while upholding our specialization in drilling services.”

Miguel Ángel Arenas
General Manager
GEOTEC

How did 2023 unfold for Geotec, and what was the company's main focus?

It has been a year of many challenges, where shutdowns for various reasons demanded that we become much more efficient and seek technological alternatives to reduce downtime and ensure maximum operational performance. Amidst these challenges, 2023 also allowed us to fulfill our commitment to diversity. Recognizing the untapped potential within female talent, we redoubled our efforts to empower women. We firmly believe that fostering gender diversity is a moral imperative for cultivating a culture of safety and innovation within our company. In line with this vision, we continue implementing technological developments, especially in safety, to keep our operations risk-free.

How are the programs for female operators evolving?

Becoming a drilling operator involves thorough training that lasts approximately two years. The trainee operator progresses through several stages before mastering the operation of a drilling machine completely. Our apprentices completed half of their training, showing genuine enthusiasm and commitment. With this training, they will be prepared to take control of the equipment and leadership on the platform, supervising their crew and auxiliary systems. Interestingly, our selection process attracted candidates from various professions, receiving an unexpected number of applications, indicating the program's attractiveness.

What sets Geotec apart from others in the market?

We stand out in the drilling market by specializing in various services, including

deep drilling (>1,500m) and directional drilling. We have professionals and equipment to offer the latter service directly. Our strategic perspective is visionary, recognizing that environments will become increasingly challenging.

How does Geotec prioritize safety within its operations?

We have strengthened our presence in operations by prioritizing managerial visits and ensuring the application of the highest standards in the sector. 2023 was successful in terms of safety, with no accidents involving lost time: we have gone over 19 months without incidents of this kind, demonstrating the effectiveness of our safety culture.

What are some technological investments that Geotec has made?

We continue to implement rod-handling systems in each of the drilling services and mud plants for water recirculation, the latter to recycle almost 85% of our water consumption, efficiently managing this resource. Likewise, we have introduced solutions such as the Core Pusher system, which autonomously extracts core samples during drilling operations, minimizing human exposure to potential hazards. This technology, successfully used in collaboration with Rio Tinto, has yielded promising results.

We recently acquired a fleet of Epiroc Smart equipment capable of drilling within 360 degrees and at great depth. The goal is to use these machines during downtime typically experienced throughout the day, such as during lunch breaks or overnight rest periods. This equipment can operate autonomously during these intervals, completing at least one run, resulting in an additional drilling of 3 to 6 meters. Glencore-Antapaccay recognized

us with the 2023 annual award in the Innovation and HSE Technology category.

Do you believe there is less greenfield exploration due to capital constraints?

I do not think it is solely a capital issue; it is about risk. Nowadays, countries like Mexico, Peru, Colombia, and Ecuador are considered unpredictable and present unique challenges. Investors, especially juniors, may hesitate to commit substantial capital when the regulatory landscape is unclear. When metal prices peak, ideally, greenfield projects should begin.

What is your outlook for Geotec in 2024?

2024 has started promisingly, marked by the expiration of several contracts and the emergence of new bidding opportunities that will drive market dynamics and reshape current positions. We anticipate significant long-term contracts with major clients, indicating a period of growth and potential expansion.

We have hired Augusto Hipólito, an experienced manager with a solid background in geotechnical engineering, to gain a distinctive advantage in the industry. While diamond drilling companies typically offer geotechnical services as part of their offerings, there is a demand for firms specialized in large-scale engineering projects. This team strengthening allows us to establish a special geotechnical division, leveraging Geotec's vital infrastructure in automation, innovation, training, and support systems such as water recycling. We hope to have a greater involvement in geotechnical drilling and thus become a significant player in the Peruvian market, maintaining the line of a specialized drilling company. ■



“Currently, approximately 60-70% of our drilling is performed in mining operations. However, we are confident that this trend will reverse in the future.”

Jorge Granda
COO
AK DRILLING (AKD)

What has been AK Drilling's performance in the last year?

2023 has been a quite positive year for us, as we have managed to consolidate our operations both in the northern and southern regions of Peru. In fact, we have seen a 5% growth in Peru compared to 2022, and we have also consolidated ourselves in other countries such as Chile, Panama, and the Dominican Republic in terms of services. We are very grateful to our clients because I believe that the market has reached a phase of maturity where clients do not seek the lowest-priced services, but instead balance safety, production, and price. This holistic approach has been pivotal in maintaining client trust and our operational continuity.

How has inflation affected drilling costs and profits?

Inflation has undeniably affected results and the bottom line of the entire organization. However, we are convinced that success is not only determined by income, but rather by prudent spending practices. Therefore, our approach is based on controlling expenses to achieve the desired results, rather than obsessing over increasing revenues. Pressuring to increase revenues could lead us to sacrifice the quality of our work and jeopardize the stability we have built with our professionals. Our approach aligns with the mature market's values, where clients prioritize quality, safety, and reliability over cost alone.

What type of exploration is more prevalent in the Peruvian market at the moment?

We have seen a greater inclination towards brownfield projects while the

number of greenfield projects, particularly those undertaken by junior companies, has been significantly reduced.

Currently, approximately 60-70% of our drilling is performed in mining operations. However, we are confident that this trend will reverse in the future. We have observed a significant capital migration towards industries like technology, which paradoxically relies on minerals such as copper. The market has been cautious due to the challenges faced by junior companies in terms of permits and social issues, but we believe that these obstacles are being resolved and that the market will balance out in the coming years, especially in 2025 and 2026.

What capacity does AK Drilling have for lithium exploration?

Currently, our company is not actively engaged in lithium drilling operations, however, we have the necessary technology to do so. Lithium drilling is very similar to water well drilling, given that the mineral is typically found in brines, an aqueous medium. Therefore, the lithium extraction process mainly relies on machinery, equipment, and technology tailored for water well drilling – a domain in which we are market leaders. We are constantly exploring opportunities to execute lithium operations, particularly in Chile.

How has the implementation of AK Drilling's new compact drilling equipment progressed?

The implementation of this new equipment has been highly successful. These machines address a specific need in markets with complicated topographies, such as South America, where custom-

ers demand portable machines, but this conflicts with their high safety standards. On the one hand, the customers' safety requirements limit manual handling of heavy loads and establish strict protocols for handling hydrocarbons. On the other hand, when using portable machines, we face the challenge of transporting heavy components and handling hydrocarbons in mountainous terrain, where any spill could have a significant environmental impact. So, to address the needs of our customers while meeting safety and environmental standards, we have introduced these compact machines that can be transported autonomously and even operated remotely, eliminating the need for people to perform these tasks.

What can we expect from AK Drilling in the near future, and do you have a final message?

AK Drilling remains steadfast in our commitment to sustainable growth, constantly improving our processes and controlling our expenses to continue offering high-quality service. We understand that a company that grows too quickly can lose that personalized treatment that we value so much. At AK Drilling, we know each of our clients by name and have a close and personalized relationship with them.

I want to express my sincere gratitude to all our current and past clients who have trusted AK Drilling. Their continuous support, even during difficult times like the pandemic, is fundamental to us. We consider ourselves part of a large family not only at AK Drilling but in the entire mining community. Together, we are committed to fostering growth and development in South America. ■



Boris Quimper
General Manager
EXPLOMIN

How is Explomin growing its international footprint?

Our successful establishment of Explomin in the USA marks a milestone in our global expansion. Engaging in international bids, coupled with our operations in Peru, Chile, Colombia, and Spain, has paved the way for our expansion into the Dominican Republic, set to commence in April 2024. Furthermore, we are actively exploring the possibility of initiating operations in North America, a continent that remains uncharted in our ventures. Our goal is to gradually decentralize our operations, expanding to other countries and continents with diverse landscapes and cultures, and contributing to our evolution into a more global and robust company.

Peru is a nation of miners and entrepreneurs, and conquering the world is our key objective. This entails excelling in drilling depth and ensuring top-notch safety and quality standards, streamlining our processes, and maintaining the utmost care for our equipment. Our ambition extends beyond merely being a company that drills the most meters; it encompasses a comprehensive commitment to excel in every aspect of our operations.

What percentage of equipment does Explomin have in Peru?

In Peru, we have 70% of our global fleet, comprising a portfolio of over 100 machines. While maintaining a significant concentration in Peru, our strategic vision aims to conduct 50% of our business beyond its borders, recognizing the immense potential presented by our global ventures.

How does Explomin cope with growing competition in the drilling segment?

The increasing number of competitors in the drilling field is exerting pressure on the selling prices of some clients. Nonetheless, our long-established strategic alliances with key clients such as Nexa, Buenaventura, Antamina, and Minsur position us beyond mere price considerations. In our operational landscape, the emphasis on the quality of work and safety plays a pivotal role. ■



Daniel Santa María
General Manager
MDH

What projects is MDH working on in 2024?

At the end of 2023, we were awarded First Quantum Minerals' La Granja project, a 50,000-meter campaign. This project represents a significant milestone and is emblematic for us as La Granja was the first project we drilled when Bradley-MDH was founded almost 30 years ago. Additionally, at the end of 2022, we secured a three-year contract with Antapaccay, where we completed the first campaign last year.

We are working on the Pallancata project with Hochschild, conducting deep and low-angle directional drilling. Likewise, we are carrying out a geotechnical program for Sierra Metals in Yauricocha and drilling over 2,000 meters for Nexa in Cerro Lindo. Furthermore, we are about to start a campaign at Nexa's Mónica Lourdes project, in addition to the in-house diamond drilling and geotechnical projects we have been conducting for the Group we are part of.

What impact has local competition had on the Peruvian diamond drilling market?

Material and labor costs have experienced an increase in recent years, unlike the price of services, where an opposite trend is observed. This disparity has led to a constant erosion of margins in the business. Competition in Peru is intense, with numerous medium and large companies leading global players to withdraw from the Peruvian market.

At MDH, we focus heavily on productivity and strategic partnerships with our suppliers.

What is MDH's growth projection for 2024?

2024 has seen a notable growth in exploratory activity, presenting the challenge of ensuring sufficient equipment and personnel to meet the increasing demand. With our entire fleet assigned to projects, we have acquired two new long-range equipment from Boart Longyear to reinforce our operational capacity. The rebound in metal prices, especially gold and copper, has driven the reactivation of exploration. Our primary objective for 2024 is to achieve growth surpassing 35% compared to 2023. ■

Third Party Services

A focus on the OpEx

When thinking of a mine, the first image that crosses one's mind is probably its core activity: mineral extraction and processing. However, numerous non-core activities, with their respective services, are necessary. In complex scenarios, outsourcing many of these services has become essential for the success of large industrial operations.

Confipetrol Andina's general manager, Wilson Miranda, shed some light on mining companies outsourcing their non-core business. This can take the form of "segmented" outsourcing, where clients issue tenders for specific maintenance tasks, or can take the form of a more comprehensive service: "Most companies are strongly inclined towards comprehensive management and maintenance because having a single contractor responsible for all maintenance streamlines operations," explained Miranda.

Confipetrol's origins are in Colombia, but it has successfully expanded its services to nearly all of South America. Chile is the most recent market it entered, while Peru remains the center of operations. With most new contracts in Peru coming from brownfield projects, Miranda was asked about the differences in competition between greenfield and brownfield projects. The main distinction, according to Miranda, lies in the OpEx component of greenfield projects, which offers opportunities for various competitors to participate and win bidding processes. On the other hand, brownfield projects present a different scenario, with bidding processes occurring every three to five years, resulting in increased competition that focuses on product differentiation.

While Confipetrol focuses on plant maintenance services, specifically concentrators, processing plants, and equipment for underground mines, other labor-intensive jobs, such as fleet maintenance, are critical to a mine's day-to-day activities. In this context, Pedro del Rosario, deputy general manager at Techbrand, commented that the company saw an opportunity in the market by noticing specific equipment was frequently unavailable for maintenance, causing delays and financial losses. "For instance, the unavailability of critical assets such as an impact wrench can disrupt maintenance plans, resulting in costly rescheduling," said del Rosario.

According to del Rosario, Techbrand achieves a 99% availability rate for its clients, such as Las Bambas, Cerro Verde, and Antapaccay, by optimizing inventories to avoid unnecessary immobilization of capital.

Like many other C-executives, del Rosario emphasized that the pandemic served as a catalyst for digital transformation. During COVID, Techbrand began representing RealWear and also started using Vuforia Chalk, a remote assistance and collaboration application, to provide more effective real-time guidance to technicians encountering unfamiliar challenges. "By using Vuforia Chalk, specialists could remotely guide operators, providing instructions on tasks such as activating a truck's control panel. This guidance instilled confidence in operators, even when physically distant from the expert," added del Rosario.

SK Rental's general manager added: "Furthermore, we offer re-rental services, collaborating with partners to expand our offering of used machines, enabling us to provide comprehensive services to clients and be seen as a one-stop solution provider for their equipment needs."

Renting and leasing

SK Rental is another company whose added value lies in outsourcing, such as renting mining equipment. Despite the benefits of the business model, Edmund Egg, the company's general manager, revealed that SK Rental is struggling to enter into large-scale mining due to large-specialized equipment requirements like hydraulic shovels that are difficult to relocate after years of use: "The main limitation is establishing more extended renting periods for this type of machinery, as we are currently more attractive for shorter periods," explained Egg.

SK Rental offers two main business lines. The first is traditional renting, which emphasizes short-term contracts typically lasting from one to twelve months. These contracts are primarily for mining and construction services such as PAD applications, road maintenance, and plant construction. The second business line is for long-term operations, which is particularly advantageous



Fernando Martínez
General Manager
ALIVO RENTING

“Alivo Zero offsets CO2 emissions from leased assets, providing clients with annual certificates to achieve net-zero emissions, addressing the growing need for environmental standards and pollution reduction.”

Fernando Martínez, the general manager of Alivo Renting, formerly Avis Mareauto Peru until mid-2023, shared that the decision to launch its new brand stemmed from the company's assessment of unmet needs in specific niches within the market. Consequently, Alivo chose to end its association with Avis and focus on four verticals: medical equipment, lifting and loading equipment, agricultural tractors, and heavy machinery. As Alivo's general manager pointed out: "Having a variety of assets allows us to provide comprehensive solutions beyond mere vehicle rental. Thus, we avoid competing over minor differences in the cost of leasing a vehicle, as we can add additional value by providing other services." ■



Wilson Miranda

General Manager
CONFIPETROL ANDINA

What was Confipetrol's performance like in 2023?

In 2023, Confipetrol experienced a prosperous year. Currently, we have 3,500 employees deployed across Peru, spanning the mining, petroleum, energy, and industrial sectors.

How is Confipetrol leveraging its experience in Peru to develop the Chilean market?

Our international expansion has successfully leveraged our local experience in the Peruvian mining sector to penetrate the Chilean market. We have already established offices in Argentina, Ecuador, Venezuela, Colombia, and Bolivia. Development in Ecuador and Venezuela is being driven by our Colombian offices, which boast a strong background in the petroleum sector.

How does competition differ between greenfield and brownfield projects?

When it comes to new greenfield projects that are starting, there is an OpEx component where everyone has opportunities to compete and win bidding processes. Despite intense competition, there are ample opportunities for all. At Confipetrol, we possess significant expertise in services, operations, and maintenance for surface and underground mining equipment. Being present in major mining operations allows us to showcase this expertise, enhancing our chances of winning new bids. Additionally, we offer a crucial differentiator: robust engineering support for maintenance reliability. Our strong safety indicators, combined with alignment with

“Our target is double-digit growth in Peru and Chile, both markets brimming with potential and undergoing significant mining development.”

asset management and international standards, give us a better offering.

On the other hand, brownfield projects present a different scenario. Bidding processes commence every three to five years, requiring us to compete with a value-differentiated product. Unlike greenfield projects, where competition is varied but without any contractors involved, brownfield projects involve contractors, leading to increased competition, which results in product differentiation.

What percentage of Confipetrol's workforce comes from nearby communities?

Nearly 65% of our workforce hails from nearby cities or communities, reflecting our commitment to hiring locally. We actively seek individuals from communities within the operational area of influence. Furthermore, 55% of our suppliers are sourced locally, demonstrating our dedication to supporting local communities. We invest significantly in training individuals and communities in the vicinity, enabling us to employ them later. Similarly, we provide our suppliers with administrative, safety, and financial training, aligning ourselves with our clients' social responsibility initiatives.

What type of training does Confipetrol provide using virtual reality?

In 2023, through RIMAC, we were honored with an award for Best Integrated Occupational Risk Management for our innovative use of virtual reality training in high-risk activities such as electrical work, working at heights, and confined space operations. This training, conducted with

special goggles, provides individuals with online, three-dimensional instruction, enhancing their preparedness for various risks that may arise during their tasks and enabling them to apply their knowledge effectively in real-world scenarios.

Furthermore, we heavily emphasize the use of software. When new employees join us, we ensure they receive all necessary training and information online, allowing us to track the support provided to prevent accidents effectively. Additionally, new team members are paired with a mentor for their first six months, who offers guidance and support throughout their work. At Confipetrol, we aim to ensure that employees return home in the same condition as when they arrived at work.

What technologies does Confipetrol use for predictive maintenance?

Through software, we can monitor various equipment within a mine online to ensure proper functioning and prevent failures. Additionally, some vehicles are equipped with devices to measure our employees' drowsiness levels, enhancing accident prevention measures.

In maintenance engineering and reliability, we employ state-of-the-art equipment for predictive maintenance across mechanical, electrical, and control systems. Recently, we have utilized digital twins to plan critical tasks such as plant shutdowns and simulate the execution of various activities during these shutdowns. We also employ drones for tomography measurements on medium and high-voltage power lines.

What is the focus of most mining companies regarding outsourcing?

Almost all mining companies are focused on outsourcing their services. Some opt for comprehensive outsourcing, while others choose segmented outsourcing. However, most companies are strongly inclined towards comprehensive management and maintenance because having a single contractor responsible for all maintenance streamlines operations. While many companies outsource, only a few do so comprehensively, but the trend is moving in that direction.

What are Confipetrol's goals for 2024?

For 2024, our target is double-digit growth in Peru and Chile, both markets brimming with potential and undergoing significant mining development. We are actively penetrating these markets, leveraging our valued experience and expertise. ■

Laboratories, Chemicals and Blasting

What ore are you working with?

Understanding the characteristics of minerals is critical across all phases of mining. During exploration, it helps determine the viability of deposits for development. It enhances extraction and processing efficiency while ensuring final product quality during production. Even during mine closure, this understanding is essential to predict the behavior of tailings or the mine site over time.

Laboratories in Peru have been investing in new technologies to streamline assays. SGS Peru introduced a new X-ray diffraction (XRD) unit tailored for precise mineral characterization and a TESCAN TIMA-X (TIMA). According to Gianfranco Martinelli, natural resource business manager at SGS Peru, even though the use of these microscopes entails higher costs, market demand is increasingly leaning towards the need for services like these: “The insights these technologies provide enable decisions that optimize reagents, energy, and other resources, resulting in substantial long-term savings,” explained Martinelli.

Certimin has been leveraging digital twins and formed partnerships with Glencore Technology to use the Jameson Cell and the IsaMill and Eriez Flotation to provide specialized services in coarse particle flotation (CPF). “As many deposits are depleting in grade or are working with lower grades, the need for new technologies to recover them arises. We are currently testing this technology to process tailings from Codelco's Chuquicamata, one of the largest open pit mines in the world. These tailings, once deemed low-grade, are now profitable. Similarly, we are conducting trials at a Peruvian mine to recover minerals from its landfills, facing challenges like Chuquicamata regarding mineral grades,” commented Jonathan Campbell, deputy general manager of Certimin.

Luz Blancas, business development manager at Certimin, highlighted the “Matrix Clarifier,” a system that can recover water and concentrate particles from process water, including overflows from tailings. “Our partner in Chile conducted several tests and pilot tests in Codelco, and after promising results, they planned to proceed to the next phase. Companies today must minimize and optimize water usage amid increasing scarcity, and the Matrix Clarifier offers a viable solution,” she explained.

According to Erika Gabriel, general manager of Bizalab, a laboratory specializing in mineralogy tests: “New opportunities are emerging in the Peruvian lithium sector. For example, Macusani Yellowcake recently received an exploration permit in an area with evidence of lithium resources. Historically, and due to the lack of legislation, lithium mining has been disregarded in Peru due to its association with rare earth and radioactive minerals”.

Henry Luna, the president of the Ingemmet (Geological, Mining, and Metallurgical Institute), explained that in December 2023, Ingemmet created the Metallogenic Map of Peru to identify copper, gold, and lithium zones. The map specified that while the coastal and mountain areas contain lithium, the highest values are found in Puno. The main presence of lithium in Peru differs from other countries in the region since it is hosted in micas such as zinnwaldite and lepidolite, as well as clay minerals (smectites) and zeolite. This will require the use of advanced technologies and extraction processes. Bizalab has been analyzing lithium samples for a junior company, and according to Gabriel, the samples are completely different from the minerals they usually analyze. “The study of lithium requires different

approaches and concepts, leading our team to develop new skills and knowledge in this area,” commented Gabriel.

Stefano Raffo, manager of the metals and mineral division at Bureau Veritas Peru, expressed that the Peruvian mining industry has reached a mature stage, so it is natural to observe a gradual decline in ore grades and increased production costs: “This phase is inherent to the industry's cycle, and the key challenge moving forward lies in efficiently and promptly replenishing mineral reserves. Exploration is the cornerstone of addressing this challenge,” he added.

Like many other companies, preparing for a new supercycle and the potential of Peruvian projects in the pipeline, Bureau Veritas upgraded its geochemistry laboratory in 2023.

Chemicals and blasting

Just as laboratories are necessary to understand the characteristics of the ore, chemicals are crucial to process them. To optimize recovery in polymetallic mines, Quimtia has been exploring integrating pre-oxidation stages into the flotation process: “We employ advanced oxidation technologies, based on the use of hydrogen peroxide, to optimize these processes and, in the case of precious metal mines, reduce cyanide consumption, which cuts costs and mitigates environmental impacts,” commented Eduardo Galdo, Quimtia's sales manager.

Quimtia has long tried to implement the WaterShed project, a technology designed to optimize tailings pond volume usage while expediting water reclamation: “WaterShed requires substantial equipment, and since tailings involve large volumes, it also requires high

>> 125



“ Although we are smaller than a multinational company, our mineralogy specialization gives us a distinctive advantage in the market. ”

Erika Gabriel
General Manager
BIZALAB

What were Bizalab's key highlights from last year?

In 2023, we experienced increased clients and sales and strengthened our team. Looking ahead to 2024, we have adapted our strategies, expanding our training sessions' focus for internal and external clients with increased frequency and duration. Additionally, we are launching a new complementary business scheme focused on mineralogy, with a dedicated website providing detailed information about minerals and their properties. It offers free content accessible to all and deeper information through a paid gateway for those interested in additional details.

In line with our commitment to sharing knowledge and strengthening institutional relationships, we have established collaborations with entities such as the Andrés del Castillo Mineral Museum and the Geological Society of Peru. The goal is to improve mineralogical knowledge in the country through talks and courses. We are also closing an agreement with the Institute for Geology, Mining, and Metallurgy (INGEMMET).

What opportunities do you observe in the lithium market in Peru?

Historically, and due to the lack of legislation, lithium mining has been disregarded in Peru due to its association with rare earth and radioactive minerals. The main presence of lithium in Peru differs from other countries in the region, since it is hosted in micas such as zinnwaldite and lepidolite, and also in clay minerals (smectites), and zeolite. This will require the use of advanced technologies and extraction processes.

At Bizalab, we have been analyzing lithium samples for a junior company

whose information and evidence are completely different in terms of geology and mineralogy. The study of lithium requires different approaches and concepts, leading our team to develop new skills and knowledge in this area. However, the accuracy of our estimates will depend mainly on further research and the results of more detailed drilling. As these works progress, we will be able to determine more accurately the potential and actual quantities of resources available, allowing us to position ourselves strategically in this emerging lithium market.

Can you explain the importance of predictive mineralogy?

By integrating mineralogy into the project's initial concept, surprises are avoided, and extraction and processing processes are optimized. This ensures that the available resources are maximized and costs associated with unforeseen problems are minimized.

Mining companies often face challenges in mineral recovery due to a lack of adequate mineralogical information. This can result in the need to solve complex problems during operation, leading to additional costs and project delays. That is why it is essential to incorporate mineralogy as an integral part of the information necessary for the development and execution of mining projects.

What type of samples can be analyzed at Bizalab?

We can evaluate any sample, regardless of its origin or stage in the mining process, from rocks and sediments to concentrates, tailings, and intermediate products. Apart from samples associated with mining operations, we also evaluate samples of soils, sediments, and ar-

eas adjacent to mining units as services offered to our Environmental Assessment and Oversight Organism (OEFA) to ensure environmental compliance and mine closure requirements. Our teamwork approach enables us to provide accurate and detailed analysis of mineral samples, contributing to the understanding and optimizing mining processes.

What are your plans for international expansion?

In the current political context, we have had to focus on internal development and expand our presence in the international market. The uncertainty in some countries in the region is prompting us to conduct preliminary assessments and consider other markets such as the United States, Canada, or Australia. Our new mineral website will initially be in Spanish, but we intend to translate it into other languages as we enter other countries.

We believe we are competitive globally due to our cutting-edge equipment and highly trained personnel; we ensure the quality of our products and services. Our response times are also faster than those of many of our larger competitors; while sample analysis can take around three months in other countries, it takes 15-20 days for us. Although we are smaller than a multinational company, our mineralogy specialization gives us a distinctive advantage in the market.

Do you have a final message?

We are a 100% Peruvian company with a more than eight-year track record and with solid technical and human resources. We want to leverage our capabilities and strengths to expand internationally. ■

123 >>

product consumption. Consequently, we need to demonstrate the account's ROI versus the expense of the tailings pond over time. Continuous spending differs from a fixed expenditure, and it is sometimes challenging to convey this to clients," he explained.

On the other hand, Mercantil has been leveraging its own metallurgical and water treatment laboratory in Lurín to help its clients find the exact dosage of flocculants for water treatment and get denser sludges and reduced tailings. "When we achieve a more compacted sludge, we offer significant benefits to clients by generating less solid waste that requires off-site disposal, thereby avoiding additional costs," commented Nicolás Scanarotti, Mercantil's mining division manager.

According to Nikolas Gordillo, general manager of Pochteca Peru, there is a significant shortage of ships, and freight rates, which were in the range of US\$1,500 to US\$2,000 in December 2023, have surged to levels beyond US\$3,000 to US\$4,000 during Q2 2024. "Flexibility is paramount in logistics, especially amidst shipping shortages and geopolitical tensions, requiring skilled personnel and robust certifications," he said.

Harold Forsyth, general manager of Orica Peru, noted that despite the challenges caused by supply chain disruptions exacerbating the capacity to import ammonium nitrate, Orica Peru successfully ensured the supply of every ton of product that its clients required. Forsyth emphasized Peru's significance as the company's third-most important market. For this reason, and to mitigate future disruptions, Forsyth revealed to GBR that the company plans to invest in an ammonium nitrate plant: "We are in advanced discussions with Peruvian authorities to invest in an ammonium nitrate plant, a major investment that will also support the agricultural industry's demand for nitrates and fertilizers."

Orica Peru is focused on introducing two products to the market: the 4D explosive, a wireless initiation system that allows for varying energy capacities within the same blasting mesh, and the WebGen, a wireless detonator that enables drill holes to stay loaded and "dormant" for months without surface cables, maximizing safety and ensuring better fragmentation. ■

Innovation for Efficiency

Executive insights on ore fragmentation and processing



Harold Forsyth, General Manager, Orica Peru
"Orica revolutionized the market by eliminating cables. Wireless detonation reduces risks, such as susceptibility to lightning strikes, which are frequent in Peru. Beyond safety, wireless detonators offer significant advantages in material control and fragmentation, adding value to clients."



Nikolas Gordillo, General Manager, Pochteca Peru
"We prioritize maximizing chemical reuse, especially in raw materials and waste disposal. This includes reclaiming and recycling water and solvents to promote sustainable practices. We provide tailored solutions for treating and recirculating this water efficiently."



Nicolás Scanarotti, Mining Division Manager, Mercantil
"Although machine learning has been present in data prediction for years, we see an opportunity to incorporate AI into water treatment, using sensors to collect data and automate processes for more efficient dosing of chemicals based on water qualities."



Eduardo Galdo, Sales Manager, Quimtia
"We found that implementing pre-oxidation not only resulted in higher silver recovery but also significantly reduced cyanide consumption, leading to substantial improvement in results, especially considering the lower cost of hydrogen peroxide than cyanide."

Logistics, Security and Insurance

Minimizing risks and maximizing coverage

According to the Peruvian Public-Use Transportation Infrastructure Investment Supervisor (OSITRAN), the investment in transportation infrastructure closed at US\$732.4 million in 2023. Despite a 33.2% increase compared to 2022 figures, this does not seem enough. "Peru faces a persistent problem of insufficient infrastructure, particularly lacking comprehensive alternative routes, causing challenges and disruptions," commented Aurelio Palacios, general manager of the logistics company Acoinsa.

The lack of alternative routes is a problem, especially considering that sometimes companies face route blockades, just as seen between 2022 and 2023 in the case of Las Bambas. In Palacios's opinion, the problem is complex. Besides lacking alternative routes, the existing ones have undergone only sporadic renovations and improvements. If we couple Peru's irregularity and mountainous geography, we get the perfect recipe for complicated logistic plans.

As such, logistics companies must invest in state-of-the-art equipment and put much effort into conducting detailed engineering to navigate Peruvian roads effectively. In the case of Acoinsa, the company invested significantly in a Blade Lifter FTV 850 Goldhofer, which Palacios describes as the "sole of its kind in Peru." This strategic move allowed the company to effectively transport 90 blades to the Wayra II project for Enel.

While Acoinsa specializes in the logistics of special and heavy cargo, Hermes excels in the logistics of cash and valuable assets. In the mining sector, according to Marcos Arias, the manager of value distribution and channels of Hermes, the company has over 30 years of experience, focusing on the aerial or ground transportation of gold and silver. Additionally: "We offer mineral custody services at our facilities and manage vaults at mining

production centers, ensuring the security of the final product. This process adds value to our clients because we take on the custody risk. Once the mineral enters the vault, it becomes our responsibility and is covered by our insurance policy and Hermes security protocols. Moreover, some clients may take advantage of this opportunity to place their production in the international market more quickly and efficiently," explained Arias.

Hermes works with a diverse array of gold producers, spanning large-scale mining operations throughout artisanal and small-scale mining (ASM). With the recent surge in gold prices, Arias was questioned about its impact on the company. According to him, the rise in prices correlates with increased insecurity, prompting the company to exercise greater due diligence with clients.

In efforts to combat illegal mining, which poses threats such as insecurity and concerns regarding the origin of gold within its sector, Hermes has partnered with USAID's Prevenir project, primarily focusing on the Madre de Dios region: "We are supporting four ASM operations who, before joining the project, sold their production to local traders at prices below the market value and with lengthy payment terms ranging from 3 to 6 weeks. Since becoming part of Prevenir, these miners have access to a formal market comprising larger, more reputable companies. As a result, they are securing better prices for their production and benefitting from significantly shorter payment terms," pointed out Arias.

Insurance, security, and safety

Like any other industry, the mining sector relies on the insurance market for coverage before liabilities. While accident, health, and asset insurance are common, the evolving nature of mining has introduced new complexities. Fac-

tors like political uncertainty and delicate relations with communities, as evidenced in recent months, directly affect mining production.

These complexities highlight the need for specialized insurance solutions tailored to the unique challenges of the mining industry. In an interview with Giulio Valz-Gen, Howden Peru's CEO (formerly known as Contacto until 2023 when Howden acquired it), he outlined three primary risk categories prevalent in mining operations: operational risks, which include incidents like fires, explo-

sions, and damage to machinery and equipment; catastrophic risks, encompassing natural events that can impact mining infrastructure; and socio-political risks, which are associated with the country's political climate and its impact on mining operations.

In response to compliance gaps resulting from the enactment of Law 29.783 and subsequent changes in Peru's occupational health and safety regulations, Howden (when it was still Contacto) took proactive measures by establishing the "mining contractors' unit": "Within this unit, we have developed a web service platform to gather all the information contractors have with various mining companies. This allows us to have a robust insurance management module for contractors, enabling the control of any type of insurance a contractor may have, such as blasting, exploration, transportation, etc.," he pointed out.

In a context where companies do not have access to operations or cannot get the mineral out of the mine, there are specific insurances: "There exists a denial

of access insurance, a product designed to cover miners' losses due to the inability to produce as a result of road or railway blockades. Unlike political violence insurance, which requires physical damage to be activated, this insurance kicks in without the need for physical damage to occur," commented César Kahatt, senior vice president & regional mining practice leader at Marsh McLennan.

According to Kahatt, because of Peru's social situation, the prices of this insurance increased in 2022, making it difficult for many miners to buy it. However, those who already had it from previous years experienced reasonable increases in renewals. "In the 2024 renewals, there has been an average reduction in premiums of around 20%," he concluded.

Activating insurance due to an accident is undoubtedly undesirable for any miner or contractor. However, several companies are making strides in the safety and security segment to enhance control and mitigate risks. One such company is White Lion Technology Corporation, founded in Peru. The

company offers operators a software solution called 2PERSONNEL, comprising modules designed to ensure security, physical safety, and compliance with health and safety standards during work operations. "Once individuals are within mining projects or operations, we have modules that oversee and manage services such as food, lodging, and transportation, thereby completing the circle of security, safety, and health for individuals," explained Jorge Salcedo, the company's CEO.

Ensuring that all workers have valid contracts is paramount, as unauthorized individuals remaining in the mine compromise their physical integrity and open the door to potential legal claims of unpaid wages. Furthermore, in the event of an accident involving these unauthorized individuals, the mine could face lawsuits. "Our technology ensures the prevention of such scenarios. In several projects where we implemented our solution, we discovered up to 900 individuals without valid contracts present at the mine," concluded Salcedo. ■



Aurelio Palacios
General Manager
ACOINSA

“Peru faces a problem of insufficient infrastructure, particularly lacking comprehensive alternative routes, causing challenges and disruptions. The limited options, exacerbated by Peru's complex geography, slow logistical advancements and highlight the urgent need for infrastructure development.”

”



César Kahatt
Senior Vice President &
Regional Mining Practice
Leader
MARSH MCLENNAN

“Liability insurances cover third-party damages from tailings dam failure. However, the insurance limits that Peruvian miners usually buy are quite low compared to the potential future claims, which might not be enough to cover the initial damage.”

”



Giulio Valz-Gen
CEO
HOWDEN PERU

“Cybersecurity has become crucial in today's business landscape. Companies face risks such as data breaches, system compromises and information theft, highlighting the need for robust coverage to uphold responsibility for the data they handle.”

”



Jorge Salcedo
CEO
**WHITE LION
TECHNOLOGY
CORPORATION**

“If an unauthorized person stays in the mine, their safety is at risk, and verifying their work status is challenging. This can lead to legal claims for unpaid wages, labor disputes, and financial repercussions. We help prevent these issues and lawsuits.”

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Thank you!

We would like to thank the honorable ministers, executives, and authorities who took the time to meet with us.



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