

Trends affecting water treatment



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By Jonathan Wilkinson

Effective approaches to water treatment will be critical to sustaining and enhancing public support for mining efforts in the future. As we all know, water is essential to mine and metallurgical processing for milling and flotation, and the treatment of mine impacted water is necessary to satisfy regulators and maintain a “social license” to operate.

Globally, expenditures for mine water treatment technologies are presently estimated to be about \$1 billion annually, and demand is forecast to increase by 30% in 2012. This growing demand is being driven by new mine development, mine expansion, tightening regulations for water quality and re-use, and stronger industry commitments to corporate social responsibility.

According to *The Raw Material Database*, there are 172 new mines in various stages of development around the world where the development cost of each mine is expected to exceed \$1 billion. In order to secure development permits, mining companies must demonstrate clear and comprehensive plans for the use and treatment of water. In regions like Canada, where there is typically a positive water balance, the focus is on treatment to produce high water quality which allows for direct discharge to the environment - this requires methods that can meet very strict discharge limits in order to protect aquatic habitat, wildlife and human health. In arid regions like Chile, where water is scarce,

companies are focused on technologies that maximize water recovery and allow for re-use within mine processes.

Mines undergoing expansion are often required to upgrade existing water treatment facilities to meet the expectations of today's regulatory environment. In most regions, regulations are getting stricter, and regulators are imposing limits on new constituents of concern. A mine expansion request provides regulators with the opportunity to review the site water management plans, and impose new requirements.

For existing mines, regulations are tightening. For example, selenium is presently under the regulatory eye in Canada, and some mine owners are now required to meet very strict limits for selenium because of concerns about toxicity and the impact on ecosystems. Sulphate is another emerging constituent of concern in many regions. For example, the state of Minnesota has proposed sulphate limits of 10 parts per million, which is several orders of magnitude below the typical effluent of a lime plant. Although not toxic except at high levels, sulphate can cause taste and odour problems in drinking water, can affect agriculture and can cause scaling when used in industrial processes where water re-use is attractive.

As a result of these pressures, technology providers are responding with new innovations, including technologies to treat new constituents of concern. BioteQ,

for example, has developed new technologies to remove sulphate. The system uses a novel two-stage ion exchange process to remove sulphate and hardness, producing a clean solid gypsum by-product and water low in sulphate.

In addition to responding to regulatory changes and regulatory pressures, strong commodity markets are incenting mining companies to look for mechanisms to accelerate the execution of water treatment projects. BioteQ has been endeavouring to respond to these needs. The company recently designed and constructed a mobile water treatment system that uses ion exchange process technologies to meet very strict discharge limits for metals. The system recovers the metal as a marketable product, and produces no residual sludge waste. The portable nature of the system enables the mine owner to move the unit around its site, and to produce very clean water that can be released directly to a fish bearing environment. The plant was custom designed and delivered to the customer within 12 weeks. By comparison, a fixed facility would typically take 12 months to complete.

The demand for innovative, cost effective water treatment technologies for the mining industry is growing. Significant opportunities will exist in future for firms such as BioteQ to play a key role in assisting mining customers to address these emerging needs and requirements. **CMJ**