

Advanced Mining Wastewater Treatment

Relevant Applications:

Acidic, metal laden wastewaters including:

- Acid Mine Drainage
- Evaporation Ponds
- Heap Leach Pad

Application Challenges:

- Acidic conditions that increase chemical consumption and limit technology options.
- High concentrations of fouling species such as organics, iron, aluminum, gypsum, and silica that require extensive pretreatment.
- Variable concentrations that create challenges for maintaining treatment performance and compliance.

ECD in Mining:

ECD is a patented technology containing proprietary ceramic-based, ion-selective membranes. Powered by electricity instead of pressure, ECD pulls dissolved ions out of wastewater into a concentrate stream, making ideal for bulk TDS reduction and high water recoveries. ECD presents advantages in mining applications through:

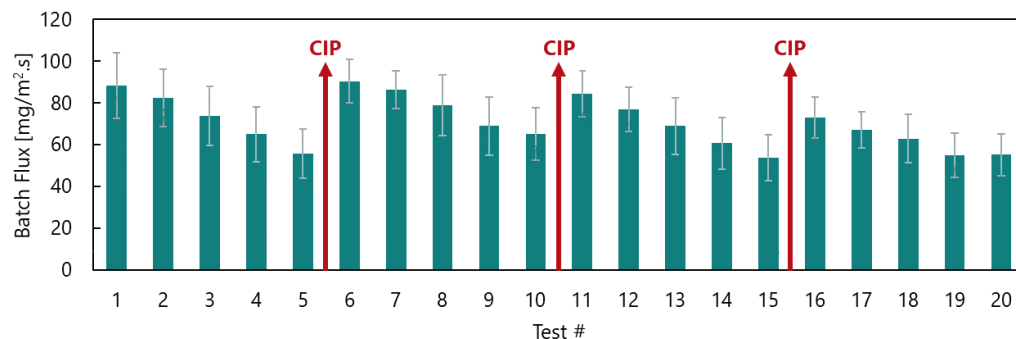
- Process design that limits scale build-up when treating gypsum saturated water.
- Robust ceramic material that enables operation in acidic environments.
- Higher sustainable water recovery rates than traditional membrane technologies.
- Validated cleaning processes that stabilize performance and water recovery rates.
- Electrically driven treatment that readily responds to variable TDS concentrations, resulting in adaptable operations.

Performance Data:

Parameter	Mining Stream 1		Mining Stream 2	
	Feed	Effluent	Feed	Effluent
TDS (mg/L)	74,000	250	8,380	306
Sulfate (mg/L)	45,000	1,500	2,490	14.2
Calcium (mg/L)	530	12	653	0.64
Aluminum (mg/L)	3,200	110	32.9	12.1
Feed CaSO ₄ Saturation %	373%	N/A	127%	N/A
pH	3.0	3.5	2.6	3.6
Water Recovery	45-50%		70-75%	



Clean-In-Place (CIP) Validation



Mining streams have relatively high fouling potential. By optimizing our pre-treatment and cleaning processes, Membrion has demonstrated recoverable performance over repeated operation and cleaning cycles. Membrion expects significantly higher water recoveries from a process train of <5 unit operations as compared to current treatment trains of 8+ unit operations.