

Salt and Freshwater Recovery with RecovOAR™ for Chlor-Alkali Applications

Background

The chlor-alkali industry produces essential chemicals such as caustic soda, chlorine, and hydrogen that serve as building blocks for a variety of industrial applications. As global demand for these products continues to grow, chlor-alkali producers are facing increasing pressure to secure reliable sources of both freshwater and salt, the two fundamental inputs required for modern membrane cell operations. At the same time, rising environmental expectations, stricter discharge requirements, and growing concerns around resource consumption are driving facilities to evaluate more sustainable approaches to water and brine management.

Effective water management has become a critical operational priority. Large volumes of high-quality water are required throughout the production process, while conventional treatment systems can generate concentrated brine streams that are costly to manage. Rising freshwater scarcity, salt supply uncertainty, and stricter discharge regulations are driving interest in advanced membrane-based brine concentration solutions that maximize water recovery, recover valuable salts, reduce wastewater volumes, and improve overall resource efficiency.

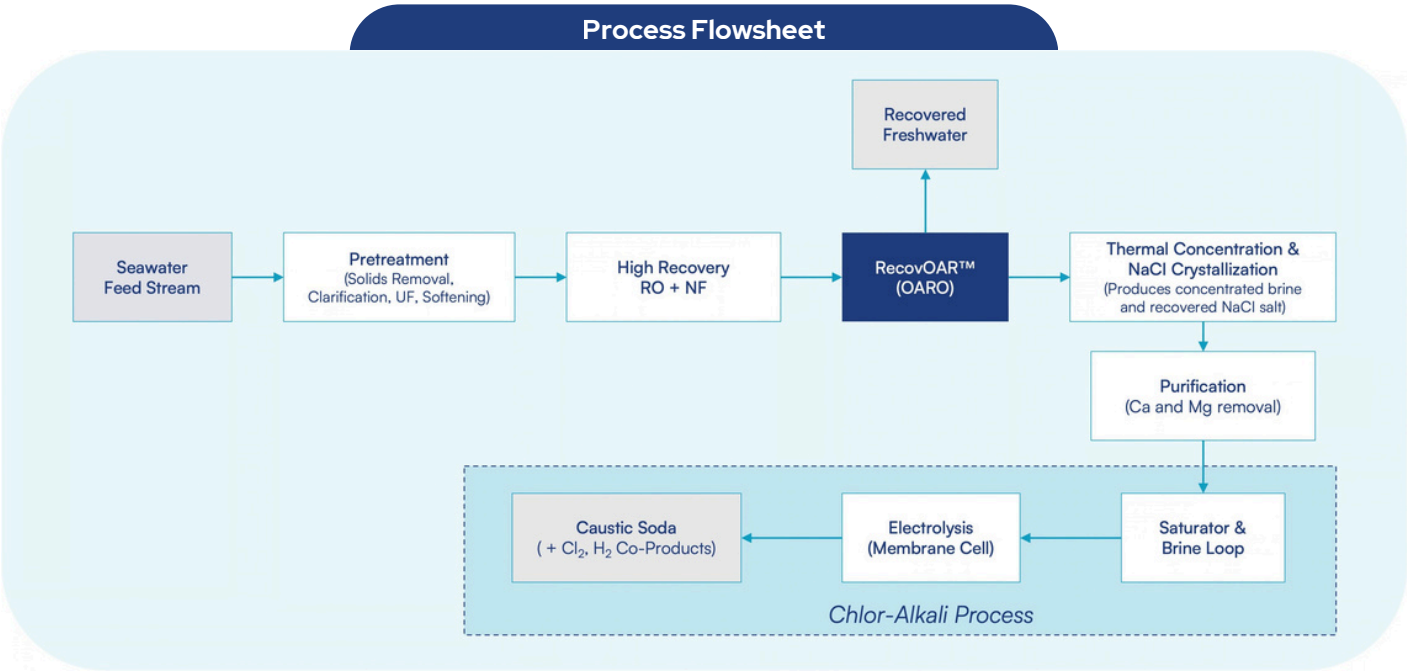
The RecovOAR™ Solution

RecovOAR™ is an integrated, membrane-based solution designed to recover valuable freshwater and salt using Osmotically Assisted Reverse Osmosis (OARO). By concentrating brine to levels beyond conventional technologies while operating at standard pressures, RecovOAR™ reduces energy consumption, lowers downstream evaporation requirements, and helps chlor-alkali facilities reduce dependence on external salt sources while maximizing water recovery for beneficial reuse. Its ability to convert desalination reject into a valuable process resource helps improve salt security, resource efficiency, and overall plant sustainability.

Core Performance Benefits

- Brine concentration to > 250 g/L TDS
- Optimizes thermal energy use
- Reduced addition of dry salt
- Operates at standard SWRO range
- Up to 100% increase in freshwater recovery
- Handles monovalent, divalent & mixed salts

Brine Valorization for Chlor-Alkali Applications



RecovOAR™ (OARO) produces high-concentration NaCl brine from seawater while maximizing freshwater recovery. By selectively removing hardness ions and concentrating brine beyond conventional membrane limits, the process reduces treatment requirements, improves freshwater reuse, strengthens supply chain resilience through onsite salt production, and enables the recovery of valuable products for beneficial reuse.

Proof at Scale

System Deployment:

Validating Salt Recovery for Chlor-Alkali Applications in Al Jubail

In 2021, FTS H2O validated a RecovOAR™ system at Saudi Arabia's Jubail seawater desalination hub, one of the largest desalination facilities globally. The facility, which includes a chlor-alkali plant, produces over 1.4 million m^3/day of potable water, along with a massive volume of high-salinity brine, representing an opportunity for resource recovery. Over three years of continuous operation, the system enabled the production of sodium chloride from concentrated seawater through the use of Osmotically Assisted Reverse Osmosis (OARO). With RecovOAR™, the plant delivered a recovery rate of 75-78%, producing 0.5 m^3/h of high-purity brine and achieving a 5.7-fold reduction in volume, with an energy consumption of <10 kWh/m^3 of permeate produced.



The chlor-alkali industry has outgrown conventional solutions.

Talk to our team about feed characterization and conceptual flowsheet development for your chlor-alkali project.

Explore our approach to resource recovery:

FTS H2
An Aquatech Company

https://ftsh2o.com