NATIONAL POST

Saturday, October 17, 2009

Salvageable sludge eases stress load

Reclaiming Metals, Minerals From Waste Water

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In the picturesque town of Breckenridge, Colo., Mark Meyer of the municipal water division is happy to make a showpiece out of a single three-cubic-metre bag of zinc concentrate that's ready to make its way to a smelter.

While that may not seem particularly noteworthy, the fact that the town is able to extract zinc from contaminated water and turn it into a product for recycling is a big deal when it comes to keeping waste out of the town's water systems. "The alternative to one bag going to a smelter would be 100 bags of waste sludge a week going to landfill," he says.

Breckenridge is one of the first municipalities in North America to use a metal recovery technique originally developed for the mining industry by Vancouver-based BioteQ Environmental Technologies Inc. In Breckenridge, the waste water treatment technology is designed to remove dissolved zinc and other metals from waste water that is draining from an abandoned mine (the process is known as acid mine drainage), while cleaning up the water so that it's safe for discharge into the environment.

"Mines do a serious amount of sludge generation, and all that goes to landfill and is not reclaimed," Mr. Meyer says. "A neighbouring treatment plant, in fact, pays a tipping fee of $230,000 per year. With our approach, all we have is a high-quality zinc concentrate that can go to a smelter and water that's clean enough to be sent back to the environment."

Of course, removing contaminants from water is nothing new. There is a wide variety of membrane, reverse osmosis, evaporation and other filtering techniques that do their part for removing even the smallest of offending particles. In many cases, however, all that bad stuff that is filtered out of the water is what creates ongoing environmental headaches. In many cases, it ends up in some type of toxic sludge or as crystalline solids that have to be kept in special storage facilities or require specific disposal techniques.

The reason BioteQ tackled the mining industry first was simple, says Mike Bratty, the company's manager of development engineering. "There are hundreds of refineries and mining sites throughout North America that are dealing with tens of billions of dollars in liability relating to acid mine drainage in both active and abandoned sites. What they are starting to focus on now is reducing the quantity of waste generated by the drainage."

Those that have water treatment issues to contend with -- whether a mine or municipality -- are

learning that there is merit to be gained in technologies that make sure those contaminants don't end up sitting in sludge or landfill sites in perpetuity.

Depending on the technology of choice, it is possible to reclaim gold, silver, zinc, phosphorous, magnesium and cobalt, among many other metals and minerals found in mining and industrial waste water streams. Sulphates can also be extracted from mine water and utility sites to produce a clean gypsum product that can be used in construction.

Ostara Nutrient Recovery Technologies Inc. is another Vancouver-based firm that is putting its own spin on removing and recycling products from waste water streams. Phosphorous is its main nutrient of choice.

"What we're doing is recovering nutrients from waste water that would normally be destroyed by chemicals or disposed of in sludge, which is either landfilled or incinerated," says CEO Phillip Abrary. "But phosphorous in particular is something that the agricultural industry would like to get its hands on for making high-grade fertilizer."

What makes the need for this type of technology more pressing is the fact that phosphorous is a non-renewable mined resource that is depleting at a high rate, he says. "But it's vital to survival."

Ostara's latest project was unveiled with great fanfare at the Durham Advanced Wastewater Treatment facility in Tigard, Ore.

"Our region accounts for 80% of the container plant industry in the country, so fertilizer is in high demand," says senior operations analyst Rob Baur. "Most plants are grown in sawdust, bark dust, sand or peat moss, so they require a great deal of fertilizer.

"With this system, we provide another outlet for getting the phosphorous out of the water system and using it to create high-quality, slow-release fertilizers. Better yet, we don't have to use as many chemicals or worry about disposal."

While municipal waste water projects such as Breckenridge and Tigard are in their infancy, they're a strong indication as to where water treatment needs to go in the future.

"There will be a lot more of this going on as demand for water increases," Mr. Abrary says. "We're just using technology to take something out (of the waste stream) and doing something worthwhile with it."