



Interview with Ross Orr of BacTech Mining

BacTech Mining Corp. (BM:TSX Venture) owns commercially-proven bacterial oxidation and bioleaching technologies that liberate precious metals and base metals from difficult-to-treat sulfide ores and concentrates. To date, the company's patented BACOX technology has been used at three gold mines located in Australia, Tasmania and China. Two of these mines are still in operation, with their technology producing in excess of 200,000 ounces of gold per annum.

BacTech is expanding the use of its patented BACOX bioleaching technology to the processing of toxic, arsenic-laden mine tailings. An added benefit of bioleaching, in addition to stabilizing arsenic and capturing heavy metals, is that it oxidizes sulfides in the tailings, thereby eliminating a major source of acid mine drainage. The technology also recovers precious and base metals from the tailings for sale to market. In the words of the company, "Bioleaching is an environmental clean up solution that also creates a profit."

Junior Mining Stock Report recently spoke to BacTech's President, Director and CEO, Ross Orr, about the company and its prospects in the gold and base metals market and the challenges and opportunities that lie ahead. Below is the transcript of that interview.

Q: What was your initial attraction to the natural resource business and how did you get your start in it?

Orr: I've been associated with the mining, oil and gas sector since I left the brokerage business in the early 1990s. I was involved with a group called CC Capital Partners and we raised a lot of money for companies not only in oil and gas but also in biotech as well. And through that process I came across a company called BacTech, which I found in Australia in 1996. I helped them go public and brought them up here from Australia, re-positioned them here in Toronto, raised their initial capital and I am a director. As a result of some internal turmoil we had in the mid 2000s I ended up stepping into the president's role, where I've been for about three years now.

Q: Please describe for us BacTech's bacterial oxidation and bioleaching technologies for separating precious metals from sulphide ores and concentrates.

Orr: We like to say our bugs eat rocks. That's how we break it down into layman's terms.

Q: Sounds intriguing! Please elaborate.

Orr: My description is: hold your fist up in front of your face. That fist is made up of sulfur, iron, usually arsenic, and inside of that fist is gold or silver or copper or whatever. You put a whole bunch of those fists together and you get a concentrate, which is separating the good stuff from the waste rock.

Generally about 10 percent of what you're pulling out of the ground becomes concentrate. That concentrate then goes into the massive tanks where we try to provide a Garden of Eden for these bacteria and they work 24 hours a day. [The bacteria] don't care about the iron, they don't care about the arsenic, they don't care about the gold. They only go after the sulfides and that's how they generate their energy. But as a result of them oxidizing these sulfides you liberate the metals for conventional recovery and you don't burn anything, which is really nice.

Q: Other than gold, what other types of metals does BacTech's separation process work with?

Orr: Well the one plant that we're planning on doing up in northern Ontario in a town called Cobalt will recover nickel, cobalt and silver. One of the things that bioleaching is good at is the ability to stabilize arsenic into what they call a ferric arsenate, which is effectively a non degradable form of arsenic. That's why we like to go after arsenopyrite gold deposits because of the ability to handle that arsenic while you're liberating gold. And of course concentrates that have arsenic in them used to go to the smelters and roasters of the world but they are limited as to how much they can burn in a given year for various reasons. You can't have arsenic trioxide going up smokestacks all around the world.

I found a company up in northern Ontario in an area called Cobalt, Ontario, which oddly enough was a silver mining area back in the early 1900s. It was almost a Klondike-type rush where in the span of 20 years they mined about 350 million ounces of silver out of this area. There were places in this area where they were mining up to 25,000 ounces per ton. They have a slab there in a local museum the size of a big desk that is one continuous piece of native silver, it's quite something. You're talking about a population that went from probably two goats and a chicken to about 12,000 people in the span of about three or four years. There are over 100 old mines in the area, anywhere from six feet deep where a guy was following a vein to a full-blown underground developed mine. The one thing that they all had in common was that there were no environmental studies done in those days, so everything just got thrown out the back door. They filled up lakes and areas on surface which liberated a lot of the natural arsenic that was in the rock, so you've got a very contaminated area.

Q: I assume the company has the technology to solve this problem?

Orr: Well I went and looked at it and said maybe we can process all these tailings, take out the arsenic but in the meantime also recover the silver, the nickel and the cobalt that are there still in the tailings. In those days the nickel and the cobalt weren't important as there weren't a lot of uses for it. They were just after the silver. What we found on this one tailing that is sort of our test area is that we got over 90 percent of the arsenic to report to the concentrate, which is fantastic. Then we were getting mid 80% on the cobalt and nickel and upper 70% on the silver. Effectively this project pays for itself by virtue of the metals that you're generating. It pays for itself and provides a really nice return on investment.

Q: How many years has BacTech been involved in the Cobalt project?

Orr: We just got involved last year and we've made applications to the federal and provincial governments for about \$12.5 million in grants. What we're saying is that this technology, although we've done it with gold a number of times and built plants around it, this is the first time we've actually stepped across and done something in the base metals side. The bioleaching technology is very similar between the two. It's the front end and the back end that differ. We then asked, 'What kind of a metal are we going to make at the back end? Are we going to make a nickel-cobalt precipitate and ship it out to somebody else for processing or are we going to produce metal onsite? So it's a \$25 million demonstration plant that would generate in its own right a nice return. It would be the first piece of four additional plants (modules) that would get us processing a million tons a year of tailings.

Q: That's really quite impressive.

Orr: And out the back end you'd be producing a 1000 tons of cobalt, roughly 500 tons of nickel and probably two million-plus ounces of silver.

Q: Please tell us about the company's Biogold plant in China.

Orr: It was built in the early 2000s and is still operating today. The plant is operating and was doubled in capacity in 2007. It has the capacity to produce about 150,000 ounces of gold a year. It's actually a nice plant in the sense that it shows the diversification of the technology because the last I heard it was treating concentrates from 13 different mines and one as far away as Greece. So you can see how the bacteria can be adapted to treat different types of ores even when they're blended together.

Q: The plant in China is BacTech's biggest plant, correct?

Orr: It would be now, yes.

Q: Once the separation process is complete does BacTech pour its own bars on site?

Orr: You would probably make a dore and then ship that off to a refiner and let somebody else put the finishing touches on it.

Q: What other countries does BacTech have a commercial presence in?

Orr: Australia, specifically in Tasmania. That plant has been running since about 1998. We've also just done a deal in Armenia. I was over there in June and we came across a deposit in southern Armenia that was held by an Australian company called Tamaya Resources. And Tamaya spent a lot of money on this old Russian underground deposit, which has 18 kilometers or 12 miles of underground tunnels, which is very [typically] Russian – they didn't drill a lot of holes- they just put the boys to work. So there's a lot of infrastructure there now as it is. The Australians were doing their metallurgy on material that had been sitting on surface for 30 years. So it was oxidized and they were getting great results but then when they went underground the results dropped to something like 30 percent gold recovery. So effectively they went bankrupt and that was the end of them. We spent the last year getting the confidence of the Armenian government and introducing them to the potential for bioleaching to the point where they have now given ourselves and a company called Caldera Resources the rights to go in and conduct what they call a scientific study, meaning we have access to the deposit. We can go underground, take fresh samples of the refractory material and bring it back here to do bioleach work on the samples. If the results are positive. we would go through the formal permitting process of acquiring the mine. BacTech has the right to back-end into 40 percent equity in that project.

Q: BacTech was recently granted a patent for a new reactor for building underground tank farms in order to save capital costs. Does the company have plans on building these underground facilities in the foreseeable future?

Orr: The biggest expense in bioleaching are the tanks because they're stainless and they're big. So what Dr. Paul Miller [BacTech's Vice President of Technology and Engineering] was looking at doing was putting these vessels in the ground and using the stability of the earth as a wall and maybe using concrete instead of stainless and lining it with some sort of a PVC or something non-corrosive. If we had more money we would probably pursue that more aggressively. But I'm off to Guatemala to look at another gold mine which is quite sizable and will put us over one million ounces if we can get our hands on it.

Q: What about the Mexican patent concerning copper heap leaching?

Orr: It's for Mexico and we don't have any projects on our drawing board for Mexico right now. But if we got involved with something in Mexico it would most likely involve a gold-copper deposit. The copper would come as a by-product. Again, that's the beauty of bioleaching. It's the ability to treat a bulk concentrate and that's what attracted us to the Armenian project because it's gold-copper-zinc-silver. The original owners were going to have to separate to make a gold concentrate, which of course would have been contaminated with copper and silver and zinc. Then they'd have to make a copper concentrate, which would be contaminated with zinc. Then they'd have to ship them half way around the world to a smelter for processing. We can do it all there on site with the tanks and electrowinning. That was what we proved with Penoles in Mexico back in the early 2000s, the ability to treat polymetallic concentrates.

Q: BacTech has announced that it is contemplating creating a gold company subsidiary that will be spun out to the BacTech shareholders. Can you provide us with any updates on this proposal?

Orr: The first thing we want to do there is get a decent gold project and I think we've done that with Armenia. What we'll probably do is either dividend it out or we'll marry it to a company that has money, a company with no projects but has money. This would be a built-in financing. If I dividend it out to the shareholders we still have to do a financing, so why not marry the money? In this market the value of that company as a pure gold play will be pretty intriguing because they're all near term producers. You're past the drilling phase and you're now dealing with a known commodity, a known resource, that you can actually start to do bioleach work on with the intention of going to production sooner than later.

Q: What progress is being made with BacTech's involvement in the black oil shale project in Sweden?

Orr: It's new and it's definitely an R&D situation. You've got a bio heap leaching operation in Finland by Tatavaara, which is a heap bioleach for black shale oil and it has been operating now for about six months. The gentleman here in Toronto from Continental Precious Metals was the one who came to us and said, 'These guys are doing it, can you do it for us?' So we said pay us the money and we'll find out. So we're doing some column leach test work over at the University of Toronto in the lab. It's pure R&D but it's obviously a very big prize if you can do it because you've got 2.8 billion tons of material but it is fairly low grade. You've got low grade uranium, which we can do. We've never played around with vanadium or titanium before. But there's nickel as well as gold and there's also kerogen, which is the sludgy type of oil that comes out of the shale as well.

Q: It sounds like there's no limit to the type of minerals that can be extracted using this technology, yes?

Orr: You have one common denominator and that's sulfides. That's what the bacteria want to get their teeth into. If you brought me an oxide gold deposit I would say you're wasting your money with us, you don't need us. We strictly go after refractory situations, which means sulfide hosted.

Q: What are some of the strengths of your technical team?

Orr: I can honestly say that Dr. Miller is the best in the world at this. I just love to sit back and watch him go. He basically will tell you whether bioleaching will work when he reads the background on a project. The test work is really just verifying his initial thoughts whether the project is a go or a no-go. We're a very small company so we have to stay focused on what it is we're doing. That's one of the reasons

why we're spinning out the gold situation. We are creating a real conflict between our shareholder base. You have the guys who like us because of the environmental cleanup work we are doing but they said, 'What are you doing in mining? We can't invest in you if you're in mining.' And of course the mining guys don't see the value of investing in tailings reclamation. This is why we have to do the separation [of the company]. I still believe, though, that the gold company will be obligated to pay a royalty back to BacTech. They are using BacTech's technology and we will be giving them an exclusive right to the gold technology. We've actually separated it into primary mining and secondary mining. Primary mining is anything that's still in the ground, so the oil shales will go into that company, the gold projects will also go in there. The other side will be just strictly mine reclamation, tailings, etc.

Q: Where do you see the price of gold in the coming months? Are you optimistic that price recovery will continue in the precious metals?

Orr: Put it this way. If [the gold price] did nothing from here I would be very happy. I don't need \$2,000 gold. This is perfect. I'm looking at projects where I've got production and capital costs and everything all in for say \$400 [an ounce]. That is a nice margin. If it goes to \$2,000 it's will be anarchy out there. It's hard enough finding projects now with the price of gold where it is because everybody just pulls everything close to their chest. Don't forget, I'm trying to leverage myself into some of their gold in exchange for solving their problem and the big guys just say, 'Get lost – it's voodoo!' And the little guys, all they want to do is license your technology. There's no money in that for us.

Q: So is a relatively stable to lower price of gold better for BacTech?

Orr: Only if I'm trying to acquire [laughs]. So as the price of gold goes up people's expectations change dramatically. It just becomes more of a greed factor I guess is what it really is. One thing about gold is that it definitely has a mind of its own. I see it has hit a new high again this morning [Oct. 8]. But we haven't seen that frothiness that we've seen in the past. And I don't know if it's because the ETFs are involved now or whatever because it seems that the retail guys have just been handed their rear end too many times and finally said, "You know what – forget it! I'll buy the ETFs instead."

Q: How much of an institutional following does BacTech Mining have?

Orr: A pretty good one, actually. Our biggest shareholder is Pinetree Capital, which owns 10 percent. A group out of London, England called Baker Steel, which holds about 7.5 percent. Crosby Capital out of Hong Kong owns about 7.5 percent. And then I've got a lot of high net worth types that own big blocks. MGI Securities here in Toronto hold 8 percent and that would be for high net worth people. So I would say probably 40 percent of the stock is tied up institutionally.

Q: What do you see as the future prospects for BacTech Mining?

Orr: The gold arm of our company is obviously something that all of a sudden has gotten very exciting in the last 30 days. Not just because of the price of gold but more that everything is coming together. If we're successful in landing this other project then we've got over a million ounces net to BacTech on the books which is a billion dollars worth of gold. The question is, from the market's perspective, how much do you pay for an ounce of gold in Armenia or an ounce of gold in, say, Central America or an ounce of gold in Ontario that is 1.) Refractory, meaning problematic, 2.) What's the political risk associated to that ounce in that country, and 3.) What are your prospects of actually bringing that gold out to the market? Refractory gold in the ground with no solution to the problem is probably worth \$5 to \$15 an ounce. If you introduce a technology that liberates that gold and does it economically, realistically that gold should be worth \$25 to \$50 an ounce in the ground. Keep in mind that gold is like \$1,055 an ounce right now, so this is not even 10 percent of the value being ascribed. So then you apply your

country risks to it. An Ontario ounce that's refractory and has a solution for liberating gold would probably be worth \$150 to \$200 an ounce because of the political stability and the ability to develop a mine here. Armenia is, I don't know, maybe \$50? Central America maybe \$50. But still, if you have a million ounces and the worst case scenario is \$25 an ounce, that's a \$25 million market cap. My market cap is \$7 million Canadian. Why? Because we don't do a very good job of doing what we're doing right now with you with this interview but we're going to start doing it. We have to. It's a good story we have here and it's time we got it out.

[Visit the company's web site at www.bactech.com for more information.]

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