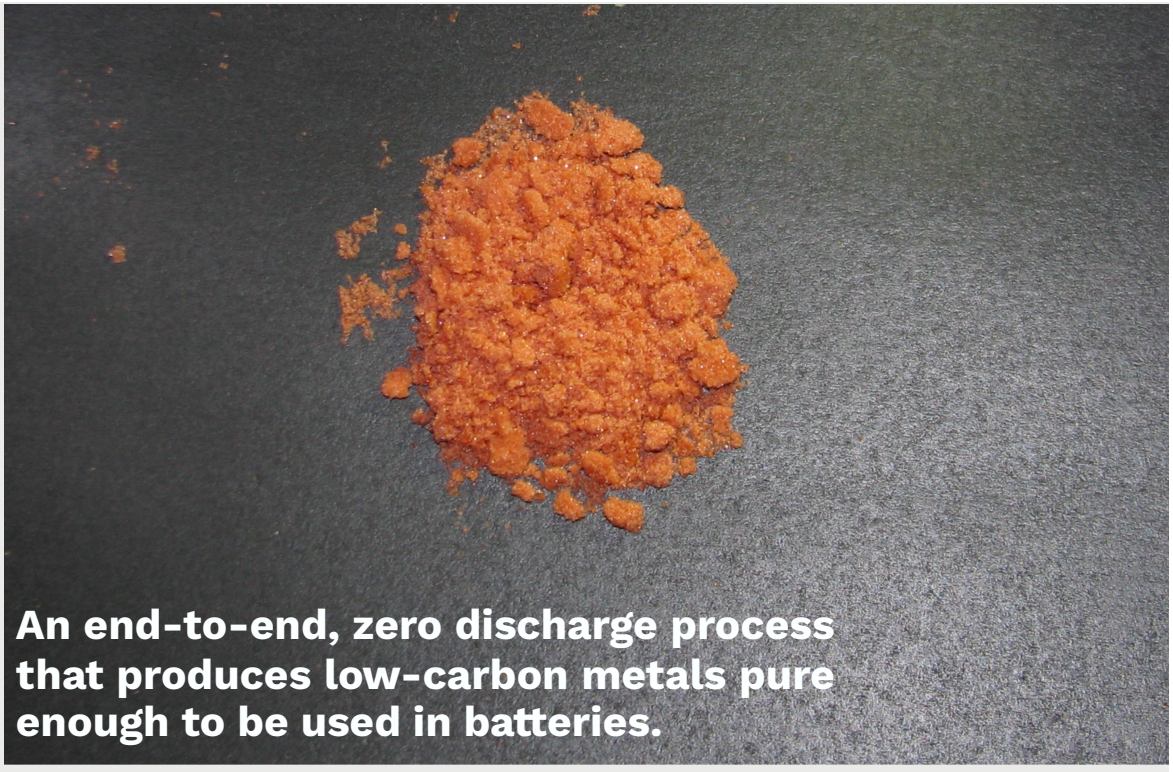
Re-2Ox

Critical metals for a cleaner world



An end-to-end, zero discharge process that produces low-carbon metals pure enough to be used in batteries.

July 2022

Interview with CEO

Below follows an interview transcript between Neal Hamilton, VP of Growth at Benzinga and Frank Basa, CEO of Canada Silver Cobalt Works at the Clean Tech Small Cap Conference on April 22, 2021.

Q: Frank, you are the chairman and CEO of Canada Silver Cobalt Works Incorporated. Can you tell us a little bit about yourself and your organization?

A: We're a group of older professionals who take over what we call distressed assets, distressed shells, and we try to make something out of them for our investors, and hopefully a major player comes in, takes us out after we've completed a fair amount of work.

One of the assets we picked up in Canada's Cobalt Camp, and it's evolving, was this very high-grade silver asset (Castle Mine), which also has a lot of cobalt, nickel, copper, and arsenic.

What we've done is develop an extraction process we call Re-2Ox, and the whole purpose of our presentation today is to discuss this process. Without this process, the whole Cobalt Camp, which in its day used to have about 108 mines, cannot produce cobalt sulphate or any battery metal, but the process itself has that ability, and we've already produced in lab tests a cobalt sulphate on what we call Asian specs (specifications).

Q: Very interesting. I can't wait to see what you have.

A: Basically, this is a process that was developed over a six-year timeframe and was originally designed to be working with what's called a primary metal, a concentrate from mined material in the Cobalt Camp.

Over that six-year timeframe, we did a lot of bench-scale test work. We designed two pilot plants, then did full scale testing, and we produced, at that time, a cobalt carbonate. The market wanted a cobalt carbonate, so we produced a cobalt carbonate, and we were on spec. Moving forward, conditions change, demands change, so now the market wants cobalt sulphate. So, we took the process and we produced cobalt sulphate with it.

A little bit about why it's called Re-2Ox. We have a lot of questions on that. Everybody thinks the Re means recycle. Not really. It means reactor. We have two reactors in this process that take the primary metals, which are from the mines, and the secondary metals, which are the spent batteries and, of course, for the two reactors, we need oxygen in the process. We put that all into a design of a process, called Re-2Ox, as you see in the flow-sheet our intent is to use the process to produce battery metals.

We started to produce cobalt sulphate about three years ago, and we wanted to recycle batteries. We travelled throughout Asia, North America, and Europe. What we found was there was not actually a lot of spent batteries available.

Instead of waiting for the opportunity, we created the opportunity.

We created a very high cobalt-nickel-copper con (concentrate) with high arsenic, and then we subjected it to the Re-2Ox process. Lo and behold, we produced what we call cobalt sulphate to Asian specs.

It was a company called Sumitomo that gave us the specs, and they were the only ones who gave us specs, so using their specs, we did produce a cobalt sulphate for the battery market.

One of the most important things people have to understand about the Re-2Ox process is that in a lot of the recycling right now that we encountered in our travels, recyclers took the spent batteries and put them into a smelter. It's a pyro process. They are burning it, followed by hydrometallurgical. In our process, there's no stack. **We don't burn anything. It's leaching. It's hydrometallurgical.**

To further explain, using our hydrometallurgical process (no smelting) we can produce a product "on spec." If a customer comes to us and says, "Listen, we want cobalt sulphate at this grade with these impurities," we can do that.

We're going through the next stage of development now, which is where we ask SGS, a global player in this industry with 22,000 employees globally, to build us a pilot plant. Right now, what they're doing for us is they're testing three different batteries – lithium ion, nickel hydride, and nickel cadmium batteries. What we're trying to do is establish the parameters, the bench-scale test work, to build a pilot plant. And then of course from there build a larger plant, which will produce a quantity of the battery metals.

When we started in May 2018, we produced a cobalt con, which was very high in nickel and copper, and also very high in arsenic. And we were able to extract 99% of the cobalt, but also 99% of the arsenic. Now we found out the arsenic, not only is it a critical metal, it's one of the 40 metals the USA considers critical.

In August 2018, we produced our first cobalt sulphate from the Cobalt Camp, which I think nobody's ever produced before in the Cobalt Camp. We were very successful in doing that. And now moving forward to this year, we decided we'll build a pilot plant. And we're starting to do the test work on the three different types of batteries.

What's really important, and a lot of people need to understand, is that recycling the batteries by themselves is not economical.

When we looked at all these processes out there, they were all smelters and had a primary metal, which is coming from their mines, and then the secondary metals, which is battery recycling, but the battery recycling was secondary to the issue.

As we show in the flow chart, we do have our own primary metals that we will put through a mineral separation process, which, produces a concentrate, which will then join with the secondary metals, which are from battery recycling. As part of the battery recycling process, we'll do a physical processing to remove the plastic and seals to produce a black mass. Then, it is combined with the primary metals concentrate, and the combination goes into our first reactor.

In our first reactor, we remove the economical undesirables like arsenic. When we remove the arsenic, we produce it as a cobalt arsenate, which is used in wood preservatives. From the first reactor, the material travels to our second reactor. We put all the metals into solution, and then we pick out the metals that the customer wants for their specific battery chemistry.

The critical thing to this entire process is you have to recycle the solutions. If you recycle the solutions, then of course you have a green process.

In conclusion, the Re-2Ox process is a very simple elemental process. It's hydrometallurgical, and it works with primary and secondary feeds to make the process economical and viable. You have to have a process for primary and secondary metals to work together. You cannot recycle the batteries by themselves. We've already produced cobalt sulfate from our primary metals. And we're in the process of building a pilot plant, which will eventually lead to a full scale plant.

Q: Is this process cheaper than other methods, like the smelting process mentioned?

A: What we want to do is create something that's green. A smelter is not green. The economics of running a smelter, they're massive facilities, they have high volume, that's why they can do it economically. For us to make this thing work, we have to have a primary feed, which we do have, and then we can get into the battery recycling.

If we look at doing the battery recycling for batteries themselves, while our process is capable of it, we can't do it economically. We want to be competitive globally. So, the facility has to be very large to deal with the primary metals. And then of course you can do secondary metals, which are your spent batteries.

Q: That is such a clear explanation. We've got a really good mix here of larger investors with a lot of money under management and the retail investors. Looking at those two types of investors, what do you think is most exciting from your perspective?

A: We tend to have long-term investors in our companies which are designed for the investor who likes managed risk. In the event we go into production, which we are targeting, then the major players come in and they replace the board.

Now we already met with the Germans, and the Chinese. They'd like to see this process, but in reality, a process is not something you do in an afternoon. It takes a fair amount of work. They have to see the economics and they'll go ahead and then acquire the process.

If you look at the way we've done it, you'll notice we tried to patent it. Then we found out, after talking to our patent attorneys, they said, don't patent it, just license the process. The minute you patent it, everybody knows about it. And some enterprise who will start using it and then you have a legal battle. So we kept the process proprietary.

It is very simple, elemental. It can be built anywhere. We use old conventional reagents, nothing exotic in what we're doing. And the reality is, it's bulletproof. We spent more than six years working on this process. We've already spent 8 million dollars on it, but we still have a fair ways to go to make sure that we meet the demands of the market.

Q: That's a very interesting story about your IP there. Do you filter the leach tanks when they're drained, and is the water cleaned and repurposed?

A: The water is repurposed, everything is filtered. I simplified the process in the flow chart without putting too many things in there, but yes, it is filtered.

You've got to recycle the water. The water itself is valuable. So we won't throw it away. There is a great value to the water.

Q: What would you say is your strategic moat around your organization?

A: I think the only thing we could say is that we can do better than anybody else. We're the only ones doing it. I can take very complex high arsenic concentrate, and I found out some of the batteries also have arsenic in them, we can take the arsenic out and repurpose it. That's all. We're the only ones doing it that we're aware of.

In the old days, the smelters used to take all these arsenic cons and they would blow it out the stack. The smelters do that. There's a lot of these arsenic cons and we found a lot of them of all places in South America where they can't go anywhere to get processed. And even the Chinese, when we went to the Chinese with our con, they refused it. So we took out the arsenic and of course then they accepted it. So even the Chinese will not take high arsenic feeds.

Q: Is there anything that you think that investors should really be looking for in this space to find a company of quality that has staying power?

A: It's a tough business. You have to find people that've been in the industry for a little while. They've been doing this for at least 40 years. There's a lot of enterprising people, very good ideas, but I tell you the recycling business, which I've been in as well, is brutal.

It's not that simple. And everybody's your competition. If you think you're gaining ahead, next thing you know, is that the battery market dries up and somebody's stockpiling batteries in Europe. And, of course, you then get no feed. So that's why we said, we're going to be a primary metal producer.

We control our own feed. We're not buying, but instead we're going to toll it for anybody who brings it to us.

In other words, if Panasonic wants to come to us, we'll toll it for them. And we will produce product on spec.

Q: Is there one note that you would like to end on that you think everyone can take away from this?

A: Well, I think you got to have what I call a green process. And I think we meet that criteria and it's not easy to meet. And the main thing in our process is the recycling of our solutions. Otherwise it's not a green process.

Everybody thinks about the smoke stack industry, that's one criteria. But the ability to recycle your solutions is a critical thing to being a green process.

Frank Basa

CEO & Founder

About

The Re-2Ox process is the only known hydrometallurgical process purposely designed and adaptable to recover and recycle metals from lithium-ion, nickel-hydride and nickel-cadmium batteries.

The core of the ability to meet EV battery manufacturers' needs requires a metallurgical process that can treat primary feeds and secondary feeds equally well into final end-user products.

Put simply, Canada Silver Cobalt Work's Re-2Ox is a proprietary technology designed to efficiently extract and produce the input materials to specifications of battery sector end-users.

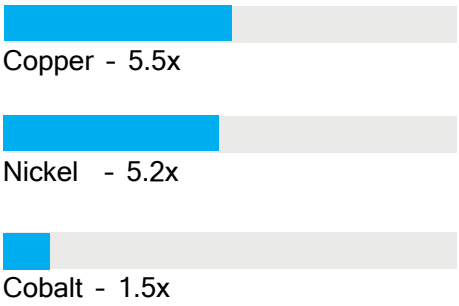
The Re-2OX pilot plant is a strategic advantage for the production of battery metals for the EV market. The company is taking all necessary steps to become a producer of silver and battery metals for the EV market, while fully developing all assets. Feed material will be North American, with production for the North American market.

Our Philosophy

The transition toward a circular economy requires ‘green’ battery technologies, however, true sustainability can only be achieved with an efficient way to capture valuable materials in spent batteries and divert them from landfills.

Market Description

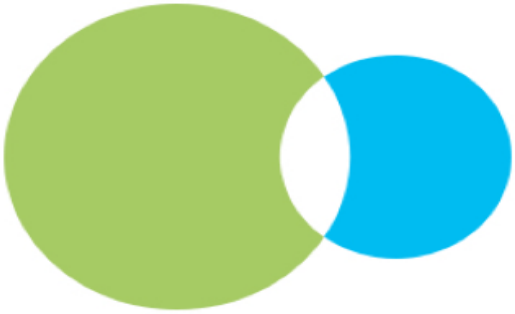
Market Needs



Widespread adoption of batteries, with low carbon technology places considerable pressure on both the mining and recycling industries.

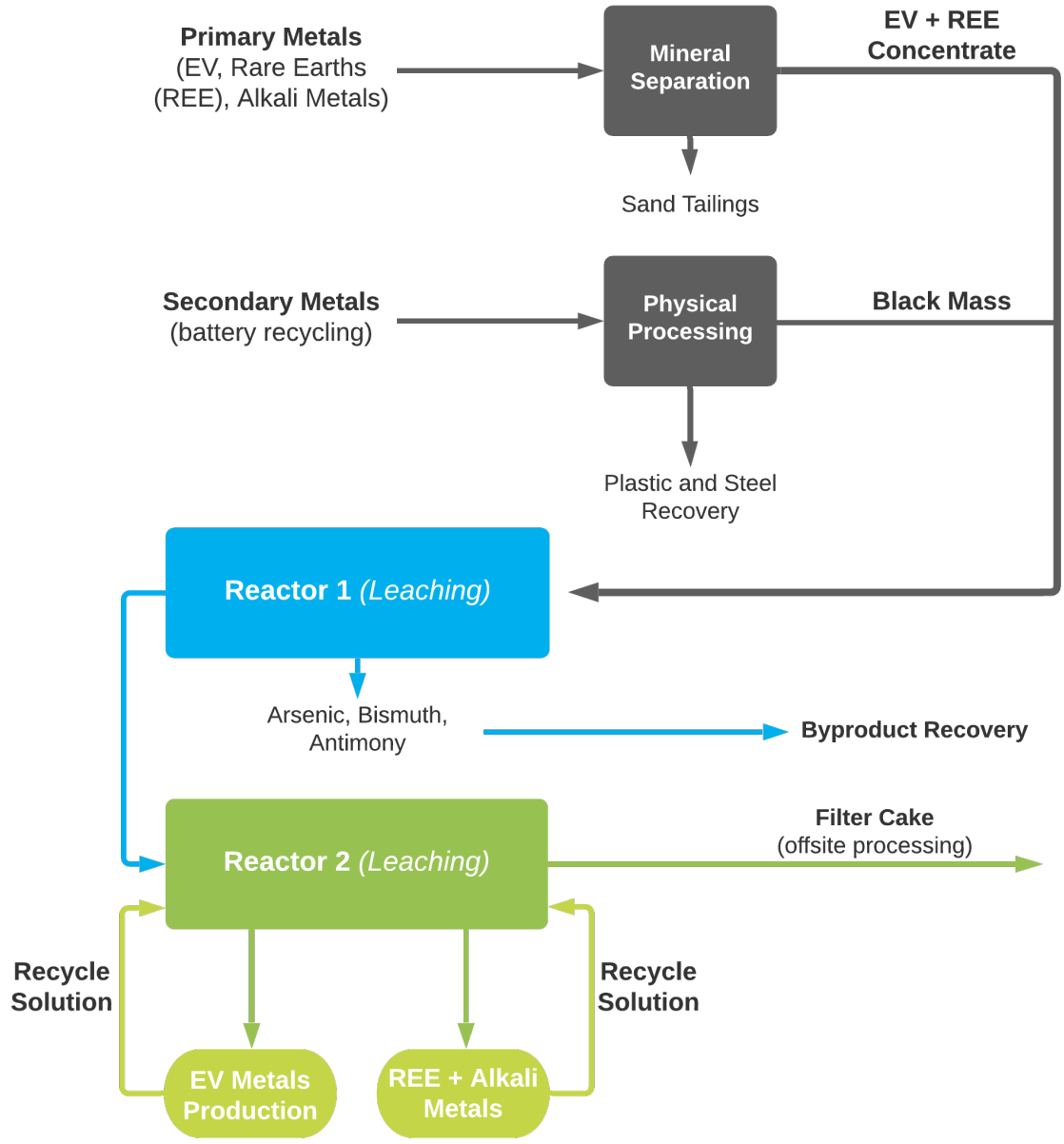
Left: A Recent Bloomberg New Energy Finance report predicts strong demand increases in battery metals by 2030.

Market Trends



Flow Sheet

The process depicted below has been modified from its original version to incorporate diverse feed types including but not limited to Battery Metals and Rare Earth Elements.



Future Plans

The Re-2Ox Process retains the capability to produce multiple streams of specification grade material. The company is open to collaboration with a range of industry partners.

Battery Metals

Concentrates can be recovered of all the key metals used by battery manufacturers, and subsequently made into custom specifications.

Rare Earth Elements

Both primary and secondary feeds can contain different Rare Earth Elements such as Rubidium, Caesium, and Scandium. All of which have uses in high technology.

By-product Recovery

Materials recovered include Arsenic, Bismuth, and Antimony, which are used in Residential, Agricultural, and Forestry industries.

Re-2Ox

We are currently evaluating long-term partnerships, processing, and tolling agreements. If you are interested, please contact us to learn more.

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