

MEXICO
MINING REVIEW



HIGHLIGHTS
2019



Mexico Business Publishing supports business and political leaders in driving the development of Mexico's main industries by offering first-hand industry intelligence and analyses based on face-to-face interviews with carefully selected stakeholders. As an independent publisher of comprehensive, high-level annual reviews, our mission is to accelerate the exchange of vital industry information that enables Mexico and its business community to capitalize on emerging opportunities.

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MINING REVIEW

2019

Mining is at the core of almost everything that makes the world modern. Yet, the industry is also extremely volatile. After years of hardships, the companies that survived the last downturn did so by becoming experts in cost-reduction, efficiency and productivity strategies. Optimization of resources has become the pillar for those that want to remain standing. From human talent development to embracing the digital revolution, the industry's horizon is shaped by doing the most with the least.

But just as mining has fueled the modern world, it is the human component that has kept the industry flourishing. This realization means the mining community in Mexico and around the world is growing increasingly aware of the importance of adapting best practices to be socially and environmentally responsible, while bringing wealth and development to the communities where it operates.

Also figuring into the picture is the election of a new president, Andrés Manuel López Obrador, who will guide the country and its economy, and the policies that will shape the mining industry, for the next six years.

Mexico Mining Review 2019 gathers all the expertise of the mining industry's top leaders in Mexico. Over 200 interviews, in-depth analyses and infographics offer companies the business intelligence they need to seize the industry's opportunities. Published in a political transition period, it also compiles the sectors' voices in a Wish List to the incoming administration, with suggestions of what mining needs the most from the new government.

The fifth edition of Mexico Mining Review is written as an essential reference point for the industry, analyzing the main trends over the past year and shedding insight on the direction that mining is likely to follow over the near and midterms.

OPTIMISM DESPITE GLOBAL UNCERTAINTY, LOCAL HURDLES

After a strong start to the year buoyed by geopolitical uncertainty globally, metals prices have stagnated. US unemployment is low, taxes are favorable and the dollar is strong, making it the preferred investment. But metals such as silver, copper, zinc and lead continue to be required for industrial applications

The last year saw considerable change in the rules of the game, proving that anything is possible. Mexico's closest ally, the US now has a president that announces major trade policies through Twitter, long-standing trade agreements are being renegotiated and the threat of trade wars is real. At a more local level, companies are getting used to a recently-elected president who ran on a nationalistic agenda and made history along the way, marking the first time the president of Mexico has not belonged to the PRI or PAN parties. The context, nationally and internationally, has made geopolitical instability the new norm for the global market and while in the past, volatility meant good news for operators, some fear that investors may hold back as they adapt to the persistent instability.

In times of uncertainty, precious metals are the go-to investment option. According to Morningstar, a Chicago-based investment research firm, "for as long as many can remember, gold has reacted favorably to geopolitical turbulence – as uncertainty increases, the rush to gold as a haven has been the counterbalance." But 2018 has bucked the trend and now, low unemployment and lower taxes in the US is underpinning the dollar and limiting the need for metals hedging. "In recent times the established paradigm has been challenged," says Morningstar.

But in spite of the speculation, Deloitte sees consistent demand across precious metals, advantages in rising global debt levels and few other investment options that can compete against the engrained history of the mining industry. "Gold is in fairly stable territory while silver unfortunately is still waiting for its moment to shine," says Philip Hopwood, Global Mining Leader at the consultancy. "Copper and zinc are enjoying positive momentum mainly because of supply constraints. Many commodities are in a good place thanks to the growing popularity of electric vehicles (EV)."

While still far from their 2011 peak, prices are continuing to improve and operators are finally starting to harvest the fruits of their cost-reduction practices sparked by the bear market of 2015. Mexico continues to be in the Top 10 as one of the biggest producers of silver, gold and copper but authorities must remain aware of the rising attractiveness of mining jurisdictions like Chile and Peru. Added revenues have meant more money to be channeled into exploration,

helping operators strengthen their pipelines and offering a strong outlook for the industry in the years to come.

MEXICAN GOLD OUTPUT DECLINES

After falling to nearly US\$1,000/oz in 2015, the industry welcomed the rise, albeit slowly, of gold prices. In 2017, the price was on average US\$1,257/oz, having traded in a range between a low of US\$1,151/oz in January and a peak of US\$1,346/oz in September, although these prices are still a far way off the decade peak of US\$1,895/oz in 2011. Global gold output in 2017 rose slightly to 104.4 million ounces from 99.7 million in 2016 but Mexico fell to ninth place on the global list of gold producers after being No. 8 for two years in a row thanks to a 4 percent drop in domestic production.

New gold projects in the pipeline offer optimism for production in 2018. Fresnillo is taking the lead as its Pyrite Plant fed by the Saucito and Fresnillo mines in Zacatecas is expected to start operating in the second half of 2018. The dynamic lixiviation plant in development in La Herradura is also expected to increase gold production by 36,000oz/y along with the potential of bringing online Juanicipio in 2020 to produce 30,000oz/y.

SILVER ON TOP

In silver production, Mexico maintained a firm grip on its position as top producer in the world for the eighth year in a row despite the 4 percent fall in global silver output. The global decline was caused by losses at major mines in South America, Oceania and Europe but was compensated in large part by greater output in North America. And as silver is often a byproduct of gold and copper production, the 2017 spike in global exploration investment after a four-year retreat could be a positive indicator of even bigger output in the years to come.

When it comes to the country's main silver mines, Peñasquito was not only the main gold producer but also the main silver producing mine in 2017 with an output of 21.5 million ounces. But Fresnillo is still the global silver king as four of its mines were included in the Top 10: Saucito, Fresnillo, San Julián and La Ciénega. Overall, silver output in Mexico totaled 187 million ounces in 2017 at an average global market price of US\$17/oz, and ranging between

a high of US\$18.3/oz in February and a low of US\$15.2/oz in July.

THE SWAYS IN COPPER PRICES

While silver and gold were not as drastically shaken by geopolitical events, a possible trade war between China and the US and a strong growth in supply caused copper prices to sway. The volatile climate impacted the metal more as China is responsible for half of the world's consumption of copper. Copper in 2017 began to make a comeback after several years of low prices. In December 2017, prices reached heights of US\$7,215/t for the first time since 2014. But the good news did not last long. The metal peaked at US\$7,261/t in June 2018 and dropped below the US\$6,000/t benchmark in mid-July. Analysts from Goldman Sachs speculate that this drop was sparked by concerns over rising tension between China and the US but that the impact will not last long in the case of raw materials like copper. In July, S&P revised its price predictions for copper, lifting them to \$6,800/t from \$6,600/t for 2019 and to \$7,000/t from \$6,800/t for 2020.

THE BEST IS YET TO COME

Change is the key word for the industry as volatility permeates not only the geopolitical realm but also the way business is done within the sector. To stay afloat, a traditionally closed industry must adapt to the ebbs and flows of consumer and investor demands. The rise of new competitors in the financial market such as cryptocurrencies and fintech that are catching ever-more attention from investors are equally motivating operators to transform. Having learned their lesson from the past downturn, miners are much more cautious about their use of capital and seek strategic projects to add to their portfolios. Technology is also playing a greater role as companies are on the hunt for innovative methods that can positively transform their operations.

National giants, such as Fresnillo and Industrias Peñoles, also continue to grow and succeed both locally and internationally. The market has adapted to the rapid influx of international companies, mostly Canadian, that are taking an interest in the Mexican mining industry. The country advanced in the Fraser Institute's attractiveness index from 50th place to 44th. But as other jurisdictions also become more attractive, Mexico must advance at a faster pace.

Mining is present in every aspect of everyday life, from cars to homes and right down to country's coin currency. To further promote growth, the sector must continue to create societal awareness of the sector's role in economic development. Communication among the social, public and private sectors can open doors to capital and facilitate permitting. And with a new administration taking over the reins of government, the mining industry also has an opportunity to secure a prominent place on the federal agenda.

THIS YEAR'S MAIN DEVELOPMENTS

2017

August	→ Gold prices soar to US\$1,356/oz amid US-North Korea military tensions
September	→ Mexico announces application for Extractive Industries Transparency Initiative (EITI)
October	→ AMLO announces plan to bring Napoleon Gómez out of exile in Canada and appoint him Senator
	→ Mexico and Ecuador sign a cooperation agreement for mining industry
November	→ Beginning of workers' strike at El Limón-Guajes for Torex Gold

2018

January	→ China announces a ban on scrap copper imports causing copper prices to bounce back to \$7,270/t on the LME
	→ First Majestic Silver announces acquisition of Primero Mining and flagship San Dimas operation in Durango
February	→ Silver prices dip back below US\$17/oz
March	→ Mexico signs new TPP11 with 10 countries, agreement excludes the US
April	→ Torex Gold announces official end of El Limón-Guajes blockade
May	→ Miners on the BMV register significant falls, Frisco leads with 23 percent
	→ Claudia Pavlovich, Governor of Sonora, proposes before CONAGO an initiative to overturn exploration deductibility law enacted by the fiscal reforms
June	→ Minera Frisco and Goldcorp announce tie-up in Mazapil, Zacatecas
	→ Retaining wall collapses at Rio Tinto mine in Chihuahua, leaves one fatality
July	→ AMLO announced as next President of Mexico with 53 percent of the vote, congratulations offered by Germán Larrea, with whom he has a tenuous relationship
	→ New stock exchange, BIVA, begins operations in Mexico
August	→ Grupo México announces potential to re-open San Martín mine in Sombretete, Zacatecas after 11-year strike
	→ AMLO meets with executives including Carlos Slim to announce his policy priorities, includes mining development
	→ Napoleon Gómez inaugurated as a Senator of the Mexican Republic
September	→ Gold prices begin to drop below US\$1,200 amid backdrop of strong US dollar



PREPARING THE MINING INDUSTRY FOR THE DIGITAL REVOLUTION

MARIO ALFONSO CANTÚ

Undersecretary of Mining at the Ministry of Economy

Q: What were the Undersecretariat's key accomplishments during this administration?

A: The National Development Plan 2013-2018 included mining as a strategic industrial sector. We emphasized this by also creating a plan specifically designed for the mining industry. The Mining Development Program 2013-2018 has four main objectives: promote higher levels of investment and competitiveness in the mining sector, increase the amount of financing for the mining industry and its supply chain, strengthen the development of small and medium mining companies and modernize institutional norms for the sector, improving attention to processes related to mining concessions.

We encouraged a more solid communication channel between the private and public sectors through the establishment of four additional mining clusters to the Zacatecas one, created in 2012. We are also promoting the creation of a new cluster, which we hope will be established before the end of this administration.

Most investors do not usually talk to the Undersecretariat directly but with local authorities first to see what kind of support they can receive from the government before deciding to invest in a project. Unifying efforts is a good way to ensure the future of projects in the country. This will also help ensure that the next government will continue the current work regarding the mining industry. We created committees with municipal and state governments in collaboration with federal authorities to address the industry needs.

Q: How are you shortening and simplifying the permitting process in the industry?

A: The Hydrocarbons Law establishes that mining authorities must consult with the Ministry of Energy if there is oil or other hydrocarbons in the area where the mining concession is required, making permitting processes slower. The Undersecretariat of Mining has been carrying out the Integral Model of Mining Administration (MIAM), which includes the digitalization of 42 related mining concession procedures, updating of the Geographic Information System

and the cross-referencing of polygons so they reconcile with the Public Mining Registry. We have also worked on the digitization of files related to mining concessions and the systematization of documents. We want to consolidate and modernize physical spaces for safeguarding documents to streamline the processes of mining regulation. We have also added a temporary increase in the workforce to reduce the backlog in the processing of procedures and correction of data from the Public Mining Registry through conciliation with historical physical records. The CartoMinMex information system is already online and works as a geographical information system for consultation with data from the mining archives, which at this stage includes mining cartography and its public registry.

Q: How is the Undersecretariat creating more international opportunities for the Mexican mining industry?

A: Many Memorandums of Understanding (MoUs) that the previous General Mining Coordination had signed were not being followed up on. We decided to make sure these agreements were put into action. We also increased our outreach by diversifying beyond Canada, even though this country will always be our main mining partner.

The Undersecretariat identified the main mining events and regions in the world that the sector could benefit from and decided to increase its presence in these areas, including Australia and China. In particular, Mexico and China signed MoUs in mining cooperation federally and provincially, as well as between the geological surveys of both countries. Business missions took place with holders of mining projects and throughout the present administration the presence of Chinese companies was gradually increased. Currently, Chinese companies have 20 mining projects in Mexico.

In the case of Australia, we actively participated in promoting investment in important mining events, which was reflected in a gradual increase in investment. Australian companies now have 30 projects in our country.

Q: How are you helping improve the financial opportunities available in the sector?

A: FIFOMI plays an important role as a facilitator of credit to small and medium companies. But in the past, more than 50 percent of the credit was being directed toward housing and transportation, which did not make sense. After many years, we restructured the credit for project financing and have already had several success cases. While FIFOMI used to give only MX\$320 million in direct credit, last year it reached MX\$1.25 billion.

We have also created a graduate scheme with Bancomext that companies can use as they continue to grow to broaden their financial opportunities. Bancomext has already supported five companies that were recommended by FIFOMI and we expect this number to rise. Our goal is to train companies and teach them how to use more professionalized financial models so they can eventually expand to list on the Toronto Stock Exchange, the most important market for the mining industry.

Q: Why are national banks so resistant to the mining industry?

A: National banks do not want to lend money to the mining industry mostly due to the high risk and the lack of knowledge given the complexity of the industry. The only bank that has shown interest is Scotiabank. It has a rich history in the Canadian mining industry. FIFOMI is helping close these gaps by organizing meetings with investors and banks to find more solutions for the Mexican mining industry. One option is the syndicated loan with the participation of private banks. This strategy has been widely accepted and promises to be effective in promoting the sector. We also collaborate with brokers, such as Trafigura, to offer revolving credit through a select group of banks with 60 days of financing at a favorable rate.

Our direct involvement consists also of providing a fund worth MX\$2 million to state authorities so they can promote the development of mines in their states. Zacatecas, Sonora and Chihuahua are involved in this fund, which is designed for small mining companies. There used to be many opportunities and funds available to small mining companies from authorities such as the Ministry of Agriculture, but these have slowly been phased out.

Q: How has the Undersecretary of Mining promoted the restoration of immediate deduction of pre-operational expenses for mining operations?

A: We believe the elimination of immediate deduction of pre-operational expenses for mining operations at the end of 2013 has lowered Mexico's ability to compete with other mining jurisdictions. We have facilitated meetings between representatives of CAMIMEX and the Ministry of Finance to propose restoration of such a fiscal incentive to Congress. Other actions to encourage mining investment in exploration in Mexico are the freeing up of land from 289

mining lots in the first half of 2018, with an area of more than 157,500ha available for allocation to those requesting it in the form of a mining concession.

The Mexican Geological Survey works on the 1:50,000 scale cartography of the national territory. One of its applications is the evaluation of the potential of existing mineral resources. The information generated by SGM is of public use through an institutional data bank called GeoInfoMex, which allows the information to be easily consulted in different layers, providing a significant saving of time and resources.

Q: What should the next administration prioritize when it comes to the mining industry?

A: The schemes implemented by the current administration have been successful. We strive to leave everything organized for the next administration with a report on our main advances along with suggestions on the main areas of opportunity that we did not get a chance to focus on. One example is updating the legal framework that was mainly approved in 1992. Back then it may have been a leading example in the industry but nowadays it is extremely outdated compared to other laws and regulations related to mining activity, like the environmental law.



Currently, **Chinese companies** have **20 mining projects** in Mexico

A long-term vision and a national policy are also essential to promote the development of mining and the country within a framework of sustainability, economic growth, social benefit and respect for the environment. The field of public policies to support the development conditions of the sector also has great areas of opportunity. Some of these include the creation of a Large Projects Office to accelerate response times and support strategic mining projects in collaboration with other federal agencies, the improvement of the fiscal conditions of the sector through mechanisms such as the immediate deductibility of pre-operational expenses, the development of a secondary market for mining concessions, the expansion of SGM's activities for the exploration of industrial minerals and the strengthening of the economic, technological and commercial cooperation ties with our strategic partners.

Mario Alfonso Cantú has extensive experience in the public, private and academic spheres. Since January 2013 he has served as General Mining Coordinator of the Ministry of Economy



CONSERVATIVE PRICE PREDICTIONS FOR LONG-TERM HEALTH

PETER DOUGHERTY

President and CEO of Argonaut Gold

Q: How do you evaluate Mexico as a mining jurisdiction?

A: When we evaluate our position as a company in terms of reserves and resources, today we are roughly 50 percent in Mexico and 50 percent in Canada. While we have more projects in Mexico, and that is where we are producing from, they are smaller in nature, whereas we have a very large, undeveloped project in Canada with about 4.2 million ounces of measured and indicated gold resource. Mexico is good for providing smaller projects for companies looking to start up. In terms of our portfolio, we always want to be diversified to reduce our exposure to the political risk involved in the industry.

There are other locations in Latin America where we have had wonderful experiences, including in Chile and Peru, so we are open to investing in these locations. Central America is also very attractive. Although Nicaragua is facing some unrest at the moment, it has a strong geological endowment. We have also not ruled out more projects in the US and Canada, so our focus is really all over the Americas. We are not looking to go to Australia, China or Africa right now as we do not believe we can add as much value in those countries.

Q: How much has the concession you acquired in Baja California Sur progressed?

A: We acquired two projects as a result of the acquisition of another gold company, one in Baja California Sur and one in Sonora. The project in Baja California Sur is one of the highest-returning projects anywhere in the world. The economics underpinning that project indicate a yield greater than a 50 percent rate of return. The project has a higher grade, relatively low strip ratio and a higher recovery rate. It holds around 1.7 million ounces of gold, so it is a substantial project but it remains underdeveloped. The project is located around one hour from La Paz, in a

relatively rural area. The interesting thing about this is that the local community really welcomes the project. When people become informed about the project, they can see the value for local communities. As soon as the permit is granted, we stand at the ready to move that project forward because it is a tremendous deposit.

Q: What are the main factors that allow the company to maintain a healthy balance sheet?

A: I think strategically we have to craft a roadmap and define how we will reach our goals in a way that provides accountability. Our expectation is that we live in a US\$1,250/oz gold price environment. We then look at what kinds of projects we need, which are essentially those with an AISC of US\$950 or less so we leave ourselves some margin. This is necessary to generate the cashflow we need to build the next mine. Those are the foundational pieces we use as the building blocks for the company's future. If a company can stick to those, it should be able to build a business. We have been fortunate enough to do that but others have found themselves growing too fast or shrinking margins too thin, and they end up in real trouble when prices inevitably change. As miners, we cannot impact the price of gold, so we have to take whatever comes to us. But the one thing we can do is become the most efficient at extracting minerals, processing them and getting the gold to market.

Q: What are the next steps to achieve your 2020 production goals?

A: The three projects we are running today will get us to over 200,000 ounces. We will have to expand the San Agustín mine slightly by adding a 10,000t/d crushing, conveying and stacking line to achieve this target. We are already embarking upon that goal and examining what we need to change to get there. We also have two other projects we are not even considering. These are both lower cost projects and have the potential to be higher producers than the projects we are operating today. They have very short construction windows of around one year but we still need to get past the permitting process. With those two, we can see ourselves producing over 300,000 ounces, and we have the large Canadian project on top of that.

Argonaut Gold is a Canadian gold company engaged in exploration, mine development and production activities. Its primary assets are the production stage El Castillo mine and the San Agustín mine

ORGANIC GROWTH, RESOURCE OPTIMIZATION STEPPING STONES FOR SUCCESS

SALVADOR GARCÍA

Director General and COO of Starcore International Mines



Q: To what extent do you believe gold prices will increase?

A: We believe they are set to go up throughout 2018. The problem we have identified with the gold price trend is its inherent fluctuation. We are gold and silver producers and, although both have suffered inconsistency in their variations, we maintain a great deal of confidence in both minerals. This price instability is challenging and complex to adapt to. The price levels of base metals such as copper, lead and zinc have remained suitable for our purposes, with greater stability compared to gold and silver. Our perception is that lead and zinc prices will continue increasing.

Q: How has Starcore modified its business strategy to position itself at the forefront of the industry?

A: In August 2017, we set in motion an intensive program of exploration and development, critical to maintain our San Martín mine within the expected production level and more importantly to prolong its lifecycle. To date, we are tripling the mine's original development plans in terms of production capacity. These measures have brought about new reserves and better results in the short, medium and long terms.

Q: Could you elaborate on your Letter of Intent to acquire Sinaloa's Santa Fe property?

A: This property is located an hour away from Mazatlan in Sinaloa's Rosario municipality. Global Kompas is undertaking the relevant PEA for this project, set to conclude by April 2018. The PEA will be decisive in our final decision to enter production. This project is quite advanced in terms of permitting, with the Environmental Impact Assessment granted, explosives use authorized and it is fully electrified. A third party will oversee the construction phase while we have yet to decide if we will cover the mine's development or if we will use another contractor.

Q: Sinaloa and Queretaro lack a mining track record. Why choose these locations to develop mines?

A: Attractive projects care little for territorial delimitations. As gold and silver producers, we are mandated to bring to life interesting projects, wherever they may be. We

continuously scout for economically viable opportunities and have no preference to one state over another. For instance, we have our Altiplano plant in San Luis Potosí's Matehuala municipality, where we treat precious metals concentrates. It is a strategic location to attract clients or concentrate suppliers to obtain gold and silver precipitates. Queretaro's mine is 25 years old. Starcore acquired it in 2006 and we have worked there ever since. The state is magnificent in terms of security and economic development.

Q: In these times of low prices and fiscal challenges, what can the mining industry learn from Starcore's optimization?

A: Careful economic and human resource optimization is at the core of our optimization strategy as any slight change in any variable of our business model equation can have a snowball effect, whether positive or detrimental. We established a department for operational excellence where principles such as adequate use and cost optimization in explosives use, blast efficiency and day-to-day operations, scoop type or mining fundamentals, are always upheld, especially in the face of uncertainty.

Q: What is the next stage of Starcore's growth?

A: While Santa Fe is the next project we will be focusing on to ensure our growth, we are also scouting for viable projects nationwide to continue growing. We are fully aware that a single operation is not sustainable in the long-term, so we are looking to expand our portfolio to another two or three and diversify. We have a couple of projects in the US, but we still consider Mexico as our main market and source for growth, despite the hurdles. Mexico has great potential and we only lack the proper incentives to regain the interest of both local and international investors of all sizes because our geological potential remains tremendous.

Starcore International is a gold producer with operations across North America. Its projects in Mexico include the producing San Martín mine in Queretaro, the Altiplano plant in San Luis Potosí and the El Crestón advanced exploration project in Sonora



FRESNILLO'S FORMULA FOR SUCCESS: STRICT CRITERIA, BULLISH INVESTMENT

OCTAVIO ALVÍDREZ

CEO of Fresnillo

Q: What factors helped Fresnillo increase its silver production in 2017 despite an overall drop in global production?

A: Our long-term vision has been key to our ability to maintain high production rates no matter the price cycle. It is our main differentiator. We invest in exploration continuously throughout the cycles and are not dependent on M&As; 95 percent of our growth is organic. This gives us the possibility of bringing onstream projects that are strong and able to withstand the cyclical nature of the mining industry without diluting the quality of our portfolio. Our strategy has allowed us to become one of the few companies that still has a strong growth pipeline despite the downturn. In 2017, we produced 53.3 million ounces of silver and 930,000 ounces of gold, making Fresnillo the world's largest silver producer and the No. 1 gold producer in Mexico.

Q: Why does the company believe that San Julian can become a new mining district in Mexico?

A: San Julian is our latest operation and it constituted the largest investment in the company's history. We invested a total of US\$515 million in the areas related to the feasibility study but we also considered the larger exploration potential of the district. By only exploring approximately 30 percent of the area we were able to develop a mine and this makes us believe that resources and reserves will continue to increase for many more years. In the first two years alone, we were able to increase the reserves we had initially identified in our feasibility studies. We have two different ore bodies in the area, one of which is disseminated and requires a flotation process while the other is a vein system that uses a dynamic leaching process. We had to invest such a large amount in San Julian because of the two different processes required and the initial lack of infrastructure in the area,

Fresnillo is the world's largest silver producer and Mexico's largest gold producer. It is listed on the London Stock Exchange and has seven operating mines across Mexico. In 2017, it produced 53.3 million ounces of silver

but its positive return and the additional potential drove our decision to follow through with the project.

Q: What are the next steps Fresnillo is taking to start production at Juanicipio?

A: The public information we have released on Juanicipio is from our prefeasibility study in 2012. We are in the process of concluding a full feasibility study as we have now a larger volume of resources and we realized that a larger capacity would require a bigger investment than what was publicly released. Juanicipio is the next-largest project in our pipeline and we are discussing with our JV partners the conclusion of the feasibility study. The approval process will be followed up by the project construction phase. Our goal is to start production in mid-2020 and we have identified 250 million ounces of indicated silver resources. This may be smaller than Saucito but those are high-quality ounces to add to our portfolio.

Q: What criteria does Fresnillo use for new projects before incorporating them into its portfolio?

A: We expect all our projects to have a minimum of 150 million ounces of silver when it comes to reserves or 3 million ounces of gold for us to consider it suitable for our portfolio. Most of our mines are also in the first quartile in terms of production costs so this is a key aspect to consider in our projects before we even think about developing them. We prioritize a stream of quality production ounces in our portfolio. The project also must be able to provide at least 15 percent IRR that can be achieved with higher grades or competitiveness in terms of the investment required to develop it.

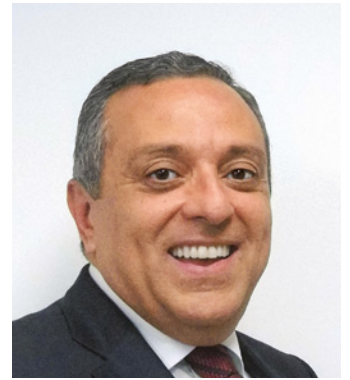
Q: How important is it for Fresnillo to diversify its areas of operation?

A: In Mexico, we have 1.8 million hectares of exploration concessions and have many targets to explore but we believe that it is always healthy to diversify. The company has identified exploration opportunities in Peru and Chile and is scouting Argentina. We see Peru as a good country to enter as it has the culture and tradition of mining.

INTRODUCING PROGRESS AND EXCEEDING GUIDANCE IN OAXACA

LUIZ CAMARGO

Country Representative and Director of Finance and
Corporate Affairs of Compañía Minera Cuzcatlán



Q: How do you ensure responsible and sustainable operations and how do you add value to the communities you work with?

A: In Mexico, we work in Oaxaca, which is probably the most complex state in which to operate a mine. But Fortuna Silver Mines, through its subsidiary Compañía Minera Cuzcatlán, was able to change the mentality of the communities of San Jose del Progreso. This area was marginalized with little infrastructure development and scarce public services for education, health and sanitation. Today, the area around where we built our operations has flourished and developed sustainable communities, with schools, local stores and other amenities that benefit the community. Our company always prioritizes security, environmental and social aspects. Our operations in Oaxaca started producing in 2011 and are expected to be exhausted by 2024. From the exploration to the forecasted closure phases, our investment in the area totals over US\$1 billion, including CAPEX, materials, supplies and services. The company will also contribute over US\$340 million in taxes over its life cycle in the area

We are committed to the local communities of San Jose del Progreso and nearby communities. In 2017, we spent US\$33 million in the area on supplies, labor and raw materials. This money included the workers' share of the profits (PTU) and expenditures. This is a lot of money for such a small region. Also, our relationship with the local and federal authorities has been very good and they have been supportive of this project. The company's policy is to be strictly transparent and in full compliance with local requirements.

Q: How close are you to accomplishing the company's FY18 guidance and how much production is coming from Mexico?

A: Fortuna's annual production guidance for 2018 is 8.3 million ounces of silver, 48,300 ounces of gold, 25.8 million pounds of lead and 44.8 million pounds of zinc at an estimated consolidated AISC of US\$6.8/oz of silver. Ninety percent of the silver guidance and 100 percent of gold guidance comes from Mexico, while zinc and lead are predominantly from Peru. We expect to exceed our forecast by at least 10 percent. Regarding our San Jose

mine in Oaxaca, our original forecast was to produce 850t/d but we were able to start outright with almost 1,000t/d in 2011. By 2014 our production was at 2,000t/d. In 2016 we reached the peak of the mine's operations with 3,000t/d while adhering to budget.

Q: You have several exploration projects in joint venture with Prospero Silver. How successful has this been?

A: I think this JV is working very well. By the end of 2018, we will decide whether to increase our participation, which is less than 20 percent currently, or select some of the properties Prospero is analyzing and take them to development ourselves. We expect our property portfolios in Mexico to increase as a result of this JV.

As for other exploration activity, we are looking at both brownfield and greenfield projects. Compañía Minera Cuzcatlán's 2018 budget for exploration in Mexico is almost US\$10 million, most of which will be spent near our current operations in Oaxaca.

Q: What is Fortuna Silver Mines' expectation for its operations in the country?

A: Fortuna Silver Mines is a relatively young company, having started 14 years ago, but our board and staff are experts in the mining industry and the opportunities that exist in Latin America. We have operations in Peru and Mexico and will start in Argentina in the third quarter of 2019. We are focused on strengthening the company's foundation based on a culture of sustainable growth. We are also building a robust platform and organizational structure that can be replicated in other mining jurisdictions abroad. This implies analyzing the capabilities we have and harmonizing these with our needs. Fortuna's first mine was in Peru, the second in Mexico, the third will be in Argentina. Our fourth mine most likely will be in Mexico.

Compañía Minera Cuzcatlán is a subsidiary of Fortuna Silver Mines, a rapidly growing precious metals producer that operates two low-cost mines in Peru and Mexico and holds commanding land positions in Peru, Mexico and Argentina



MEXICO MINING *forum* 2019

**SHERATON
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MEXICO CITY,
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“The organization was very executive, the program balanced and well-thought out and the speakers with solid backgrounds in all areas. The presence of the Canadian Minister for Natural Resources as key-note speaker was most welcome”

*Armando Ortega, Vice President
Latin America of New Gold*



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ZINC SURPLUS TO FEED US MARKET

FERNANDO ALANÍS
CEO of Industrias Peñoles

Q: How optimistic is Industrias Peñoles regarding industry growth, considering the volatility of the sector?

A: There are many people within the mining industry who speculate but few who actually understand what is happening. Precious metals are highly volatile and companies cannot change their plans every time there is an unexpected change. Successful companies need to have a long-term vision and not let themselves get carried away by the ups and downs of the price cycle. We need to focus on the few things we can control such as reducing costs, increasing productivity and being highly efficient and everything else will fall into place. Companies that follow these rules can obviously still be impacted by a sudden drop in prices but they will be strong enough to survive the volatility.

Q: Why is the company taking a bet on zinc by investing in the expansion of its refining plant in Torreon?

A: We believe that Mexico is in an optimal position to refine zinc. The North American market is experiencing a zinc deficit but Mexico has a surplus of the metal. The main markets for zinc are automotive, construction and home appliance manufacturers because the metal can prevent steel corrosion. The US is one of the biggest consumers in the world for zinc thanks to its growing infrastructure industry.

In response, we are investing US\$327 million in our refining plant in Torreon to increase production to 360,000 tons from 240,000 tons. We export the material to various countries and regions around the world, such as the US, Europe, Central and South America. The expansion is almost completed and we are collaborating with Outotec, a company that serves a wide variety of sectors, to incorporate new technology into the plant. The project is expected to be completed in May 2018. A large portion of the additional product being refined will be sent to the US.

Industrias Peñoles is a 100 percent-owned subsidiary of Grupo BAL. The group is the largest gold and lead producer in Latin America and through its subsidiary, Fresnillo, the largest silver producer in the world

We are completely self-sufficient and can do everything from production to processing and refining. The company has a commercial office in Connecticut and various warehouses around the US. Sixty percent of the zinc we refine is adapted to the specific needs of our clients. We can also provide technical support and help our clients make sure that zinc is up to par with their operational requirements.

Q: How close is the Rey de Plata project to starting production?

A: This project has already finished its exploration phase and will go into production in 2019. It is located in Guerrero, an area complicated by security issues but we are making sure to work hand-in-hand with surrounding communities to avoid problems and by proving the economic and labor opportunities the mine can bring to the region.

Q: What does the country need to become a more competitive mining jurisdiction?

A: To experience a boost in the industry, Mexico truly needs clearer public policies. Many years ago, someone saw the potential Mexico had in the automotive industry and decided to establish a series of public policies to incentivize the development of this sector. The country now plays an important role in the automotive sector thanks to the vision this person established. The mining industry in Mexico needs a similar set of actions to take full advantage of the potential of the mining sector.

To see more projects in the country, we need less jurisdictional volatility to incentivize investment because mining law plays a crucial role in competitiveness. The results of the Frasier Institute Report are a clear example of this. In 2011, Mexico's mining sector experienced US\$15 billion in investment, a record high, while in 2017 it dropped to US\$3 billion thanks to the changes in the law. Considering that the industry requires a long-term investment, public policies should also have a long-term vision. One of the biggest issues is that exploration is no longer deductible in a year, which is something common in countries like Australia and Canada. Exploration is the core of mining and a drop in investment will negatively impact the industry. These kinds of policies need to be adjusted.

BETTING ON BASE METALS WITH SUSTAINABLE GROWTH

DARREN BLASUTTI

President and CEO of Americas Silver Corporation



Q: With zinc prices rallying, what is your midterm outlook for the metal and how is Americas Silver positioned to take advantage?

A: We have been very bullish on zinc. We just built a new zinc-silver-lead mine, San Rafael in Sinaloa, which came online in December 2017 and is now ramping up. Our internal estimates envision zinc prices averaging about US\$1.40/lb over the next three years. Even though those prices are not as high as the prices we are seeing today, as an average this number makes us very bullish on the metal. We see strong deterrents on the supply side with respect to environmental regulations and dropping grades in China. These are all factors we believe will continue. We also see dynamism from the offtake side. We signed a four-year contract with Glencore, which would have been unheard of two years ago. We will produce about 45 million pounds of zinc in 2018 from our Sinaloa mine and rising in 2019. This compares to 9 million pounds in 2017.

Q: In terms of diversification, to what extent have you looked to emerging metals like lithium that are surging in demand?

A: I have been in the mining industry since 1994. In this time, there have been many trendy metals, like rhodium, rare earth elements, molybdenum and now lithium. We do not feel the hype is sustainable over the long term, as prior experience has taught us. Right now, lithium and cobalt are doing well, but molybdenum is not. We understand the supply-demand fundamentals of the metals we are involved in. That being said, we are very bullish on zinc, lead and copper and we will be a very fast follower, increasing our brownfield and shutting down silver production when prices go up.

Q: How would you evaluate the operating environment in Sinaloa?

A: Our CSR strategy is always based on quality employment opportunities. In terms of the Sinaloa property, much of the groundwork was already done by Scorpio Mining, the company we acquired, and it did a fantastic job in laying the company's foundations in the area. Cosala is a small community and a substantial portion of its GDP comes from our activities in the area. We employ around 350

people, and when including the supply chain and indirect employment, the community recognizes how much of a benefit the mine provides.

More broadly, the main challenges when investing in Mexico can be seen as common to almost all jurisdictions. Property rights issues can be a challenge since the system can be formalistic and rather cumbersome. Sometimes it is not clear who has what interest in a property and the process for a final determination can take a very long time while having significant implications. We have worked through this and feel that things are getting better with both the system and our familiarity with it.

We have a good workers' union, which has been understanding of the dynamics of our business. For example, we had 450 people working here when we took over the company and, unfortunately, we had to lay off 220 people in the first few months. We did this with every intention of re-hiring these people as soon as the company turned around. We stuck to our word and now our staffing levels are up to more than 300. There is a chance that this will climb further when Zone 120 comes online.

Another challenge is finding a balance in our community activities and investments. For example, if the local government requests resources for a certain activity or project, we must consider how our contribution will be valued by the community. It may be better to independently take on projects that directly benefit our closest stakeholders. We are happy to contribute and ensure that all people in the towns we operate in get value from the mine. But we also want the community to see that we are the source of this contribution and this is not always clear with government-run initiatives, including the Mining Fund.

Americas Silver Corporation is a leading junior silver producer with a strong operating platform in the Americas. With the recently constructed San Rafael mine in full production, it is positioned to become one of the lowest-cost silver producers



PROSPECT GENERATOR GOING IT ALONE WITH CUALE PROJECT

PADDY NICOL

President and CEO of Evrim Resources

Q: Why did the company decide to focus on the mineral belts in the western North American continent?

A: When Evrim was launched in 2011, we were interested in a database and a group of projects that were located in Sonora, Durango and Sinaloa. They were high-quality projects and this is what initially attracted us to the region. We also have a great deal of exploration expertise in the Western Cordillera of North America. Many people working for Evrim are experienced in the gold belts of Mexico and the copper porphyry belts in British Columbia. This strategy allows us to really focus and understand not only the geology of the region but also on regulations and community relations.

Q: What are your expectations for the US\$7.2 million private placement from Newmont Mining?

A: The first time we did an alliance with Newmont was in the Trans-Mexican volcanic belt for early-stage generative exploration over a broad area. That experience created a strong relationship between both parties. When Newmont wanted to expand in North America over a larger scale, it made it much easier for us to have that discussion on what Evrim could provide. When the discovery at Cuale was made, our relationship made it easier for Newmont to invest US\$7.2 million into Evrim, and approximately US\$5.8 million of that amount is earmarked for exploration of our Cuale high-sulfidation gold project.

Q: How close is Evrim to forming a JV for Cuale?

A: With respect to Cuale, it is the one project Evrim has decided to keep in its own portfolio and not JV. For every project generator, there comes a project where the opportunity and geology are so compelling that the company will take its own risk capital and stake it on that, and that is exactly what we are doing with Cuale. We have been able to use Evrim's share value as leverage to raise

a significant amount of funding for the Cuale project. At least 80 percent of the funds raised by the Newmont private placement will be allocated to exploring Cuale. We generally like to mitigate exploration risk and that was one of our key strategies. But we will assume most of the risk on Cuale. Having said that, it is an extremely prospective high-sulfidation gold target and I think Newmont shares the same outlook that we do in thinking Cuale has a tremendous amount of potential to grow into something very significant.

Cuale is a project that has never been drilled and is creating a lot of excitement in the market. It is not very often that a company comes across a target with the numbers that were found in the trenching programs. Those numbers alone have generated tremendous interest from a number of groups as to what our next steps will be. It is still a fairly early-stage project but an exciting one.

While most deposits in the Talpa de Allende area of Jalisco are polymetallic in nature, Cuale is a gold target, which is pretty unique for the region. The project has near-surface potential of high-grade gold, and high-sulfidation deposits are considered among the lowest-cost producing mines. The size of successful high-sulfidation deposits in the Sierra Madres can be in the range of 2-5 million ounces of gold, as seen at La India, Mulatos and El Sauzal.

Q: What has been your experience working in Jalisco, which is not a traditional mining state in Mexico?

A: Jalisco is a lesser-known area for exploration, especially from a junior perspective. But in 2012, we formed an alliance with a company called Callinan Royalties and through this we were paid to conduct generative exploration and acquire projects for our own account, in exchange for a royalty. One of the prospective areas we identified through this program was the southern Sierra Madres, which is where Jalisco is. As previously mentioned, the state is known more for being a polymetallic belt rather than a gold belt but our team was very interested in the region, and Cuale was one of the projects that emerged from that program. The fact that Jalisco is a lesser-explored area is also an opportunity for us to enter and acquire ground on a fairly inexpensive basis.

Evrím is a mineral exploration company operating under the prospect generator/joint venture business model. It is fiscally conservative and participates in multiple discovery opportunities

GROWING THROUGH ADVANCED TECHNOLOGICAL APPLICATIONS IN MINING



HÉCTOR MIRANDA

Mexico Country Manager of Orica

Q: How do your blasting services differ from those offered by other companies?

A: We provide innovative solutions that can greatly reduce time and costs. For companies that are not afraid to incorporate new technology, we can help them to increase productivity rates considerably in the same window of time as more traditional systems. And for those that are more conservative and wish to retain their existing mechanical systems, we can help them find ways to improve their process and reduce costs.

We have noticed that initiation systems in the industry have evolved considerably and this could change the way blasting systems work. Programmability in detonators now allows companies to adapt blasting systems to the needs of the operation on a daily basis and we use these solutions in our portfolio. We differentiate ourselves by providing products that no one else offers in the market that can greatly improve operations. For example, we are the only suppliers of i-Kon, the top-selling electronic detonator globally. Just recently we introduced wireless system Webgen into our portfolio. This can be initiated remotely and helps mines to fully automate blasting processes. In fact, we just carried out our first tests of these products in Canada with Goldcorp and we are now starting to promote it in Mexico as well. Fresnillo is quite likely to adopt some of these products as it is a company that prioritizes investment in technology.

Q: In which phase of the mine production cycle do you specialize?

A: We participate in initial unitary process, which is drilling and blasting, and the result of this process impacts approximately 90 percent of performance of the following downstream processes. Our services are dictated by what size of fragmented rocks the operation requires. For example, milling processes require much finer rocks than a leaching system. Ideally, at the planning stage we can collaborate with mining operators in feasibility studies and help them to incorporate the most cost-effective blasting system possible, thereby challenging output assumptions of the mine. This can effectively reduce CAPEX. But companies

rarely do this, so we provide a tailor-made solution to each operation with each plant design already in mind.

Q: How is your business impacted by the development of more complex mines that are increasingly going underground?

A: I believe that Mexico will experience an increase in underground mines over the next 20 years as many open-pit mines will shift to underground to better extract mineralized bodies and become more cost effective. Many mines start off underground, turn into open-pit mines, then start underground operations once again. Big open-pits more likely will convert to underground when cost requires that shift. That is the case of big pit in copper mine in other countries like Chile, where Chuquicamata after 100 years of exploitation is now moving from the largest copper open pit to one of the largest and newest underground mines in the world.

Q: What strategies will the company deploy to maintain its leadership in global explosives?

A: Orica is now focusing on expanding its presence by acquiring companies that can provide innovative technology solutions to maintain its competitive edge. We have incorporated groundbreaking solutions to our portfolio through this strategy such as GroundProbe a novel technology in radar that can predict movements to avoid surprise motions within rock structures. Orica is also starting to provide services in intelligent blasting to use data to create a design and improve processes continuously, with a new technology called BlastIQ that includes the latest in geological data management. Finally, Orica also is offering high-level technology in ground support for underground operations. While Orica is focusing in new development in technology, we remain open to acquisitions that can help us to continue growing and securing our position in the market.

Orica is the world's largest provider of commercial explosives and innovative blasting systems. It is also a leading supplier of sodium cyanide and a specialist provider of ground support services in mining and tunneling



GENERATING ROI BY PRIORITIZING QUALITY AND EXPERTISE

ÁLVARO CHACÓN

Managing Director Mexico and Central America of Martin Engineering

Q: In what ways is Martin Engineering benefiting from the industry's positive outlook?

A: The company is experiencing growth for the third consecutive year and we have not seen these kinds of results in two years. Part of the performance is due to more selectivity in terms of purchased products and better-trained employees, which makes us more competitive. The industry is expanding in terms of volume and percentage and in 1Q18 we were able to hit monthly targets within the first week of each month.

On a global basis, mining represents 30-35 percent of our effort and resources and in Mexico, our participation in the industry is similar, with 35-40 percent dedicated to the sector. Our number one client is Goldcorp and we have a site in Peñasquito with a team of 25 technicians. Goldcorp recently awarded us an additional two-year contract. We are working on diversifying our portfolio and acquiring new clients and we have already reached a deal with Operadora de Minas, a subsidiary of Grupo México in Cananea. Originally, we were working with it through a distributor but believe that it is more efficient to deal with the operator more directly.

Q: What is the company's main added value in comparison to companies that offer similar services?

A: We differentiate ourselves by prioritizing quality and providing multifaceted services and solutions. Unlike other companies we make sure that we have an experienced team of technicians who can help operators onsite. One downside is that it can be quite costly to maintain this quality as companies do not want to pay for the added value. For example, in one project in Coahuila with Grupo Altos Hornos de Mexico, we are providing a team of 25 technicians who work onsite all year long although the operator does not fully pay for these costs. This greatly

impacts our profit margin and makes it difficult to balance quality with earnings, which is a normal paradox within the industry. We find that we are selling more but earning less.

Q: How do you overcome resistance from companies that do not want to pay more for higher quality services?

A: In effect, we are analyzing our business model and production process to find ways to become more competitive without compromising quality. One way we are doing this is by an alliance we created with Pennsylvania State University Department of Minerals and conducting a study to identify the ROI that the presence of these technicians is providing clients in terms of security. We are doing this because we believe increased safety often implies higher productivity in comparison to projects that do not have a team of technicians and we are using data to prove this. This study is already having a significant impact on the industry and we have coined a new term, Return on Conveyor Safety, to show the true value of what we offer the sector.

Q: What would Martin Engineering like the next administration to prioritize when it comes to the mining industry?

A: I would like the government to understand the differences between what the public and private sectors can offer the country. They both play important roles in Mexico and the administration should do its best not to inhibit investment.

Authorities should also try to diversify FDI in the country as we are highly dependent on Canadian companies and we could have more investment from other regions such as Latin America and Europe. They should also facilitate processes and regulations, and one welcome effort would be to overturn the recent regulation that dictates operators must wait 10 years to deduct exploration investment. Allowing them to do so within the first year would greatly help the industry. All these factors are important because Mexico can be a difficult country to work in as it has *ejidos* and surrounding communities that have the power to impede projects.

Martin Engineering is an engineering firm with more than 70 years' experience and a global presence of highly-experienced technicians and engineers in 19 countries on six continents, and customers in dozens of industries

AN UNDERSERVED AND GROWING MARKET IN MEXICO



Jeffrey Davis
President and CEO of Cyanco



Leonardo Martínez
Business Development
Manager of Cyanco

Q: How does the sodium cyanide segment impact the mining industry?

JD: The sodium cyanide industry plays a critical role in the global gold and silver mining value chains, but is structurally underinvested. The global market for sodium cyanide is growing rapidly and there are only five major players that we consider to be top-tier producers. In effect, most of the major global gold producers only want to buy from one of these five companies. Considering the discrepancy between demand and supply, the industry will experience a global cyanide shortage in 2019. I would advise all our clients to design a good supply chain strategy with trustworthy producers. Demand is growing more quickly than capacity. We have only been in Mexico for three years and we already have 10 percent market share. The segment will continue to grow and we want to strengthen our position to remain among the Top 3 producers in the country.

Q: What role does Mexico play in the global sodium cyanide industry?

LM: Mexico has a long history of mining and is blessed with an abundance of mineral resources. The level of mining activity also makes Mexico the second-largest consumer of sodium cyanide in the world. Sodium cyanide may be a global industry but companies can only achieve competitive advantages at a regional level. As Mexico is a strategic market for us, we have a factory in Houston and a distribution terminal in Hermosillo, Sonora. It is our key focus outside the US.

Q: How does the company plan to expand its presence in Mexico?

JD: To better serve our customers with warehoused products in the country, we expanded our distribution terminal in Hermosillo and our transloading capability. We also built a plant in 2012 to meet the demand in Mexico and to increase our supply.

Many of our competitors are also growing their presence in Mexico. Cyplus inaugurated a plant in Veracruz in 2017, Chemours announced that it is building a plant in Durango that will start producing in a few years and Cyanco will be the next one to increase capacity. From an outsider's

perspective, it may seem that the industry is being saturated but the demand is so great that the market requires and welcomes all these new plants.

Q: How are you adapting to the rise of new technologies such as biomining ?

LM: Even though sodium cyanide is 125 years old, it is still considered state-of-the-art technology. There is nothing that works better. In our view, no product will be able to replace sodium cyanide in the medium term. In bioleaching, every single mineral must be processed uniquely and requires different solutions, whereas sodium cyanide works on a diverse range of ore bodies. A mine manager is not going to replace a product that can guarantee an optimum percentage recovery with something that may be more sustainable but can only recover a lower percentage. The difference in profits is too significant. The industry is always evaluating alternatives but up until now no other solution provides the proven, industrial-scale reliability that cyanidation does. We are not closed to new technologies. If something appears in the market that proves to be a good alternative, we are open to incorporating it. However, for now, sodium cyanide continues to be the best option for silver and gold mines.

Q: How is the company mitigating geopolitical risks and what trends are you seeing?

JD: We are not worried about the NAFTA renegotiations as the Mexican mining industry is still heavily dependent on imports and it is doubtful that anyone would allow the ecosystem to be interrupted. Otherwise, operations could shut down overnight and there would be many angry miners. South Korea is a significant supplier of sodium cyanide for the Mexican market and any escalation on the Korean peninsula or disruption of shipping routes could have a major impact on global markets. On the upside, prices are becoming stronger and our customers are starting to see greater cash flows.

Cyanco is one of the world's largest producers of sodium cyanide. Founded in 1988 in Winnemucca, Nevada, the company offers innovative cyanide solutions to increase safety and reduce mine costs



OPERATOR PUTS CSR AT THE HEART OF MINING

CARLOS SILVA

Director General of Carrizal Mining

Q: As the Mexican mining industry becomes increasingly international, what are the main challenges that companies in the sector face?

A: Before the year 2000, the mining industry here was predominantly Mexican. It was not until 2003 that foreign companies started to enter Mexico and they have added a new perspective to the sector. The transition has not always been easy and we need to strengthen the leadership skills at both international and Mexican mining companies. The industry is also struggling to maintain its strong family values. Before the sector became more global, Mexican operators often invested in developing neighborhoods close to the mines so employees could bring their families with them. But it is no longer as common for miners to take their families to projects that are in remote areas and companies are no longer investing in developing nearby neighborhoods. Miners used to work six days a week and rest one. Since their families were close to the mines, they were able to dedicate this day to spending time with their loved ones and to see them at least once a week. But now miners work 20 days in a row and rest 20. Due to the family structures in remote areas, often mothers must take care of the family alone for 20 days at a time. Now, Carrizal Mining is contracting families rather than employees for 20 days at a time. As a result, our productivity is better and the families are extremely happy onsite.

Q: What have been the main results of the organizational changes Carrizal Mining implemented?

A: In 2013, we decided to internally change our focus because the company was in a weaker financial position. Thanks to these changes our company has enjoyed a steady rise in profitability over the past three years. 2017 was a great year but prices did not reach the levels we saw in 2012. To keep profit levels up, we had to increase

productivity and efficiency. We also went back to the basics and focused on acquiring a team imbued with values that align with those of the company, such as honesty, respect and keeping the family close. This has helped bring more purpose to the company and to maintain production levels at an optimal level.

Human capital is a big priority for us. We do not rely on recruiters and have developed a unique system to select team members that includes a three-month trial. Finding and retaining talented people is always a challenge. Through our system, we carefully identify the strengths and weaknesses of each member and create a plan to further develop each one.

Q: What are the company's plans for the Zimapan concessions?

A: We are not owners of the concessions in Zimapan and this means that the mine has a limited lifespan. Carrizal Mining plans to expand the mine's lifecycle by acquiring the concessions. The area has a history of mining. Peñoles left the area in 2000, Trafigura then entered the area in 2004 and left in 2008 and we came into the picture in 2009. We hope to continue the mining tradition of the area by expanding the project.

Q: How are women impacting the industry and what role do they play at Carrizal?

A: Women continue to have an important role in the company. Most companies hire women to simply handle public relations with the government or for similar roles, but we go beyond that and make sure they are an important part of our operations. We have women in executive positions. We have four managers, only one of whom is male. We have a woman in charge of analyzing risk in our operations, a woman in technical services and a woman in the administrative and financial area; all are at the highest level of the company. The matter of women in mining is often used by companies to help strengthen their reputation. But the roles that are given to women are all too often superficial. Not enough women are being given directorial or leadership positions. Carrizal is one of the few companies that offers these opportunities.

Carrizal Mining is a Mexican-owned company located in Zimapán, Hidalgo. It produces lead, zinc and copper. It is committed to being a sustainable company, dedicated to the environment and to the health of its human capital

ENERGY AS A MEASUREMENT OF OPERATIONAL EFFICIENCY

FELIPE RIVERA

Industry Business/Process Automation Hub Leader Mexico and Central America of Schneider Electric Systems Mexico



Q: How does Schneider Electric help mining companies optimize their energy consumption?

A: For Schneider Electric, the approach for energy administration must be based on diversification of supply. This allows the creation of a strategy for cost management through different energy generation possibilities. For example, some regions where mines are located are favorable for solar or wind generation, among others. The idea is to build an energy approach based on diversification and power banks, ensuring availability and supply, minimizing costs and optimizing resources.

All big mining companies in the country have their own energy diversification plans. Schneider Electric works with several of these to optimize the ways in which they can generate that energy. The industry remains gas-dependent so our goal is to realize a broader diversification. We are convinced that the available technology, such as IoT, Big Data, artificial intelligence and analytics, gives the industry a tangible opportunity to optimize the use of its assets. First, companies need to strive for energy diversification and then for optimization. That is, to not depend on only one source, but to also consume less and produce more.

Q: How will Schneider Electric's EcoStruxure platform revolutionize the Mexican mining industry?

A: This data architecture is based on the collection of all available technology for data management plus the company's 130 years of research and development on automatization, energy optimization and asset management. At its core, it impacts the capacity to process information in field devices. The mining industry has thousands of them, so we are implementing new features for data management that allow sensors to multitask. This way, they keep performing their main duty, which is to measure something like temperature or vibration, while at the same time, providing a series of readings related to the main variable. For example, this allows the measuring of a field device's vibration, temperature and atmospheric humidity, opening the possibility for correlated analysis of multiple variables. As a result, it ensures a better monitoring of asset optimization and calls attention to any piece of machinery that requires intervention. It is impossible

to keep all equipment working at 100 percent availability; it is not viable given the high maintenance costs for this level of performance. But there is an algorithm for achieving the correct operation of machinery in a certain mine that reduces operational, energy and maintenance costs.

Our slogan "Energy Does Not Lie" refers to a fundamental physics concept in which energy consumption reflects the behavior of a person, a machine and even a society. This is the same principle with companies, as they must strive to remain at their best operational performance. So, we focus on guaranteeing that their energy will be used in the best possible way. Within EcoStruxure there is also a specialized architecture for water management that ensures the measurement of water conditions. Companies can thus manage the amount of water used, how much will be cleaned, reprocessed, re-used and all the energy required to achieve sustainable consumption. We continuously develop technology to support EcoStruxure by launching about 365 patents per year to secure optimum energy consumption for our clients.

Q: How can mining companies start to incorporate IoT and IIoT into their operations for greater efficiency?

A: Our technology offering can be incorporated starting from just one sensor or engine. For example, one installed speed shifter provides real-time readings on engine burnout. Suddenly, the mine is working with mathematical algorithms as it acquires the capacity to measure and process information. This analysis is predictive and reports the state of operational efficiency. Our capacity to process information will give us power, so it is key for miners to stay at the forefront. Technological innovation no longer takes years but just days. As commodity prices are so volatile, the industry's needs are constantly changing. So, technology developers must keep up with these changing needs in a collaborative way to meet shifting demand.

Schneider Electric is a global leader in electricity management, helping clients optimize energy levels and resource consumption to create an overall more efficient and sustainable level of production

MEXICO

MINING REVIEW

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ON TRACK TO FINDING A PERMANENT SOLUTION TO BLOCKADES

FRED STANFORD

President and CEO of Torex Gold



Q: How did the controversy around the El Limón-Guajes (ELG) mine develop and how has this progressed?

A: This problem caused us to lose the last two months of 2017 and the first month and a half of 2018, which equates to 25,000-28,000 ounces per month. What happened was an old fashioned 1950s union raid. We have a union to which over 50 percent of our employees have signed membership cards. However, another union believes that it should be the union to represent our employees. There is a perfectly legal process for sorting matters like that out with employees going through a government-sanctioned independent ballot. This external union, instead of following the legal process, decided to blockade the mine and shut down operations. When taking into account the multiplier effect, they probably threw 7,000 people out of work, despite the fact that a union is supposed to look out for the best interests of the employees.

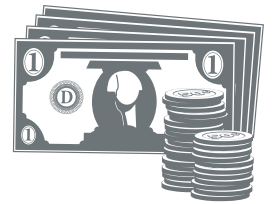
Likewise, the blockading union has tried to blame the company for everything bad that has happened around the area. There have been three fatalities that have nothing to do with Torex or the blockade but because the deceased had some form of connection to the mine, the union has tried to blame the company for the fatalities. I am accustomed to working with unions that seek to improve the lives of employees. It is hard to understand why a union would value political action and their own self-interest over the needs of the thousands of employees of our company, and of our contractors and suppliers, that have been thrown out of work by Los Mineros' actions.

Q: What support have you received from Guerrero's government to overcome these obstacles?

A: The government has certainly provided us with support, albeit it took a little longer than we would have liked. Guerrero as a mining jurisdiction will need to re-earn some trust. Torex made a US\$1 billion investment in the state, and we expect that in return the company will be able to operate every day. It is unacceptable that our operations were shut down for so long simply because someone thinks erroneously that the company has the capability of

changing unions. Although there are a few problems left, I think we are on the right path to a permanent solution.

Torex made a **US\$1 billion investment** in Guerrero with the **El Limón-Guajes** and **Media Luna** projects



Q: What are your plans for your current properties and your future in Guerrero?

A: Across the Balsas River at our US\$500 million Media Luna project we will continue to drill, although its access is still blockaded. Obviously, we need to evaluate the merits of that project, given the propensity to blockade, and I do not think it will progress as quickly as it would have before. In terms of acquiring new properties, the purpose is to diversify single-asset risk so we would not put it in the in a place where a single event can impact more than one of our assets. Our first acquisition would not be in Guerrero but our second one may be.

Q: What are your forecasts for gold prices in 2018 and 2019?

A: My general world view is that civility is in decline and rogue states can become more rogue with the loss of US influence. Civility in decline tends to be bad for the world and what is bad for the world tends to drive an increase in the gold price. I think inflation is likely on the return, which is also bad for the world but good for gold. The world is also facing uncertainty regarding how capital markets will respond to the unwinding of quantitative easing. This has the potential to cause a decline in the prices of stocks and bonds, which I think will drive people to gold as a safe haven.

Torex is an intermediate gold producer based in Canada. It is engaged in the exploration, development and operation of its 100 percent-owned Morelos Gold Property, an area of 29,000ha in the highly prospective Guerrero Gold Belt



EDUCATE TO ENCOURAGE GREATER BMV PARTICIPATION AMONG MINERS

JOSÉ-ORIOI BOSCH

CEO of BMV Group

Q: How are you attracting mining companies to the BMV?

A: The sector has a great deal of potential in Mexico simply because of the country's geological wealth. We have a few mining companies listed on the BMV, but not enough. The mining sector represents 4 percent of the country's GDP and there are many mining companies working here, but only four companies are listed on the BMV: Peñoles, Grupo México, Autlán and Minera Frisco. These companies can take advantage of the BMV's different products since we do not exclusively focus on the stock market. Some of these companies also have short and long-term debt, so a lot of the time private debt is listed on the BMV to attract investment.

In Mexico, there needs to be a greater diffusion of knowledge in terms of the benefits and the processes for listing on the BMV. The problem is that many companies that require financing to grow or to carry out their expansion plans are not familiar with the BMV, its products or requirements. I think this is the main challenge. Those companies that have taken advantage of the opportunities of the BMV have been extremely successful.

Q: Why does Mexico not have a system like Toronto's designed for SMEs and junior mining companies?

A: We have the legislation and, to a certain point, the products. The issue is that the level of financial education in Canada is far more widespread. In Mexico, smaller companies can already list on the stock exchange and the barriers to entry are actually very low. For example, there are no financial requirements to seek financing in the debt market. Requirements for capital markets have been loosened and we have been creating new products like the *Sociedades Anónimas Promotoras de Inversión Bursátil* (SAPIB), which are designed for small to medium-sized companies.

BMV Group is comprised of companies that together operate a stock exchange, derivative products, an OTC securities and derivatives brokerage company, a securities clearing house and a derivatives clearing house

We also have a promotion department that focuses on seeking out these companies that are not necessarily large but that want to grow and that need resources to do so. For a while now, we have provided an incentive plan for companies with less than MX\$500 million of shareholder equity, whereby the listing fee is not charged and the first year's maintenance fee is charged at a 50 percent discount.

Q: What are the implications of the new BIVA stock exchange for your strategy?

A: We are not yet sure what BIVA's strategy will be so I cannot comment much on that. However, we hope that the strategy will involve developing the trading market as it has great potential. If, instead of focusing on growing the market, it cannibalizes itself, the market will be equally as small, or even smaller. And with two stock exchanges, this makes no sense.

Q: How has the BMV protected itself against external shocks caused by international tensions?

A: The companies listed on the BMV are so diversified in terms of sectors, sizes and business segments that the impact of geopolitical uncertainty has been much less intense in Mexico. The renegotiation of NAFTA presented an opportunity for Mexico to turn to other markets. Mexico has a great number of free trade agreements with other countries, even though the majority of trade is focused on the North American region.

Q: What would be included in your wish list for the next government administration to make doing business easier?

A: I think the most important thing is to spur greater growth. Rather than growing 2.5 percent, Mexico should grow by double that, at least. There have been some encouraging changes in this administration with the structural reforms, but with increased economic growth, this launches a cycle whereby greater investment is attracted to the country. Of the companies listed on the BMV, more than 90 percent are concentrated in four states in the country: Nuevo Leon, Mexico City, State of Mexico and Jalisco. It should not be like this because the GDP of those four states is not 90 percent of the country's GDP. This means something is failing and we need to look at how we can support those companies in the other states.

A NATIONWIDE NETWORK FOR COMPETITIVE LOGISTICS COSTS

JOE SALINAS

Senior Director Latin America of Brink's



Q: What is the role of Mexico's mining industry within your international business strategy?

A: Brink's Global Services' (BGS) strategy in Latin America heavily relies on our two main pillars: Mexico and Brazil. Mexico is the No. 1 exporter of silver ore in the world, a market expected to grow to US\$17.8 billion by 2020, mainly driven by an increase in gold exports. Due to the market's size, we continue to invest in equipment and resources along with a fully dedicated team of supply chain experts who focus on multimodal transportation of precious metals from Mexico to various parts of the world. The shipment flows are toward Canada, the US and Switzerland, where we also have our own infrastructure to provide our customers with door-to-door services.

Q: What are your most demanded services in the Mexican mining industry?

A: Brink's Global Services has a key market position in the precious metals exports from Mexico. Our customers demand fast transit times and reduced costs, so we have a strong nationwide network in Mexico and can provide a variety of door-to-door services through helicopters, air charters, commercial airlines and our own fleet of armored trucks. The market pressure and client demand drive our teams to be creative when managing their supply chain. We are constantly searching for new airfreight partners and routes that can improve transit times. We know there is a need for a competitive logistics cost, yet the risk of transporting valuable cargo remains high in the country, so Brink's keeps adapting but cannot cut corners and put our people and cargo at risk. Our solution is to leverage our carrier network, adhere to our internal security procedures and ensure we keep clients' products safe until delivery.

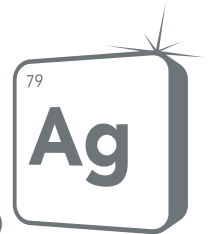
Q: What is your main added value to the Mexican mining industry?

A: As the market leader in this industry, we focus on developing strong commercial relationships, operational excellence and price competitiveness. Our strategy is to listen to what our customers need, adapt and implement. In 2017, we implemented Key Performance Indicators to measure Brink's, our subcontractors and our customers, which has

lead us to an exceptional level of service performance. We add value through 158 years of industry experience and our global network, instilling confidence in our customers when we are handling their valuable cargo. The Brink's brand was built on trust and integrity, on its people, security and service. We will continue to build on those foundations.

Also, at Brink's we look out for the best interest of our customers. As the market and flows of precious metals change, we have to work with our partners to provide seamless transportation solutions to the US, Canada, Europe and Asia. We ship most of our cargo by air and

Mexico's silver ore export market is expected to grow to **US\$17.8 billion by 2020**



we constantly look for the most effective way to reach the various destinations. We are improving and adding value by carrying out door-to-door multimodal seamless international shipments with full cargo liability coverage for our customers.

Unlike general cargo, valuable cargo requires strict and confidential flows of information. Our customers need visibility regarding their cargo throughout the supply chain. We have a very personalized relationship with each of our customers, so the challenge we face is providing visibility while limiting information to reduce the risk of losses. To support our clients, we have expanded and customized our tracking and tracing visibility tool, Brink's Online. Our portal is used by customers to safely track and trace their shipments in a centralized and secure way.

Brink's is a premier provider of secure logistics and security solutions including cash-in-transit, ATM replenishment and maintenance and cash management services. It offers the mining industry management of the entire logistical process

MEXICO

MINING REVIEW 2020

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THIS IS HOW WE DO IT

Filtering out the most important information has become a critical success factor for business and political leaders alike. Rather than time or money, attention has become the scarcest resource. We are committed to delivering the right information to the right people in the right format. This is how we do it:

- Cutting-edge information based on interviews with the industry's most influential stakeholders
- Dedicated editorial team with an in-depth understanding of the Mexican mining industry
- Editorial cooperation with the leading voices of the Mexican mining industry
- Customized readership ensuring unprecedented reach among key decision-makers in Mexico and around the world
- Available on today's most impactful business intelligence platforms: print, online and iPad

WHY MEXICO MINING REVIEW?

In this changing environment, reliable and relevant information is crucial to take full advantage of both current and emerging opportunities within the country's mining industry. By connecting key stakeholders across the Mexican and international public and private sectors, Mexico Mining Review is dedicated to accelerating the exchange of essential industry information that will drive the mining industry's development. Published annually, Mexico Mining Review features the perspectives of the leading players in the industry, providing a comprehensive overview of the latest exploration and investment trends, technological breakthroughs, social and environmental achievements and operational challenges in the Mexican mining industry.



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We would like to invite you to nominate your company for inclusion in Mexico Mining Review 2020, including direct interview features, guest article submissions and specific topic coverage requests. All participants are also welcome to take advantage of the opportunity to advertise in the publication, the details of which can be found on the following page.

INTERVIEWEE INCLUSION

Interviewees will have the opportunity to directly highlight development strategies, industry trends, innovative technologies and successful projects relating to their company. Being featured as an interviewee in Mexico Mining Review 2020 will enable top executives to share their direct insights in the most comprehensive review of the Mexican mining industry available.

ARTICLE SUBMISSION

We welcome valuable editorial input from knowledgeable players in the industry interested in contributing their voice and authority to Mexico Mining Review 2020. The inclusion of a guest article in Mexico Mining Review 2020 will provide authors with the opportunity to share in-depth insights and gain exposure among our vast readership network.

TOPIC SUGGESTION

We recognize that cooperation is one of the keys to success in the mining industry. Mexico Mining Review 2020 will be a continuously evolving knowledge-gathering exercise and we invite industry experts to suggest any additional topics that would further enhance the quality and comprehensiveness of the publication.

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Our annual summits and forums are industry highlights that bring together the business and political leaders shaping Mexico's future. Participate as a sponsor, speaker or guest.

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November 11, 2020

MEXICO AEROSPACE *forum*

December 5, 2018

October 9, 2019

MEXICO MINING *forum*

February 6, 2019

February 12, 2020

MEXICO ENERGY *forum*

February 20, 2019

February 26, 2020

MEXICO TALENT *forum*

April 24, 2019

April 22, 2020

MEXICO BUSINESS *forum*

May 8, 2019

May 6, 2020

MEXICO OIL & GAS *summit*

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September 5, 2019

September 3, 2020

MEXICO AUTOMOTIVE *summit*

October 2, 2019

September 30, 2020

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