



Introduction

Ultrafiltration is a pressure driven membrane process, which is increasingly applied in advanced drinking water treatment processes, particularly to improve the water quality with respect to organic and microbiological parameters. The combination with coagulation is a promising process combination to remove natural organic matter and maintain a high membrane performance. This hybrid process can also help to reduce subsequent disinfection by-product formation.

Importance

In recent years, surface water purification with ultrafiltration membrane has become an attractive alternative to conventional clarification. No or less need of chemical agents, good quality of produced water independent of feed water quality, good removal efficiency towards microorganisms, less production of sludge, compact process, and easy automation are some of the advantages of ultrafiltration compared to conventional treatment. Originally, ultrafiltration was used to remove turbidity and microorganism from good-quality surface water. Although this technology is now applied in an increasing number of installations, there is still room for improvement with respect to operational issues. The main goal of this survey is to get in-depth information on operational strategies of existing ultrafiltration water treatment plants with and without the use of pre-coagulation. On this basis operational recommendations shall be developed.

Approach

Within this survey a questionnaire has been developed, which was sent to the operators of UF water treatment plants. In addition existing reports about operational strategies of UF in the field of drinking water production were evaluated and integrated into this survey. On behalf of the DVGW (Deutsche Vereinigung des Gas- und Wasserfaches e.V.) the Water Technology Center (TZW) in Karlsruhe/Germany is organising a survey about operational experiences of UF drinking water plants in Germany as well. This report will be available presently.

More information

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TKI Categorisation

		Classification				
Supply Chain	Process Chain	Process Chain (cont'd)	Water Quality	Water Quantity (cont'd)		
Source	Raw water storage	Sludge treatment	Legislation/regulation			
- Catchment	- Supply reservoir	- Settlement	- Raw water (source)	X		- Leakage
- Groundwater	- Bankside storage	- Thickening	- Treated water	X		- Recycle
- Surface water	Pretreatment	- Dewatering	Chemical			
- Spring water	- Screening	- Disposal	- Organic compounds			
- Storm water	- Microstraining	Chemical dosing	- Inorganic compounds			
- Brackish/seawater	Primary treatment	- pH adjustment	- Disinfection by-products	X		
- Wastewater	- Sedimentation	- Coagulant	- Corrosion	X		
Raw water storage	- Rapid filtration	- Polyelectrolyte	- Sealing	X		
- Supply reservoir	- Slow sand filtration	- Disinfectant	- Chlorine decay	X		
- Bankside storage	- Bank filtration	- Lead/plumbosolvency	Microbiological			
Water treatment	- Dune infiltration	Control/instrumentation	- Viruses			Consumers / Risk
- Pretreatment	Secondary treatment	- Flow	- Parasites	X		
- Primary treatment	- Coagulation/flocculation	- Pressure	- Bacteria	X		Trust
- Secondary treatment	- Sedimentation	- pH	- Fungi	X		- In water safety/quality
- Sludge treatment	- Filtration	- Chlorine	Aesthetic			- In security of supply
Treated water storage	- Dissolved air flotation(DAF)	- Dosing	- Hardness / alkalinity	X		- In suppliers
- Service reservoir	- Ion exchange	- Telemetry	- pH	X		- In regulations and regulators
Distribution	- Membrane treatment	Analysis	- Turbidity	X		Willingness-to-pay/acceptance
- Pumps	- Adsorption	- Chemical	- Colour	X		- For safety
- Supply pipe / main	- Disinfection	- Microbiological	- Taste	X		- For improved taste/odour
Tap (Customer)	- Dechlorination	- Physical	- Odour	X		- For infrastructure
- Supply (service) pipe	Treated water storage					- For security of supply

- Internal plumbing	- Service reservoir								
- Internal storage	Distribution								Risk Communication
	- Disinfection								- Communication strategies
	- Lead/plumbosolvency								- Potential pitfalls
	- Manganese control								- Proven techniques
	- Biofilm control								
	Tap (Customer)								
	- Point-of-entry (POE)								
	- Point-of-use (POU)								

TKI Categorisation (continued)

Contains	Constraints	Meta data							
Report	Low cost	<i>Farhad Salehi Thomas Wirtgens Thomas Melin</i>							
Database	Simple technology	<i>RWTH Aachen University</i>							
Spreadsheet	No/low skill requirement	<i>Farhad Salehi</i>							
Model	No/low energy requirement	<i>salehi@iwt.rwth-aachen.de</i>							
Research	No/low chemical requirement								
Literature review	No/low sludge production	<i>SINTEF</i>							
Trend analysis	Rural location	<i>Source</i>							
Case study / demonstration	X Developing world location								
Financial / organisational									
Methodology									
Legislation / regulation									
Benchmarking									