

**PROTECTING FISH IN
RECIRCULATING AQUACULTURE
SYSTEM USING INTEGRATED
MEMBRANE TECHNOLOGY**

Case study

*Providing highest quality water for fish farming
in Norway with HYDRAcap™MAX and PRO-XS
membranes*

The
PROBLEM

Fish farming industry is constantly and rapidly growing as the demand for fish meat as part of the healthy diet is increasing. The end-user who operates a salmon fish farm in Norway, looked for innovative solutions for Recirculating Aquaculture Systems (RAS). For the production process salmon fish are kept in land-based tanks and this process is known as RAS. As fish are sensitive to water

quality, RAS requires complex water treatment which consists of continuous treatment of the recirculated water and also treatment of the fresh make-up water that is pumped from the nearby sea. The end-user looked for the best available water treatment to protect the fish from poisoning and diseases caused by the poor quality of makeup water.



N O R W A Y

<i>Ultrafiltration</i>	3 racks of 6 pc. HYDRAcap™ MAX80 assembled with HYDRAcube™ rack system	<i>Two stage</i>	6:4 x 6M
<i>Capacity</i>	80 m³/h of permeate at constant flow	<i>Recovery</i>	75%
<i>Nanofiltration</i>	PRO-XS- 1 skid, one pass	<i>Permeate flow</i>	60 m³/h

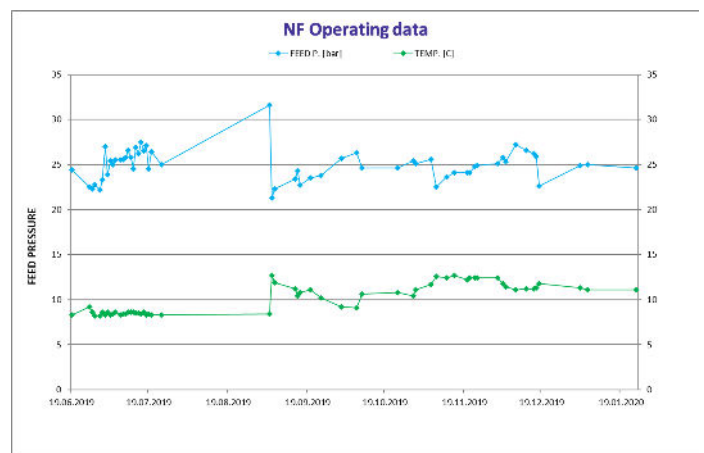
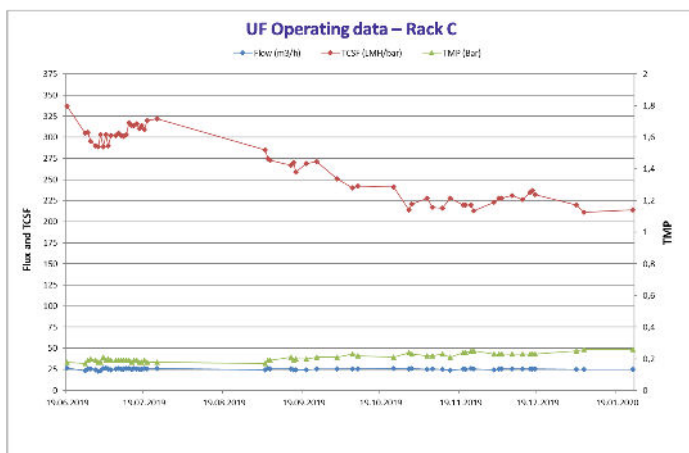
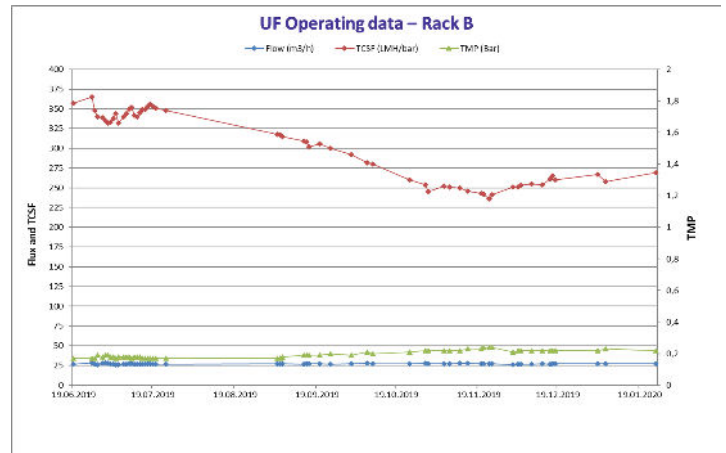
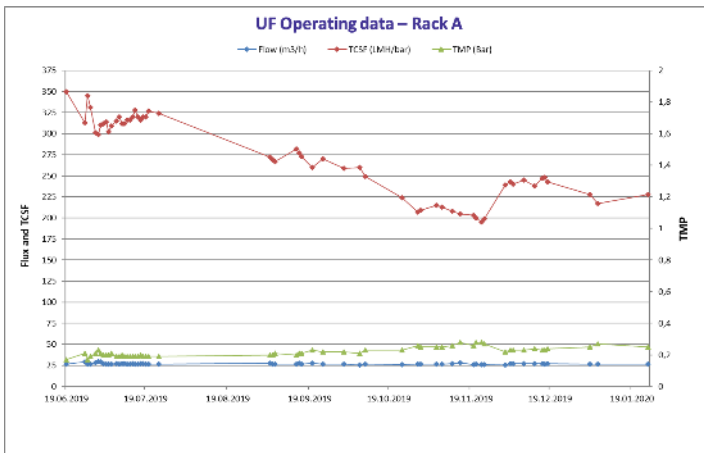
The
SOLUTION

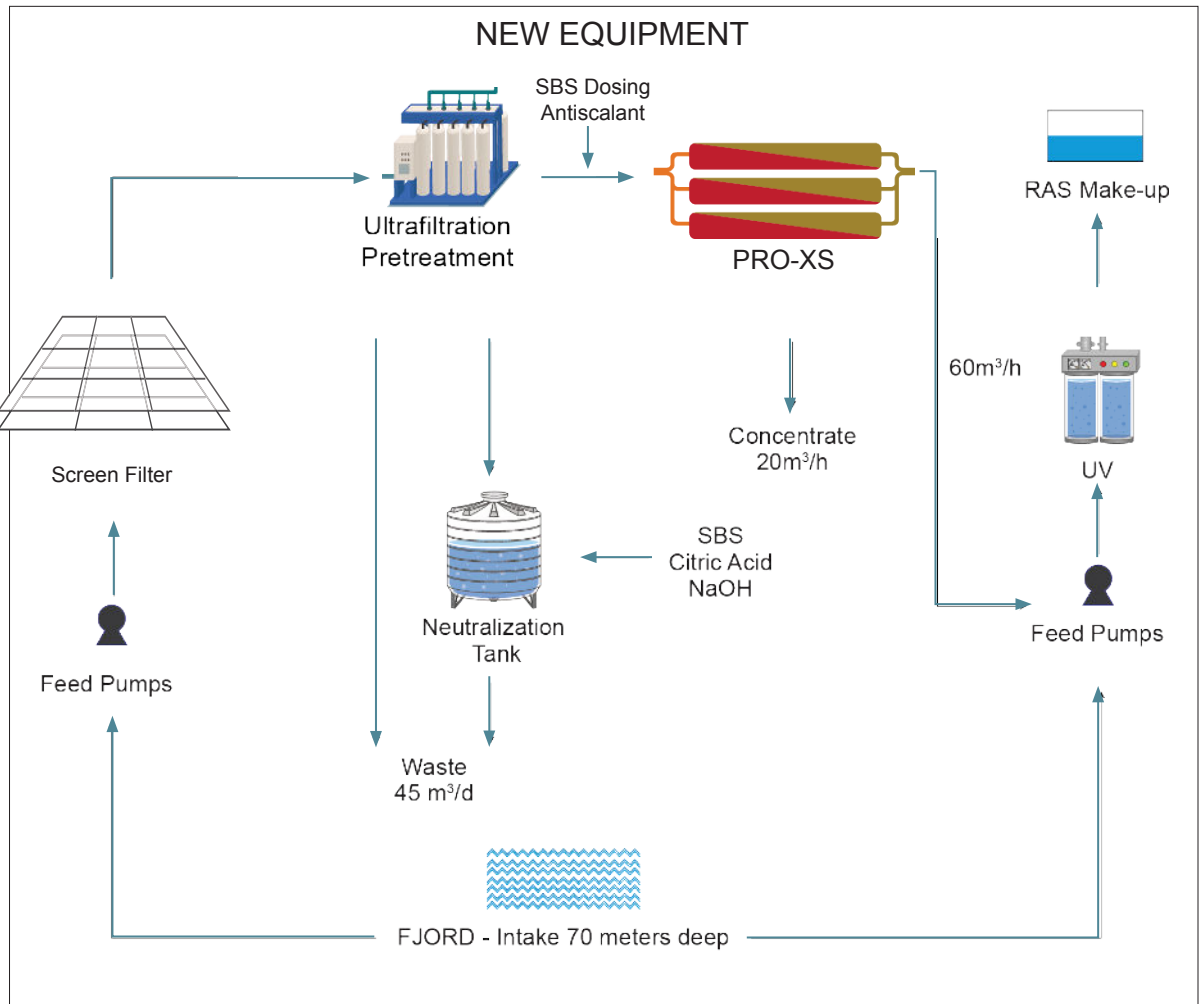
Ultrafiltration and Nanofiltration are considered as the most suitable technologies to remove all the contaminants like suspended solids, algae, organics, and bacteria from the seawater, the water is then used as make-up water for the RAS. The value of the fish in the system significantly exceeds investments cost required to deliver UF and NF system, so the client decided to go ahead with best available technology. Before the installation of UF and NF, seawater was pretreated only by an automatic screen and UV disinfection.

HYDRAcap™MAX – UF technology used to treat a wide range of highly variable water as either primary treatment or as pretreatment to RO & NF. Compared to conventional pretreatment, the HYDRAcap™MAX offers the combined benefits of high recovery and low footprint. High strength PVDF membrane minimizes fiber breakage rate and ensures consistently superior filtrate quality, which enables RO and NF systems to be operated at higher load while maintaining longer intervals between cleanings.

PRO series RO & NF elements - The PRO series elements is a set of specialty spiral wound membranes customized specifically for challenging industrial process applications. These membranes extend performance of existing Hydranautics high performance products. PRO series elements were specially designed to treat a variety of feed streams including high fouling, high TDS, or chemically aggressive feeds.

Hydranautics™ supported the client through all phases of the project i.e. quotation, design, construction, and commissioning. The technical team suggested HYDRAcap™MAX and PRO-XS membranes for the treatment process. As expected, after the commissioning the UF & NF provided high quality water, operated at low Transmembrane Pressure (TMP) and required minimum chemical cleaning. Hydranautics™ team continues to play an important role in optimizing the operations. That is to ensure that the system keeps delivering the required amount of high-quality seawater to client's RAS.





The
IMPACT

The possible poisoning or infection of the fish due to the poor water quality could have caused losses equivalent to millions of dollars. Therefore, the safety of the fish was the most important added value by the membrane

technology. The better quality of the water provided higher fish yield and lower mortality. Even after two years of the commissioning, client remained highly satisfied with membrane performance.

Author

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For more information about Hydranautics case studies, contact us at hy-marketing@nitto.com or visit our website at membranes.com

About Hydranautics

Since our founding in 1963, Hydranautics has been committed to the highest standards of technology research, product excellence and customer fulfillment. Hydranautics entered the Reverse Osmosis (RO) water treatment field in 1970 and is now one of the global leaders in Integrated Membrane Solutions. Hydranautics became a part of the Nitto Group in 1987. Nitto is Japan's leading diversified materials manufacturer. The group offers over 13,000 high value specialty products worldwide including optical films for liquid crystal displays, automotive materials, reverse osmosis membranes for desalination and transversal drug delivery patches.

As leaders of high quality membrane solutions, we believe our commitments extend beyond manufacturing and selling our products. Our skilled staff of technicians, engineers and service professionals assist in designing, operating and maintaining a robust, reliable and efficient membrane system to meet your requirements and exceed your expectations.