Integrated metalrecovery system

MR3 Systems, the United States, offers a technology that combines high-affinity metal capture, metal refining, waste decontamination and water purification into a single integrated system. The MR3 plant uses sophisticated and highly innovative engineering and special MR3 ion-exchange media of unprecedented affinity, selectivity and density to economically remove and simultaneously purify almost any metal from aqueous solutions. It operates efficiently with metal concentrations of over 20,000 ppm to less than 1 ppb. Radionuclides present in wastewater have been reduced to undetectable levels by this system, even with concentrations as low as parts per trillion.

The MR3 process consists of a continuous operation in which several steps – selective capture, purification and concentration of individual metals removed from industrial, radioactive or mining wastes – have been integrated into one automated modular treatment plant. In this process, toxic metals, tailings, sediments, sludges or ashes are transformed from their solid state into an aqueous slurry. The solid materials are then separated from the metal-laden liquid as the solution passes through metal recovery units, where each module selectively removes its target metal from the mixed metal stream. Each separated metal is then processed individually into a non-waste, metal product: e.g. ferric sulphate for drinking water purification, zinc sulphate for fertilizer, copper sulphate for either algaecide or animal feeds, etc.

Potential applications of the MR3 system include:

- Water purification, metal reclamation and refining from metal-laden industrial wastewater;
- Water purification and metal reclamation from metal-laden acid mine water;
- Metal reclamation (including precious metals) from mining tailings;
- Cleaning sewage sludge and sewage sludge ash;
- Metal recovery from hydroxide sludges from the metal finishing industry;
- Cleaning contaminated soils, including silt and clay fractions;
- Cleaning fly-ash and bottom ash;
- Cleaning groundwater of heavy metal contamination, including chromate (Cr-6);
- Cleaning harbour and lake sediments;
- Recovery of metals and water from plating rinse waters;
- High-affinity capture of low concentrations of radionuclides;
- Recovery of individual metals from slags and cinder; and
- Selective removal of iron from electro-galvanizing baths to greatly prolong bath life.

All the MR3 media developed to date, totalling 24, have exhibited excellent capacities for metal capture, each being specific to an individual metal or group of metals. The MR3 media have high degrees of specificity and affinity specifically for aluminium, arsenic, cadmium, caesium, cobalt, chromium, copper, gold iron, lead, magnesium, manganese, mercury, molybdenum, nickel, plutonium, selenium, strontium, thorium, titanium, silver, uranium, vanadium and zinc. The non-toxic media are more efficient in capturing metals from aqueous solutions compared with conventional ion-exchange materials. *Contact: MR3 Systems Inc., Pier 54, San Francisco, CA 94107, the United States. Tel: +1 (415) 9471 090; Fax: +1 (415) 9471 095; E-mail: info@ MR3Systems. com.*