Dynatec Provides Membrane System to Recover Silver

Dynatec was selected to provide a complete system to recover silver in DuPont's Manati, Puerto Rico microcircuit materials plant.

The Problem

DuPont's microcircuit materials production facility in Manati, Puerto Rico produces high purity silver in their process. The process produces a wastewater stream containing valuable dissolved silver compounds. The plant had an existing membrane treatment system to recover the silver from the wastewater, but the system had performance problems, required excessive maintenance and chemical cleaning costs were high.

The Solution

When the plant expanded its operations, DuPont performed an evaluation. The choice was between expanding the existing membrane system or installing a Dynatec membrane system designed for simple automatic operation with low operating costs. Dynatec was ultimately selected to provide a complete system because the Dynatec design offered a more reliable, easier to operate process. The installation includes transfer pumps, two reaction tanks, three ultrafiltration skids designed for 25 gpm each with room for expansion, a sludge conditioning system, and a filter press.
The Process

Wastewater from the process is stored in an equalization tank. Transfer pumps deliver the equalized wastewater to the first reaction tank where DTC (dithiocarbamate) is added to react with the aqueous silver compounds to form insoluble metal salts. The water then enters another reaction tank where the pH is adjusted to optimize precipitation of the silver compounds. The precipitated silver compounds are then filtered in one of the three ultrafiltration skids. The ultrafiltration system, using tubular PVDF membranes are designed for automatic operation. When the membranes become fouled, the operator initiates an automatic cleaning, and the system performs a chemical membrane cleaning procedure and the ultrafiltration skid is brought back into service. The permeate from the ultrafiltration is discharged and the concentrated silver is sent to a sludge conditioning tank where a high molecular weight cationic polymer is added to aid in filterability of the sludge. The sludge is then sent to a filter press and the cake is sent to a silver reclamation facility.

Conclusion

The installation of the new system was successful. The system has been operating for several years. Current operation at the plant consists of operating two filtration skids at a time with one as a standby. The system is designed to add capacity by simply adding membranes to the existing UF skids. Operators are happy with the system's operation and the lower amount of maintenance and chemicals required.