

Mining in Peru

The country emerges from the low cycle as the world's second largest copper producer

TABLE OF CONTENTS

Rethinking the Future.....	p54
Production Overview.....	p57
Interview with Gonzalo Tamayo, Peru's minister of Energy and Mines.....	p58
The Junior Segment: Picking Up.....	p63
Engineering and Construction.....	p69
Equipment and Services.....	p75

This report was researched and prepared by Global Business Reports (www.gbreports.com) for Engineering & Mining Journal.

Editorial researched and written by Alfonso Tejerina, Imara Salas, Alice Pascoletti and Laura Brangwin.

For more details, please contact info@gbreports.com.

Cover photo courtesy of Ferreyros.



Rethinking the Future

As the industry becomes more dynamic globally, new strategies are required to avoid fresh growing pains



Las Bambas is expected to yield between 420,000 and 460,000 mt Cu this year. Photo courtesy of Las Bambas - MMG.

With decent gold and silver prices and a very positive upward trend in base metal prices over the last months, miners worldwide seem to have more confidence in the near-term future. In Peru, leaders surveyed confirm activity has been picking up and that operators, after a great deal of cost-cutting and efficiency-searching, are finally in a healthier position to make the investments in capital equipment, exploration and other fields that had been deferred over the previous three years.

The down-cycle was a long, difficult journey. This experience should ensure that, while companies finally look for growth and new brownfield or greenfield projects, they do not neglect to focus on maintaining low production costs. According to Víctor Gobitz, president of the Peruvian Institute of Mining Engineers (IIMP) and CEO of Buenaventura: "The mining industry is a price-taker. We cannot assign different attributes to what we produce to sell it at a higher price, like the automotive industry does, for instance."



Víctor Gobitz, president, IIMP; CEO, Buenaventura.

Peru is already one of the most competitive mining producers worldwide. Reasonable labor costs and a favorable exchange rate during 2016 played their part, but managers locally also implemented a number of strategies to make the most of their existing operations.

Luis Rivera, executive vice-president for Gold Fields in the Americas region, described how the company achieved significant savings at their Cerro Corona gold-copper mine in Cajamarca during 2016. The measures implemented included the use of additives to diminish fuel consumption, a more productive blasting process, the implementation of the dispatch system for more efficient haulage, the installation of a gravimetric circuit for higher gold recovery and an increased copper recovery rate through the use of better reagents. "In 2017, we are trying to improve our mine wall conditions to access deeper mineralization with higher grades. This, coupled with our better cost position, would allow us to expand our reserves and



Luis Rivera, executive VP Americas, Gold Fields.

extend the mine life. Also, we have 7 million metric tons (mt) of oxides that are not included in our mining plan today. Before the end of the year we could have a feasibility study for a leaching process facility," said Rivera.

Such efforts are replicated across the underground segment as well. Hochschild Mining, a precious metals producer, currently has all-in sustaining costs of \$11.5 per ounce of silver equivalent, as compared to \$22/oz five years ago. Meanwhile Southern Peaks Mining has reduced the production cost at Condestable, a medium-sized copper operation, from \$42.9/mt processed in 2013 to \$25/mt today.

Adolfo Vera, president and CEO of Southern Peaks, explained that the company has always been comfortable hedging some of their production to minimize the risk of short-term market fluctuations, but emphasized that they have also introduced significant longer-term changes to the operation since they acquired the asset from Trafigura in 2013: "We have migrated towards massive methods that are less labor intensive. 70% of our production is achieved through sub-level stoping, as opposed to 30% before [...] A paradigm shift is to see Condestable as a poly-metallic mine and no longer as a copper mine. In the past, we have always focused on the copper head grade, but now we analyze the copper-equivalent grade," Vera said.

Shortage of new projects

According to estimations from the Ministry of Energy and Mines and Peru's Central Reserve Bank, total mining investments fell by nearly half year-on-year, from \$7.5 billion in 2015 to less than \$4 billion in 2016. Gonzalo Tamayo, Peru's Minister of Energy

and Mines, anticipated even lower levels of capital investment in the short term: "It is absolutely normal that expenditure levels decrease after world-class projects such as Las Bambas, Toromocho and the Cerro Verde expansion," he said.

The \$1.2 billion expansion of Southern Copper's Toquepala operation and Shougang's expansion at the Marcona iron ore operation are currently the largest projects under implementation, but since social issues put a stop to emblematic projects such as Conga and Tía María, the general election and a fairly depressed copper outlook did not help the industry push for new ventures.

Yet, winds of change can already be felt. According to Minister Tamayo: "Metal prices are improving and we expect companies to take positive decisions this year with regard to new projects, like Pampa de Pongo, Corani and Mina Justa, which should translate into higher investment levels from 2018 onwards. We also expect a decision on Quellaveco mid-2018."

Several factors, internal and external, explain this optimism. The election of Pedro Pablo Kuczynski last year, a business-friendly President, came hand in hand with the production constraints at Escondida in Chile and Grasberg in Indonesia. This accentuated the upward trend of the copper



Luis Marchese, president, SNMPE; country manager, Anglo American.

price earlier this year, providing a better picture for new project developers. Also, the fact that industry association SNMPE is chaired by Anglo American's country manager is a sign that the company will sooner or later move ahead with the Quellaveco copper project, after years of back and forth, while other large players in the country like Southern Copper also anticipate significant expenditures to expand the Cuajone operation as well as the Ilo smelter and refinery. Luis Marchese, president of SNMPE, hopes that industry investments will outperform the \$14 billion predicted by the government for its five-year mandate.

"With the exception of Quellaveco, most projects are in the range below \$1 billion. It is going to be a challenge to promote this new generation of projects," he said.

It seems clear that Peru will receive new greenfield investments over the next years, but for that to happen, the authorities need to make sure all the conditions are met for investors to spend money in Peru rather than in other jurisdictions. Competition is tough and countries like Ecuador and Argentina are taking decisive steps towards developing their mining industries. Companies with assets in Peru, like Fortuna Silver and First Quantum, for instance, have already acquired assets in Argentina.

On the regulatory side, Peru is considered to be fairly competitive and it has certainly proven to be a friendly investment destination for the last quarter of a century - a track-record that Argentina, with tax retention on exports and currency exchange limitations only abolished recently, cannot match yet. If anything, with the development of the industry over the boom years, Peru has suffered from an overregulation effort. Marchese of SNMPE referred to the fact that, over the last 10 to 12 years, the amount of permits required to move a project into production has quadrupled, from 50 to 200 today.



For Gold Fields, the actual results of a responsible management are a society in progress, a balanced environment and the security needed in order for all our employees to perform their job, because this way, and by considering the welfare of everyone, we can lead our country to the place it should be.



GOLD FIELDS

www.goldfields.com



ADDING VALUE THROUGH CONTINUED DISCOVERY

Emerging Cu-Au-Ag Discovery
Extensive 2017 Drilling Campaign

Experienced Team

Proven Track Record

Well-Funded Projects

Portfolio of Additional Properties

Capacity to acquire additional
opportunities arising from
distressed market



**ANTAKORI INFERRED RESOURCE
(JULY 3, 2012)**
294.8 MILLION TONNES
GRADING 0.48% CU,
0.36 G/T AU AND 10.16 G/T AG

TSX.V: REG BVL: REG

CONTACT DETAILS

Av. Jorge Chavez No 170, Oficina
No 1001 Miraflores – Lima – Peru
(51) 1-748-0100

1177 West Hastings St Suite 2300
Vancouver, BC Canada V6E 2K3
(1) 604-685-6800

www.regulusresources.com
info@regulusresources.com

Community relations

Obtaining a social license has become an important risk factor that companies need to address from the beginning, and getting the go-ahead to build the mine and initiate production does not guarantee that the operation will not be halted later on. Las Bambas, one of the country's largest copper mines, reached commercial production last year, but had to find alternative routes to take its concentrate to the port of Matarani as the locals blocked the main road for months.

This also had a domino effect over neighboring projects. First Quantum Minerals, for instance, decided to postpone resettlement discussions with the communities in the Haquira project, a deposit hosting 6.5 million mt of copper, until the social context in the Apurimac region calms down a bit. Haquira would require around 1,000 people to resettlement.

Mike Parker, general manager for South American projects at First Quantum, explained the rationale behind this move: "Apurimac is undergoing profound changes with the influence of Las Bambas and nearby Constancia in Cusco to some extent. [...] That situation does not bode well for a project like ours to try to talk about resettlement."

The authorities should take these issues very seriously because not long ago, First Quantum had a clear plan to build Haquira after Cobre Panama, while today the company is keeping its options open with the possibility of building Taca Taca in Argentina first. Taca Taca would require no community resettlement, even though longer-term political risk in Argentina also needs to be taken into consideration (Taca Taca is a 28-year project).

Most leaders agree that the Peruvian government needs to extend its presence across Peru's vast territory to reach the country's dispersed population with basic social services, otherwise the communities will demand that mining companies address these needs. "The mining sector is perceived as distant because it is an activity that takes place mostly in the high Andes, where human development indexes are very different to those in the cities. This generates high expectations that are difficult to manage", affirmed Víctor Gobitz of Buenaventura.

From the mining companies' perspective, it is very important to pay attention to all stakeholders, says Óscar Díaz, CEO of Viceversa Consulting: "If problems were solved with money there would be no conflicts, because the mining industry is very rich. You need empathy to connect with the needs of the people and to have an integrated approach towards risk."



Julia Torreblanca, VP corporate affairs, Cerro Verde.

The model of the Mining Canon, whereby a percentage of the income tax paid by the mines goes to the regional and local governments, has proven ineffective due to the inability of the different institutions to execute development projects in a timely manner. During the Alan García government, the Voluntary Contribution program was praised for its capability to implement development projects, while other initiatives are currently being handled under the Works for Taxes program.

In some cases, companies have decided to invest in development projects of their own, on top of the taxes due by law. Freeport McMoRan's Cerro Verde operation, for instance, has spent around \$650 million over the last 12 years in water projects, the latest of which was the La Enlozada waste water treatment plant. The facility treats the raw sewage of the city of Arequipa. Julia Torreblanca, vice-president of corporate affairs at Cerro Verde, gave more details: "Engineering and social planning are typically handled separately, but we decided to run those processes in parallel. Even if we could have asked for water rights from the Chili river's regulated system, it is in good shape thanks to our previous investments in the Pillones and Bamputañe reservoirs, we decided that the right thing to do was to invest in cleaning up the river, which is Arequipa's main water source and was being contaminated by the city's raw sewage. On the flip side, with the water treatment plant we were able to use some of that treated water for our expansion."

While very positive, these company efforts will not be enough without a clear strategy by the State to develop the mining sector. The government has to act as a catalyst for industry efforts, designing and implementing a macro, long-term plan. The opportunity cost of not developing projects is very substantial and, while Peru is already one of the largest mining countries worldwide, there is enormous potential left.

Production Overview

Copper production broke the 2 million mt/y barrier during 2016



Derek Cooke, president, Cerro Verde.



Óscar González Rocha, president and CEO, Southern Copper.



Suresh Vadnagra, president, Las Bambas.

It was another great year for Peru's copper production. With the completion of Cerro Verde's expansion, operated by Freeport McMoRan, and the start of commercial production at Las Bambas by MMG, total copper output reached 2.35 million metric tons (mt) during 2016, a 38% increase year-on-year and a 70% increase over 2014 figures. Thus Peru reinforces its position as the world's second largest producer of the red metal after Chile, while Chinese copper output only grew by 11%, for a total of 1.85 million mt/y.

Company-wise, and according to data by the Ministry of Energy and Mines, Cerro Verde became the largest contributor with 522,100 mt/y (+104%), followed by Antamina with 443,600 mt/y (+8%), Las Bambas with 329,400 mt/y and Southern Copper with 312,900 mt/y (-3%) between the Toquepala and Cuajone operations.

Derek Cooke, president of Cerro Verde, explained that the expansion to treble the concentrating capacity to 360,000 mt/d is fully up and running after a successful ramp-up between October 2015 and February 2016. "Our main focus is to safely accelerate stripping, that was previously deferred to 2017 and 2018 due to low copper prices. [...] Also, as the pit continues to expand, it is going to be consuming our current truck shop so we are building a new 16-bay truck shop which will be completed by the end of 2018."

Considering the low grade of the deposit, the success of Cerro Verde lies on economies of scale and process efficiency. "From the ball mills to the HPGRs, we have seen huge success in the various technologies used to run the plant. We also use big data all around the operation. The mineralogy is fairly constant but the hardness of the rock is not, and therefore the throughput of our primary crushers has to be monitored closely," said Cooke.

Cerro Verde's current reserve is 3.67 billion mt at 0.37% Cu, which should extend mine-life to around 2045.

Leaving aside the logistics and social issues to take the concentrate to the port of Matarani, Las Bambas' ramp-up was also successful from a production perspective. The mine, operated by MMG, is expected to yield between 420,000 mt and 460,000 during 2017 at a C1 cost of \$0.85/lb to \$0.95/lb, according to Las Bambas president Suresh Vadnagra, who provided some facts and figures about Peru's latest copper mine: "Las Bambas is one of the world's largest copper operations. We have seven large shovels and 50 of some of the largest Komatsu and Caterpillar mining trucks. The mining fleet can

move in excess of 500,000 mt/d and will move approximately 180 million mt/y during 2017. The plant has a grinding capacity of 51.5 million mt/y through two large SAG mills and two ball mills. Nominal throughput is 140,000 to 145,000 mt/d."

Meanwhile, Southern Copper is expanding Toquepala through a \$1.25 billion investment to double milling capacity to 120,000 mt/d and add an extra 100,000 mt/y of copper production starting next year. Óscar González Rocha, president of Southern Copper,

GREAT PANTHER SILVER

TSX: GPR

NYSE MKT: GPL

"New Acquisition in Peru
Offers Potential to
Increase Production by
75%"



WWW.GREATPANTHER.COM

“Positive decisions this year should translate into higher investment levels from 2018 onwards.”

Interview with Gonzalo Tamayo, Peru’s minister of Energy and Mines*

What is the vision of the Kuczynski administration with regard to the development of mining activities?

This government understands that a significant driver of Peru’s economic development is our geological potential. Peru is and will continue to be a mining country. In recent years we have become the second largest copper producer and we are among the top five producers of other metals. The conditions are there for us to maintain this leadership position, because we have only explored a small portion of the country.

Over the last years, mining has been impacted by a combination of external factors, with the end of the super cycle and the drop of commodity prices, and internal factors, with an increase of what we call ‘transaction costs’ related to advancing projects to the operational stage. This has to do with the de-centralization of decision-making in many government agencies, with red tape and, in some cases, with social conflicts. We are introducing mechanisms to make the rules simpler and to expedite procedures at the exploration stage. In environmental matters, we are introducing a single window and electronic processes. Finally, with regard to social conflicts, the previous government left a wide perception that it failed to fulfill the commitments it had with the communities. We want to rebuild trust with a more coordinated State presence in the affected areas.

How is this government going to channel the investment into social development projects?

There are two mechanisms. On one hand, the Ministry of Finance is issuing sovereign bonds to fund infrastructure projects. The first of these offerings has already been completed to finance projects in Cajamarca. On the other hand, in January the government created the Social Advancement Fund that articulates the activities of several ministries to work together and address the needs of these regions with diverse sources of funding, from government resources to donations from multilateral bodies or companies.

Peru has had mixed results in terms of the development of basic infrastructure. How can this record improve?

In the main mining regions you can see an improvement of the socio-economic levels. Probably, in those areas where there has been a bigger involvement of private parties, the projects have obtained better results, either through the Works for Taxes pro-



gram or the Voluntary Contribution program. In those projects that were handled by the State, we have seen the country’s weaknesses, with delays in the execution and the development of projects that do not solve the people’s most basic needs, such as stadiums or bullrings, instead of systems for drinking water and sanitation. It is a complex problem of a sociological and anthropological nature.

Mining investment in Peru has fallen consistently since its peak in 2013. When do you expect this trend to be reversed?

In recent years, we have seen the completion of world-class projects, such as Las Bambas, Toromocho and the Cerro Verde expansion. It is absolutely normal that expenditure levels decrease after projects of that size. That being said, metal prices are improving and we expect companies to take positive decisions this year with regard to new projects, like Pampa de Pongo, Corani and Mina Justa, which should translate into higher investment levels from 2018 onwards. We also expect a decision on Quellaveco mid-2018.

What is your position about Southern Copper’s Tía María copper project?

In the same way that this new government is changing its approach towards community relations, we have told the owner of Tía María that they also need to change their strategy to promote the project. If they do exactly the same things as before, that change is not going to happen. The company has appointed a new manager to develop the project, and we expect some progress if they manage to improve their relationships within their areas of influence.

What can be done to solve the problem of illegal mining in Madre de Dios, and what has this administration changed with regard to the formalization process of the previous government?

The environmental problem in Madre de Dios is very serious, and our position is very clear to be against the development of alluvial mining. Having said this, the new formalization process looks at addressing some of the limitations of the previous process, which had very poor results. We have tried to improve the economic incentives to encourage formalization, to strengthen the relationship with the regional governments, and to create a mining fund to promote the production of clean gold in Peru.

*On July 27th 2017, Cayetana Aljovín was sworn in as new minister of Energy and Mines.

Arequipa is home to the largest copper concentrating complex in the world

We are generating a significant and positive economic impact on Arequipa and Peru by increasing job opportunities, taxes and improving the local market of goods and services.



Cerro Verde

Affiliate of

FREPORT-McMoRAN

highlighted the fact that the expansion will be completed with the installation of just two large 30,000 mt/d mills. "It does sound unreal, but the existing capacity of 60,000 mt/d consists of a total of 41 mills. This is an operation that has more than 50 years."

After this, Southern will embark on the expansion of the smelter and refinery located in Ilo. The smelter will increase its processing capacity from 1.2 million mt/y to 1.8 million mt/y, while the refinery will go from 280,000 mt/y to 320,000 mt/y of cathodes. "The remaining production will be sold as anodes from the smelter. Once we finish the Toquepala expansion, we will decide if we expand the smelter first or if we go with the two projects in parallel. In total, we are talking of an investment of \$800 million to \$1 billion," said González Rocha, a figure that could become \$2.6 billion if the company also goes ahead with the \$500 million expansion projected at Cuajone to reach 120,000 mt/d of throughput capacity, and if the controversial Tía María project also sees the light at some point.

Southern is also reportedly interested in buying a stake in Anglo American's Quellaveco project due to the location of this deposit in between Toquepala and Cuajone. Luis Marchese, country manager of Anglo American, admitted that the company could incorporate



Leaving aside expansions, Peru does not have any new large projects under construction right now. Photo courtesy of HV Contratistas.

a partner for the project: "We might reduce our participation so we are not so exposed to one single project, although we would keep control of the operation."

Anglo American is expected to take the construction decision mid-2018. Marchese provided more details about the current state of the project: "The plant will process 127,500 mt/d. Now, we need an updated estimate of the economic parameters, including the capex. Quellaveco should be a low-cost operation, because Peru offers competitive energy costs and the project has good geology, with a stripping ratio below 1 and a head grade of 0.65% Cu."

Although not as large as Quellaveco, Minsur's Mina Justa copper project is also expected to receive the final thumbs up in 2018, while improved market fundamentals for copper are also prompting polymetallic deposits to shift their focus to the red metal, as is the case of El Brocal, a Buenaventura subsidiary. Gonzalo Eyzaguirre, vice-president of operations at Buenaventura, assured that copper is providing great economics, even in the case of the arsenical copper El Brocal produces: "The complex copper concentrate is not so much penalized these days, so we have launched an ambitious project to go from 7,500 mt/d to

El Brocal is dedicated to responsible mining practices balanced to promote long-term shareholder value and the health and well-being of employees and host communities. Our goal is to be a low-cost polymetallic producer in a responsible manner creating economic growth for all stakeholders throughout the life of El Brocal mine and well beyond.



Tel: (511) 611-3900

www.elbrocal.pe

Av. Javier Prado Oeste 2173 - San Isidro, Lima

EL BROCAL

13,000 mt/d of mining in the underground section to be completed in just nine months. The project includes the construction of the Esperanza tunnel, a tertiary crusher and improvements to the flotation process."

Eyzaguirre said that the project encompasses \$14 million in direct investment on top of \$8 million in expenditures that have been moved forward in areas such as ventilation. The relationship of El Brocal with Buenaventura helps generate synergies: "Perhaps the most successful [synergy] can be found in the commercial side of things since Buenaventura now handles the sale of concentrates in a centralized manner. This gives El Brocal a better negotiating position," Eyzaguirre concluded.

Other base metals

Besides copper, El Brocal is also a medium-sized producer of zinc, a metal where Peru is a prominent player worldwide. While zinc operators took advantage of improved metal prices in the later part of last year, overall production in Peru went down by 6% to 1.34 million mt/y. This was caused primarily by a 12% decrease in Antamina's zinc output to 261,500 mt/y, which placed Volcan, which also suffered a 4% reduction, as the country's largest zinc producer with approximately 273,400 mt/y. The other large

zinc player in the country is Milpo, part of Votorantim of Brazil, that reported production of 258,700 mt in 2016.

In other base metals, lead production remained flat at 314,100 mt/y, and molybdenum output grew by 28% to just under 25,800 mt/y, helped by Cerro Verde and Antamina, which trebled and doubled their production figures, respectively.

On the tin front, production at Minsur's San Rafael mine decreased 4% to 18,800 mt/y, but the company is implementing several measures to stabilize production at a range of 20,000 mt/y, including the use of ore sorting technology to monetize low-grade material, which is already operational, and the development of the B2 project to reprocess tailings planned to be in construction in late 2017 or early 2018.

San Rafael's mine life should be extended with the addition of the neighboring Nazareth tin deposit located 3 km away. Juan Luis Kruger, CEO of Minsur, provided more details: "We already have 8 million mt of additional tin material at an average grade of 1.5% Sn. That translates into an inferred resource of 120,000 mt of contained fine tin. We are having a second advanced drilling campaign this year with the view of having a measured and indicated resource by the end of 2017, while we have also initiated a conceptual study."

Gold

Yanacocha's decline continued during 2016, with gold output reaching 668,200 ounces per year (oz/y) (-27%). Meanwhile, Barrick also saw production fall at the Lagunas Norte mine from 560,000 oz/y in 2015 to 435,000 oz/y in 2016 due to the transitioning of the ore body into the sulphide section, yet margins remained extremely attractive with all-in sustaining costs of \$529/oz.

Manuel Fumagalli, executive director of Barrick, underlined some of the cost-cutting initiatives to keep the operation's profitability: "Thanks to a digitalization initiative under our 'best-in-class' program, we achieved efficiency improvements in our carbon-in-column (CIC) plant, and this allowed for savings of \$18.6 million last year alone. On top of that, this improved the recovery from the inventory at the leach pads, generating additional income of \$5 million."

The future of Lagunas Norte lies with the sulphide potential of the deposit and the refractory ore project, although the company is looking at ways to extend the mine life while delaying the investment on an autoclave plant. According to Fumagalli, they could develop a transition project to process the inventories: "Through screening, we can recover the oxides and leach them at the

**EXPERIENCED MANAGEMENT TEAM
TO DELIVER GROWTH**

**OPERATING ASSETS
WITH STRONG CASH FLOW**

**FOCUS ON SUSTAINABLE
LONG TERM VALUE**

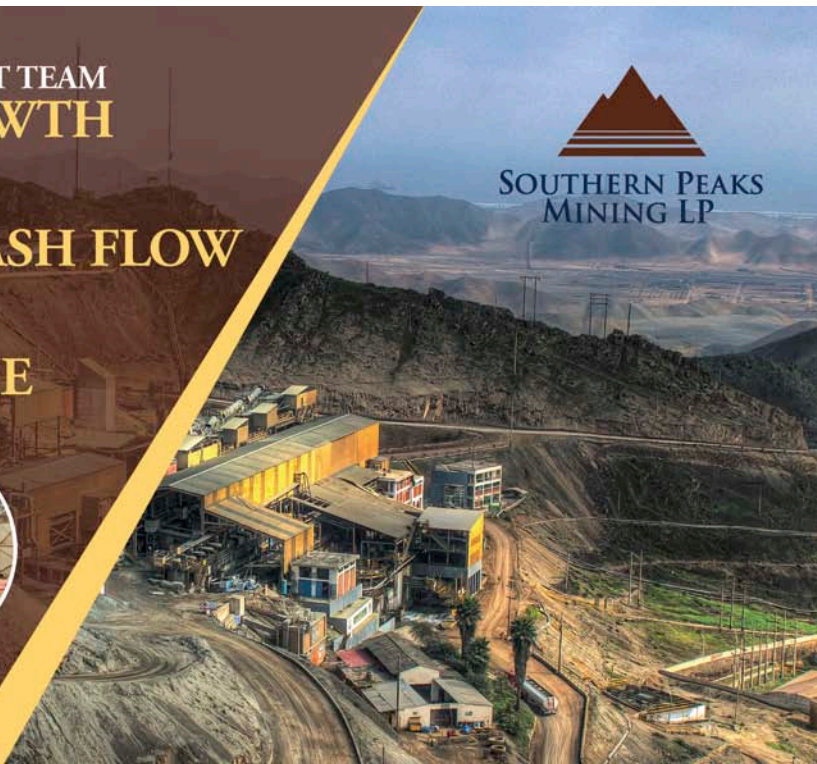




CONDESTABLE
Lima, Perú



ARIANA
Junín, Perú



Av. Manuel Olguín 501
Edificio Macros, Oficina 803 - Monterrico

info@spm.pe | (511) 200-5000
www.southernpeaksmine.com



Manuel Fumagalli, executive director, Barrick.

leach pad, while the remaining carbonaceous material, which also contains oxides, could be processed via milling and a carbon-in-leach (CIL) plant. This way we can achieve an optimal sequence for the mine-life because we move oxide production forward and we defer the capex required for the flotation and the autoclave process to treat the sulphides."

In spite of the decline at the country's largest operations, Peru's total gold production grew by 4% in 2016 to a total 4.92 million oz/y. Some of the companies that contributed to this growth were Hochschild Mining, with the production from its largest operation, the Inmaculada gold-silver mine, and Minera Poderosa, that yielded 221,000 oz/y in 2016, a 12% increase year-on-year.

Marcelo Santillana, general manager of Poderosa, summarized the company's recent developments: "In 2016 we met our growth targets. We obtained the permit to implement technological improvements and process 800 mt/d at our Marañón plant and we began the studies to expand our Santa María plant to 1,000 mt/d. The largest expenditure for this expansion will be the tailings dam at a cost of \$10 million."

Recent highlights in terms of precious metals operations also include Tahoe Resources' Shahuindo, which started commercial production in 2016, and the inauguration of Buenaventura's Tambomayo mine, located in Caylloma (Arequipa) at 4,800 meters above sea level. Víctor Gobitz, CEO of Buenaventura, gave more details about the latter: "Tambomayo, developed in record time since 2009, has overcome a tremendous logistical and technical challenge and will yield 150,000 oz/y of gold and 3 million oz/y of silver. It is an underground mine that optimizes metallurgical recovery and uses filtered tailings disposal to assure the industry's best practices," he said.

In regards to Tahoe's expansion project at Shahuindo from 12,000 mt/d to 36,000



Phil Dalke, VP and managing director, Tahoe Peru.

mt/d, Phil Dalke, vice-president and managing director for Tahoe in Peru, said: "We established that ore treatment can be a better return on investment, so the Shahuindo project includes many things: the crushing and agglomeration circuit for ore treatment, a major leach pad construction, additional power and water and additional metallurgical tests to prove everything up."

At today's prices, Shahuindo has a mine life until 2026, and this operation will eventually replace the ounces from La Arena, the other Peruvian gold mine of the corporation. La Arena, however, is not over yet. It will continue producing 150,000 oz/y into 2020 and there are plans for a large sulphide development. Tahoe's vice president for exploration, Brian Brodsky, provided the latest about this project: "In 2014, Rio Alto completed a feasibility study for a small operation, which included a resource of 275 million mt of mainly copper with gold credits. In 2015, we drilled some holes to prove that this body is open at depth and we have recently completed a scoping study that suggests a significantly larger project. We are currently undertaking a more detailed pre-feasibility study."

Silver

In parallel to gold's good performance, Peru's silver production also increased last year by nearly 7%, reaching 140.6 million oz/y, with Buenaventura (24.7 million oz/y) Volcan (22 million oz/y) Antamina (20.9 million oz/y) and Hochschild (13.9 million oz/y) as the main producers.

Ignacio Bustamante, CEO of Hochschild Mining, affirmed that the company has plenty of space to maximize its existing operations in the country: "At Arcata we are using 1,700 mt/d of the 2,500 mt/d plant capacity, while at Pallancata we currently have 2,000 mt/d of excess capacity, although that will go down to 400 mt/d or 500 mt/d once we put the Pablo vein into

operation. Besides, the Ares plant is completely idle and at Inmaculada we are going to accelerate our exploration work with the view of possibly expanding the plant which is currently working at 3,850 mt/d."

Meanwhile, Pan American Silver significantly improved its operating results in Peru thanks to an extensive mechanization program. Between Huarón and Morococha the company produced more than 5 million oz of silver at very competitive cash costs, favored by the strong U.S. dollar. Steve Busby, COO of Pan American Silver, commented on the productivity enhancement brought in by mechanization: "We were particularly concerned about dilution, but looking back at the last three years, we had less mining dilution than we had anticipated. I attribute much of that to the extensive survey and blast pattern controls we put in place. It has been a double win for us." Busby added that these improvements have led to a significant increase in the company's exploration budget for Peru.

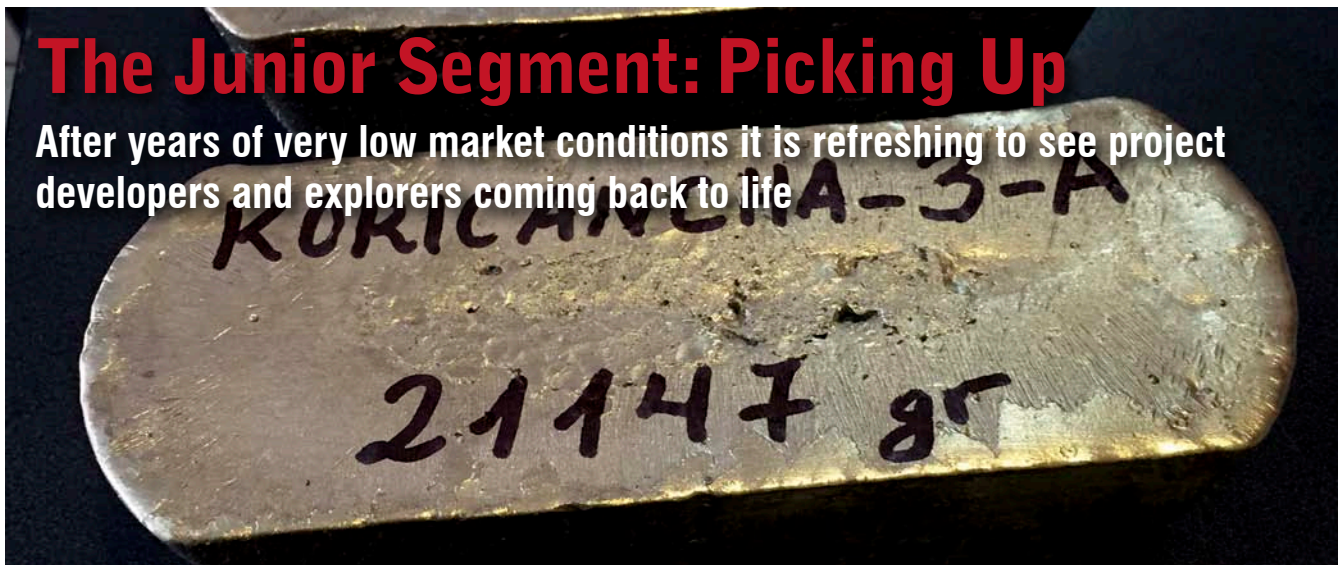
The improved market conditions are also attracting new players to Peru. Great Panther Silver, a producer with assets in Mexico, signed a deal with Nyrstar to acquire the Coricancha mine in Peru, primarily a precious metals deposit with a base metals component, that had been in care and maintenance since 2013. The company announced the closing of the agreement in July, and it plans to conduct a pre-feasibility study this year and to invest between \$20 million and \$25 million to put the mine back into production.

Robert Archer, president & CEO of Great Panther, said: "One of the things that struck me in Peru is that there are not many medium-sized projects owned and operated by public companies. I saw a lot of opportunity for public companies of our size with access to the capital markets to bring some of these mines into production. We want Coricancha to be our first base of operations, and then gradually grow in the country in the same way we have done in Mexico."

According to the historical records, the Coricancha deposit breaks down into gold (45%), silver (35%) and base metals (copper, lead and zinc) 20%, which means that once again a primary silver producer is looking at gold and other metals to add value to shareholders: "Realistically it is very difficult to find and acquire a silver-dominant project –this is a challenge for all sorts of producers. Also, with lower metal prices, shareholders are more concerned with cash-flow than they are about specific commodities, but certainly our plan is to stay focused on precious metals," concluded Archer.

The Junior Segment: Picking Up

After years of very low market conditions it is refreshing to see project developers and explorers coming back to life



Several Canadian companies have invested in gold processing plants in Peru. Photo courtesy of Trek Mining.

Two main trends have appeared in the market in recent years. On one side, you have those juniors who have learnt to navigate the low cycle through innovative business models, mostly aiming at generating cash flow. On the other, the few juniors left with good assets and access to finance have benefited from much better market conditions to keep advancing their projects. This is an overview of the main companies active across the different niches of the business in Peru.

Gold processing

Cash flow generating models go from developing small mining operations with the support of contractors and third party mills, like Lupaka Gold and PPX Mining are doing, to the capital participation in toll processing businesses, following the successful model of Dynacor. Inca One Gold Corp, Trek Mining and more recently Montan Mining and Duran Ventures have been investing in the development of mineral processing facilities in Peru.

Last year Dynacor completed the construction of its new 300 mt/d mill in Chala, Peru. The company processed third-party ores for a production of 73,500 oz/y last year. "Our mill is built to the specified ore in the Peruvian mines in order to maximize the recovery rate," said Jean Martineau, president and CEO of Dynacor. Q1 2017 production was a lower than expected 17,125 oz, a figure that showed the impact of extreme flooding in Peru during March.

Inca One Gold has also invested in a gold processing business in Peru, although in this case the company does no exploration. After a rocky start with delays to obtain the local tax rebates that the company

was entitled to, Inca One is finally on track to process 100 mt/d at their Chala One plant in Arequipa: "We are processing high grade gold ore with more than 20 g/mt, so it does not take a lot of tonnage to have significant cash-flow. This year our revenues will be between \$20 and \$30 million. The expectation is that we will be able to process 30,000 to 35,000 mt/y over the May

2017-April 2018 fiscal period," said Ed Kelly, CEO of Inca One Gold.

Gold project development

With gold prices at stable levels and with Peru's very competitive cost position in gold production, the market is hungry for new deposits. The prolific north-central mineralized belt is one of the main areas of interest

Pembroke Copper Corp.

Successful mineral deposit discoverers

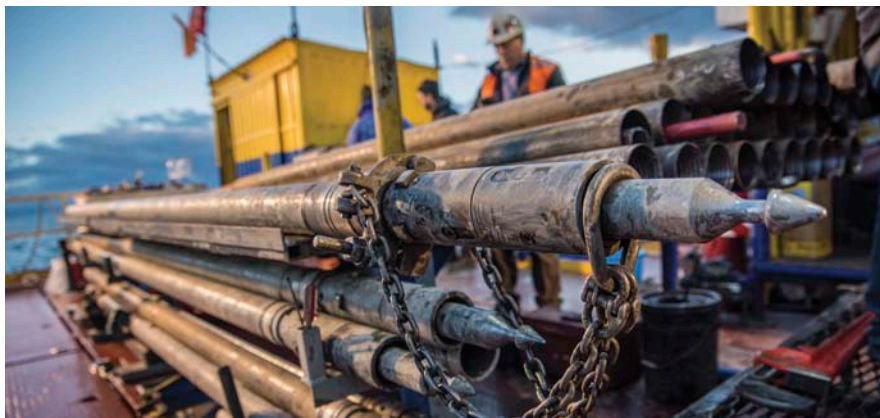
Exploring and developing the newly discovered
Pecoy-Tororume Porphyry Copper District, Arequipa District,
Southern Peru

Experience, Expertise, Excellence in Mineral Exploration and
development

Pembroke Copper Corp. Brian R. Booth, President and CEO
1212-1030 West Georgia Street, Vancouver, British Columbia V6E 2Y3 Canada
Tel: 778 327 6540 Email: info@pembrookmining.com
www.pembrookmining.com



Thomas Larsen, chairman and CEO, Eloro Resources.



Drillers are seeing increasing demand for their services. Photo courtesy of Geotec.

according to the amount of mining concessions granted there over the last year.

Thomas Larsen, chairman and CEO of Eloro Resources, who are drilling the La Victoria property in Ancash this year, gave more details about these developments: "We now control 80 square km, adjoining Newmont to the south, which recently acquired a major land position. Also Barrick, Anglo American and Fresnillo staked ground in the nearby areas. Last July, First Quantum had also acquired a big land position to our eastern border, so there is a large audience in the area at this point."

Eloro has recently signed an agreement with Australian company Cott Oil and Gas that is funding expenditures for C\$2 million to earn a 10% interest in the project and have the option to spend an additional C\$3 million to obtain a 25% stake. La Victoria includes an epithermal gold system running 1.2 km vertically that Jim Steel,

Eloro's senior corporate advisor, considers to have the same geological setting as Shahuindo.

"We are permitted for 8,000 meters and the drilling campaign should take us through mid-2018," said Larsen. "In parallel to this, we are doing a lot of preliminary geophysics and sampling on the Ccori Orcco concession to prove the continuity of the mineralized system from 4,200 meters at San Markito to 3,000 meters at Rufina, and potentially deeper. We will also be doing fieldwork south of Rufina towards the Newmont concessions. It is going to be a very active period for Eloro over the next 16 months".

Meanwhile, Lupaka Gold is advancing towards production at the Invicta property. The company suffered delays to sign the access agreements with the local communities, and was further delayed earlier this year with the Coastal Niño floods in the area, but financing is in place—\$7 million provided by Pandion Mine Finance in a gold prepayment agreement. The plan is to ramp up production using mining contractors this year. "At 350 mt/d we have enough resources to be in production for around 10 years," said Gordon Ellis, chairman and CEO of Lupaka Gold. "Maybe we could acquire an existing plant, or it may make more sense for us to build a plant on site. There are half a dozen plants within a reasonable trucking distance that are quite willing and competing to process our ore," he added.

The copper fever

As Peru continues to enhance its profile as the second largest copper producer, a number of juniors with good financial backing are trying to define the next saleable copper deposit. Investors remember very well the successful run of different copper juniors in Peru, such as the transactions involving Norsemont (acquired by Hudbay Minerals), Peru Copper (acquired by Chinalco) and Antares Minerals (acquired by First Quantum), among others.

John Black, who led the Antares transaction in 2010, is now the CEO of Regulus Resources, a company focusing on the AntaKori copper project in northern Peru. AntaKori is located next to the Tantauatay gold-silver mine operated by Coimolache, a joint venture between Southern Copper and Buenaventura. Regulus signed an exploration agreement with Coimolache to collaboratively share information and better understand the potential of the district. "Coimolache have basically bumped up against our land package," declared John Black, CEO of Regulus.

AntaKori already has a copper-gold-silver resource of 295 million mt at a copper equivalent grade of 0.8%, which the company expects to expand this year through a 15,000 to 18,000 meter drilling campaign.

Black gave more details about the geology of the project: "Previous drilling campaigns at AntaKori found extensive skarn mineralization that remains open in most directions and is similar to other



ELORO
RESOURCES LTD.

**EXPLORE ELORO'S
GOLDEN OPPORTUNITY**

Eloro reaches the next stage at its highly prospective La Victoria Project - as it prepares to drill the property for the first time in its history.

TSX-V:ELO

Toll Free: +1.800.360.8006
Tel.: +1.416.868.9168
info@elororesources.com
www.elororesources.com



Luquman Shaheen, president and CEO, Panoro Minerals.



Tom Peregoodoff, president and CEO, Kaizen Discovery.



Brian Booth, president and CEO, Pembroke Copper.

occurrences in Peru, most notably Las Bambas and Antamina. At AntaKori, the skarn mineralization is cut by breccia bodies with fragments of porphyry copper-gold mineralization, indicating probably porphyry mineralization at depth [...] [Gold Fields'] Cerro Corona, located 6 km from us, is a porphyry deposit currently in production."

The other big region for copper exploration is southern Peru, home to the majority of the large copper mines already in production. The wider southern district includes listed companies that are actively exploring for copper, such as Panoro Minerals, Kaizen Discovery and Camino Minerals, as well as private ones, like Pembroke Copper Corp.

Panoro Minerals has PEA studies completed at both Cotabambas and Antilla, although the company is focusing its efforts on Cotabambas right now. Panoro counts Hudbay Minerals as a shareholder and has a funding agreement with Silver Wheaton to cover expenditures until December 2018.

Luquman Shaheen, president and CEO of Panoro, summarized the main goals for 2017 at Cotabambas: "The first one is to drill 4,000 meters on the oxide mineralization north of the proposed pit. The second one is to drill the María José high-grade sulphide target—we plan to drill about 10,000 meters there, with a budget of \$3 million. The third priority is to carry out metallurgical testing to improve the recovery rates in some of the high gold oxides and also in the transition zone material."

Kaizen Discovery, a listed company backed by HPX, has redefined its strategy to put its British Columbia exploration aside and work on copper-gold deposits in Latin America. Their current focus is Pinaya, an advanced project that was under the radar for the last couple of years due to litigation between the previous owners.

Now, Kaizen owns 90% of the project, in partnership with ITOCHU of JAPAN who

hold the remaining 10%. Pinaya already has a resource of 41.7 million mt containing 297.9 million lb Cu and 656,000 oz Au (measured and indicated), and a further 40.2 million mt in the inferred category, for additional 319 million lb Cu and 388,000 oz Au. "In these poly-metallic systems you are exposed to diversification very quickly. Having the gold credits is absolutely fantastic, I personally find these porphyry copper-gold systems very attractive," declared Tom Peregoodoff, president and CEO of Kaizen Discovery.

Peregoodoff explained why, in his opinion, there is a discontinuity between the

resource value and the market valuation of Pinaya: "The property never really had a high-level analysis to understand the relationship between the known skarn resource, the gold oxide prospect, as well as the potential porphyry centers within the belt. The group that made the discovery focused on proving the resource, but the property is very big and could potentially host other porphyry centers, which typically appear in clusters."

Another upcoming player in the copper exploration segment is Pembroke Copper, a private company established as a grassroots explorer eight years ago that is now moving along the Peco and Tororume deposits on

CAMINO MINERALS

Our Mission:

Grass roots exploration for copper and precious metals, primarily in Peru

Discovery Hole:

RC drilling intersected 106 meters of 1.3% copper at Los Chapitos
Diamond drilling intersected 316 meters of 0.63% copper

Exploration Model:

Mina Justa, southern Peru, 374 million tonnes @ 0.71% copper and 9 g/t silver

info@caminominerals.com
www.caminominerals.com

Camino Minerals Corporation
COR : TSX.V

the coastal porphyry belt near Arequipa. At Pecoy, Pembroke already earned-in a 51% interest from Trafigura after spending \$13 million, and through further expenditures it can earn an 80% stake. The actual resource at Pecoy is 612 million mt at 0.34% Cu plus gold, silver and molybdenum credits, at a cut-off grade of 0.25% Cu. "Because of Pecoy's location at the coastal belt the economics are much better than some of the other porphyry projects in the Andes where there is no infrastructure and you are a long way from the coast," commented Brian Booth, president and CEO of Pembroke Copper. "Pecoy is going to be an attractive project for major copper producers because it has the size and the location to be a mine for a long time. We are at very low elevation and it is a desert, so no-one lives on our actual project area – that means no relocation will be required," he added.

This year, Pembroke has a budget of \$5 million to work on engineering studies at Pecoy and to start drilling the Tororume project, which is 100%-owned by Pembroke. With regards to the possibility of listing the company, Booth said: "We plan to stay private at this time, but we are completing all the paperwork that would be required if going public was a desire for us over the next year or two."



Graham Carman, president and CEO, Tinka Resources.

Finally, further north along the coast, within the iron oxide copper gold (IOCG) belt and 100 km from Minsur's Mina Justa copper deposit, Camino Minerals is drilling the Los Chapitos project. "Like Mina Justa, Los Chapitos has a regional potassium feldspar alteration event, followed by an intrusion-related event that deposited magnetite," explained Kenneth McNaughton, president and CEO of Camino Minerals. "A later event introduced copper which replaced the magnetite with copper sulphides, and also deposited copper and hematite into fault breccias. Based on our geophysics, we expect to see oxide mineralization at 200 to 250 meters

deep, and below that we expect copper sulphides," he added.

Camino completed a first 1,500 meter RC drilling campaign at the Adriana zone which resulted in the discovery of oxide and high grade sulphide mineralization, and is now carrying out a 3,000 meter diamond drilling campaign at both the Adriana and Katty areas of the project. McNaughton, who anticipates having an initial resource estimate by late 2017 or early 2018 if drilling goes well, was glad to see that risk money is back in the game: "The markets have improved dramatically since the end of last year; however, the money seems to be going to companies with solid management and which have a project of merit."

Zinc - a new outlook

A company that has benefited from the extraordinary run of the zinc price since late last year is Tinka Resources. After the company's share price hit rock bottom in the first months of 2016, the market situation changed drastically for the better. Indeed, zinc had not traded at more than \$1.20/lb since 2008, noted Graham Carman, president and CEO of Tinka.

Last year, the company released a new resource for its Ayawilca project in Central Peru with 18 million mt at a zinc equivalent

KAIZEN DISCOVERY

TSXV : KZD

kaizendiscovery.com

PINAYA COPPER-GOLD PROJECT, PERU

Building a new South American resource company using leading-edge technology, strong partnerships, and great people.



Peru offers significant uranium and lithium potential in the Macusani area. Photo courtesy of Plateau Uranium.

grade of 8.2%, while it also ran initial metallurgical tests. “We took the typical grade from a chimney at West Ayawilca, grading 7% to 10% zinc, and we obtained a 52% zinc grade concentrate with no pollutants. There is some iron associated with the sphalerite, but there are no penalties for arsenic or manganese. This first study was to see if we could produce a marketable concentrate, and the answer is yes, we can,” said Carman.

While last year’s resource estimate unveiled a potentially valuable tin component in the deposit, Tinka’s focus right now is on the zinc. Carman added: “I think we are very close to the point where the project has enough tonnage already, but we want to make it more robust and prove there is potential for much more mineralization [...] The exploration objective this year is two-fold: to target a global resource of over 30 million mt and to continue to add significant high-grade chimney-style zinc mineralization.”

Uranium and lithium

The uranium market has been low for a few years—even before Fukushima, the uranium price was on a downtrend. In this context, the market has seen a great deal of consolidation, and Peru was no exception. With the combination of Macusani Yellowcake and Azincourt Uranium, the resulting entity, Plateau Uranium, was able to build up a large uranium resource of 124 million lb in the Macusani plateau in south-eastern Peru. Last year, Plateau updated its PEA for a production model of 6.1 million lb/y over 10 years, which would create one of the top five uranium mines worldwide. Now the company is working on an updated PEA to incorporate the lithium component of the deposit as part of the operation as well. “There is more lithium at Macusani than in the brine deposits of Argentina, Chile and Bolivia to-

gether,” affirmed Laurence Stefan, COO of Plateau Uranium. “Because of the low grades, you have to look at it as a by-product, but as a serious by-product. Lithium gets extracted into the same solutions when uranium is dissolved—it is just a matter of deciding the route to extract lithium and what the final product is going to be: lithium hydroxide or lithium carbonate,” Stefan added.

Ted O’Connor, CEO of Plateau Uranium, assured that the fundamentals are very solid both for the Macusani project and the general uranium market, notwithstanding current low spot uranium prices: “Annual uranium demand is 170 million lb, while mine supply is 150 million lb, now going down to 135 million lb [due to output reductions by Cameco and the Kazakhstan government]. Nobody can make money at the current prices, but the spot price is relatively insignificant because almost everything is contracted for the medium and long terms at prices closer to \$40/lb [...] The cash cost at our Macusani project, according to the PEA, is \$17.28/lb U_3O_8 including royalties.”

The fertilizers market

Peru is already a sizeable producer of phosphate rock from the large Bayóvar operation in the Sechura desert in northern Peru. Developed by Vale, the operation has recently been acquired by Mosaic as part of Vale’s overall sale of its fertilizer assets.

The area hosts several companies developing phosphate rock projects hoping to feed the growing fertilizers market worldwide. These include Fosfatos del Pacífico (Fospac), a joint venture between Peruvian company Cementos Pacasmayo and MCAP (Mitsubishi and Zuari); Focus Ventures; and GrowMax Resources.

Focus Ventures’ Bayóvar 12 project is already quite advanced, with 58.8 million mt of proven and probable reserves. The pre-

TINKA
RESOURCES LTD
LARGE HIGH-GRADE ZINC RESOURCE IN PERU

TSXV:TK • OTCBK: TKRFF



NOW DRILLING AT AYAWILCA IN PERU

Ayawilca Inferred Mineral Resource Estimate (May 2016)

18.8 million tonnes grading 8.2% zinc equivalent
(5.9% zinc, 74 g/t indium, 15 g/t silver, 0.2% lead
at a 5% ZnEq cut-off grade)

Tinka is targeting zinc resource growth at Ayawilca in 2017

Already one of the most significant zinc discoveries
in Peru in 20 years

10,000+ metre drill program commenced in
February 2017

2017 drilling identified a new high-grade zinc
discovery at South Ayawilca with some of the best
zinc intercepts to date



www.tinkaresources.com



Peru needs to promote exploration to renovate its project pipeline. Photo: Las Bambas camp site, courtesy of MMG.

feasibility study for the project contemplates a \$167 million *capex* and the production of 1 million mt/y at 24/28% P_2O_5 . Gordon Tainton, president of Focus Ventures, described the next steps for the project: "Moving towards feasibility, we have two main optimization objectives: the capital expenditure and the operational cost. We are looking at continuous mining with the use of a bucket rotary wheel excavator system with integrated conveyors stripping off the waste burden. We are anticipating this will provide the project improved operational costs."

Meanwhile, GrowMax Resources (previously known as Americas Petrogas) re-branded after selling its oil and gas assets in Argentina and is now well funded to advance its fertilizer business in Peru. The company has two projects in the Bayóvar area: on one hand, it has a potash resource in brine, and it is advancing the engineering for a pilot facility to produce 5,000 mt/y of sulphate of potash (SOP). The plan is to start construction this year and be in production in 2018. Secondly, and similarly to Focus, the company is advancing a large

phosphate project, which already has a PEA for a 1 million mt/y operation with a grade of 30% P_2O_5 , although Stephen Keith, president of GrowMax, affirms that there is plenty of room for optimization: "We are very confident that we can significantly reduce the *capex* and *opex*. Additionally, we want to look at other products such as direct application phosphate rock products that we can sell as an organic fertilizer, SSP, etc. We are also looking at a small starter mine with much lower startup costs to be able to target the local market."

All players across the segment have realized that the phosphate business is different than the traditional metallic mining project development. The commercial component is key, which is why Fospac brought in Mitsubishi and Zuari as joint venture partners; and this is why Focus Ventures recently hired Gordon Tainton, an executive with decades of experience in the fertilizers business.

In the words of Stephen Keith of GrowMax: "The biggest mistake by juniors in this segment is that we tend to focus on the mining side of things, but that is just one piece of the puzzle. The real skill is to sell the product. If this was a gold mine, you would be basically mining a bank account. In phosphates, it is completely different. Pricings and clients vary all over the place."



**PLATEAUTM
URANIUM**

TSX-V: PLU
Frankfurt: QG1
US OTC: PLUUF

Uranium & Lithium in Peru Moving toward 2020 Production

- Strong Uranium-only Project Economics at US\$50/lb U3O8
- Lowest Quartile Production Potential of US\$17.28/lb U3O8
- Control All Uranium Resources in Peru & 910 km² Land Package in Macusani Plateau Uranium District
 - 52.9 M lbs U₃O₈ Measured & Indicated (248 ppm)
 - 72.1 M lbs U₃O₈ Inferred (251 ppm)
- Additional Lithium Resources in only 4 Uranium Deposits
 - 67,000 t Li₂O Measured & Indicated (0.13% Li₂O)
 - 109,000 t Li₂O Inferred (0.12% Li₂O)
- Positive Lithium-Uranium Extraction Results – adding value
- New High Grade Pinocho Discovery – Improved Economics Expected
- Environmental Baseline Study on-going
- On Path to Permitting with 2020 Production Visibility

Head Office

141 Adelaide St. W., Suite 1200 Toronto, Ontario M5H 3L5
+1-416-628-9600

Ted O'Connor

Chief Executive Officer & Director ted@plateauuranium.com



www.plateauuranium.com

Engineering and Construction

While demand increases at the study phase, contractors await projects to enter construction



Moving forward, projects will be increasingly challenging from an engineering perspective. Photo courtesy of Cerro Verde.

During the boom years, consultants had their hands full. The large amount of projects in the market caused some headaches, such as the pressure on deadlines, human resources and salaries. Yet on top of the economic benefits of a buoyant business, the great advantage was that, for the most part, engineering players did not have to leave their desks to hunt for new jobs. "Work came straight to

our door", remembered Alberto Coya, general manager of MWH, a company that recently merged with Stantec.

The last three years have been very different. Big names in the engineering business had to downsize, create synergies within the different offices, look for new opportunities in new sectors and new countries, and develop commercial skills they had forgotten to be

necessary: "The market has changed a lot. We already hit rock bottom and we are going back to a bullish period, yet the market will not be the same as 10 years ago. Low costs will continue to be a requirement," said Denys Parra, general manager of Anddes, a firm created by former Vector Engineering staff that grew very rapidly and counts 220 people in Lima.





CONTRATISTAS S.A.
65 YEARS OF EXPERIENCE

LEADER IN ENGINEERING AND CONSTRUCTION SERVICES



OUR SERVICES • CONSTRUCTION AND BUILDING • CONSTRUCTION AND INDUSTRIAL INSTALLATION
INFRASTRUCTURE • TUNNELLING • EPC PROJECTS



Tel: (51) 712-7100 Fax: (51) 712-7195 Email: info@hvcontratistas.com.pe www.hvcontratistas.com.pe



Alexandra Almenara, general manager, SNC-Lavalin.

Federico Schwalb, general manager of Buenaventura Ingenieros (BISA), another local firm, shared a similar analysis: "With prices improving and with the cost-reduction efforts made by the industry, we are seeing positive results again—not to the levels of 2013, but decent still."

For companies in the bigger leagues that were used to handling large EPCM projects, the lack of new multi-billion dollar projects meant a paradigm shift to make their businesses sustainable. SNC-Lavalin, for instance, had to restructure to serve its industries of interest more efficiently, while it also entered the environmental, social and per-

mitting businesses working for both mining houses and junior companies—which was not an area of focus before. "We were primarily seen as a large EPCM projects company, but due to the lack of EPCM projects in the market, we have expanded our service offering," said Alexandra Almenara, general manager of SNC-Lavalin in Peru.

In the case of MWH, even with the low cycle, mining still represents 85% of the Lima office's business, the remainder coming from energy projects. The company has traditionally specialized in wet infrastructure and last year it completed two emblematic projects for one of the country's largest copper producers: a very large tailings dam and a water treatment plant near the Chili river in Arequipa. Now, the merger with Stantec is opening up new opportunities. "Stantec has good expertise in underground mining in terms of reserve and resource calculation, energy for mining projects and material handling," explained Alberto Coya.

Stantec has actually chosen MWH's 140-strong Lima office as the base from which it intends to grow its underground mining offering in Latin America.

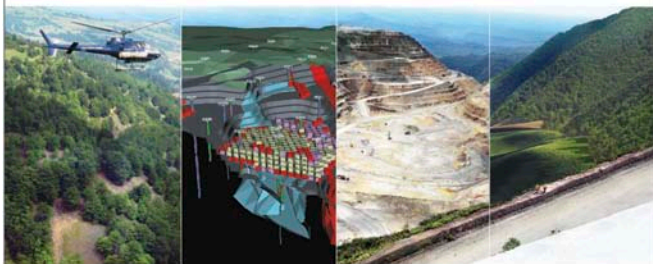
Similarly, the Lima office of SRK Consulting has also expanded its scope after the multi-national consultancy merged with SVS Ingenieros in Peru. Now, the company has

added significant resource evaluation capabilities to the areas of practice previously available with the SVS team.

Antonio Samaniego, director of SRK Consulting in Peru, affirmed that the firm managed to minimize lay-offs in Lima during the downturn and that the crisis actually pushed demand for due diligence reviews for project transactions. The focus on cost reductions by miners also prompted consultants to produce numerous studies on operational efficiency. Samaniego explained: "We have done many studies referring to mine services intended at controlling or lowering operating costs. Areas of focus included ventilation, dewatering and hydraulic backfilling." To expand its offering in this segment, SRK recently acquired a specialized U.S. firm, Mine Ventilation Services.

The decrease in metal prices put a number of underground mines in a difficult position and some operators decided to introduce changes to their mining methods. In this respect, Samaniego recommended the following: "Before embarking on a change of the mining method, companies should carry out a study of the behaviour and geomechanical characteristics of the mine, otherwise you can drastically increase dilution and even create a global stability problem within the mine, making the operation uneconomic."

Cradle to cradle



Exploration, feasibility, due diligence, engineering and operations through to mine closure.

Our global experience gives you expert, integrated solutions on every phase of your mining project.

Same team — start to finish.



>1,400 professionals • >45 offices • >20 countries • 6 continents

www.latam.srk.com

T: +511 206 5900

E: karindr@srk.com.pe

PERU'S INTEGRATED SHOTCRETE SOLUTIONS PROVIDER

info@robocon.pe robocon.pe



Antonio Samaniego,
director, SRK Consulting.

Construction

The recent wave of mining investments (\$42 billion between 2011 and 2015) is unlikely to be repeated. Up until the peak in 2013, it was a rosy period for construction firms, earthmoving contractors, installation specialists and metal-mechanic companies, among others. Today, however, a lot of the *capex* work has given way to *opex* activities, as mining operators need to handle substantial production processes.

In this context, contractors have had to adapt. Ricardo Vega, president of the OHL Group in Peru, a Spanish-headquartered multinational construction firm, said: "2016 was not the best year for us in the mining sector, but the industry is reactivating with improved metal prices and with the government efforts to promote project development. Besides construction work, through the OHL Industrial division we can also install large equipment and handle operation and maintenance contracts."

Enlarging the scope of the service offering is also the key growth strategy for San Martín, a large local mining contractor which wants to position itself as a full-service construction company and to rely less on its core business, contract mining. In this context, the company has gone beyond earthmoving and civil work to build plants, such as Moly-Cop's new production facility in La Joya and Buenaventura's Tambomayo processing plant. "Tambomayo was an emblematic project for us because we did everything from the earthmoving to the installation of the last piece of equipment that the plant needed to start operating," said Alfonso Brazzini, general manager of San Martín.

The company wants to increasingly participate in projects out of Peru, and is already working at First Quantum's Las Cruces mine in Spain, as well as in two limestone operations in Colombia.

Expanding the service offering is easier said than done; it requires large investments

Global expertise serving the Peruvian mining industry

One of the largest international Construction and Concessions groups, with 17 years in Peru, provides its experience and global support for the development of mining and infrastructure projects.



Obrascón Huarte Lain, S.A. – Sucursal del Perú
Av. 28 de Julio 150, of 701, Miraflores - Lima 18
Tel: (+511) 625 7200
www.ohl.es



Sistema de
Gestión
ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007
www.tuv.com
ID: 8105079070



OHL
105 años



José Antonio de Apraiz, territory director, OHL.



Improving efficiency is a key driver for miners. Photo courtesy of Southern Copper.

in heavy equipment, as well as a great deal of technical training and safety inductions for all the new employees. In this context, planning well in advance is a must: "With the improved metal prices, we anticipate sustained growth rates with more mining projects, so we must continue to invest," said José Antonio de Apraiz, territory director of OHL Construcción. "In Peru, we have a fleet of more than 400 machines, including our own concrete and asphalt plants, as well as yellow equipment and ancillary equipment," he added.

De Apraiz also highlighted that, as a multinational company, OHL can share know-how

between the different countries where the company operates: "Additionally to our team of 1,400 people in Peru, we have a presence in 30 countries, which gives us access to proprietary technology globally. Mining companies require strategic partners that can bring improvements and technological innovations and our rapid response to complex problems is one of our distinctive features."

HV Contratistas, a company part of Chile's Salfacorp, provided construction work for projects such as Antamina and Toromocho and now is using the synergies with its mother company to enter new business areas within the construction segment,

namely earthmoving for project development as well as industrial maintenance. Antonio Ferreccio del Río, general manager of HV Contratistas, said: "Up until now, we had not really been offering earthmoving services, but we do now because it is what clients need right now. This year and in 2018, the demand is going to come from that segment: we cannot just sit and wait until new mining projects see the green light."

With regard to industrial services, the challenge there is competition from smaller contractors, which puts pressure on rates. Ferreccio del Río continued: "Salfacorp has an industrial division and we see opportuni-

**BYRNCUT
OFFSHORE**

**WORLD CLASS MINING SOLUTIONS
CREATING VALUE**

Byrncut specialises in high-speed large-profile mechanised underground development and production methods in hard rock.

We apply best practise and supply leading technology supported by high quality maintenance and operating systems to ensure we deliver value to our clients.

We have proven ability to deliver world class safety and training standards in any international location.

Byrncut Offshore Pty Ltd
Tel: +61 8 9270 1000
www.byrncutoffshore.com
byrncut.offshore@byrncut.com.au



Antonio Ferreccio del Río, general manager, HV Contratistas.



Greg Jackson, managing director, Byrncut Offshore.



Marc Blattner, general manager, TUMI.

ties to start doing plant maintenance, although price is a key factor there. We are making an effort to adjust our rates, but the industry needs to mature as well and realize that you cannot pay the same price if what you want is better standards."

STRACON GyM, a large mining contractor, has now a 50-50 split between construction activities and contract mining. The largest construction project it is involved with right now is Cobre Panama in Central America for First Quantum. In Peru there are no projects of that size under construction.

Part of the Graña y Montero Group, STRACON GyM is using the synergies with the sister companies GyM and GMI (for construction and engineering respectively) to provide a more integrated solution beyond earthmoving and contract mining services to clients throughout Latin America. In parallel to this, it is also targeting underground mining opportunities, such as the recent development of the San Ramón gold mine in Colombia for Red Eagle. Right now, underground mining only represents 6% of STRACON GyM's revenue. Steve Dixon, CEO of STRACON GyM, said: "There is a natural progression in the region to have more large scale underground operations as well as changes in the way some of the underground mines operate. This will present opportunities for larger, more sophisticated contractors like us. We already see opportunities with Codelco in Chile, while in Peru operations like Antamina and Yanacocha could also develop an underground model. In some cases, underground mining is also a way to reduce social risks."

STRACON GyM is not the only player eyeing the development of large-scale underground mining in Latin America. Byrncut, one of Australia's key contractors, also has plans to expand in the region following a presence of nearly two decades in the African market. To achieve this Byrncut has signed a joint venture with San Martín, which bodes well with the Peruvian company's efforts to diversify its offering. "Peru has many underground mines, but they are typically what we refer to as 'conventional mining', which is small-scale with tight tunnels, compact equipment, and more manually intensive work," said Greg Jackson, managing director of Byrncut Offshore. "As new mines emerge, companies will be looking for scaled-up versions with higher productivity, lower costs and more mechanization or automation resulting in less employees. The market we are tackling in South America is evolving," he added. Jackson is aware that there are not many large underground projects that fit these characteristics right now, so their entrance to Peru is more of a five-year plan: "Our comparative advantage is that we are rapid developers that integrate strong safety and management systems to help clients jump-start their mine, which is typically the first three or four years of a new operation. Byrncut can then either stay throughout production or hand over the project to the owners if they want to be operators," Jackson said.

Niche underground services

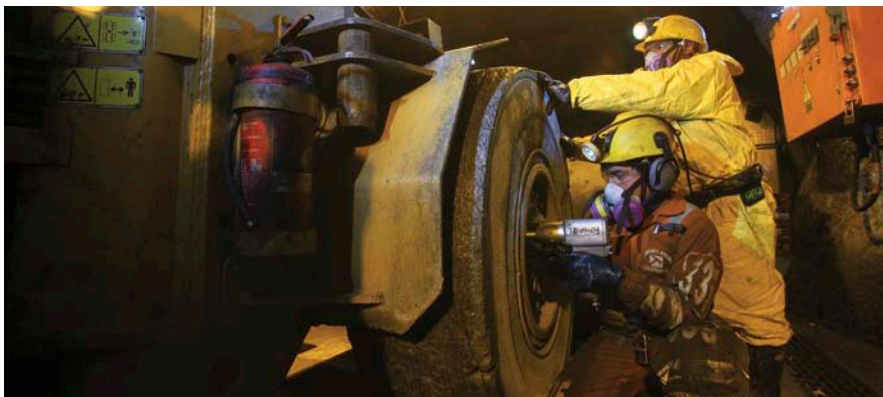
With its long history in underground mining, Peru is home to some specialized underground contractors that are also adapting to the evolution of the market. TUMI Raise Boring, for instance, is a technology developer and contractor specialized in raise boring services with a fleet of 13 machines working in Peru and a headcount of 300 people. Traditionally focused on raise bore holes for ventilation, TUMI introduced a new machine, the SBM 400 SR, in order to get involved in production drilling. Marc Blattner, general manager of TUMI, gave more details: "With the SR model we provide a hole at the center of the blasting zone [...] A normal setup time for a raise bore hole is five to seven days. With our machines, we can do it in about 45 minutes. The SR model is very much like a jumbo; you connect it to the power, the machine levels itself up, pins itself into place and does its work."

We are better together

 **MWH** now part of  **Stantec**

MWH is now part of Stantec. Together we offer expanded mining, tailings, water, and environmental services to the mining community.

Visit stantec.com/mining/MWH to learn more.



Mechanization is gaining ground in Peru's underground mines. Photo: Morococha mine, courtesy of Pan American Silver.

After a negative experience in Bolivia last year, the company is now targeting the Chilean market of box-hole services as a new opportunity for growth with a new machine that follows the same pattern of the SBM 400 SR. "Up until today, box-holing has used a very primitive technology. We are not trying to reinvent the wheel, we just want to use our experience to make the system much more efficient," explained Blattner, who believes that Codelco, with operations like El Teniente and Chuquibambilla, would be the perfect first client for this service.

One of the key areas of underground mining advancement is rock support, a segment

where shotcrete application has become the standard in many Peruvian mines. Robocon is one of the key contractors offering the service and, similarly to TUMI, it also has in-house capabilities to design and build equipment to avoid relying solely on OEMs.

The company is currently expanding by more than 30% with two new contracts with Buenaventura at Uchucchacua and Tambomayo, which add to their presence in mines with Volcan and Pan American Silver, as well as their involvement at Yanacocha's exploration tunnels. Besides shotcrete application the company has integrated vertically, implementing its own

plants for the production of both shotcrete and cemented backfill. Robocon currently employs 850 people.

By expanding its range of services, Robocon has been able to offer its clients a more competitive package. Enrique Sattler, Robocon's general manager, explained that the company is also evaluating covering the scaling phase of the shotcrete value chain, while the firm has also introduced the concept of the slick line to Peru; a vertical pipe that is being installed in Volcan's Chungar mine. The slick line takes the shotcrete from surface down 500 meters through gravity: "With this technology the client can save significant time and costs associated with the transportation of shotcrete by mobile equipment. There are several very deep mines in Peru where this solution can provide great savings," affirmed Sattler.

A flat market in underground mining activities since 2013 seems to be changing rapidly. Mining operators that had managed to reduce their costs to the very minimum are now opening up new fronts to make the most of better commodity prices. Contractors will need to keep up with this trend, expanding and renewing their fleets and training enough people to support the upcoming growth with quality services and a good safety record.



MORE THAN 40 YEARS OF DRILLING EXPERIENCE

IMPROVING SAFETY AND INCREASING PRODUCTIVITY!

TUMI is looking at the future of Raise Boring with automated Raise Boring and Boxhole machines



Sistema de Gestión
ISO 9001:2008
Válidez:
3 años
www.tumi.com
ID: 910084722



MACHINERY
SAFETY CERTIFIED



MACHINERY
SAFETY CERTIFIED



Tel: +51 (1) 717 8034 RPC: 968 289 294
Email: sales.ventas@tumiraiseboring.com

Equipment and Services

The pressure on costs continues, but the market is improving



Caterpillar and Komatsu are the dominant players in Peru's large mining equipment segment. Photo courtesy of Southern Copper.

The global mining equipment market is projected to grow by 2.3% annually over the next years, reaching an estimated value of \$80.8 billion by 2021, according to a Lucintel market report. In Peru, the general halt in purchasing new machines during recent years means that various mines have to finally acquire new equipment. Brian Doffing, president of Atlas Copco's surface and exploration drilling business, commented that the trend of overhauling rather than buying had to end sooner or later: "Machines are not like wine; they do not become better with time. At some point there is a pressure point where the net present value of buying new equipment and obtaining lower operating and repair costs makes it more efficient for the clients to replace the old machines."

In this context, both Original Equipment Manufacturers (OEMs) and distributors with

a strong presence in the market are preparing their operations to respond swiftly as demand for new units increases. The anticipation of growth has already sparked substantial investments in after-sales infrastructure closer to the mines, most notably in the south of the country. With the Komatsu-Joy Global merger, Joy Global's large repair center in La Joya (Arequipa) is already being used to overhaul Komatsu trucks, for instance, while Ferreyros, the local Caterpillar distributor, is investing around \$30 million in a new repair center in La Joya as well, which should be operational later this year.

The development of large-volume projects in Peru over the last years has opened up a very substantial market for the largest mining trucks. Indeed, Peru is the second largest market for the 400 short-ton Caterpillar

797F truck, only after Canada. The 797F has moved over a billion mt in Peruvian mines such as Antamina, Toquepala, Cuajone, Antapaccay, Toromocho and Las Bambas. Meanwhile Komatsu, a dominant player in the 320 short ton range with the 930E model, is also introducing its largest truck in Peru, the 980E, of which some units are already operating in Antamina and Cuajone.

The consolidated offering of Caterpillar and Bucyrus on one side, and now Komatsu and Joy Global on the other, means that the two large OEMs of mining equipment can compete on virtually any segment of the mining value chain. As an example, Caterpillar is already introducing to Peru its 794 AC model with a payload capacity of 320 short tons. "After a year of testing we are ready to introduce the 794 AC to the Peruvian market," said Gonzalo Díaz Pró, general manager of





PERÚ PIPING SPOOLS

COMPANY CREATED AND DEVELOPED WITH THE HIGHEST TECHNOLOGY

WE SERVE SEVERAL INDUSTRIES
Mining, Oil & Gas, Refining, Energy, among others. We handle alloy, stainless and carbon steels, with no limits of thickness or diameter.

DECADES OF EXPERIENCE IN THE ENGINEERING, E&C AND METAL-MECHANIC SECTORS.
Our drivers are Service, Efficiency, Innovation, Safety and Delivery on our commitments.

OUR SERVICES:

- Isometric drawings for optimal installation
- Prefabrication of spools and pipe supports:
 - Carbon steel pipes
 - Stainless steel pipes
 - Alloy steel pipes
- Painting to specific requirements
- Pipe grooving
- Heat treatment
- Testing, X-rays, ultrasound
- Logistics and transportation to site
- Support during installation phase

+51 940 872 143 +51 940 872 117 www.pps.net.pe contacto@pps.net.pe



Exploration Diamond Drilling.

Geotechnical and Hydrogeological Diamond Drilling.

RC Drilling and Water Well Drilling.

Perforation for Holding with Anchors / Bolts and Micropiles.

Lefranc / Lugeon Permeability Tests.

Installation of Piezometers / inclinometers.

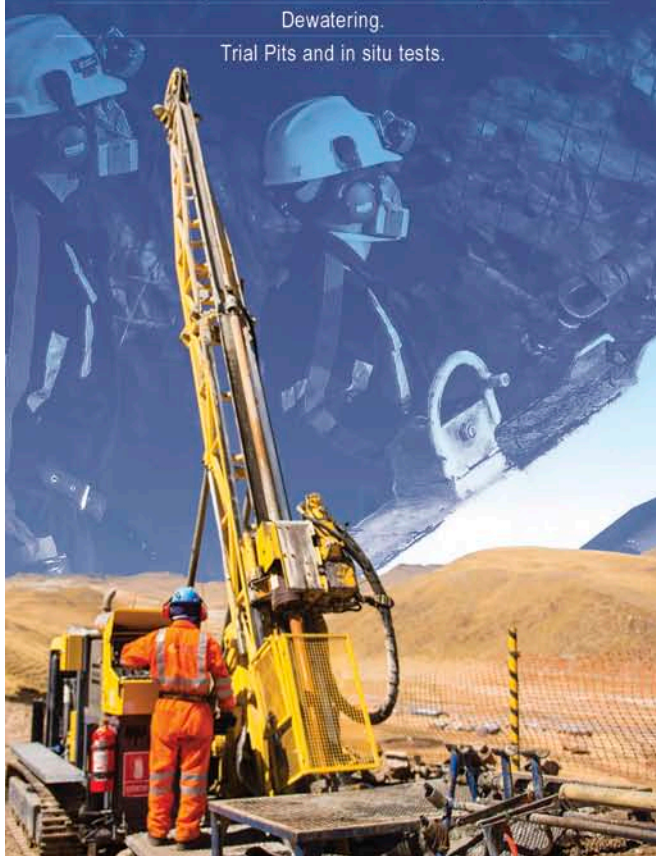
Cleaning, Piezometer Development and Airlift Testing.

Soil Mechanics Tests SPT / LPT / Cono Peck.

Recovery of unaltered sample with Shelby tube.

Dewatering.

Trial Pits and in situ tests.



REMICSA DRILLING S.A. RUC: 20306363761

Av. José Antonio Lavalle Mz. D Lote 22,

Urb. San Juan Bautista - Chorrillos, Lima-Peru

Tel: (51)(1) 2549140 / (51)(1) 2541420 Ext 124

www.redrilsa.com.pe

General Manager: Daniel Arce - darce@redrilsa.com.pe

Ferreiros. "The 794 AC is a good option for mining operations that require a payload capacity of 320 short tons, or those who are more familiar with electric transmission models."

For its growth potential, the underground segment is also becoming a battleground for international and local OEMs alike. Ferreyros is the leading player in low-profile loaders following the acquisition in 2004 of Elphinstone by Caterpillar, as Díaz Pró related: "Before that, Atlas Copco and Sandvik dominated the market, but at some point we sold up to 90 machines annually. 2016 saw a significant decrease in this business, but with better metal prices, sales are picking up again this year."

Manufacturing in Peru is somewhat unusual, yet local company Resemin is changing perceptions with unprecedented growth as a Peruvian manufacturer of drilling jumbos for underground mining. Resemin saw its best year in 2016, with 62 machines sold, meaning a 25% increase in revenue according to Resemin's CEO James Valenzuela.

Resemin's Muki, an innovative 1.05 meter wide micro-jumbo, is used in narrow-vein operations in Peru and is already being sold in other countries. The company continues to expand its offering, having recently developed a scaler and a 1.30-meter wide bolter; yet Valenzuela assures that, after the Muki, the next transformational milestone will be Resemin's production of scoops: "A market three times the size of the jumbo business," he reckons.

Plant solutions

A driving force behind innovation in the mining equipment market is the phenomenon of operations increasing to an immense scale. Huge mines require the adequate size of equipment to support the operation, thus companies are launching larger equipment. Fernando Samanez, VP sales mineral processing solutions for the Pacific Rim at Metso, explained: "As volumes go up, you need to reduce the number of items, otherwise the plant becomes unmanageable. You cannot have 20 crushers because you would need belts everywhere and the setup would be too spread-out."

Samanez affirmed that Metso has been a pioneering company in the introduction of large-scale equipment, including the largest SAG mill in the world (42 feet) developed together with Newmont for the Conga project, which unfortunately never saw the light, and the world's largest secondary ball mill (30 feet).

Processing plants treating more volumes require larger ancillary items such as spools. Metal-mechanic company Esmetal, together with other partners, recently decided to invest \$10 million in a brand new spools factory near Lima. Diego Aguirre, president of the board of Peru Piping Spools (PPS), the newly created entity running this operation, gave more details: "PPS designed its plant to produce spools only and not any other metal-mechanic products, which gives us unique advantages in terms of engineering, plant layout, specialization, costs and easiness of installation."

In barely a year of operations, PPS has become a leading provider of spools to the oil refining and mining segments. In mining, it has won two contracts with Southern for the Toquepala and Cuajone expansion projects, and the company expects to serve the wider regional market as well. PPS general manager, Pedro Ipince, affirmed that the next step is to move into the *opex* market, considering Peru's large installed capacity: "Entering the replacement market will reduce our exposure to the industry cycles. Large miners offer an interesting replacement business for spools, but to forge these relationships you need to know the customers' needs very well. We would probably have to assume the risk of importing certain volumes of raw materials to produce large-diameter spools, and this way have enough stock to respond fast in case of an emergency."



Gonzalo Díaz Pró, general manager, Ferreyros.



James Valenzuela, CEO, Resemin.



Diego Aguirre, general manager, Esmetal; chairman, PPS.

Drilling services

With the uncertainties surrounding the general election and commodity prices, 2016 proved to be as equally stalled as 2015 for service companies. Fortunately, company leaders can project some optimism, with businesses already picking up in market segments such as exploration.

Geotec, a drilling contractor with more than 50 years of experience, has definitely felt the fresh start of 2017. Within the first month of the year, their fleet occupation had increased by 50% compared to 2016, and that is even more remarkable considering January is typically a slow month for drillers. "With certainty, this year the drilling market is going to expand by 30% to 40% and the increment will be more acute in surface drilling, because in past years, 60% of the activity has centered around underground operations," commented Miguel Ángel Arenas, general manager of Geotec.

The company has recently incorporated six underground drilling rigs that are already working at Yanacocha. With more activity, the next natural step will be an increase in drilling rates, something that miners will try to delay as much as possible. According to Arenas, margins continue to be low and that is a challenge for providers: "To offer a world class service, you need an efficient organization with certifications for quality, safety, environmental care and social responsibility. While the pressure on rates continues, we see new companies entering the market that probably do not realize the level of knowledge, safety, expertise and logistics required to fulfill the clients' objectives."

Daniel Arce, general manager of Redrilsa, agreed: "At Redrilsa we have recently doubled our levels of activity and we now have around 1,000 collaborators. It is no secret that specialized workers increasingly demand better economic packages, raising costs considerably, while the prices of raw materials and tools are also going up. In this

LEADING SUPPORT FOR WORLD-CLASS MINING

24/7 on-site field support in Peru

Over 1,000 employees working and living at mine sites

The biggest network of repair shops in the country

More than 500 off Highway trucks operating in the country

Specialized training and technology services for Mining

\$200 million of inventory of spare major parts and components

The most comprehensive product line for Mining

BUILT FOR IT.

www.ferreyros.com.pe

Ferreyros CAT
UNA EMPRESA FERREYROS



Miguel Caillaux, director, Certimin.

respect, despite the fall of commodity prices in recent years, it is necessary to rethink the current rates per meter in the drilling business," he said.

Redrilsa is a Peruvian contractor established in 1996 and currently operating in Peru, Mexico and Zambia, where it provides services both in surface and underground drilling. The company has recently acquired equipment for reverse circulation drilling, water wells, and geotechnical and hydrogeology works. "One of the innovative DDH technologies we have incorporated has allowed us to drill service holes of up to 6 inches underground in narrow sections of just 3.5 x 3.5



Innovation is yielding significant savings in the industry. Photo courtesy of Barrick.

meters. In water wells, we can drill wells of diameters up to 28 inches," added Arce.

Another contractor that sees opportunity in the underground mining market is MDH, part of the Aruntani group of companies. Previously a joint venture between Bradley and MDH, the company was taken over by the Peruvian shareholders when Bradley was sold to Major Drilling.

Ian Carlo Venero, general manager of MDH in Peru, anticipated the following developments in the drilling market: "We are going to see deeper holes in mining exploration, while underground exploration is going to represent a bigger part of the business in

the future. In one of our underground projects we are already drilling 2,000 meter holes, while traditionally holes in these environments went to 800 meters in depth." Venero added that the market will adopt fully-automated drilling rigs with rod feeders to eliminate the need for a helper manipulating the equipment and thus increase safety.

Laboratory tests and innovation

A few years ago, mining companies would take samples out of Peru for some of their laboratory testing needs, especially on the metallurgical side. Today, however, Peru offers laboratories with the modern infrastruc-



THE LATEST TECHNOLOGY IN DRILLING EQUIPMENT AT YOUR SERVICE.

Our extensive drilling experience, latest technology and expert technical team, guarantee the quality of all the services that we offer.

There is no place in Peru that we cannot reach.

Geotec

www.geotec.com.pe



Certimin

Geochemical, Metallurgical, Environmental and Operational Services for the Mining Sector

www.certimin.pe

ISO 9001
ISO 14001
OHSAS 18001

Icontec

ture required for advanced testing. Certimin, a local laboratory in Lima, invested three years ago in a mini flotation plant and aims at supporting mining clients from exploration all the way to project engineering and plant optimization. "Our technology complex has physics and chemistry laboratories to run geochemical, metallurgical and environmental tests," said Miguel Caillaux, managing director of Certimin. "We have the latest technology for pilot plant tests and are able to engage in geo-metallurgical research for development projects and mines in operation. This provides effective information for decision-making at the operational, administrative and economic levels."

Certimin has a strong focus on innovation and has recently completed a project for a major copper player to introduce an innovative technology for coarse mineral flotation. "This allows for the recovery of sulphide mineralization in size ranges above the ones in conventional flotation, like marginal ores, coarse ores from the metallurgical process or from the thick portions of the flotation tailings," explained Certimin's metallurgical manager Eloy Román.

Certimin is also introducing to the Peruvian market a clarification process to recover more water out of the concentrate and tailings thickeners that is already being used by Codelco in Chile and that could be increasingly adopted as mining companies face more water usage limitations.

Blasting

While many companies cut off exploration during the downturn, they could not stop production, so they put pressure on blasting solutions providers to bring rates down and to realize more productivity for lower costs. Short contracts, designed to keep a highly competitive market, means that explosives providers are participating in tenders pretty much all of the time: last year a large copper producer awarded a contract for just one year. "Our industry is still under pressure. Even if volumes have kept stable, the margins have decreased substantially," lamented Gustavo Gómez Sánchez, general manager of Exsa.

Exsa, a Peruvian blasting solutions provider, managed to keep a good position through the introduction of the Quantex technology for open pit mines at a moment when the market was demanding cost savings. Gómez Sánchez explained: "The Quantex technology allowed us to grow in volumes. We closed 2016 with a 47% market share in open pit mining. Pretty much all of that is with Quantex, which means that the market has transformed very quickly. Indeed, the



Gustavo Gómez Sánchez, general manager, Exsa.

traditional heavy ANFO had been the market standard for the previous 25 years."

Exsa is opening up an operation in Chile, where it plans to start testing the Quantex technology with open pit clients this year. The company is also ramping up production of initiation systems at their brand new plant in Lurín, south of Lima, with the idea of capturing significant market share in a market worth \$75 to \$80 million annually in Peru.

Other rock fragmentation companies in the market include local company Famesa, Enaex of Chile and Orica, a multi-national player with a significant participation in open pit mining operations in Peru, with contracts currently with Barrick, Cerro Verde and Las Bambas.

Asked about the search for efficiency, country manager of Orica, Gustavo Costa, said that choosing the right explosive can save significant costs to operators down the line, and gave the example of Orica's Vistan/Vistis 250, an aluminum-based product that is 2.5 times more powerful than the conventional product: "The better the rock fragmentation, the more efficient the mineral processing will be at the plant with energy savings. Blasting energy is eight to 10 times cheaper than the energy used in grinding, but it is not always easy to pass that message along to mining companies," said Costa.

50% of Orica's revenue in Peru actually comes from the provision of cyanide, a business the company decided to keep when it sold its chemicals division, and which is very important in Peru due to the large gold production of the country. In terms of initiation systems, the company is launching a new wireless detonator, which Costa expects to have an impact in underground mining, where advancing production fast is very important. Costa assures that, depending on the results of this year's tender processes, Peru could become the number one country for Orica in the region. In preparation for that, the company doubled its capacity at the Congata plant (Arequipa) last year.

EXSA
Rock Fragmentation Solutions

THE NEW ERA IN INITIATION SYSTEMS

Manufactured with components of the highest quality and under the most stringent international technical specifications.

iNiBLAST®
CAST BOOSTER

EXSACORD
DETONATING CORD

SHOCK TUBE

EXSANEL®
NON-ELECTRIC DETONATOR

PETN

Visit our website:
www.exsa.net

[f](#) [t](#) [in](#) /@ExsaSoluciones



**OUR EXPERIENCE
CONTRIBUTES TO
THE SUCCESS OF
YOUR BUSINESS**



SERVICES

Transportation of hazardous materials

Transportation of mineral concentrate in encapsulated truck bodies

Aggregate material assembly and road maintenance

Crushing plant

Gas transportation at national and international level

Underground operations



Arequipa: (51-54) 607461

Lima: (51-1) 6513232

mvalverde@dcrcmineríayconstrucción.com
www.dcrmineríayconstrucción.com



Peru suffers from an infrastructure deficit. Photo courtesy of Southern Copper.

Logistics

Investments are a sign of a healing market, and mining service companies can expect increased growth as more mining projects become activated. However, providers will need to address the pressure from the industry to consolidate more services in order to compete in the market. Mining companies do not want to continue to deal with various providers to fulfill a required solution. Instead, they value providers with a full-service offering.

DCR Minería y Construcción, a Peruvian company based in Arequipa, decided to specialize in the transportation of dangerous goods such as cyanide and hydrogen peroxide in order to have a competitive edge in the highly competitive transportation market. Today, the company has the triple certification as well as the ICMI certification for cyanide transportation, and moves cyanide around the country for some of the largest precious metals producers like Barrick, Tahoe, Volcan and Aruntani. "We have a fleet of 180 trucks dedicated to dangerous goods transportation, and we also move mineral concentrates for Cerro Verde, Las Bambas and Fortuna Silver. The latter is a business that has changed a lot with the regulations that now oblige companies to use confined truck bodies and discharge tipplers" explained Ángela Corrales, manager at DCR Minería y Construcción. Corrales explained that DCR wants to expand again into the contract mining business for earthmoving works, an area where the company already had experience in Cajamarca in the past. "We are taking the first steps at the Pallancata mine, in order to become a contractor with engineering capabilities that can do road maintenance and build mining camps. Right now new development projects and camps are not seeing much activity, but we will surely enter this segment with an experienced partner," concluded Corrales.

To compensate the lack of new project work, transportation and logistics company Stiglich also expanded its services to as-

sist clients on more fronts. They physically moved their operations to a 20,000 m² facility, which includes 5,000 meters for storage and project cargo handling, and it currently offers general freight services, as well as the traditional oversized cargo services.

Carlos Roldán, until recently general manager of Stiglich, commented that mining companies are not getting the most of their logistics chain: "Today, we have a buyers market, and this does not encourage mining companies to share their plans in advance. The demand-offer dynamics are like that, but this has a negative consequence, because providers cannot minimize the costs of the services [...] With a more fluid collaboration, everyone across the value chain would benefit from increased efficiency."

Those who have seen many cycles will say that, once the market comes back, all the talk about efficiency will be gone because very few mining companies keep the financial discipline when they are just trying to grow and push production. Surely, while the first half of 2017 has meant an upturn in business for mining services companies, the market is not at that level yet, so this year companies will have to keep a strong focus on operational efficiency and competitive rates, while they also prepare for increased market demand.



Ángela Corrales, manager, DCR Minería y Construcción.