SUNDSFJORD SMOLT AS

RAS for Salmon | Case Study

Commissioned: 2012

Challenge:
Design and build of a low footprint RAS-plant.

Solution:
Kaldnes® RAS, comprising of Hydrotech™ drumfilters, Kaldnes® MBBR, centralised CO_2 degasser and circulation pumps. The plant is fully monitored and controlled by Veolia's own control system - VA Operatör.

Design capacity:

Production:
>3 million smolt annualy

Maximal feeding:
1.800 + 1.400 kg pr. day

Fish tank volume:
1.800 + 1.200 m^3

Operational data:

CO_2 out of fish tank:	8 -12 mg/l
NH_4-N + NH3-N:	1,0 - 1,15 mg/l
NO_2-N:	0,2 - 0,4 mg/l
NO_3-N:	< 100 mg/l
Nitrogen saturation:	91- 98 %

Sundsfjord Smolt AS

The plant consists of two departments. On-growing 5 (VH5) and on-growing 6 (VH6) each have a separate water treatment (RAS5 and RAS6).
The smaller VH6 is running purely on fresh water, while VH5 can run on both fresh and sea water. Fish tanks, piping, oxygenation system and energy plant were delivered by Plast-Sveis AS.

Main components

The water treatment plants Kaldnes® RAS, consists of four main components:

► Mechanical cleaning

Hydrotech™ drumfilters remove particular matter like excess feed and fish feces from the water.

► Biological treatment

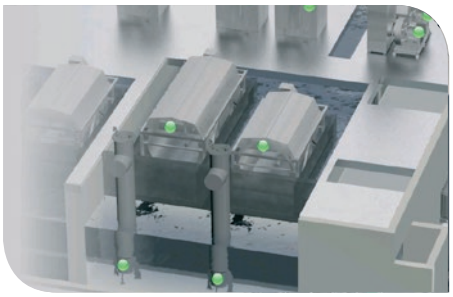
Dissolved waste products are decomposed by bacteria and micro-organisms in a two-stage Kaldnes® MBBR (moving bed bio-reactor).

► Gas-stripping

Carbon dioxide from the fish respiration is removed in the sentralized CO_2 -degasser.

► Automation

The whole plant, including water treatment, lights, oxygen and water heating, is monitored and controlled by Veolia's own control system - VA-Operatör.



Foot print

In total, the two Kaldnes® RAS plants have a capacity of 3.200 kg per day of feeding, and a total hydraulic capacity of 6.035 m^3/hour. Including control room and MCC room, the total area is only 480 m^2 or 21% of the total plant floor.

Key parameters

Parameter	VHS	VH6
Total fish tank volume	1.800 m^3	1.200 m^3
Maximum biomass	90.000 kg	60.000 kg
Maximum feeding	1.800 kg/day	1.400 kg/day
Dilution water	23 m^3/hour	19 m^3/hour

Table: Basis of design

Parameter	Sample values
CO_2 out of fish tank	8-12 mg/l
NH_4-N + NH_3-N	1,0-1,5 mg/l
NO_2-N	0,2-0,4 mg/l
NO_3-N	< 100 mg/l
Nitrogen saturation	91-98 %

Table: Water quality parameters maximum feeding with 60-75 kg/m^3 biomass.

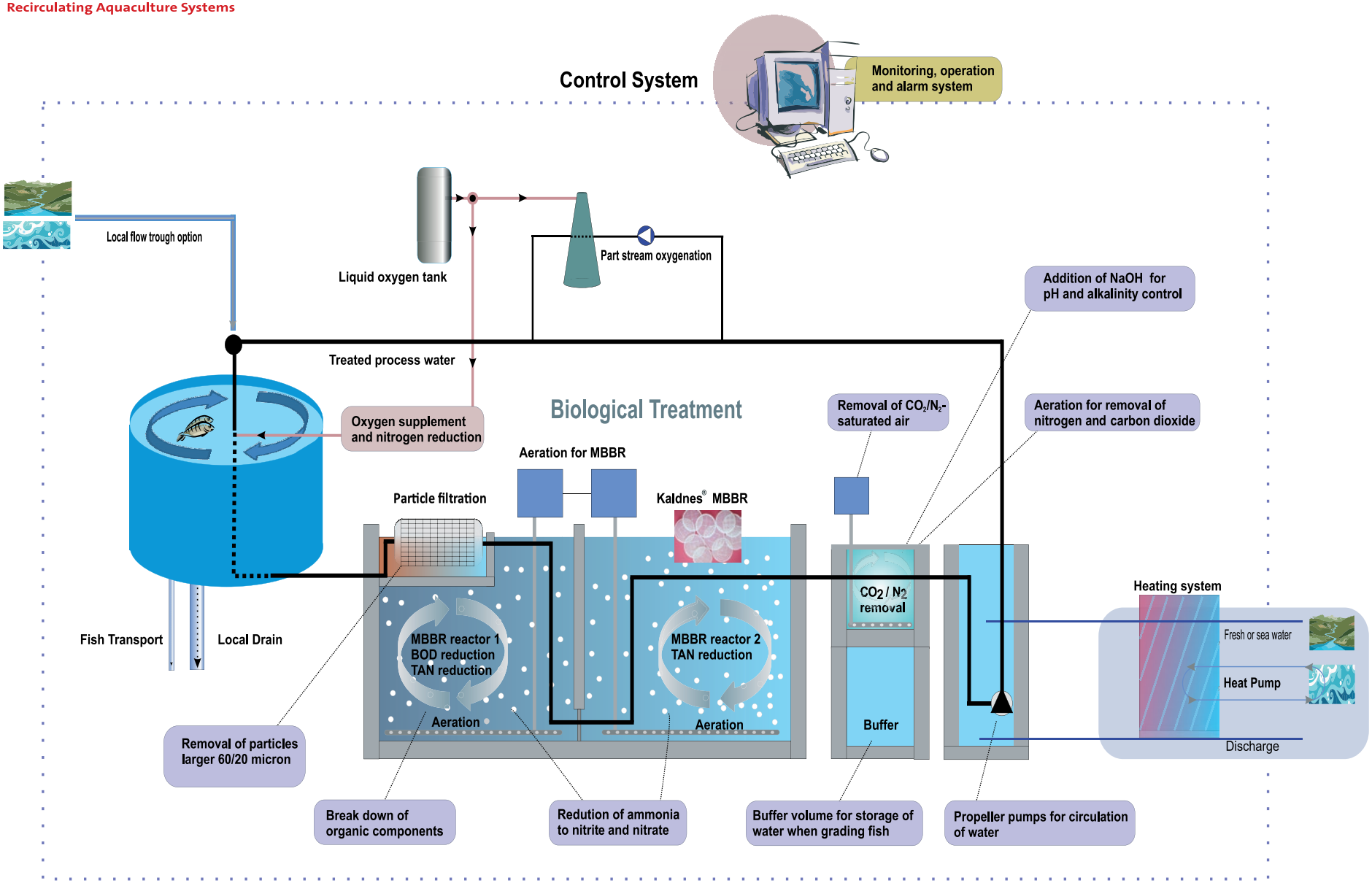
Project progress

It was of importance for Sundsfjord Smolt AS to be able to transfer fish from the start feeding department in the beginning of May 2012. The customer's wish was met by planning, erecting and commissioning on-growing 5 and 6 simultaneously in the existing building in just 7 months. Shortly after, full production was achieved in both departments.

Mile stones	Date
Contract signature	27. september 2011
Introduction of fish	15. mai 2012
Guarantee test at full production	2. oktober 2012

Kaldnes® RAS

Recirculating Aquaculture Systems



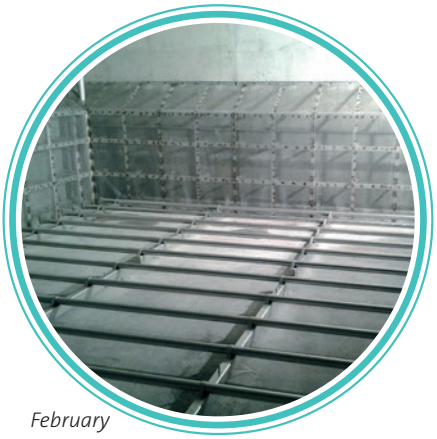
Sundsfjord Smolt AS

October

November

December

January



February

March

April

May

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