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Stabilizing mine tailings is good for business — and the environment.

"As the Vice President of Environment, Science and Technology," begins AREVA's John Rowson, "it's my job to ensure that operations are environmentally sustainable. That means the land has to be usable after it was mined in the same way that it was used beforehand."

Mining companies like AREVA mitigate short-term effects of mining throughout the extraction process. But they also need to mitigate long-term effects, such as preventing contaminants in the groundwater. Rowson continues, "We're talking about keeping materials stable for thousands, even tens of thousands of years."

Arsenic is a toxic by-product of most mining processes, and one that the industry has long been studying. In an effort to reduce long-term effects at the McLean Lake Operation, Rowson's team developed a process to engineer mine tailings in a way that contain arsenic as a stable mineral within the Tailing Management Facility (TMF). The mineral is relatively insoluble, allowing for the controlled release of arsenic in a manner that would not adversely affect nearby water sources.

Some scientific uncertainty remained in conclusions drawn from the initial laboratory studies and the regulatory agencies adopted a precautionary stance. "We couldn't point to any other mining operations in the world that were doing what we were proposing to do," says Rowson, "so we had to prove that it worked."

Evidence of mineralization wasn't visible when the sludge was viewed through conventional x-ray diffraction techniques, so Rowson and his team turned to the CLS for help. The research team used extended x-ray absorption fine structure spectroscopy (EXAFS) to identify the mineral.

"With the help of CLS, we were able to demonstrate that arsenic was stabilized in a poorly crystalline mineral. CLS helped us gain technical certainty in our quest for environmental sustainability. And that made regulatory agencies far more comfortable with licensing our operations."

"It's hard to put a dollar value on that. We simply would not be able to mine ore bodies if we couldn't prove that we can control the long term effects of the mine tailings."

Jeff Cutler, Associate Director of Research for Industrial Science at the CLS adds, "Our work with AREVA was a true partnership. We work hard to provide solutions for our clients—in this case, AREVA needed proof that their methods were successful, and we were able to provide that."

John Rowson, Vice President of Environment, AREVA Resources Canada Inc. at McLean Lake (www.aveva.ca)

