

Snow Lake stockpile.

Waste to Riches

Bacteria with the Midas touch find gold in a stockpile of waste

BY HEATHER HUDSON

It sounds like something out of a fairy tale. After all, turning garbage into gold is not something that happens in real life, does it?

Apparently, it does, thanks to the appetite of some hungry bacteria with the Midas touch.

Last spring, BacTech Environmental won a multi-million dollar contract to introduce North America's first bio leachate plant right in our own backyard in Snow Lake. The company proposes to transform tons of potentially hazardous waste left by Alexis Minerals back in the 1950s into two piles: one non-toxic and the other precious gold.

Mary Ann Mihychuk, a geologist and former Manitoba Mines minister, has been consulting with the company to bring the technology to the province since March 2010.

"BacTech approached me for assistance working in the province. They explained that they use naturally occurring bugs, bacteria, to remove arsenic from metals. This is called bioleaching. At the Titanic Exhibit in Winnipeg recently, I saw the process at its best where these kinds of bacteria are actually eating away at the Titanic. These same bugs can be used to consume metals and clean up environmental disasters.

"It's a very practical and profitable way to deal with potential hazardous waste."

Here's how it works:

Gold molecules, like the ones in the Snow Lake stockpile, are often surrounded by *arseno pirate*, more commonly known as arsenic. Traditional methods of separating these iron arsenic particles from the gold were not always successful. Mihychuk says the industry has used smelting, which releases potentially toxic emissions, to try and break that molecule to no avail.



Biorecovery, on the other hand, employs the use of naturally occurring bacteria, harmless to both humans and the environment, to unlock the molecules and convert them into a stable form called *ferric arsenate*, a benign end product, eliminating the potentially hazardous portion.

BacTech has a collection of strains of bacteria sourced from around the world. Mihychuk says that they can be found just about everywhere but it's best to use a variety from all over for optimal results.

With three commercial plants, two in Australia and one in China, BacTech Environmental was convinced they could get the same stellar results with the mound of potentially hazardous waste in Snow Lake.

Back in the 1950s, Alexis Minerals was left with naturally occurring rocks that contained arsenic. Without a satisfactory

process to extract the gold, the company stockpiled it with the thought that one day they would go back and cure it.

“This material is actually concentrated. It’s already been crushed and semi-processed so it doesn’t have any other potentially hazardous waste. It’s a high grade opportunity with the right technology,” explains Mihychuk.

Up until now, piles like this were either put underground under cement as fill or in a facility underneath water, which prohibits the oxidation or release of any potential harm. These are called tailings ponds.

One of the advantages of the bioleaching process, besides the obvious release of gold, is that it permanently takes care of the historic waste, reducing environmental harm.

“There is a program in Canada instituted by government that basically goes about capping old deposits, putting a layer of clay or other material on top and continuously monitoring the site to ensure there’s no pollution coming from it,” said Mihychuk.

“Bioleaching is even better because it treats all of that in situ material forever. We’re not just capping it – which in a storm could open or something else could happen in the future – we’re actually treating the waste product into a way that’s not going to cause problems in the future, with no cost to the public purse.”

Mihychuk goes on to explain that the traditional way of managing these materials is to use tax money to cap and monitor the sites. With this new process, BacTech will profit from the gold held in the waste material. The revenue from the gold

allows the company to take care of the waste site and potential environmental harm.

“BacTech was very interested in seeing if they could get hold of that deposit [in Snow Lake] and take care of it. After the bacteria have done their work, the newly benign waste product will go into tailing and the other will be a sediment laden with gold, ready to be processed and poured.”

Though Alexis Minerals is not in production at this time, Mihychuk says they hope to be up and running within the year so they can process the material and pour the gold for BacTech.

“We’re hoping this will happen within 12 months. We need to locate a site and go through the environmental studies and then we’re ready to go.”

How profitable is the site expected to be? A recent analysis showed that 9.6 grams of gold can be extracted per ton.

“This is a multi-million dollar contract in that we are looking at \$20 million for the plant and we anticipate that there is over \$100 million worth of gold in the pile.”

When it’s up and running, Mihychuk says Snow Lake will be home to state-of-the-art technology not seen anywhere else in North America.

“We’re hoping that the traditional mining companies will see the use of bioleach as an option for them for their own processing of their in situ ore deposits. The technology can be used to clean up waste but it can also be used for present day mining. There’s lots and lots of opportunity.”

We’ll never look at bugs quite the same way. ♦

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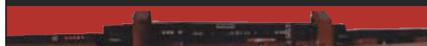


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