SEAWATER

Seawater Intake Biofouling Case Study Antofagasta Region, Chile

*Hydro*FLOW® treatment reduced biofouling, corrosion (MIC), and marine growth in a seawater intake system, improving reliability and significantly reducing chemical dependency.

80%	90%	100%	$57k
Maintenance Reduction	Corrosion Reduction	Chemical Elimination	Annual Savings

⇄ BEFORE & AFTER

BEFORE

- Severe biofouling in intake line and exchangers
- Frequent system openings for cleaning
- High chemical use for corrosion control

AFTER

- ✓ Biofouling significantly reduced
- ✓ 80% fewer system openings and downtime
- ✓ Chemical use eliminated

BEFORE

Marine growth on conical strainer

AFTER

Reduced fouling on conical strainer

OVERVIEW

Enaex operates a major ammonium nitrate production facility in the Antofagasta Region of Chile, using seawater for cooling through a large intake system supplying multiple heat exchangers. The intake line extends over 100 metres and branches to both plate and tube exchangers. A *Hydro*FLOW® unit was installed in November 2024, with performance monitored over a 12 month period. Initial analysis in June 2025, during peak summer marine growth, showed significant maintenance reduction, with further laboratory validation completed in late 2025, confirming reductions in corrosion (MIC) and biofouling across the system.

CHALLENGE

Severe marine biofouling and corrosion across the seawater intake system led to frequent maintenance and reduced operational reliability.

- Severe biofouling affecting plate and tube heat exchangers, reducing efficiency
- Frequent system shutdowns and openings required for manual cleaning and inspection
- Corrosion (MIC) buildup across intake pipelines and strainers, impacting long term integrity
- Increased marine growth during peak summer season accelerating fouling and blockage

SOLUTION

*Hydro*FLOW® Multihead 52" unit was installed on the main seawater intake line, with performance monitored over 12 months across seasonal operating conditions.

UNIT INSTALLED

1x *Hydro*FLOW® Multihead 52"

PIPE SIZE & DISTANCE

1320 mm OD, 126 m to heat exchangers

INSTALLATION POINT

Before split to heat exchangers

INSTALLATION DATE

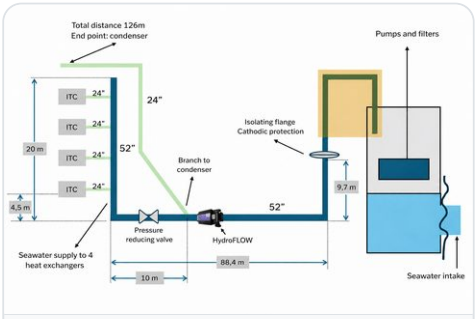
12 November 2024

INSTALLATION

HydroFLOW® on seawater intake line

INSTALLATION

Installed unit on intake pipeline section



SITE

Water Schematics

RESULTS

80% fewer system openings

Heat exchanger openings reduced, lowering maintenance and downtime.

90% corrosion (MIC) reduction

Corrosion (MIC) tubercles reduced across pipelines and intake system.

65% biofouling reduction (strainer)

Biofouling reduced in conical strainer, improving flow and reducing blockage.

50% biofilm reduction

Biofilm and marine growth reduced across intake surfaces.

Chemicals eliminated

Chemical dosing removed, reducing operating and maintenance requirements.

$57k annual savings

Annual savings achieved from reduced chemicals, maintenance, and downtime.

KEY TAKEAWAY

Summary

*Hydro*FLOW® treatment was applied to a large seawater intake system supplying multiple heat exchangers across an extended pipeline network. The system achieved significant reductions in maintenance requirements, corrosion (MIC) and biofouling, while improving reliability and eliminating chemical dependency. These operational improvements delivered measurable annual cost savings of $57k.

80%	90%	$57k
MAINTENANCE REDUCTION	CORROSION REDUCTION	ANNUAL SAVINGS

ADDITIONAL PHOTO EVIDENCE

BEFORE

Corrosion (MIC) and deposits inside intake pipe

BEFORE

Biofouling inside intake line

SITE

Heat exchanger system area

AFTER

Clean pipe surface after treatment

AFTER

Reduced fouling after treatment

SITE

Seawater intake pipeline