

Presentation

In times when we talk about open-pit mining, we present a responsible mining project here in Panama: the extraction of gold.

History

500 years ago, Panama was attractive to the Spanish for the gold in the ornaments worn by natives or “First Nations settlers” as they like to say in the isthmus and the possibility of getting a passageway or a channel to the Indian sea Marcus Brutus spoke of.

The gold that adorned them was a clear indication of the volume that could be drawn from these lands, the Indians stretched and kneaded the 18 and 24 carats gold of soft material and then molded their figures.

Columbus was not wrong and those who followed him, after reaching the shores of Panama after their fourth voyage Gold was abundant in the area and the Indians spoke of a sea across the isthmus. In addition to the task of evangelization, Columbus was determined to carry gold to Spain to finance the crusade that would allow the holy places of Jerusalem to be returned to Christian hands.

At the mouth of Rio Belen in the region he named Veraguas, the admiral attempted to found the first Spanish settlement in the American continent, but his intention was wrecked by the hostility of the chief Quibian.

Sometime later, after the death of Columbus, the Spanish crown divided the isthmus into two governments: Nueva Andalucía and Castilla del Oro.

Today, more than 500 years after, the Panamanian government granted the mining of gold in a total of 100 hectares to an individual. Once again, in this place of America the massive extraction of ore begins.

Petaquilla gold, part of the Petaquilla Minerals Group, is the one that has the concession of 100 hectares, 40 of which are exploited, from which between 200 and 250 ounces are extracted per day.

The owner of the Panamanian group is Hispanic, Richard Fifer Carles, the second name that links him to the renowned former bishop of Barcelona. Fifer Carles embarked on a project to responsible and modern mining we invite you to discover.

The venture is called Minero Molejón Project, it is located in the Cerro Petaquilla (hill) in the Donoso district in the province of Colon.

The Mine

Explanation Engineer Lazaro Rodriguez

Three areas are developed here and are the ones we will be seeing right now, Planning defines what is moved from where to where and when, Geology verifies whether the plan complies with the reserves we have, and Operations executes the plan.

How? With heavy equipment, drilling and blasting with explosives. That execution is provided as a PDI service in moving earth drilling.

Once this is developed, the mineral is ready for the process. What happens to our mineral is that it is not visible, it consists of particles dispersed in the rest of the materials, our process starts with a physical process of grinding.

Why grind? Because this tiny gold particle, which is associated with the rest of the materials, must be exposed, and the first step to expose it is to reduce the size of the rock to a minimum.

In our process of crushing and grinding, we reduce these particles to a size of 74 microns, which allows the exposure of the gold particle and lets our reactive to reach and separates it from the material.

By then, in the first stage of milling, we have achieved to separate our first gold particle and then, as Rafael was explaining, a thickening process begins where liquids are separated from solids, but why do we separate them?

Because that gold particle that is already released, is immediately sent to the refinery for the activated carbon to treat it, and the rest of the gold particles that were not detached are sent to a lixiviation process, which will grant it residence, time simply to allow the cyanide, as a reagent, to act and release the particle, and then it is also sent to activated coal.

Two coals full of gold and silver particles. That is sent to processing in the refinery, and these particles are then removed from the coals and sent to a gold concentrate, that gold concentrate is dried and subsequently melted and the result is a doré bar, which is the same particle that we have been releasing, either in an early stage or after some residence time.

The gold and silver are melted, and become a doré bar, so that our final product in the processing plant is a bar that has a gold concentrate and a silver concentrate which, depending on the area where the pit comes from, can range from a 70-30 to a 50-50

The beginning of the process

The area we are looking at is called the Central Madison, the lowest point from where we stand is 80 meters. The mine supervisor explains how the process the ends up feeding the plant is completed.

Engineer Jesus Pinzon:

"The process begins first with the marking of pits in the area from which we will extract, whether it is mineral or infertile. Then we begin to see the perforation, we send the sampling with the staff here to the law laboratories, we examine it and see the percentage of mineral and whether it is infertile, so that we can then begin extraction".

Q - On which proportions is the study of the mineral based?

"The sterile part is when you see from point 20 down; the mineral is the one that goes from point 20 to point 90s. This is a low-grade ore and a high grade is from 1 gram up to 3, 4 grams per ton, depending on what the bank gives us".

Q - 3, 4 grams is what comes out as final product?

"Right, the final product that we will add to the area of plant".

Q - How many tons can be extracted per day?

"We add to the plant about 2,500 tons per day, that depends on the banks we bring, right now I have a bank from which we're going to begin extracting 11,000 tons of 3.80 we will then add to the plant, or that we will later move to the yard to be stored there.

The second part of the process involves and what is ideology, after the sample reaches us it is moved to the Gold Control area ... we have a program, the Yenke, that generated the banks for the process, later it goes to the mine planning, this gives us the information regarding the banks we will be extracting and then operations comes in to extract the mineral or sterile for the developing or feeding the plant".

Q - Based on what I see there marked, is it necessary to perform a blasting as the one that just took place?

"Right, right, that depends on the material, where we are now we do not need explosions, but down there in bank 76 we need to blast, as we did and you saw in the Bank 82".

Q - After blasting they begin to load the trucks?

“Right, after the blast, the operations part begins and we start to remove the material, which goes either to the plant, the low-grade stock or hydraulic tappet.

Main Area

This enormous plant and all its workers, along with their caution and efficiency, go beyond what they might do for this small place...

Explanation Engineer Rafael Eysseric

“In this area you can see the main center of the plant, which is the control center. It is a completely computerized gold production plant, from which we can fully control the plant, start and stop engines, keep track of the process... well, in short, control all operations to improve the efficiency of each of the activities of the plant.

In the background you can see the ball mill, in which particles are reduced to 74 microns is the size we have found which we can recover a higher percentage of gold, everything you see in green, is working and what is red are the teams that are redundant in the plant and allow us to have efficiency.

In the ball mill we have the feeders with variable speed, also supply valves of cyanide, water or lime, depending on the needs of the plant, we have all the electrical controls amperage motors, kilowatt consumption of mill main motor and pump speeds, combined with the densities of the products which allows us to calibrate a process and to meet the parameters set by design”.

Q - Are we able to know the outcome of the process?

“Right, on the screen to the right, you can see all the plant control parameters that are taken to the Metallurgical Laboratory, for now the operator of this control room receives the information and with that information the decisions will be made as to the adjustments to be made at this stage of the process.

The plant was designed in the first stage to recover 2,200 tons per day and we are expanding to 3,000 tons, and then a second stage to 5,000 tons per day.

We can increase the flexibility of the design made in the plant, we can increase the flexibility in the production and also have increases with the addition of new equipment as a fourth ball mill, additional grinding systems, washing drums and

the increase in the area of coal columns, which has allowed us to recover over 93 percent the contained gold that comes in the rock from the mine”.

Rock Mineral

We are at the heart of the plant; here the ore is separated from the rock

“The blue is the water storage tanks for the process, in the first tank of the right is where we use water that mainly goes to the mills; the second tank, the tank number two, is the tank of water returning from the plant which is redirected from the thickeners to what is the product container tub.

Ball mills are the yellow and green which are in operation at this time and that allows us to reduce the size of particles to 74 microns. In the tower you can see the hydrocyclones. The classification system of the particle is fed from the mine, it reaches the primary crushers and from the grinding system it comes to the grey chutes there in the bottom, in which the product is stored, with a particle size of about 12 millimeters. This material has been added to the ball mills with water, lime and cyanide added to start the residence time and the extraction of gold, and from there it is downloaded to the boxes in which, by means of pumps, they are sent to the classification system of the hydrocyclones and hence the one which has the proper particle size continues the process all the way to the thickener, while the one which doesn't have the proper particle size returns to the mills”.

Q - What role does the cyanide have?

“Cyanide is a chemical used not only in mining but in the global chemicals industry. In mining we use it to dissolve the gold present in the rock and remove it from the rock, that's the main function of cyanide.

We have facilities of cyanide that comply with safety precautions and rules to perform an operation that is environmentally friendly and does not represent any risk to our workers”.

Q - What is the function of these tanks?

“The tanks you can see in the back are: the first tank is of cyanide preparation and the second tank is of cyanide dosage, with this we put it in the plant, and we can begin the process of recovering gold from the rock that comes from the mine”.

Q - What happens after with this cyanide?

“As I was saying, cyanide is a chemical like any other that requires proper management and which is used in low concentrations in the plant. Apart from

that, within the plant process we monitor the generation of hydrocyanic acid, control pH, and, at the end of the process before it goes to the deposit tubs of subproducts, what we do is a destruction of cyanide by a process bisulfite metal, and copper sulfate which guarantees us that any material that leaves the plant will not generate any environmental damage”

Q - It has been argued that there was cyanide in the nearby rivers, it was later proved that there was not, are there any chances that it reaches the water?

“Bearing in mind the control applied in the plant, there is no chance that the rivers have cyanide, you just need to remember: cyanide is an organic molecule composed of coal and nitrogen all living beings have, as well as we use cyanide synthetically, in nature there are sources of cyanide as there may be in the crops of rice, sorghum, nuts, even in red wine we can find cyanide, the difference is that the concentrations that we use are low and cause no problem with the environment.

What I want to say by this is that all waters have different cyanide concentrations, in analogy with the cosmetics industry, injections are used to remove or improve the face with clostridium botulinum and this, at the concentrations dosed or injected into the skin of humans do not cause any problems, so many of the substances that we have must be handled properly, and for that the company has taken special interest in being able to properly control each of the risk factors that the company may have.

This is the area where we deposit the water of the process, the one that comes from the process of the plant. In the back we can see the flow of water which falls there; so that when it falls to the tub the sedimentation can be performed to recover the water...

In the first tub, you also observe a recovery of water. As you can see, it is a clean, purified water, used for the process of the plant and that allows us to optimize our process so as not to take water to the process plant from any river, but simply rainwater that is captured here besides the water leaving the plant process”.

Q - That water coming out, does it come with traces of cyanide?

“That water does not come with traces of cyanide, because cyanide is destroyed in the process of the plant. With the detoxification process, before being sent to this area, what we try is to optimize the process by recirculating the water used in plants, besides the water we have, for God's blessing, from the rain, so we are using the resources of this area to perform a process which involved many recycling efforts and a lot of environmentally friendly work .”

Q - Even if it is pouring down and these tubs overflowed, never would any kind of contamination reach the rivers?

“The tubs are designed not to overflow, this process that takes place in the tubs is carried out taking advantage of the area we are in. When the tub design is made, you take into account water balance. What does this mean? A balance between regular rainfall, the water that falls from the process and the water we circulate back to the plant”.

Management Permit

In order to obtain government permission for exploitation, the company had to submit an environmental management program.

Explanation Engineer Leonel Silva

“This entails, for example, sediment control. As mentioned above, we explained that our oilfield is crossed by several streams. We have to make a study of water diversions, hydrological studies to see the run-off, meteorological studies to define the water precipitation, with which we will perform our jobs, and based on all these elements and parameters design our work, integrating the environmental aspect directly to our functions. For example, in the plant area we know that a risk of impact may be a chemical spill, even more since we have a river nearby, and we took caution in the design, establishing containment tubs that can hold even more than 110 percent of the volume of the material we move in that area and other bypass channel to an emergency tub, to channel any spillage we may have towards this tub and prevent it from reaching the environment.

We have an ecological compensation, have a permit of 100 hectares for exploitation or mining to perform our operations and we are developing a forest compensation of 1000 hectares. For every tree we cut within the area directly affected by the project, we are reforesting by planting 10 trees. 10 per 1”.

Petaquilla Study

The study carried out by the Petaquilla Gold technicians includes a phasing out plan of the areas from which they finish extracting the gold.

“As we can move forward in areas once the mine finishes the extraction, then we come in and perform engineering work. We recompose slopes, slope angles, we work on the Bergmann on the drains, begin a revegetation of slopes, either through crops or hydroseeding, using local species, such as

bamboo, which has given us very good results here, and the pinto peanut.

Then we make a full recovery plan in the area, and as we close areas of the mine we also close while making a recovery plan for the area.

We stipulated that we must recover 95 percent of the way it was before, for example within an area where it is very difficult to fill in the pit, a lake is expected to remain there, which will be worked on and cultivated with fish from the zone, and which will be connected to a river in an area... in the rest of the area if we're going to re-vegetate and reforest it”.

Molejón Project

From its beginnings, engineer Carles Fifer’s mining project implemented corporate social responsibility, and began to benefit communities in their areas of influence, changing the lives of its inhabitants.

Fifer Carles created the Petaquilla Foundation that seeks to benefit over 180,000 people in a 50-mile radius of the mine.

The Petaquilla Foundation promotes a culture of sustainable development; creates social programs that promote the economic independence of participants offering courses and counseling in different areas.

Regarding health, it implemented several programs, and the foundation built Coclesito’s rural Hospital, which receives about 20 communities in this sector. This helped to lower the infant mortality rate and saved many lives after domestic accidents or accidents with animals in the forest... lives of people who previously had no health facility near to see a doctor.

In addition to its medical units, the company has helicopters available for emergency transfers to remote places of difficult access.

Dr. Leonel Arocema, Executive Director of the Petaquilla Foundation engineer Mr. Fifer Carles chairs, said an important stretch of route was also built to reach the mine, which was also useful for residents of a large area, who, in order to reach the services of a town or city, had to come down from the jungle on horseback.

Dr. Arocema: “The social benefits of the Petaquilla mining project regarding the communities under their area of influence are large, for example here in Coclesito, where the community is larger, we can see that there are several routes, unlike other communities where there is only one route parallel to the

main one. Here, the community has its own routes, all built by the mining project, in different neighborhoods. Coclesito consists of 6 different neighborhoods and all have their route”.

Q - Regarding education support, how did a teacher manage to get here?

“The teachers used to refuse to reach the area because there were no routes that would allow good access and let alone staying. Knowing this reality, the mining project built the routes you are seeing, along with hostels for educators, which currently house 30 teachers. The hostel for educators used to be there, it housed very few in unsanitary conditions and with bad management. Look at the difference today, because today it is a place where they feel proud to move because it has all the amenities, and they are also very close to their workplaces”.

But the social action Petaquilla Gold has taken here in the Coclesito area, such as with this professional vocation institute, has led another mine -the Panama mine- which is dedicated to the exploitation of copper, to do the same and together take advantage of some things that are already made, such as this and the sewage system that exists to expand the Institute and these are works that have begun.

RESPONSIBLE MINING

A group with a modern vision that not only has accomplished its business purpose due to the high technology it uses, but had also a positive impact on the people of its area of influence, ensuring the present and enabling their future development.

Mr. Fifer Carles does not hide his satisfaction over this, while launching new ventures to support Panama, such the Foundation La Castilla del Oro.

(Interview)

Part 1: <http://www.youtube.com/watch?v=oaR3qzX4JG0>

Part 2: http://www.youtube.com/watch?v=uQD_X0q-4d4