

A woman with blonde hair, wearing a high-visibility green and yellow jacket and dark pants, stands smiling next to a large industrial water filtration system. The system consists of several large white cylindrical tanks stacked vertically, with various pipes, valves, and electrical components on the right side. The Grundfos logo is prominently displayed on the top tank.

GRUNDFOS 

**More milk and milky water
- less tap and waste water
Søren Nøhr Bak**

The Grundfos Purpose & Values

Grundfos is a global leader in advanced pump solutions and a trendsetter in water technology.

We contribute to global sustainability by pioneering technologies that improve quality of life for people and care for the planet.



SUSTAINABLE



**OPEN AND
TRUSTWORTHY**



**FOCUSED
ON PEOPLE**



INDEPENDENT

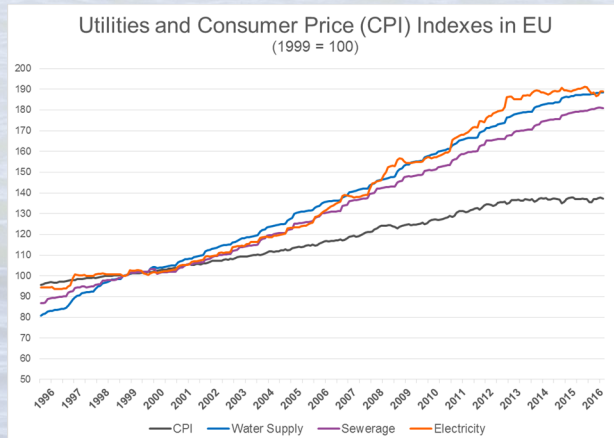


PARTNERSHIP



**RELENTLESSLY
AMBITIOUS**

Water issues are local and volatile



Capital Economics Ltd.

“Deficit of
40% in global
water supply
by 2030”

United Nation, 2015



The implications for industry

Increase pressure on preserving our environment

- Strick requirements
- Constrains on production capacity

High cost for

- Water
- Wastewater discharge

Pressure from stakeholders

- Owners
- Costumers
- Retail
- Consumers

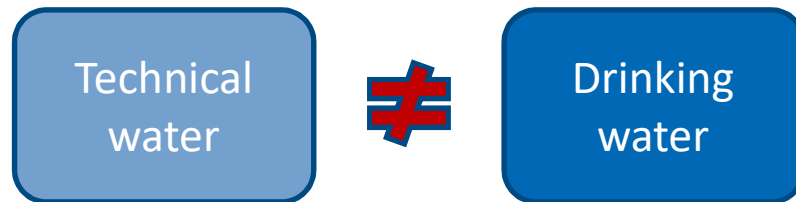
Where to re-use the water?

- Water re-use must be without comprising product quality
- Technical water opportunities:
 - Cooling towers
 - Boiler make-up water
 - External cleaning
 - Lawns
 - Cleaning of product equipment
- In all case a risk assessment is performed

What about your operations?

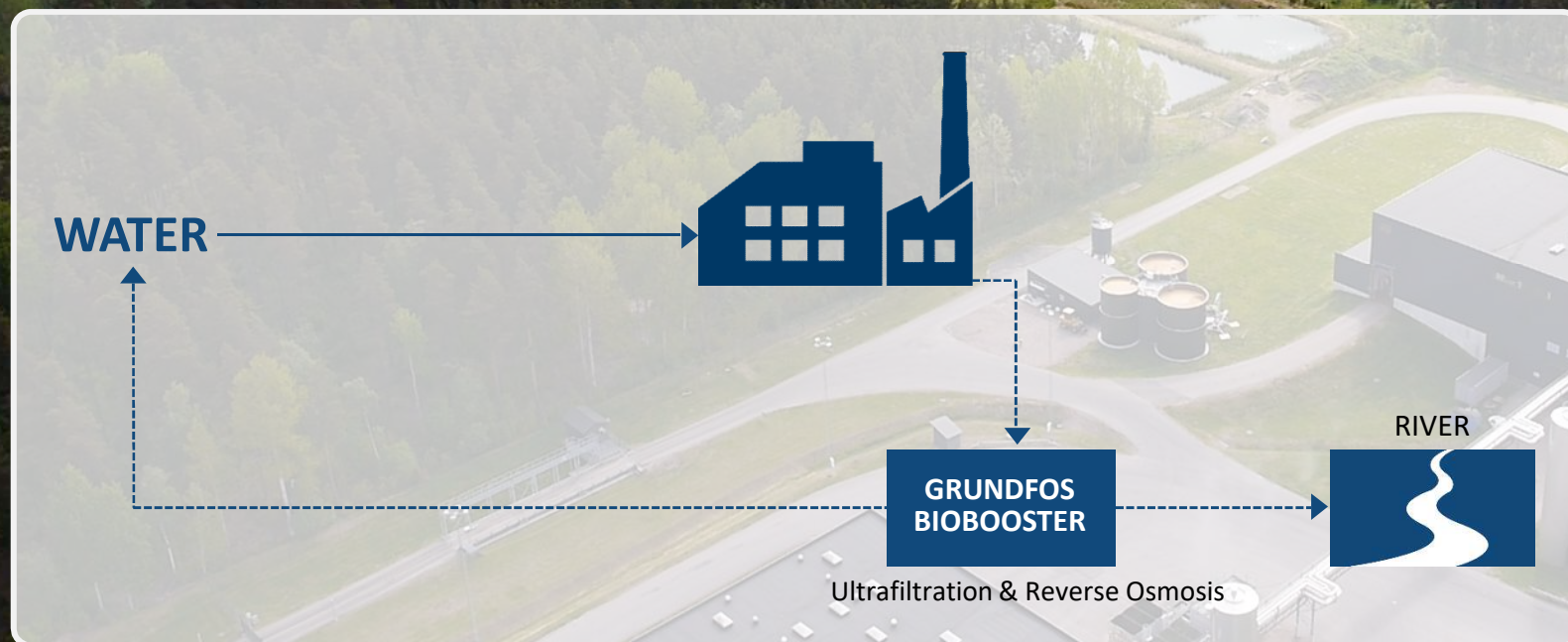
Water re-use

Issues of concern



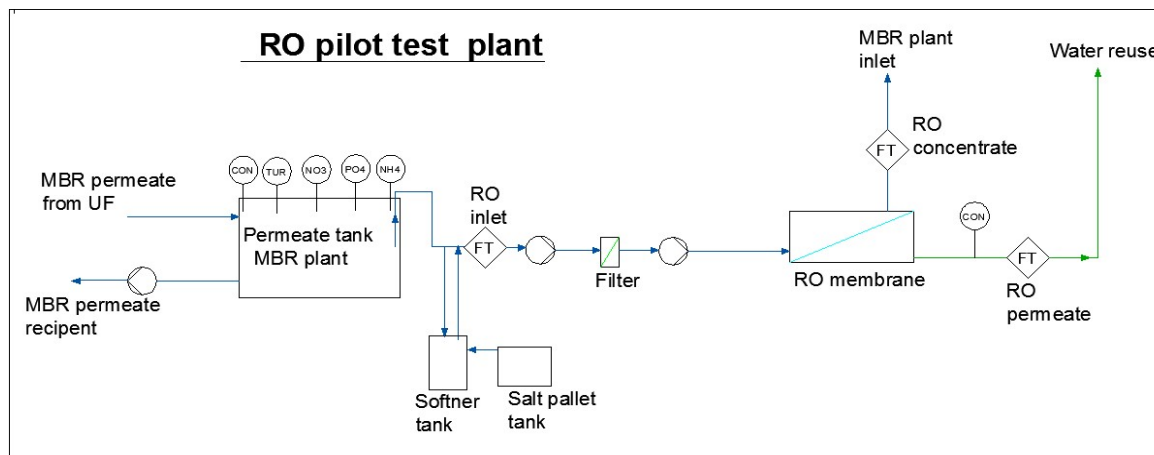
Water re-use opportunities

Mixed process effluent



Arla Foods, Vimmerby

Test of RO operation on MBR permeate



MBR and RO pilot test.

Treatment results

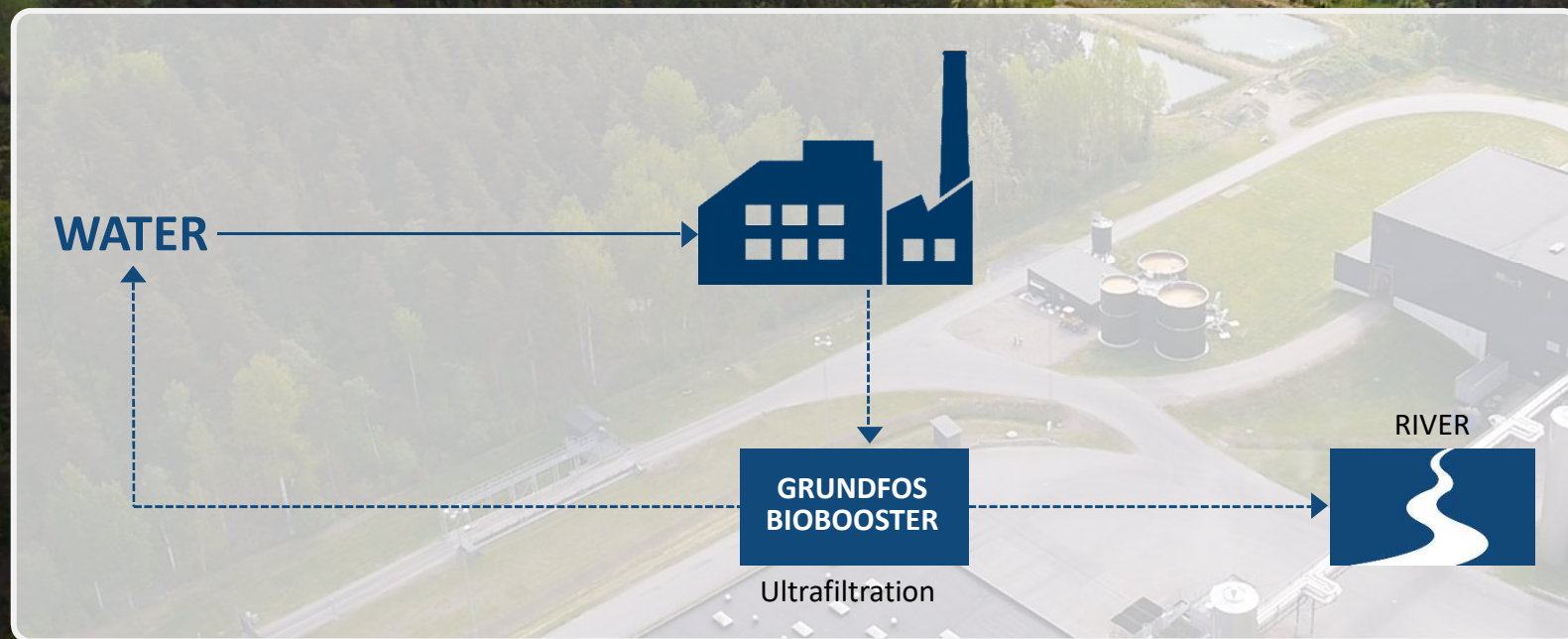
Parameters	Inlet	MBR permeate	RO permeate
COD	3140	30	5
Total Nitrogen, mg/l	248	5.5	0.7
Ammonium-N, mg/l	88	1.5	0.15
Nitrate-N, mg/l	170	2.2	0.19
Total phosphorous, mg/l	21	0.21	< 0.1
Suspended solids, mg/l	412	<2	Below dect.
Total solids, mg/l		1993	47
Total dissolved solids, mg/l		1990	47
Calcium, mg/l		26.8	<0.2
Chloride, mg/l		71	<10
Manganese, mg/l		0.031	<0.02
Iron, mg/l		0.05	<0.05
Flouride, mg/l		0.96	<0.28
Total hardness, dH, G		5.1	<0.28
Conductivity, myS/cm	5547	3011	48
Alkalinity, mg/l		1690	25
pH	2 – 12	7.6	7.2

Findings:

- Meets Swedish Drinking requirements
- Soft water
- Very low salt content including chloride

Water re-use opportunities

Milky water: RO-water (Cheese), Condensate from evaporators (Powder), ..



Arla Foods, Rødkærsbro

The solution



Full scale treatment results

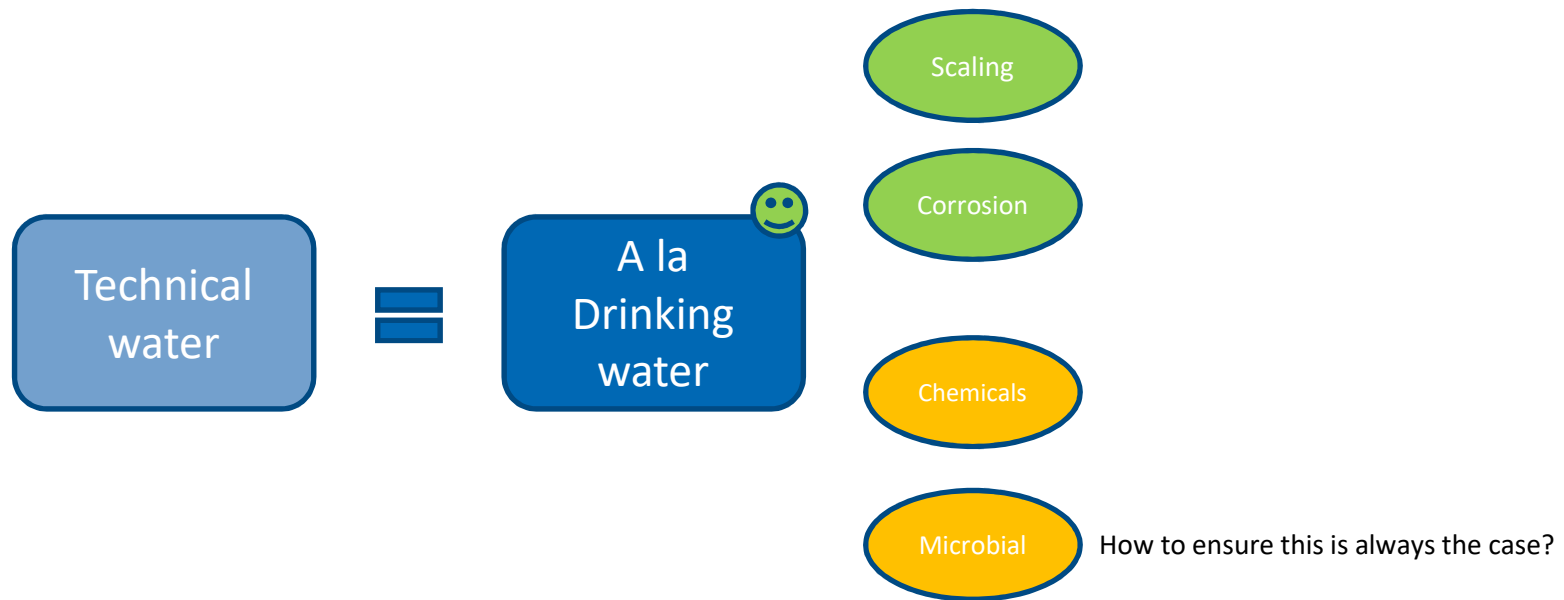
Quality parameter	Value	Unit
COD	< 5	mg/Lit
BOD5	1,42	mg/Lit
Total Nitrogen	1,35	mg/Lit
Total phosphorus	0,11	mg/Lit
pH	6,9	pH
Ammonium-N	0,06	mg/Lit
Copper	< 1	µg/Lit
Zink	< 5	µg/Lit
Urea	< 1	mg/Lit
Suspended solid	<1	mg/Lit
Total Hardness	0,6	dH
Total Alkalinity	3,8	m mol/Lit
Water Color	4	mg Pt/Lit
Conductivity	561	µS/cm
Bacterial count , 37 °	35	CFU/ml
Bacterial count , 22 °	48	CFU/ml
E Coli	< 1	CFU/ 100 ml
Coliform	< 1	CFU/ 100 ml

Findings:

- Meet the drinking water quality requirement
- Low hardness
- Low conductivity
- No pathogenic bacteria

Water re-use

Issues of concern

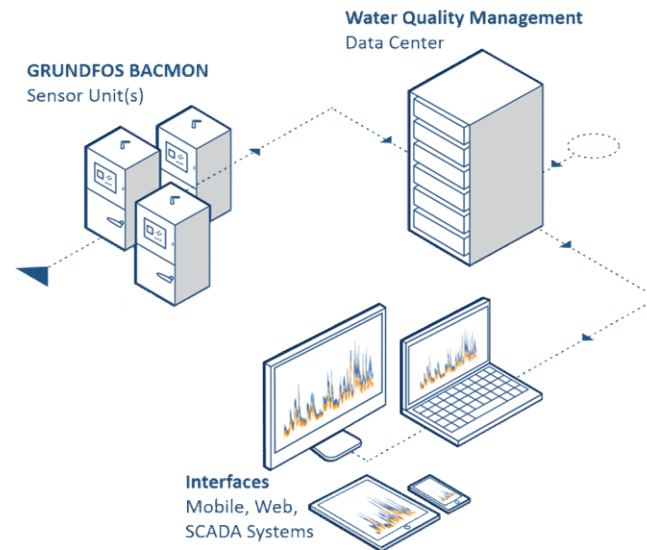


On-line bacteria Monitoring GRUNDFOS BACMON



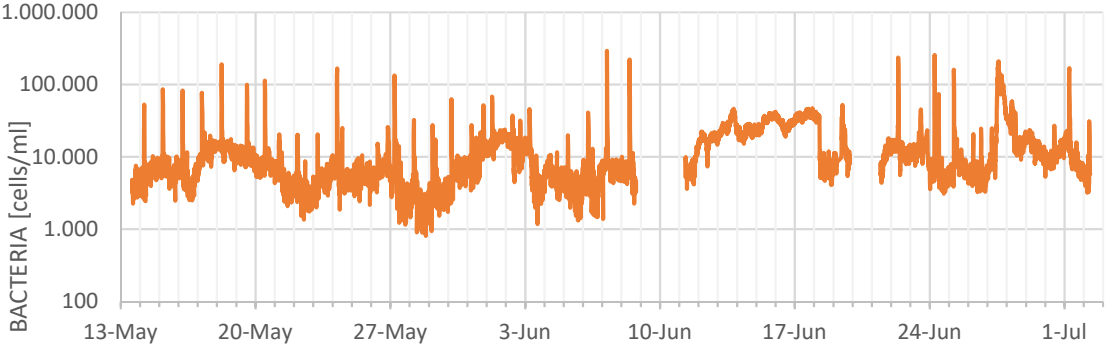
www.grundfos.com/bacmon

- Results in minutes
- Calibration free
- No chemicals or reagents – cheap and simple to use
- Fully automated operation

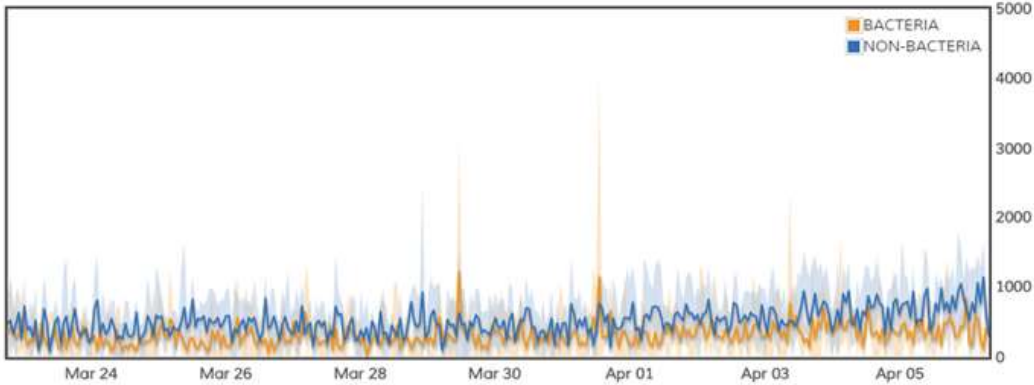


Example of on-line measurements by BACMON

Drinking water to a Danish meat industry

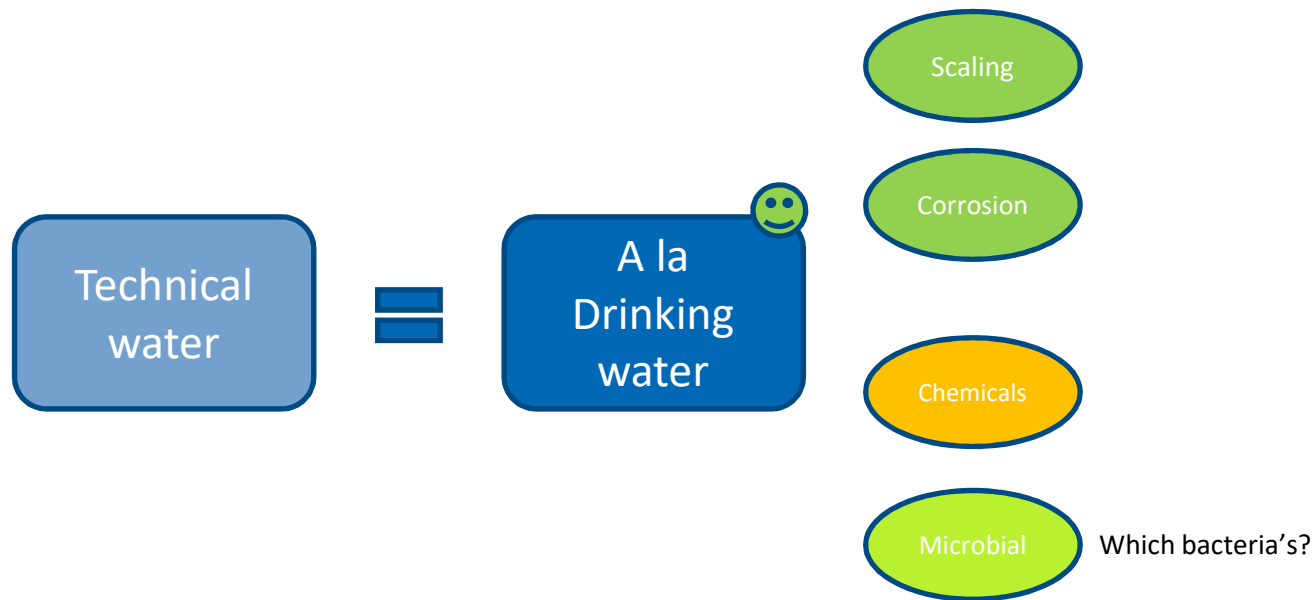


Re-use water from a Grundfos BioBooster plant



Water re-use

Issues of concern

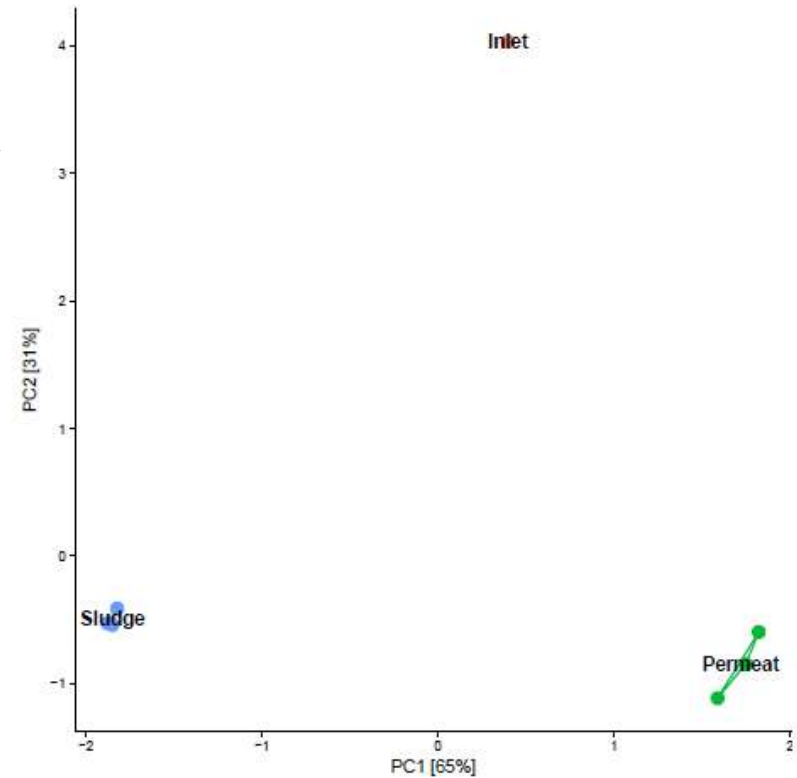


DNA investigation of bacteria

CP139 Microbial community analysis

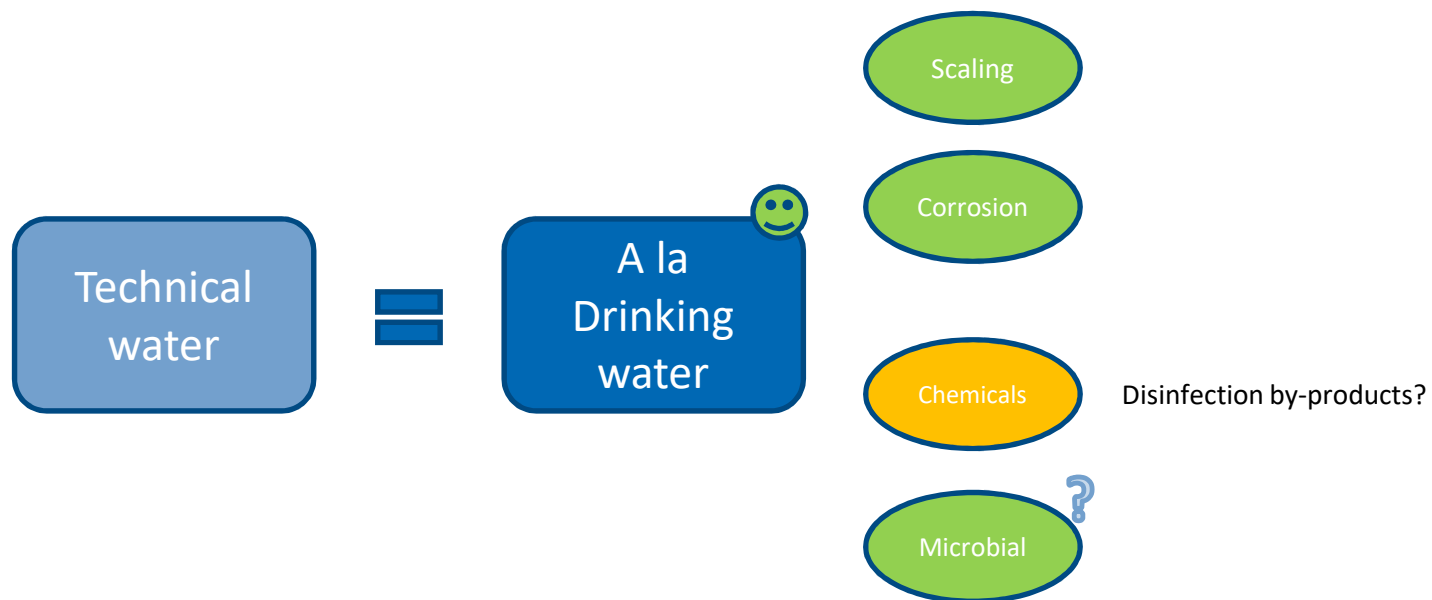


Sample point	Extraction conc. (ng/μl)	Library conc. (ng/μl)	Reads
Inlet (1)	161.8	9.3	26469
Sludge (3)	870.4 - 1086	<2.0 – 8.1	27117 - 52274
Permeate (3)	<2.0	<2.0	3649 - 20089
Re-use (3)	<2.0	<2.0	144 - 1558



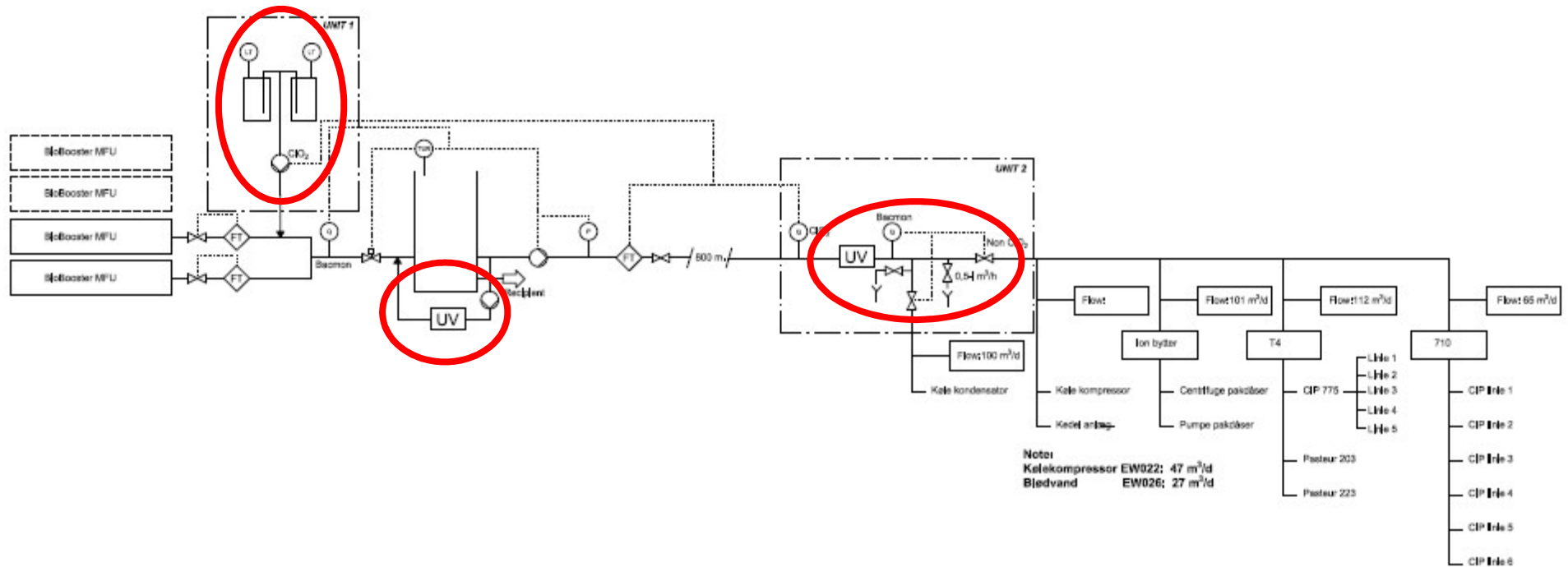
Water re-use

Issues of concern



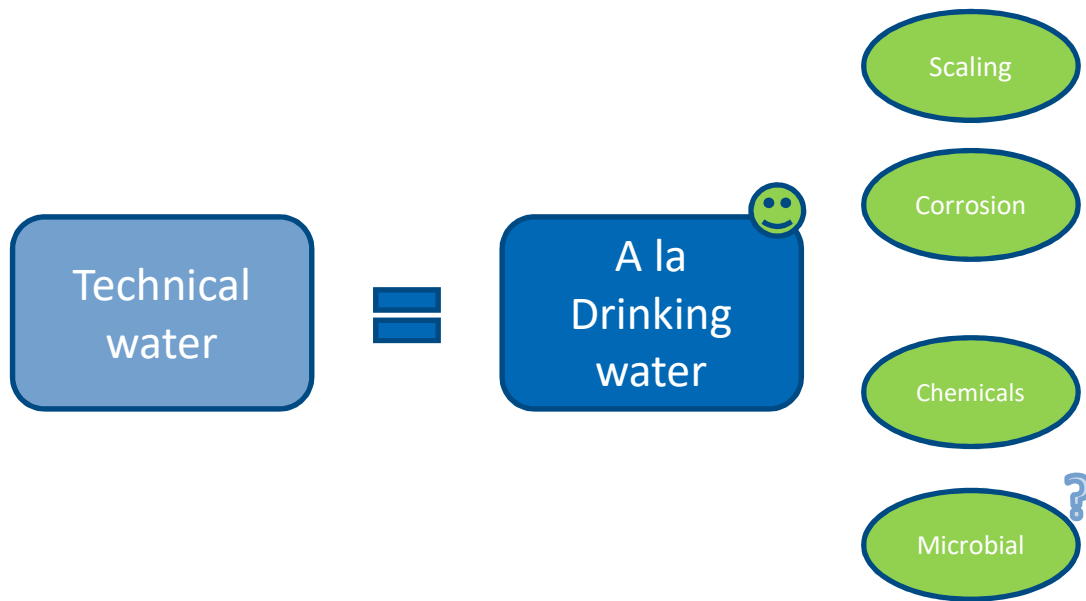
Re-use water distribution


Disinfection & control



Water re-use

Issues of concern



Critical Control Points 

Control point	Position	Interval	Trigger
Bacmon	Dairy	On-line	Shut-off
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Water you can drink

