

Waste Acid Detoxification and Reclamation

An innovative system of recycling acid solutions



Used acids can be toxic to the environment, but a new system demonstrated at the Watervliet Arsenal is showing how acid solutions can be reused in a way that saves money and prevents pollutants from contaminating the nation's land, water, and air resources.

**Watervliet Arsenal
New York**

Finding innovative solutions that protect the environment in a cost-effective way is one of the goals of the U.S. Army's Watervliet Arsenal in Watervliet, New York. A new demonstration system has been installed to allow used acids to be recycled saving the arsenal more than \$90,000 per year. The process is known as Waste Acid Detoxification and Reclamation (WADR™).

The Watervliet Arsenal produces large amounts of used sulfuric and phosphoric acid mixtures as a result of its gun tube plating operations. These

acid solutions are used to clean and prepare military gun components for chrome plating. Two 3,400-gallon tanks of concentrated acids are used in the process. Over time, the acid mixture becomes diluted with water from the rinsing operation and by absorption of water from the atmosphere. The used acids must be replaced to maintain the effectiveness of the solution.

Traditional disposal methods for the used acid solution are expensive. In fact, it can cost as much as \$25,000 to dispose of and replenish the acids from each of the 3,400-gallon tanks. In addition to the costs, state and federal environmental regulators have requested that the Watervliet Arsenal reduce the volume of acid wastes to meet pollution prevention goals. The WADR™ technology allows the Watervliet Arsenal to avoid the cost of disposing and replenishing the solution—saving time and money.



The WADR™ system is used at the Watervliet Arsenal in New York to recycle used acids.

COST-EFFECTIVENESS

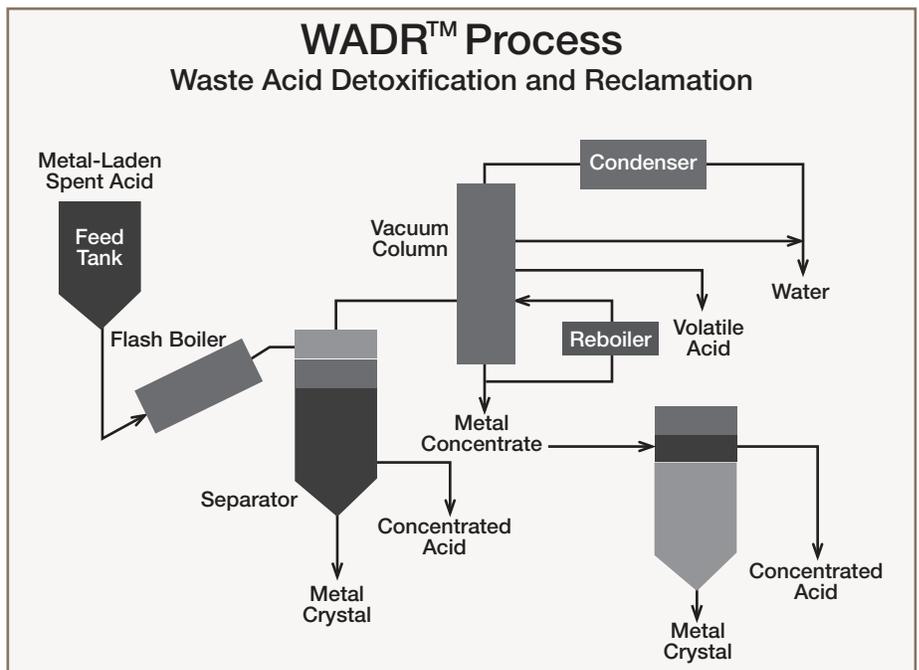
The WADR™ system costs an estimated 46 cents per gallon to treat used acids compared to \$7.41 per gallon to dispose of and replenish the contents of one of the 3,400-gallon tanks. This dramatic savings to the U.S. Army will pay for the investment costs of the WADR™ system in approximately 30 months. Assuming that four tanks are recycled each year, the net return on the WADR™ investment totals more than \$90,000 annually. This system is designed to process 325 gallons of used acids in eight hours.

PROCESS

Sulfuric and phosphoric acids are concentrated as water is evaporated from the diluted acids through a process commonly referred to as vacuum distillation. Components of the WADR™ system include an acid tank, steam-heated reboiler, vacuum column, water-cooled condenser, and process condensate tank. All of the liquid discharged to the industrial waste treatment plant is continuously monitored for pH to reduce adverse impacts to the environment. Discharge that exceeds the allowable pH limits is adjusted appropriately before entering the industrial waste treatment plant.

PARTNERSHIP

The Watervliet Arsenal is partnering with the U.S. Department of Defense's Environmental Security Technology Certification Program to demonstrate the WADR™ system to produce cost savings for the military and the nation's taxpayers while reducing environmental pollutants. The demonstration shows how similar benefits can be achieved by other agencies and private industries interested in similar pollution prevention technologies.



For more information, contact Watervliet Arsenal, Health Safety and Environmental Division (SIO WV-ISH), Watervliet, New York, 12189-4050. The telephone number is (518) 266-4534 and the fax number is (518) 266-3610. You may e-mail comments to darcy@wva-emh1.army.mil.