

Kurita's Innovative Biofouling Control Agent Kuriverter™ IK-110

Water Arabia 2020

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Agenda



Background



Kurita Innovation – Kuriverter IK-110



Hydrobio – On-line Biofouling Monitoring



References & Case Studies



ackground



Key Issues Faced with Membrane Installations



Scaling

Antiscalant

Deposition / Fouling

Pre-Treatment and Dispersant

Physical Damage



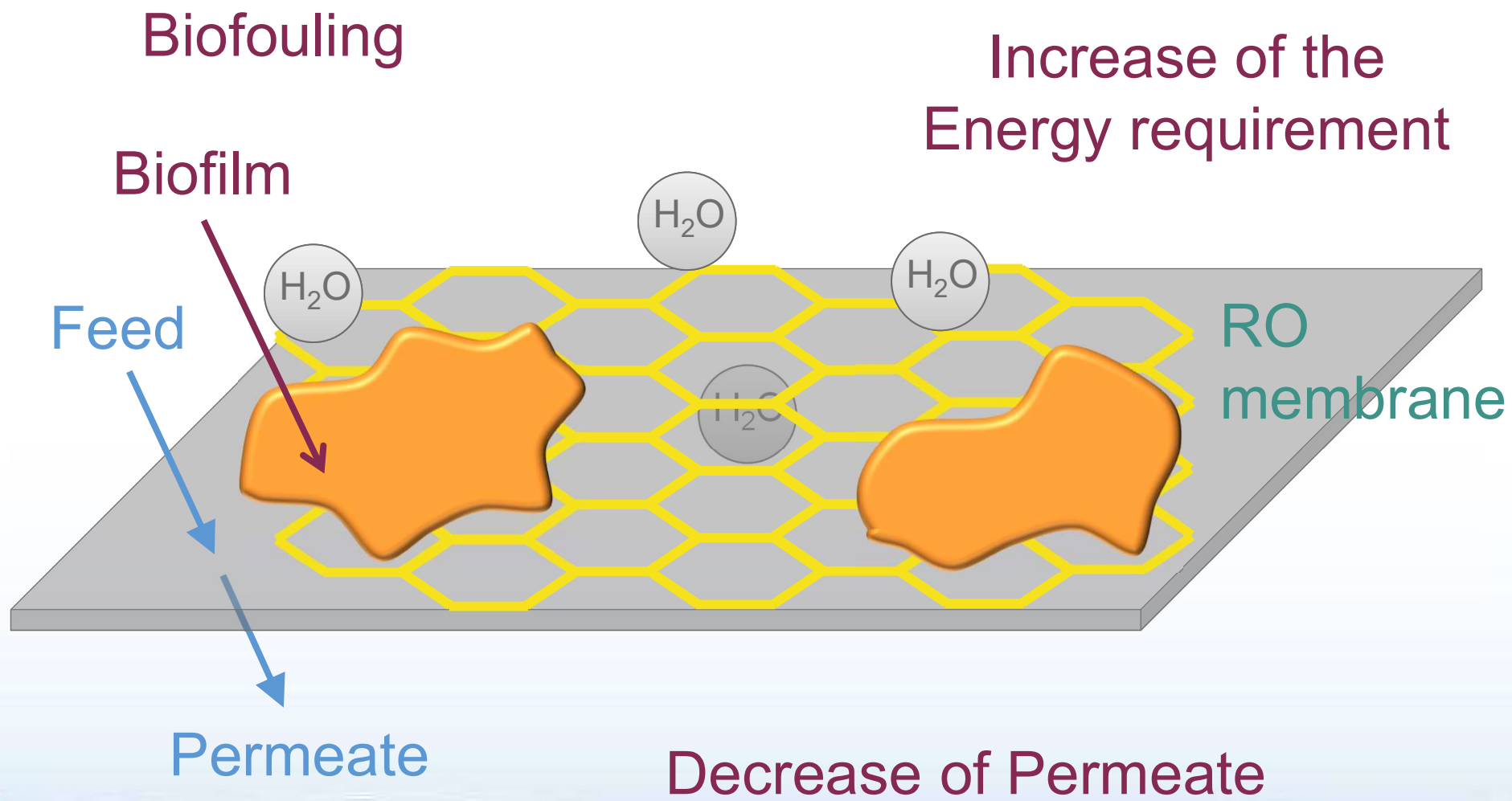
Operational Best Practice

Chemical Damage

On-line Monitoring and Control

Biofouling

Pre-treatment before but in the membrane is more difficult especially when producing drinking water



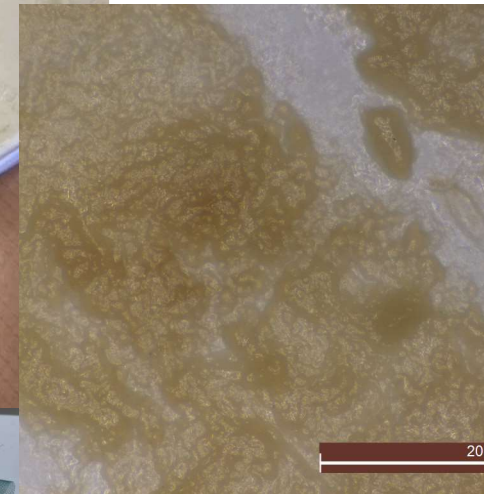
Key Issue - Biofouling

Fastest significant negative effect on RO performance.

Minor increase in dP = Major increase in pumping energy or lost production

Increased stoppage and lost production for CIP

Long term physical and chemical damage to membranes.





Kuri Innovation
URIVERTER IK-110

The key to Biofouling Prevention and Removal



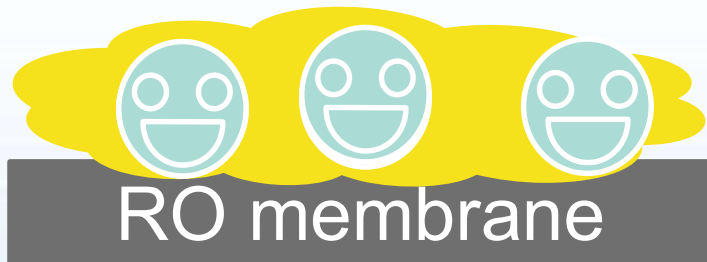
- A highly stabilized combined chlorine compound
- No free chlorine, so it will not damage the membrane.
- All Major membrane manufactures letters of compatibility.
- No oxidizing characteristics; it penetrates the biofilm, creates an unfavorable environment and initiating a detachment of the biofilm from the membrane surface
- NSF Certified for use during drinking water production



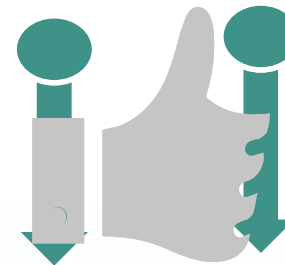
Biocide
Conventional product

IK-110
New biofilm control agent

Disinfection effect

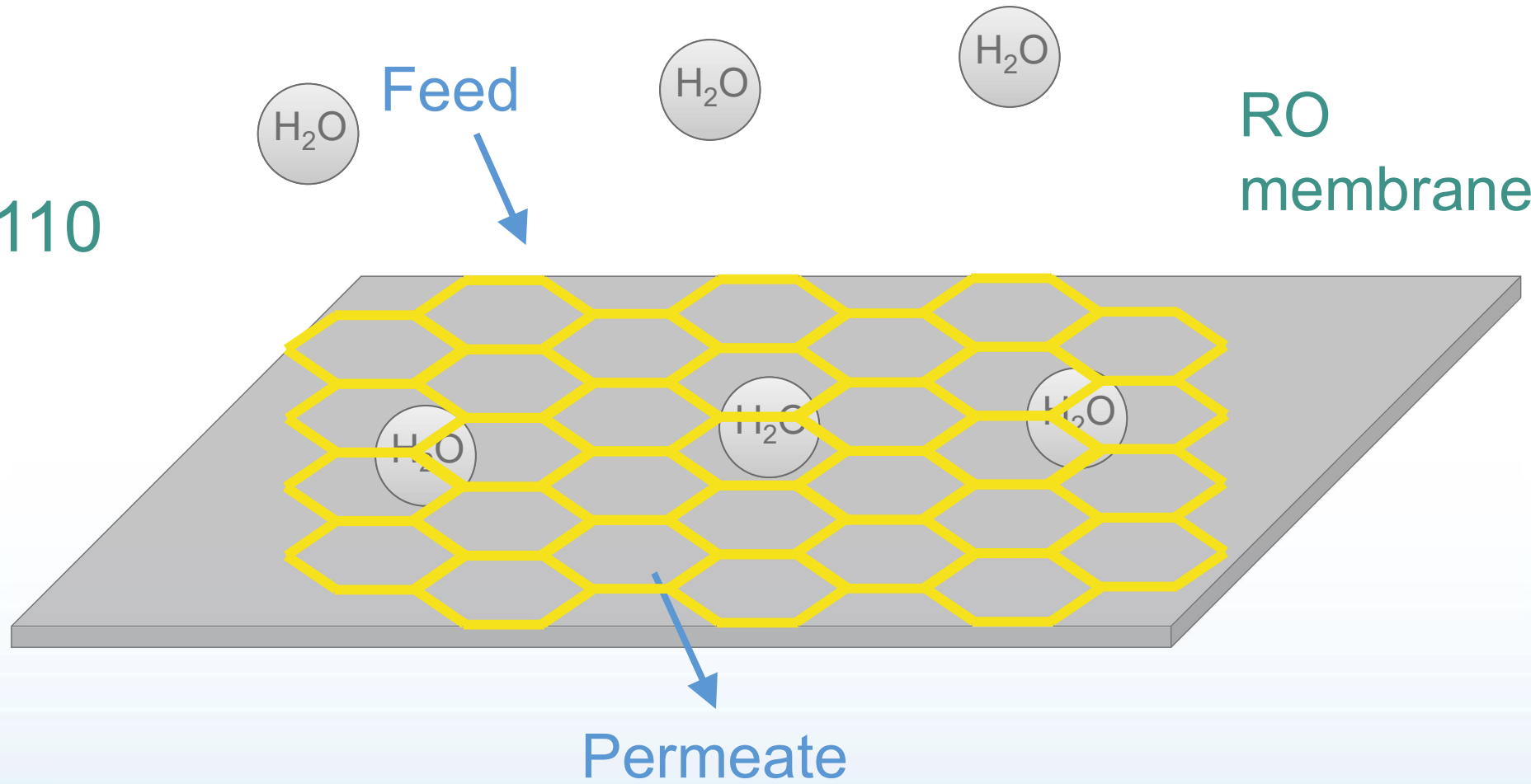


Peeling off effect

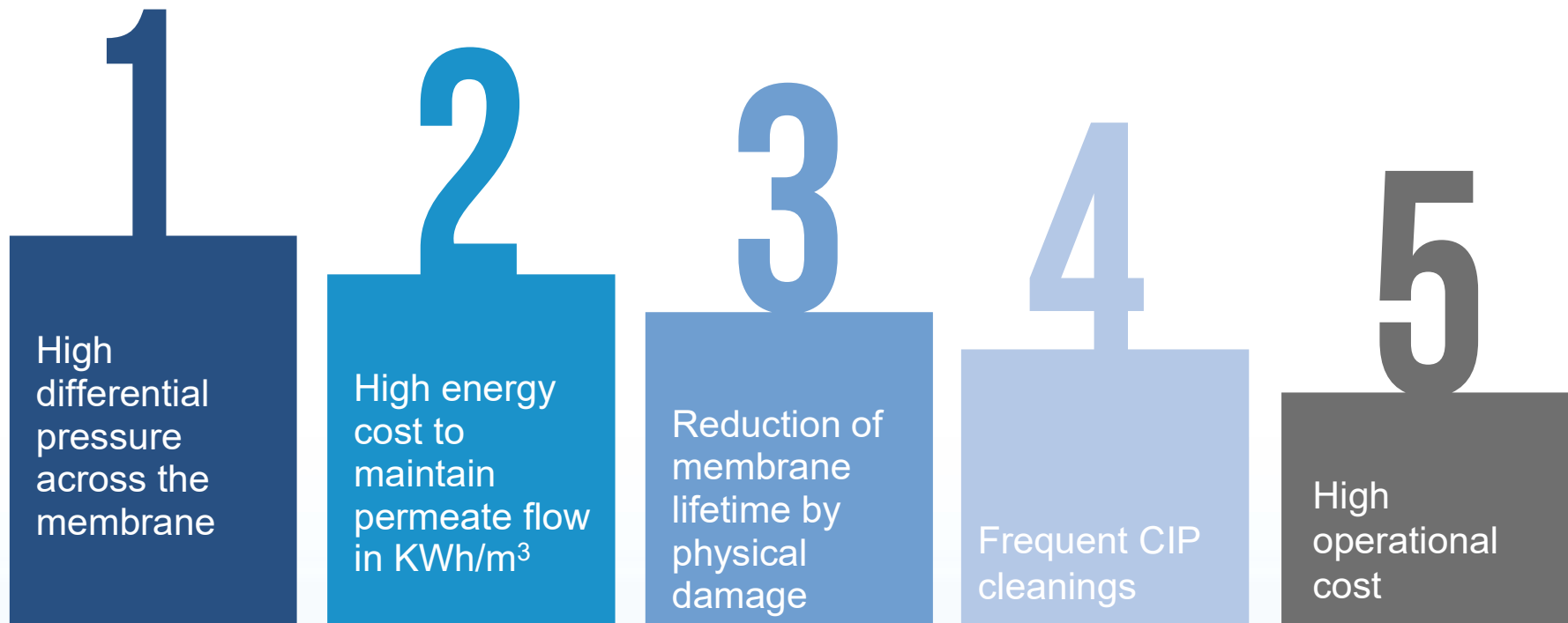


h IK-110

RO
membrane



ofilm on membranes lead to:



Kuriverter™ IK-110: Protocol



| | Kuriverter™ IK-110 application | Recommended dosage | Running Time |
|------------------------------|---|-------------------------------------|--------------|
| Normal and optimized process | Continuous or Intermittent use as fouling remover | Continuous dosing 10 - 40 mg/L | 24h/day |
| | | Intermittent dosing 10 - 80 mg/L | 3h – 6h/day |

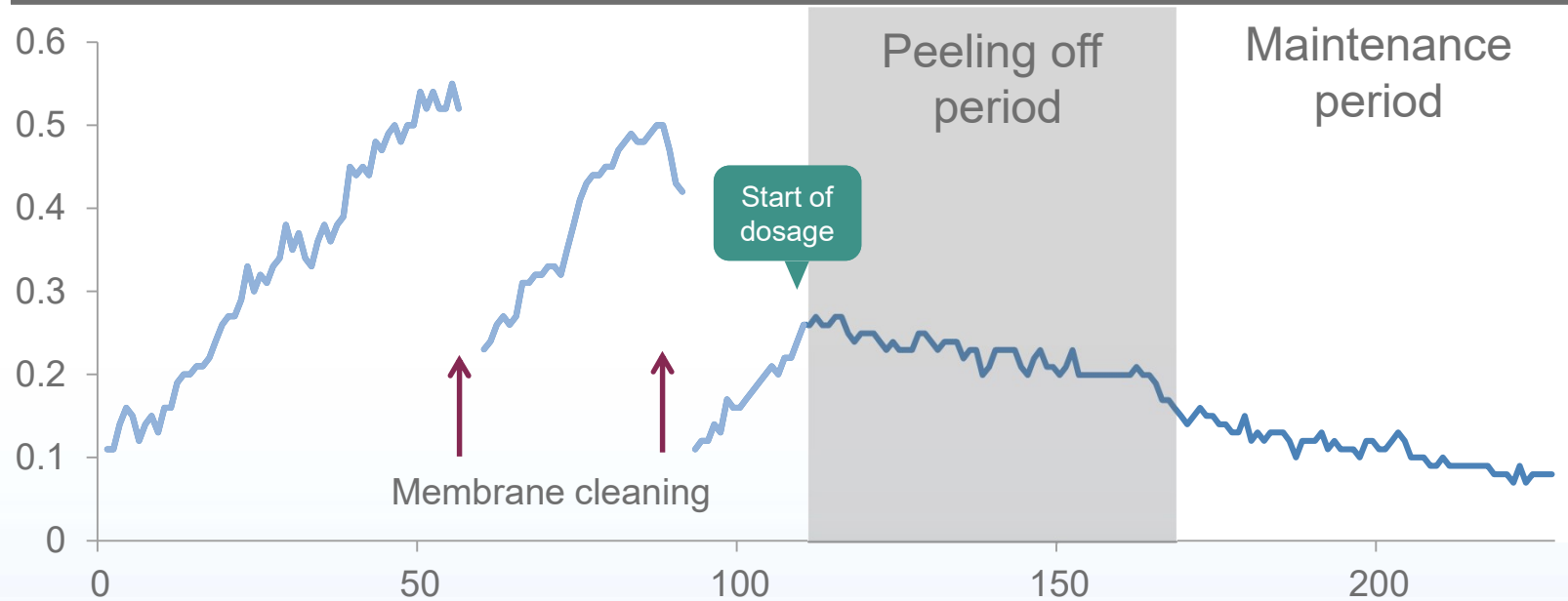
Maximum dosage is 80 ppm according to NSF

In cases of high organic contamination and non drinking water production, dosages can be up to 100 ppm

Dosing is optimized due to operational or seasonal changes

Peel-off and maintenance effect in an RO membrane

ΔP in bar over time (days)



Significant reduction of membrane cleaning

Dosing

Continuous or intermittent according organic load

Dosing before filters keeps them clean and reduce replacements

Can be dosed ahead of UF and MMF

Control

Monitor with a simple HACH Total Chlorine test method

Plot normalized parameters of Delta P, Salt Rejection and Flux

Hydrobio® Advance

inverter™ IK-110: Summary of benefits



Reduces differential pressure across the membrane

Reduces pumping energy requirement

Restores and maintains permeate flow

Reduces CIP cleaning frequency

Reduces membrane damage and replacement

Product NSF listed and patented

Easy to measure and control by HBA



HydroBio Advanced
for RO systems

BA - Hydrobio[®] Advance



Real time monitoring and optimization tool

1 Continuous monitoring of biofouling

2 IK110 Dosage optimization

3 Tracking of treatment efficiency

4 Maintain lowest possible dP and energy cost



A close-up, shallow depth-of-field photograph of a binder with numerous blue tabs. The tabs are arranged in a row, and the text on them is slightly out of focus. A semi-transparent white rectangular box is overlaid on the center of the image, containing the text "References & Case Studies".

References & Case Studies

References for Kuriverter™ IK-110



More than 200 global references available

Across All Industries



Desalination
Power Plants
Electronics
Effluent Recovery

Steel and Metal
Food and Beverage
Automotive
Tire and Rubber

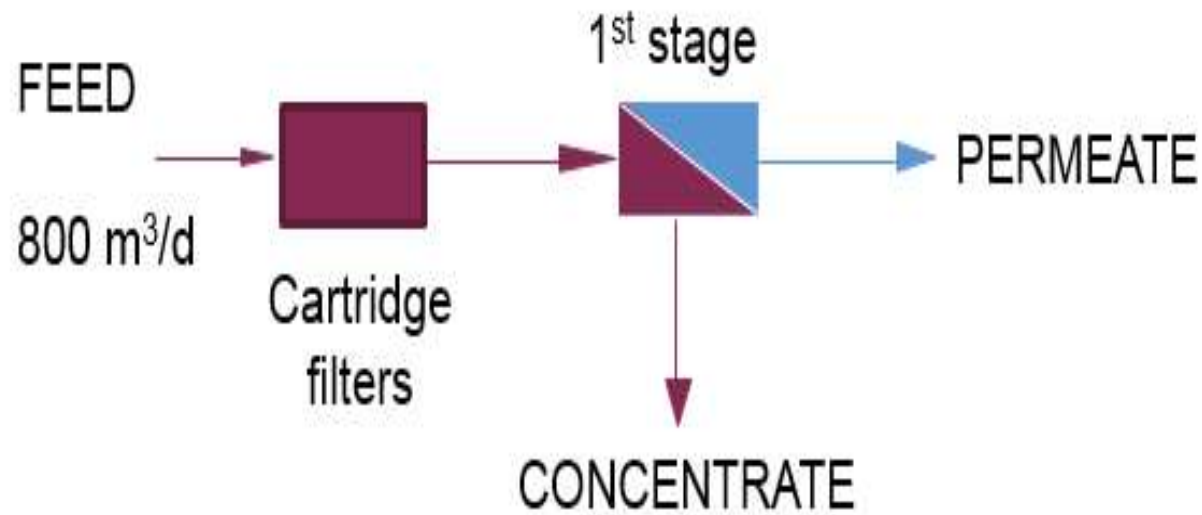


Membrane Manufacturer Letters of Compatibility
Customer Reference Letters supporting savings



Case study I

Background



VRO plant with $800 \text{ m}^3/\text{h}$ capacity affected with biofouling searched for an electricity and operation cost reduction solution.

Case study I

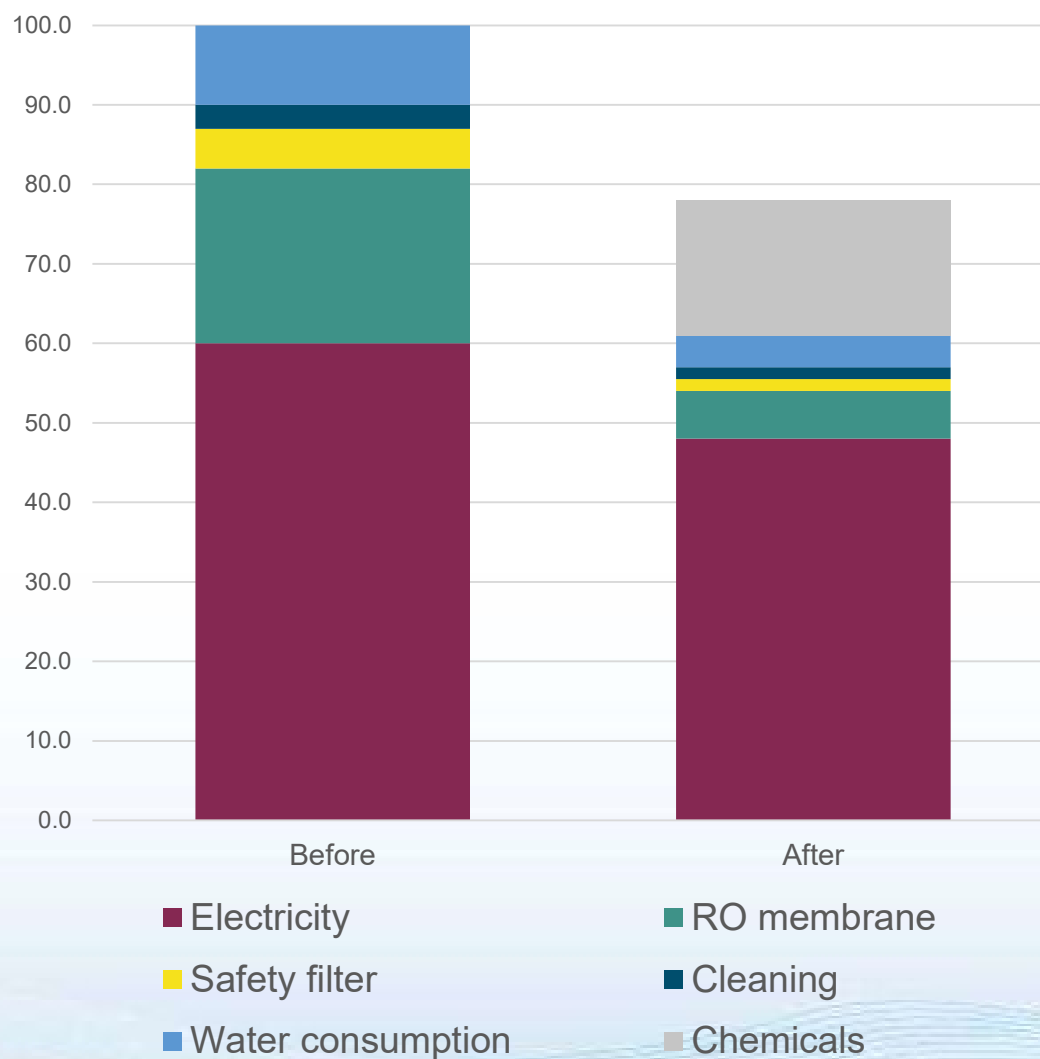
Treatment and results

Kuriverter IK 110

Dosage: 40mg/L

Frequency: 4h/d

Cost comparison



Case study I

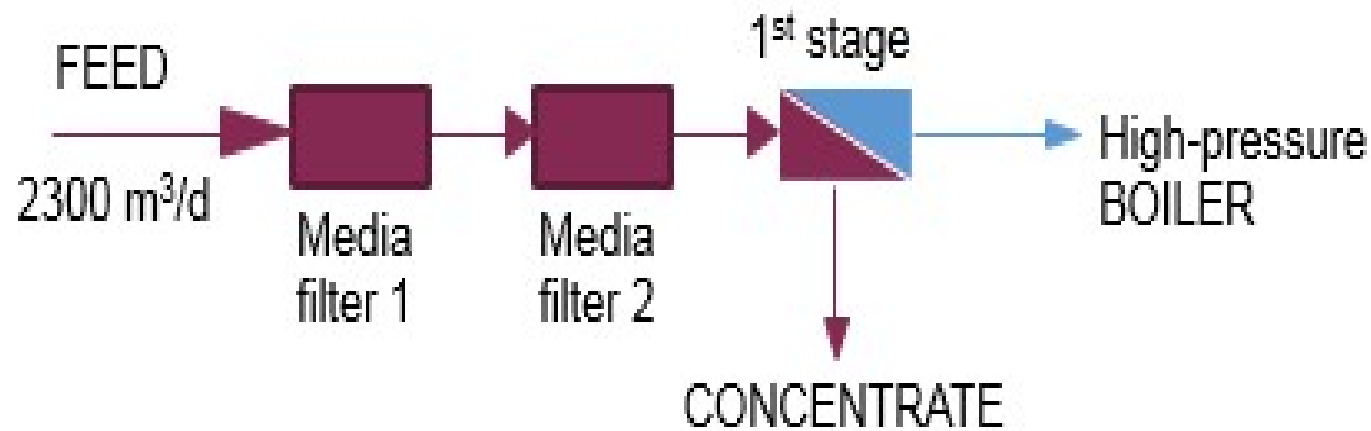
Conclusion and achievements

Extraordinary biofouling reduction



Case study II

Background



Prima customer has a RO plant for the industrial water preparation. The feed water used in the RO plant is SWRO and the permeate is used as make up water for the boiler system.

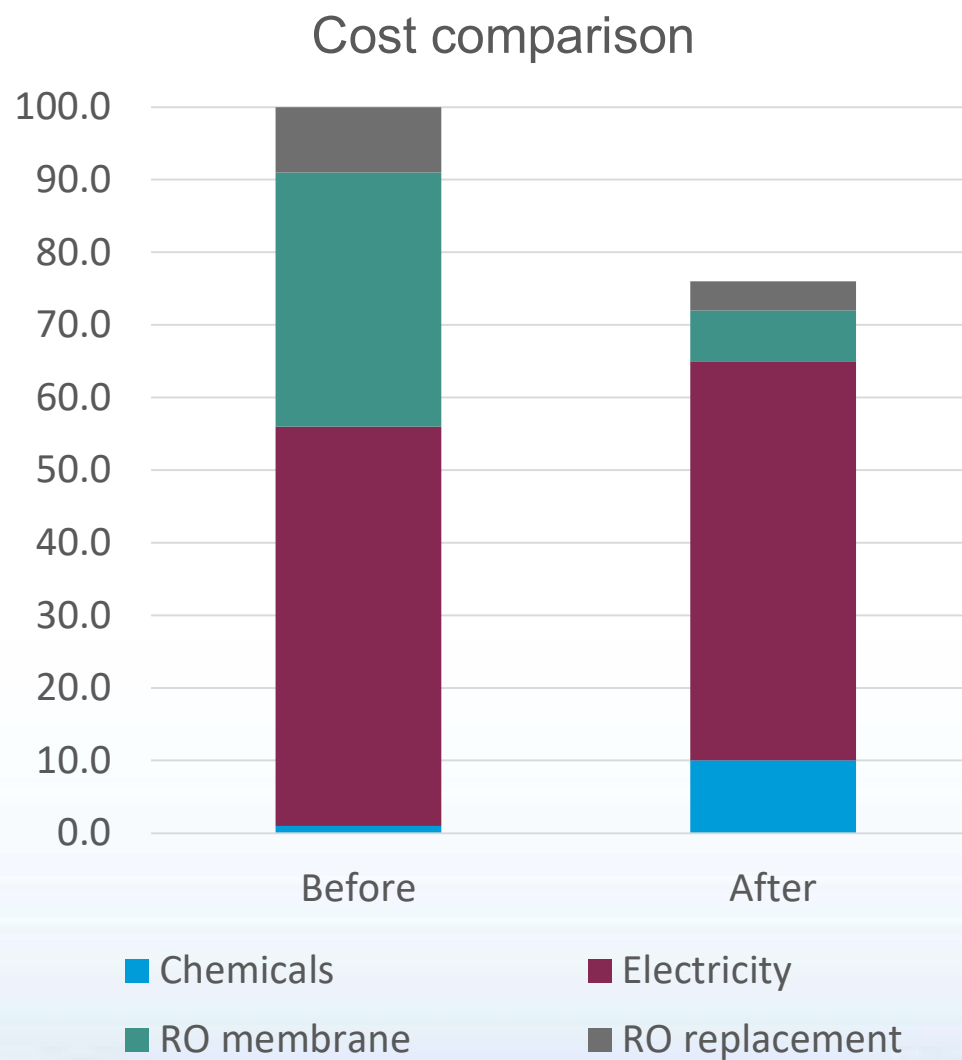
Due to biofouling problems, Kuriverter™ IK-110 was proposed to the customer.

Case study II

Treatment and results

Kuriverter™ IK-110

Dosage: 5mg/L



Case study II

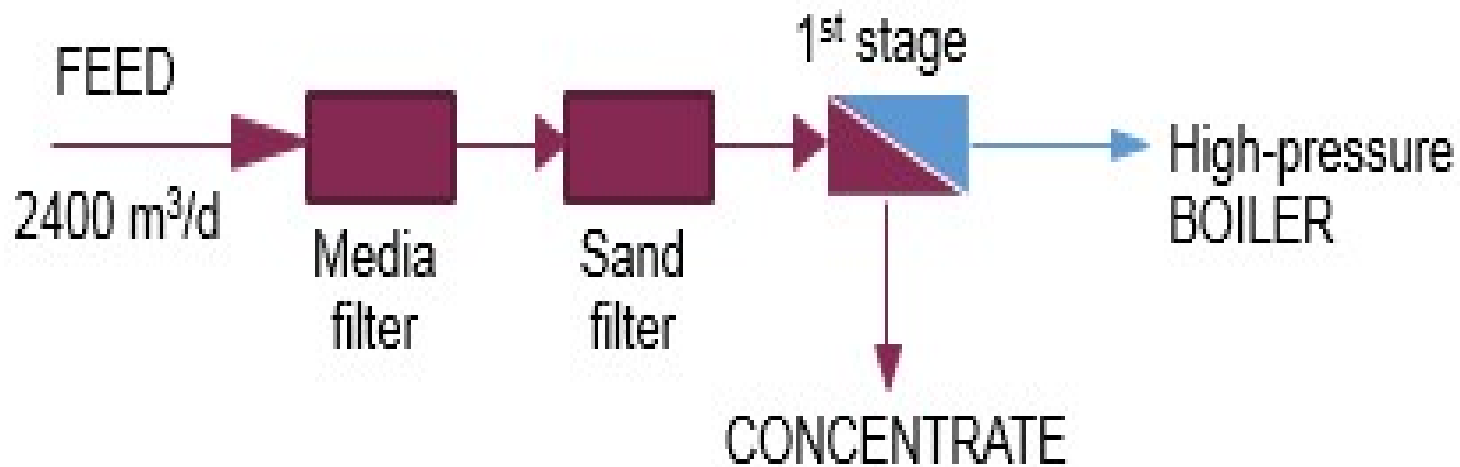
Conclusion and achievements

Remarkable total cost reduction thanks to Kuriverter IK110



Case study III

Background



A Chinese industry with a RO plant for the industrial water preparation faced a biofouling problem which involved a large number of annual cleanings. The feed water used in the RO plant is SWRO and the permeate is used as make up water for the boiler system.

Case study III

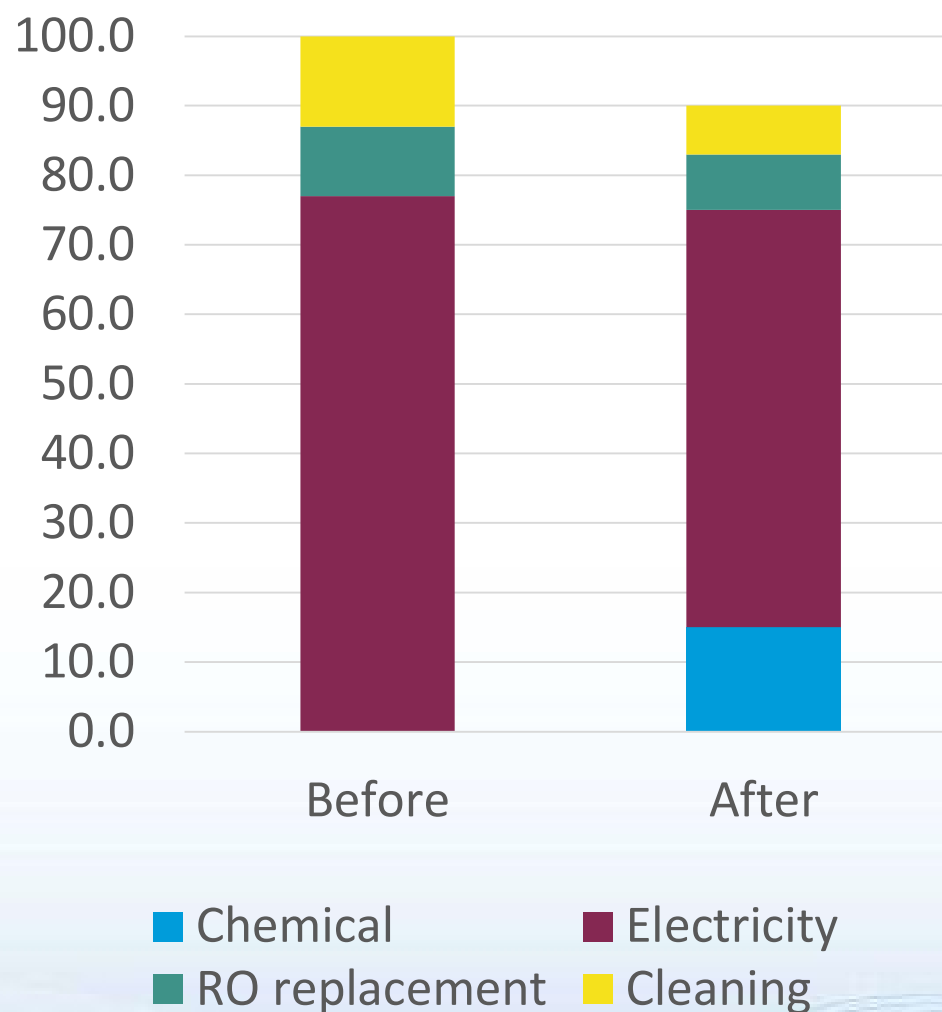
Treatment and results

Kuriverter™ IK-110

Dosage: 40 mg/L

Frequency: 3h/d

Cost comparison



Case study III

Conclusion and achievements

Less annual cleanings and RO replacement



QUESTIONS



ANSWER

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