MEMBRION

Metal Wastewater Treatment

Project Details

Industry: Semiconductor

Wastewater Source: Electrochemical deposition

Treatment Targets:
- 50 ppm Copper (Cu)
- 0.06 ppm Silver (Ag)
- 95% TDS reduction

Project Characteristics

- Dual-stream wastewater with variance in metals concentration.
- High cost associated with off-site waste trucking.
- Retrofit capacity is limited by available space.

Treatment Processes

- Offsite trucking and disposal of concentrated streams.
- Ion exchange treatment of dilute stream to meet municipal discharge limits.

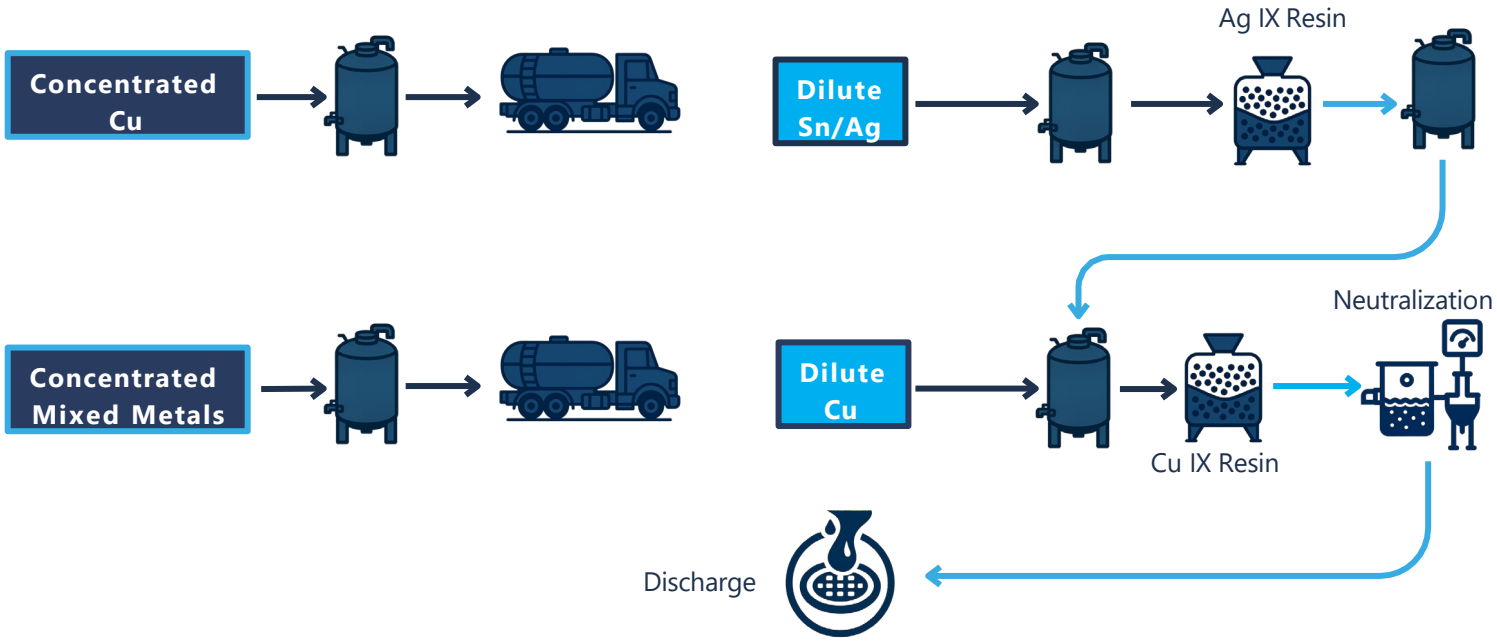
Challenge

A Pacific Northwest semiconductor company faced rising expenses and tank capacity limitations related to off-site wastewater trucking. Limited physical footprint and high concentrations of RCRA metals meant the facility could not implement a treatment process. The facility had an existing dilute metals treatment processes but with insufficient capacity to treat high concentration metal waste to the regulatory standard.

This project posed three major challenges:

- Reducing TDS in metal laden wastewater to meet IX Resin feed requirements.
- Minimizing waste trucking as a treatment process.
- Maintaining continuous facility operation during retrofit process.

Traditional Process Flow



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Solution

Membrion's electro-ceramic desalination (ECD) process was installed as a retrofit solution for lowering total dissolved solids (TDS) in low-pH, high metal wastewater. RCRA metals were concentrated into a small volume that reduced the need for trucking and enabled off-site metal recovery while ECD treated waste to be compatible with their existing dilute metals treatment process.

Results

Analyte	Feed	Dilute	Discharge Limit
TDS (mg/L)	27,000	680	-
Copper (mg/L)	4,300	31	50
Silver (mg/L)	210	0.031	0.06
Nickel (mg/L)	78	2	30
Tin (mg/L)	10,000	1.2	-
pH	1.42	2.3	-

Benefits Delivered

- 3 - 4x functional increase in tank volume and reduction in off-site trucking and associated labor/logistics
- Only 40 sq ft required for retrofit
- Immediate cost saving of 30 – 50% via a pay-per-gallon service contract
- Performance guaranteed and no install, capital, or maintenance costs
- 90% GHG emissions reduction and full metal recovery enabled

Post-ECD Retrofit Process Flow