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Q&A with Dundee Sustainable Technologies

The breakthrough of turning toxic arsenic into stable glass



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It is one of Canada’s most toxic legacies. Buried just outside Yellowknife is more than 230,000 tonnes of arsenic trioxide, a deadly byproduct from decades of gold mining at the Giant Mine. This poisonous dust is stored underground, and as the permafrost melts, the risk of it leaking into surrounding water systems grows.

The Canadian government has frozen the chambers for now, but that’s a temporary fix. What’s the long-term solution? Well, one Canadian company believes it may have the answer.

Dundee Sustainable Technologies has developed something called GlassLock, a process that turns arsenic into a stable glass-like solid that’s much safer to store.

Mining.com’s Devan Murugan sat down with Jean-Philippe Mai, president and CEO of Dundee Sustainable Technologies, to find out more about the process.

Devan Murugan: Now for those who don’t know, how serious is an arsenic problem like the one we’ve just cited at Giant Mine?

Jean-Philippe Mai: It’s definitely a serious issue because arsenic is one of those contaminants that is very soluble and highly mobile. The one you mentioned at the project in the North, we’ve been involved with for quite some time. The federal government, through a technology assessment study back in 2016, identified GlassLock as one of the best technologies for the permanent and long-term remediation of the Giant Mine project.

DM: In simple terms, how does GlassLock work? And what does it do to the arsenic?

JPM: The objective behind GlassLock is and was always to have a process which can permanently immobilize and stabilize the arsenic into an insoluble product. So essentially what we’re doing at Dundee Technologies with GlassLock is we are converting the arsenic, which can come in multiple forms, into an insoluble glass matrix.

We are not encapsulating arsenic within glass. We are

incorporating the arsenic within the glass matrix, which gives it stability as an amorphous product and really limits the mobility of the product.

DM: When you compare it to other approaches, how much more effective is GlassLock?

JPM: Well, there are quite a few different approaches to handling arsenic, but none of them have really been focused on permanent and long-term stabilization. And this is really what we’re providing here, a product that will no longer release arsenic into the environment.

We all know glass in different forms, but the great quality of glass is its ability to be insoluble. Other approaches or what the industry has been doing is to temporarily stabilize the arsenic, but there’s always that long-term mobility issue. And that’s really what we’re trying to solve here with GlassLock.

DM: Has it been tested on real arsenic and how safe is the final product in terms of long-term storage because presumably that’s the aim here, right?

JPM: Of course, we have worked with a lot of different arsenic products. We even constructed



Dundee’s GlassLock process holds dangerous arsenic in glass. DUNDEE SUSTAINABLE TECHNOLOGIES

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— JEAN-PHILIPPE MAI, PRESIDENT AND CEO OF DUNDEE SUSTAINABLE TECHNOLOGIES

an industrial demonstration plant back in 2018, which is on the site of an operating copper smelter. The GlassLock plant there was specifically designed and purposed to handle arsenic trioxide generated by the copper smelting operation.

We have a lot of operational data and worked with a lot with various different arsenic sources and arsenic products. The main characterization is, when we submit the glass to the long-term environmental stability testing, we’re able to demonstrate that the glass will be stable for long periods of time, which is effectively the objective.

Once you can demonstrate the stability of the product, then you can look at repurposing the glass: how do we reuse that glass product on site, like for a geotechnical application, for example.

DM: Now beyond the Giant Mine example I cited in my preamble, how big is the global market for this kind of technology? Are

there other mines or countries facing the same challenge?

JPM: Yes, arsenic is definitely present in the industry globally. We have seen arsenic and work on arsenic projects in Asia, in Africa, in South America and in Canada. It is really an industry-wide problem, which is sometimes well known, like the Northwest Territories project, but also sometimes a bit more unknown.

As we develop expertise in working with arsenic, we are now being exposed to a lot more projects which have arsenic issues that need remediation. Some projects are generating high arsenic concentrates where we’re able to remove the arsenic and stabilize it before it goes to market or to smelting or metal processing operations.

DM: From an investor point of view, how do you see Dundee’s role growing in the mining operations space and could this

technology become the new industry standard?

JPM: Well, we sure hope so. Dundee is a novel metallurgical process provider. What we do is we offer the industry the tools that they need to be efficient, both from an operational and an economic standpoint.

Definitely, there are a lot of upsides to GlassLock. Our role is to be a tool and allow for project developers and operators to properly and viably handle the arsenic within their ore bodies.

DM: Jean-Philippe Mai, president and CEO of Dundee Sustainable Technologies, once again, thanks very much indeed for talking to us.

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