

MEXICO

MINING REVIEW

2016

WHAT ARE THE MAIN CHALLENGES FOR MINING EXPLORATION IN MEXICO?

As a Top 10 producer of several minerals, including silver, gold and copper, Mexico is among the leading mining jurisdictions in the world. Its mineral potential is enormous, given that a significant part of its territory remains unexplored. When seeking an answer to how to better seize the opportunities for mineral exploration in the country, industry leaders mention challenges such as security, speed of procedures and the need for more investment. In this scenario, innovation and new technologies stand as the main potential allies, along with the creation of a strong human resources support group.



OCTAVIO ALVÍDREZ
CEO of Fresnillo

Security can be an issue in certain isolated areas within the country and even though we have an interesting project in Guerrero we have not been able to deploy exploration in the area due to these issues. We have tried a couple of times to start exploring it but unfortunately, we have experienced safety problems and have removed our people from the area. Thanks to our large project portfolio we can pause our efforts in this area and direct them toward less challenging regions. We hope that the area will be at a more stable stage in the future. The growing presence of the mining industry has the potential to change the reality of the state as it will bring economic growth and quality jobs. This will help lower violence and crime rates and will establish a more efficient context for mining.



JOHN-MARK STAUDE
President and CEO of Riverside Resources

We face the obstacle of speed. In this sector, exploration companies must move quickly because we are dependent on investors and they want to see fast, positive results and progress. We are trying to use innovation and technology to address this issue. We are now employing processes in the field that usually would be left until the laboratory stage, which saves a great deal of time. We can carry out assaying, scanning and drone flights in the field so we can greatly speed up the process. Something that would normally take months can be done in a matter of days. We are also addressing community relations by working with ranch owners and trying to build infrastructure for them in ways where we can help. We want to leave Mexico in a better condition than it was in when we started.



JESÚS HERRERA
Director General of Detector Exploraciones

One of the main obstacles for exploration is the deductibility of pre-operating expenses, which is now only possible after 10 years. Also, it is key to clarify the regulations regarding land ownership and mineral concessions so there are binding rules regarding the environment and the impact that mining can have on local communities. The government must have trained and capable people who really know the mining industry placed in the right positions.

Private funding is very difficult to access for exploration, and the best source of private capital for exploration is probably from high-net-worth career mining explorers or from mining operators that are looking to outsource exploration. Mexico is fortunate in that it has five or six private individuals who are themselves eager participants in the Mexican exploration industry. This is something even the Mexican industry does not understand about itself. The fact that national investors are eager to fund these projects gives foreign investors like ourselves some confidence. In addition, we are one of the primary funders of generative exploration worldwide, including in Mexico. The nature of generative exploration, where the expectation is failure, is such that the person writing the check has to be intimately involved, at least with the development of the thesis and the process by which the thesis is tested.



RICK RULE
President and CEO of Sprott US Holdings

Mineral exploration is a very speculative business; it is never a sure bet but it yields good rewards when a strong strategy is deployed. For example, 10 years ago we had a junior company called Western Silver Corporation that was developing a silver property in Zacatecas but it was struggling with funding. We persevered and ended up discovering the Peñasquito mine, which is today the most significant property in Goldcorp's portfolio. In the end, our investors were rewarded to the tune of \$1.2 billion. It is important to establish a human resources base in the country. Our last two properties have come to us through references from our geologists, who have a combined 40 years of experience in mineral exploration in Mexico. There is no recipe for success when betting on an undervalued asset.



LAWRENCE PAGE
Chairman and Director of Manex Resource Group

More investment in exploration and drilling will lead to more discoveries. Mexico has enormous mineral potential. Important discoveries are still being made right at the surface. A good example is the Alacrán silver-gold deposit near Cananea, Sonora, where high-grade silver was discovered within sight of Grupo Mexico's world-class Buenavista del Cobre copper mine. Dozens of geologists must have walked over this deposit without noticing its silver potential until the Australian exploration company, Azure Minerals, made the initial discovery of nearly 2kg/t silver in the outcropping. Mexico continues to reward companies willing to invest in exploration with important discoveries. Brownfields exploration has shown remarkable positive results, expanding the reserves of mines currently in production.



DOUGLAS COLEMAN
Director General and founder of Mexico Mining Center

Companies remain cautious and are waiting to see if prices will continue to improve. During the downturn, some mines faced great losses all of a sudden and had almost no capital to keep operations going. We also hope that exportation tariffs drop so that more investment opportunities open up in the industry. Three or four years ago there were no exportation fees and the market were lucrative, but costs are now much higher. It also is hard for us to manage high taxes for Japanese products that enter Mexico as we must compete against national companies. There is a big cost difference. Japanese companies are becoming increasingly interested in the Mexican mining industry and see great potential for their technology in the sector.



LARRY DE LA TORRE
Vice President International Sales of C&C Tsurumi Pump Mexico

HOW CAN COMPANIES MAXIMIZE PRODUCTIVITY AND REDUCE COSTS?

In light of the declining ore grade in existing mine sites and the search for larger reserves, companies are driven to maximize productivity on the concessions they already own. Operators demand new and optimized operational methods while exploration companies prioritize their projects to increase their chances of succeeding in finding world-class deposits. In the meantime, technology companies and suppliers focus on advancing down the innovation path to meet the need to optimize mine processes. Industry leaders working in several links of the mining value chain share their experiences and main challenges in the search for productivity.



GODFREY WALTON
President and COO of Endeavour Silver

We are going through the process of making our mines more efficient and productive. We started in Guanaceví, which was our highest cost mine in 2017. Once we achieve more efficiency at this mine, we will implement a similar program to enhance productivity at El Cubo and Bolañitos. We are trying to make our mining processes leaner as quickly as possible. We are simply trying to make better use of our equipment and people, which are our two biggest assets.



NACIP FAYAD
Industrial Sales Director at SKF Mexico

The mining industry is aware of the trend toward greater technological implementation. It is racing against time and if it fails to introduce the required technology, it will lose its competitiveness. SKF remains a robust player in the Mexican market because we collaborate and have a solid relationship with the national champions. But given the high competition in the sector, the product by itself is no longer a key differentiator. Our goal is to disrupt through technology by betting on Industry 4.0. This trend started in Germany 10 years ago and while in Mexico it is still developing, mining can really benefit from it, especially given the high expenses related to staff turnover. We perceive the trend is moving toward the development and implementation of sensors at mine sites and with mining machinery.



JESÚS HERRERA
Director General of Detector Exploraciones

All mining equipment is designed to achieve certain daily, weekly and monthly productivity levels. But I believe that productivity is more dependent on human capital and the training that companies provide. If the mining industry invests in the development of its people, it will achieve higher returns. As our costs would also go down, we would be more competitive and our clients would give us more work. Our main concern as a company is the safety of our people. If we lack proper security, we will end up having accidents, which will stop production, in turn lowering output. It is crucial to provide adequate safety and security training. The industry will always seek to cut costs and drive up productivity. In our case, we focus on developing our human capital and also on modifying our technologies to have more autonomous equipment.

We are reducing our operating costs in three ways. Historically we have embraced a philosophy of continuous improvement at each of our operating mines. We are currently focused on improving our metallurgical recoveries by carrying out more research and introducing new and innovative equipment and chemicals. We are also conducting programs to improve the productivity at each mine by upgrading our operational and management systems. But the biggest difference could be the construction of new, higher-quality, lower-cost mines.



BRADFORD COOKE
CEO of Endeavour Silver

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 processes 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.



HÉCTOR MIRANDA
Mexico Country Manager of Orica

Mexico has a key feature that differentiates it from its North and South American neighbors; its market demands high technology equipment and the most modern machinery that exists in the industry. This is leading the country toward automated mines. Epiroc has already started two projects: one in the Peñasquito mine with Goldcorp. These projects consist of the monitoring of all equipment through control centers, so a company can identify the status of machinery, production rates and malfunctions. This helps companies quickly complete maintenance services and control productivity. It also provides key information to engineers, which allows them to make the right decisions quickly and increase efficiency. These control systems are additionally very focused on security as they allow projects the ability to properly monitor personnel and avoid dangerous situations.



ALFREDO BERTRAND
General Manager of Epiroc México

One of the biggest challenges of the industry is compliance as projects need to meet a wide variety of national and international standards before starting production. Measuring environmental impact is particularly tricky as companies have to prove their ability to minimize risks before gaining a concession. Finding a middle point between controlling these risks and maximizing productivity is not easy and we can facilitate these processes by providing equipment with a high level of accuracy.



JAIME RAMÍREZ
Director General at Mettler Toledo



TRAINING, SECURITY THE KEYS TO BOOSTING MINING PRODUCTIVITY

JESÚS HERRERA

Director General of Detector Exploraciones

Q: How can mining companies succeed in boosting productivity levels?

A: All mining equipment is designed to achieve certain daily, weekly and monthly productivity levels. But I believe that productivity is more dependent on human capital and the training that companies provide. If the mining industry invests in the development of its people, it will achieve higher returns. As our costs will also go down, we will be more competitive and our clients will give us more work. Our main concern as a company is the safety of our people. If we lack proper security, we will end up having accidents, which will stop production, lowering output. It is crucial to provide adequate safety and security training.

The industry will always seek to cut costs and drive up productivity. In our case, we focus on developing our human capital and also on modifying our technologies to have more autonomous equipment. Our drilling machinery is modular and transportable. But as Detector Exploraciones was designed to create jobs in the areas in which we work, we strive to be at the forefront of technology without automatizing all our processes. It is also imperative that we not lower our costs at the expense of the environment. We are committed as a company to avoid damage to the environment when taking drilling samples. When humans

interact with nature there will always be some disruption, but we try to keep it to a minimum.

Q: What is the future relationship between miners and technology in the era of automatization?

A: It is not viable to compete against technology. The mining industry will become increasingly automated and as machinery starts to perform certain processes, companies must figure out where to relocate personnel. Machines cannot replace human beings; there must be someone operating the equipment. Otherwise, we would have a robotized world in which humans do not work but subsist on money paid by the government. Technology is already here but more changes are coming. As one robot can do the work of 20 people, for example, this can be a worrying future. But at the same time this can be an opportunity to increase safety. Regardless of how good a company's security protocols may be, there is always a certain risk of accidents when humans are involved.

Technology is also helping the industry to be more efficient. For example, in the exploration process, we will continue to require engineers and other specialists to carry out regional studies and determine the areas with mineral potential. But the available technology, such as aerial pictures and

geophysics, helps them predefine where to go and take samples. The existing technology, by itself, cannot tell where all the mines are located or their potential mineral grade.

Q: How can the Mexican mining industry promote an increase in foreign capital inflows?

A: The recent taxes are certainly driving foreign capital to other mining jurisdictions where taxes are lower or more favorable. This is especially true for high-risk capital. Another factor that can scare off investment is the lack of security. Mexico must have physical security first but must also strive for investment security, with its laws and regulations being respected. I believe we need to seek continuity by implementing a plan for the country over the next 20 years that will transcend political administrations so investors can have certainty that they will receive returns on their investments. As we lack this plan, governments can easily impose new taxes to fund their deficits at the expense of Mexican competitiveness.

Q: What is the main obstacle you face as a junior company in the mining exploration industry?

A: One of the main obstacles for exploration is the deductibility of pre-operating expenses, which is now only possible after 10 years. Also, it is key to clarify the regulations regarding land ownership and mineral concessions so there are binding rules regarding the environment and the impact that mining can have on local communities. The government must strive to have trained and capable people who really know the mining industry placed in the right positions.

Q: What is on your wish list for the next administration?

A: We must eliminate all the policies that are not working, which requires a deep analysis of the impact of projects and regulations. If all government involvement in the mining industry were prejudicial, the sector would have collapsed long ago. Having said that, local governments have good



The industry seeks **continuity** through **implementation of a plan for the next 20 years**

initiatives but these often lack stringent regulation and enforcement. I also believe the government has made an effort to better link the country through road infrastructure. But I believe it should keep investing in railroads, which would benefit the whole country. We are also lagging in our airports, and at the national level this infrastructure is very poor. I hope to see NAIM finished and boosting the Mexican economy but the government must also invest in local airports.

All these factors require a long-term master plan for growth. Every government seeks to make its own contribution, but these efforts are not often aligned to an integral long-term plan and thus do not really solve the problem. The next administration must also focus on improving safety in Mexico. I believe it is crucial to really enforce the law and I am optimistic about this transition. We must strive to have transparent governments, starting from the municipal level. Citizen committees must question and audit what the government is doing. Everybody enjoys complaining about the things that the government does wrong but not everybody is willing to devote time to fixing it.

Detector Exploraciones is a Mexican company founded in 1997. It provides geology, geomatics and other exploration services to both mining companies and the public sector throughout the country



Comprehensive Solution for Mining Exploration Projects

Detector Exploraciones is a Mexican company with more than **20 years of experience**, highly recognized in the Mexican mining sector.

Our services include the following:

- **GEOLOGY SERVICES**
- **GEOMATICS SERVICES (GIS)**
- **GEOPHYSICAL STUDIES**
- **MINING PROPERTY:** Technical consultancy, legal and administrative due diligence in mining areas, applications for mining concessions, reduction and division of claiming surface.
- **HUMAN CAPITAL:** Comprehensive financial and human resources administration solutions through our qualified personnel in both areas.
- **TRANSPORTATION:** We put at the disposal of our customers our vehicle fleet for transfer of technicians in projects.



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