



DNI Metals develops an environmentally better way to mine metals

June 7, 2010: By Doug Firby, Managing Editor, Troy Media

CALGARY, AB, June 7, 2010/ Troy Media/ — Pulling precious metals out of the earth has always seemed a crude and destructive process.

The environmental ravages of mining operations have fuelled a worldwide movement for greater environmental and social stewardship. Toronto-based DNI Metals is amongst a short list of innovative companies leading this movement.

So, when science delivers a devilishly simple “better mousetrap” for mineral extraction, a healthy dose of skepticism seems a natural response. Can we really pull the nickel, cobalt, copper, zinc, uranium, gold and silver that the world increasingly demands out of rock without leaving a trail of devastation in its wake?

Nascent technology does the job safely

Junior mining exploration and development company DNI Metals is doing it, thanks to a nascent technology that uses bacteria to do the job that we’ve relied on harsh chemicals like cyanide to do in the past.

DNI Metals is testing this revolutionary new process for a proposed development in the Birch Mountains, north of Fort McMurray, AB – home to the massive oil sands.

DNI’s geologists believe the area might host as much as 24 billion tonnes of mineralized black shales that could be mined. There are a dozen metals, from cobalt and copper to vanadium and zinc, that lie dormant in the black shales.

Using a new technology called bio-heapleaching – a technically accurate, tongue-twisty term that describes the miraculous alchemy - DNI pulls metals out of rock. It can be likened to the rock equivalent of making yogurt.

Until now, there have been basically two ways to extract mineral out of ore. One process, as seen in Inco’s Sudbury operation, was to smelt the rock. It’s a costly process that uses a lot of energy, and belches out sulphur dioxide and other chemicals so nasty that the mine operators built the then-tallest smoke stack in the world so that the surrounding area wouldn’t look so much like barren moonscape. The other process is chemical-based heapleaching, in which a toxic chemical – most often cyanide – is leached through a massive pile of rock to extract the precious metals in solution and collected at the bottom. This process, too, has many shortcomings, including leaks of toxic chemicals into the water table.

New process a game-changer

Bio-heapleaching changes the game, and just might reinvent metals extraction around the world.

Bioleaching is a natural process that occurs spontaneously in the environment. It requires nothing more than air, water and microbes to do its job. Commercial bioleaching does exactly the same thing – just a little bit quicker.

The ore is heaped into massive piles – typically about the size of a football field. Naturally occurring microbes discovered in research reaching back to the 1970s have the ability to oxidize iron, and turn sulphur to sulphates. These microbes – really biological catalysts that are native to many types of rocks such as black shales – are cultured and poured on top. As they soak down through the rock, metals leach out through bacterial action, and are collected in the liquid that runs out the bottom. The process is repeated a number of times until the concentration of metals has reached its apex.

Simple process requiring very little energy

What are the benefits?

For starters, it's cheaper. At its root, it's a very simple process that requires very little energy to operate and maintain. It basically does the work itself, maintaining the self-generated heat of a compost pile to continue working, even through a cold northern Canadian winter. And it's cleaner. Unlike smelting, there are no emissions to contend with. There are no tailings ponds. Any liquids are recycled back through the heap to help leach out more metals. Equally important, the bacteria used in the process occur naturally and can be gathered and cultured from the rock itself.

Most importantly, this is no longer theory. In 2008, Talvivaara Mining Company Plc established the first commercial-scale bio-heapleaching process to extract polymetallic deposits in Sotkamo, Finland. On track to reach profitability in recovering nickel, cobalt, copper, zinc, manganese – even uranium – Talvivaara sees a sustainable mine lasting 75 to 100 years.

Black shale filled with promise

DNI's Fort McMurray proposal is particularly appealing in Alberta, where the economy has been whipsawed by wild fluctuations in the price of fossil fuels. The steady royalty income from mining would help smooth out some of those highs and lows. Further, there is a potential spin-off benefit, since bio-heapleaching may be able to consume some of the massive stockpiles of sulphur that are an unwelcome byproduct of the oil sands refining process.

While immensely promising, the bio-heapleaching process still faces some challenges. For one, it is a slow process when compared to smelting – a problem typically faced by start-ups trying to generate quick cash flow. In the field, Talvivaara has yet to maximize its production potential.

Irrefutable reasons for supporting the process

There is a long list of reasons why the business community and the public sector should get behind this technology. Bio-heapleaching offers a sea change in resource extraction technology – promising to rewrite the entire environmental story from something very negative to something much more sustainable. It's a low-energy consumer, and its projected century-long lifespan offers a level of financial security the fossil fuel sector can no longer guarantee. Further, its development in the resource rich north provides long-term employment prospects that will allow local communities, including First Nations, to accelerate the shift to a diversified economic future.

DNI is on the leading edge of this revolution, taking a chance on a technology with a bright future.

The government of Alberta has done well over many years by concentrating its support and investment on the oil industry. But that game is changing, and as the province looks to diversify, its leaders would do well to give DNI's project a close look. With an international black eye over the environmental impact of oil sands development, it would be refreshing to have a good news story to tell in resource extraction.
