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Mining sector

Thermal fragmentation: a new technology for mining narrow high-grade precious metal vein ore bodies

By Bernard Gauthier

A real technological revolution is about to transform the mining industry – at least in the exploitation of narrow high-grade precious metal vein ore bodies. The process is called "Thermal Fragmentation" – a process by which a burner, operating at very high temperatures is used to "shatter" or spall the rock in order to extract the mineralised ore. With this process, mining companies will be able not only to substantially reduce their operating costs, but also to rework formerly closed mines. What is important to know however, is that the exclusive rights for the usage of the technology belongs to the Rocmec Mining Inc.. Patents have been granted to Rocmec for Canada, the United States, Morocco and currently patent pending in 6 other countries. Being the only company in North America to employ this new technology, Rocmec's growth potential is enormous. As soon as it consolidates its activities in Canada, Rocmec intends thereafter to focus on South Africa, a country that is home to the largest and most important gold deposits in the world.

All mining companies use explosives in their daily operations. The objective is to blast hard rock in order to extract precious metals such as gold, platinum, silver, palladium etc. However, when metal is located in narrow veins, it can that become very expensive, several mines were thus abandoned leaving behind several thousands, even hundreds of thousands of ounces of precious metals.

Thermal fragmentation

But today, these situations are of the past. With the thermal fragmentation technology, several closed mines can now be revived. "Currently, we are the only Company in the world using thermal fragmentation units which operate by way of a small programmable automat in a narrow vein environment. Our research over a five year period, was inspired by a burner developed in Russia during the 60's for use in iron deposits", states Mr. Donald Brisebois, president and CEO of Rocmec. The thermal fragmentation unit is composed of a burner that heats to 1800 degrees Celsius in a few seconds, which causes the rock to "shatter" the total width of the vein. "this allows us to extract the mineralised ore without collecting the sterile rock that is incorporated in the stockwork. To this day, we have yet to encounter volcanic rock that can withstand the heat generated by the burner."

The new approach with thermal fragmentation consists in the enlargement of a 15-cm hole previously drilled with an ITH-drill. A strong burner, powered by diesel

fuel and air, is inserted in the hole, lowered to the bottom and ignited. This creates thermal stresses that spall or “shatters” the rock. In simple terms, spalling is considered as a form of decrepitation caused by an unequal expansion of rock crystals that overcomes molecule cohesion. The broken material produced during this process ranges in size from fine-grained to ½ inch. A portion of the material is ejected out of the hole as burning progresses and the rest can either be blown out of the hole by compressed air or aspirated.

Multiple advantages

Thermal fragmentation comprises multiple advantages such as considerably reducing mining costs. It requires the drilling of a 3 to 6 inch pilot hole with a conventional drilling machine, a 100 to 200 tpd treatment plant and the ore extracted from the vein has a aggregate size of 0 to ½ inch.

Other advantage: a minimum of space is required to install the equipment. Since the operations are focussed on narrow vein deposits, the resulting mineralised ore is in smaller quantity, it is thus not necessary to deploy all the conventional machines and equipment to operate. The entire process can be mechanized thereby creating the first continuous mining method in an underground environment.

Patents

In 2001, Donald Brisebois quickly realized that the thermal fragmentation technology had an enormous world potential in narrow vein deposits. He started by developing a method of work and proposed a plan of action to his partners. The first tests started in May of the same year. “When I started, I was able to produce a few pounds of ore per day. The challenge was to succeed in controlling the spalling and increase the volume of ore. Today, ore production varies from 2 to 5 tons per hour of operation. ”

In 2002, several tests were conducted in secret on various properties in Quebec. The tests were so conclusive that patent applications were filed almost immediately.

Rocmec obtained a U.S. patent on July 5, 2005, followed by Morocco on October 3, 2005, Canada on March 14, 2006 and patent pending in Australia, Mexico, Brazil, China, Russia and South Africa.

Positive consequences

Obtaining a patent for the process is a major milestone for Rocmec. “It will allow us to acquire existing narrow-vein deposits that encounter dilution problems, i.e. with conventional methods, large amounts of sterile material are incorporated with the mineralised ore, thereby increasing transportation, crushing and milling

costs. The installation of large tailing ponds is also required. Our technology addresses these problems and significantly reduces operating costs."

In other words, according to Donald Brisebois, thermal fragmentation allows us to produce the same amount of gold with 100 tons of mineralised ore compared to 1,000 tons from conventional mining methods.

In the 2006 executive summary, it states that "conventional mining requires an appropriate environment for the use of equipment as well as a comfortable workspace for the workers. This is why this method dissimulates a portion of sterile rock within its mineable reserves, contrary to thermal fragmentation, which makes it possible to extract ore containing a minimal amount of sterile rock, resulting in significant costs savings related to handling and ore processing as well as environmental control issues. "

Russian Kid

Exploitation of narrow high-grade precious metal quartz veins with it's exclusive thermal fragmentation process coupled with conventional mining methods will lead the Company in becoming a mid-size gold producer. The acquisition, development and future exploitation activities at the recently acquired Russian Kid property are an excellent example of this strategy. The property is comprised of 11 claims totalling an area equivalent to approximately 84 hectares and is located in the Dasserat Township, some 36 kilometres west of Rouyn-Noranda in the Abitibi region of Quebec.

A feasibility report conducted in 1984 indicates mineral resources totaling 281,000 ounces.

The report also indicates that several quartz veins, whose widths vary from a few centimetres to 60 centimetres, contain visible gold and chalcopyrite. In total, 4 surface veins have been identified and 9 other underground veins were identified and developed. According to Rocmec, all of the veins can be exploited by way of thermal fragmentation.

Management estimates that 29,000 gold ounces will be produced over a 12 month period starting from the date of full scale operations. The underground development includes 1.600 meters of drifts for the 2006-2007 production.

Promising future

At $651.00 CAN per ounce, current gold prices support the resumption and continuation of mining activities. At Rocmec, its thermal fragmentation process places the company in a privileged position for the development of narrow high-grade gold vein deposits, particularly quartz veins with widths ranging from 12 to 24 inches. Several of these narrow high-grade vein deposits are located in the

Abitibi-Témiscamingue region of Quebec, in Ontario, the Maritimes, South America, South Africa, Australia, China and Russia. “We want to develop two distinct areas, precious metal production on our properties and the licensing of our technology. ”

From now to 2008, Rocmec plans on acquiring at least two other properties. The first year’s production target is 25,000 to 30,000 ounces, increasing to 40,000 to 50,000 ounces for the second year. Discussions with Canadian companies are currently ongoing. One of the essential criteria in the selection of a property is the presence of narrow quartz veins with high gold bearing content measuring from 30 to 60 centimetres in width.

Rocmec’s market capitalisation is currently 10 M$ and has injected not less than 6 M$ in research and development, including geological work and site preparation pertaining to the reopening of the Russian Kid site. Within the next five years, Rocmec intends to export its technology to South Africa, the largest platinum and gold producer in the world. But above all, states Donald Brisebois, the objective is to produce 150,000 to 200,000 ounces per year, in addition to obtaining contract agreements with Canadian companies in order to build a solid base before going abroad. “This strategy also aims at reassuring our investors.”

Although South Africa is one of the countries that represents enormous potential, China is also a very promising country. “Its mining potential for narrow vein deposits is also enormous as only 5% of the deposits have been or are currently being developed with hardly any mechanization of operations. We have filed a patent application for this country. ”

Discussions have started with companies operating in Peru, United States and in Morocco..

Canadian company

Rocmec is specialized in acquisition, exploration and development of narrow high-grade gold bearing projects. The majority of its properties are located in the Abitibi-Témiscamingue region of Quebec. In addition to the Russian Kid property, Rocmec holds 100% interests in Denain, Montauban, Vauquelin, Courville-Maruska and mining rights for Lac Rose.

Rocmec Mining Inc., has a treatment plant in Val d'Or and has just recently acquired a 50% interest in a 250tpd treatment plant located in close proximity to the Russian Kid property, in Rouyn-Noranda. Rocmec employs approximately 30 employees and operations proceed 24 hours a day, 7 days a week.

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