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Desalination Case Studies

Case Study 1 | Case Study 2 | Case Study 3 | Case Study 4

1 Fault Detection & Diagnosis Prevents Costly Membrane Damage

Key Challenge

Our customer's 150+ MLD desalination plant serving one of the largest regional mines, risked membrane fouling and failure due to anomalous ORP feed readings that were undetected by standard systems.

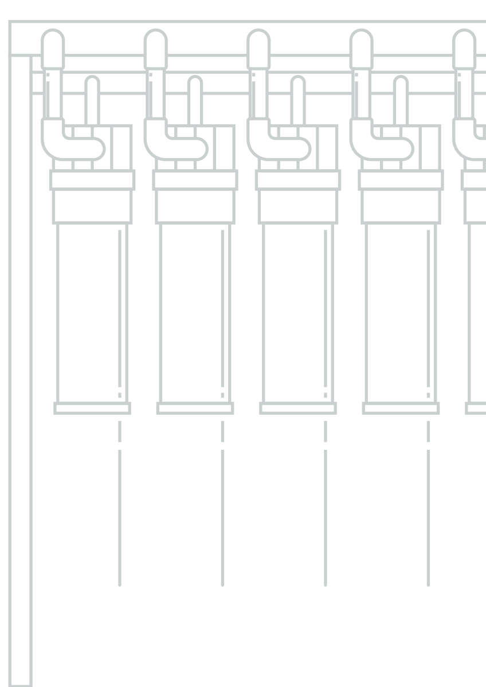
Pani's Solution

- Pani's Fault Detection & Diagnosis identified anomalous ORP feed readings for RO trains.
- Multi-signal processing and advanced analytics flagged the issue, unnoticed by PLC/SCADA systems.
- Plant staff inspected and replaced the faulty sensor, preventing further damage.

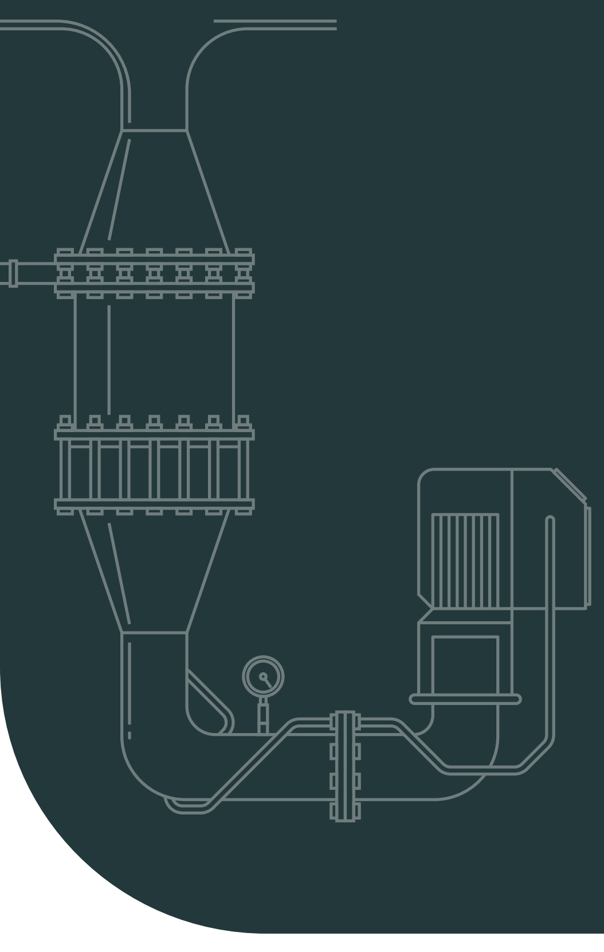
Successful Outcomes

- Detected issue within the first 30 days of implementation.
- Prevented multiple costly cleanings and membrane replacement.
- Improved system reliability with enhanced detection capabilities.

$850,000 in Cost Savings



2 Predictive Servicing Yields 4.2% Energy Savings for SWRO Plant



Key Challenge

Our customer's 150+ MLD seawater reverse osmosis desalination plant supporting mining operations needed to optimize cleaning schedules to reduce energy consumption and operational expenses, while maintaining water production critical to operations.

Pani's Solution

- Pani forecasted asset condition 10-30 days in advance using predictive servicing.
- Pani's model estimated energy consumption and determined optimal cleaning timing and rack selection.
- Provided criteria-based analysis and alternate actions to prioritize servicing and troubleshooting.

Successful Outcomes

- Achieved 4.2% energy savings, resulting in $700,000 savings.
- Optimized chemical use resulting in $440,000 spent, leading to overall OPEX savings of $260,000 in a year.
- Enhanced decision-making on cleaning schedules, improving operational efficiency.

$260,000 Overall OPEX Savings in a Year

3 Pani Lowers Energy, Increases Recovery and Membrane Life

Key Challenge

Our customer in Southeast Asia operates a 6 MLD Seawater Desalination plant with flocculation & RO processes, producing water for utility and mining applications and wanted to reduce OPEX costs for the same or greater recovery.

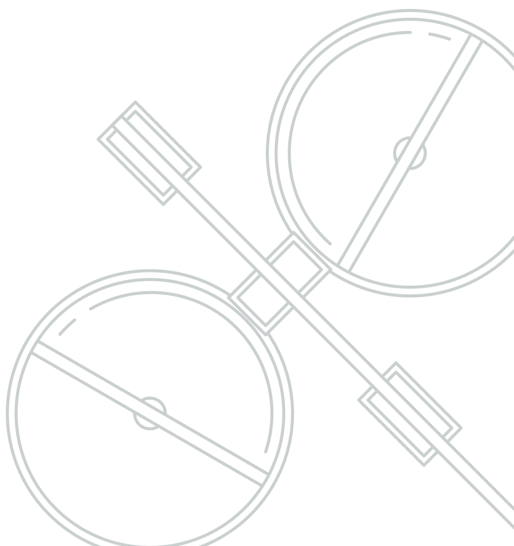
Pani's Solution

- Predictive Time-to-clean scheduling to optimize CIP timing and extend membrane lifetime.
- Advanced analytics to identify optimal times for higher recovery while maintaining energy efficiency, balancing energy consumption and recovery.
- Continuous monitoring to improve recovery and reduce overall energy usage.

Successful Outcomes

- Optimized CIP timing enabled customer to significantly extend membrane lifetime by estimated 20%.
- Consumed less energy during periods of constant recovery while also pushing higher recovery at optimal times to increase recovery for the same energy.
- Over the course of a year with Pani, both overall energy was reduced and recovery increased.

6% Lower Energy Consumption
12% Recovery Increase



4 Predictive Membrane Management Saves $160,000 for UF-RO Plant

Key Challenge

Our UF-RO plant in the Northeastern USA faced unusually high particulate fouling, resulting in flow declines and pressure drops. This threatened membrane life, operating costs, and product flow demand.

Pani's Solution

- Detected fouling and performance inefficiencies using predictive analytics 6-months earlier.
- Provided actionable insights for membrane servicing and SDI issue resolution.
- Enabled upstream checks on filtration performance to optimize RO feed quality.

Successful Outcomes

- $160,000 in savings over 2 years.
- 10M gallons of lost water recovery saved annually.
- 38 unique inefficiencies detected and prevented over 2-years.
- 30% more successful cleanings, extending membrane life by 16%.

$160,000 OPEX Cost Savings

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