

Mobile water treatment

David Kratochvil* explains how the technologies are moving with the times

Recent advances have made sulphide precipitation and ion exchange technologies available in portable systems, offering benefits that include higher water recovery rates, lower energy costs, less waste and the ability to recover saleable metals from wastewater

In mining mobile resources have become a mainstay to doing business. From portable housing and food services to excavation equipment, operations demand flexible approaches to keep their activities up and running.

One of the biggest deployment requirements at any mine site is wastewater treatment. Depending on the circumstances – and urgency – mining operations can use portable water treatment systems to address both short- and long-term requirements.

There are a number of situations where a portable solution can contribute to the continued success of the operation. For example, a mine expansion plan can trigger the need to meet new water quality limits, which puts the onus on the operator to upgrade existing water treatment processes. Given that an upgrade or replacement of a facility can take months or years to complete, a portable system can be installed as an interim measure to allow the expansion to proceed while meeting the new regulations and avoiding potential delays or shutdowns.

Weather anomalies can also put a burden on existing water treatments. Unseasonably heavy rains, heavy snows and excessive melting in the spring, or flooding can push water treatment volumes beyond the capacity of on-site facilities. In these cases, portable water treatment systems can be used as a supplemental remediation measure.

Portable facilities can also be mobilised to accelerate start-up of new mines. The ability for rapid deployment of a water treatment system can have positive impacts on the near-term profitability of a project.

The use of portable water treatment systems is nothing new. Portable systems have been in use for many years to speed deployment and/or address interim or emergency water treatment needs.

In recent months there have been a number of development breakthroughs on the portable front for sulphide precipitation and ion exchange technologies – both of which have met with growing acceptance and success in the mining industry. These technologies offer a number of benefits over more conventional portable systems, including higher water

recovery rates (in excess of 95%), lower energy costs, less waste, and the ability to extract metals from wastewater for sale to offset treatment costs.

Sulphide precipitation based technologies have been successfully applied as fixed facilities at active and closed mine sites to treat large volumes of waste water containing elevated concentrations of dissolved metals. Portable sulphide systems are now in development. These advanced technologies use biological or chemical sources of sulphide to selectively precipitate dissolved metals such as copper, zinc, nickel and cobalt as individual metal concentrates. Other heavy metals such as arsenic, antimony, cadmium, lead, and manganese can also be removed from the wastewater to meet water quality criteria. In many cases, the recovered metal by-products can be sold to generate a revenue stream, and the clean water can be re-used or discharged safely to the environment.

Ion exchange technologies can effectively remove dissolved metals and sulphates from water to meet strict water quality requirements. These processes use specialised resins that selectively remove the target constituents from wastewater, meeting very strict water quality requirements. Mobile ion exchange systems will be deployed later this year at several sites in Canada.

The availability of these water treatment technologies in a portable system provides mine operators the same benefits as their on-site fixed facility counterparts. The flexibility of portable water treatment systems can also provide the additional benefits of mitigating production disruptions, meeting temporary water treatment demands, and fast-tracking production start-ups.

As the resource sector boom continues, the demand for flexible, environmentally compliant water treatment systems is expected to grow. With the latest mobile water treatment technology offerings, mining operators can rest assured that their water treatment needs – whether it be interim, seasonal, supplemental or urgent – can be met, while continuing to meet regulatory and environmental benchmarks. **IM**

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