Inventory and evaluation of monitoring technologies for key-parameters

Introduction

Monitoring and control technologies are indispensable for the production of safe drinking water. They allow for the surveillance of source water, the permanent control of the treatment processes, and they safeguard the high quality of finished water. Furthermore, appropriate analytical techniques are indispensable for the detection of changes in water quality during distribution and for monitoring drinking water quality at consumers' tap. Reliable monitoring technologies contribute to a large extent to the consumers' trust in a high drinking water quality.

Importance

The major objective of WA 3 is to provide a set of analytical techniques and methods that ensure the provision of safe high quality drinking water that has the trust of the consumers. In WP 3.1 existing monitoring technologies are evaluated according to their suitability for application in controlling water quality in the whole drinking water production process. This evaluation includes not only basic analytical techniques, but also new and innovative monitoring technologies like effect-related DNA-arrays or electronic nose technology.

Approach

The current report is a follow-up of the first report prepared within WP 3.1: 'Monitoring and control of drinking water quality - Selection of key-parameters and describes the results of a survey on monitoring technologies for the selected key-parameters'. The existing monitoring technologies for the selected key-parameters are identified and evaluated based on information on e.g. ease-of-use, maintenance requirements, costs, and technical specifications. Also the suitability of the techniques for use in small-scale-systems (3S) is evaluated.

Result

The result is an easy-reference document with an overview and evaluation of the available monitoring techniques for many parameters relevant for assessing and controlling the quality of drinking water. Also the suitability of the techniques for use in small-scale-systems (3S) is evaluated. This report can be used as reference when deciding on analytical techniques to be used in drinking water monitoring.

More information

More information can be found in the report covering D3.1.3: Monitoring and control of drinking water quality. Inventory and evaluation of monitoring technologies for key-parameters. The report is prepared by all partners from WA3.

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

- Internal plumbing	- Service reservoir			**Water Quantity**	**Risk Communication**
- Internal storage	**Distribution**				- Communication strategies
	- Disinfection			**Source**	- Potential pitfalls
	- Lead/plumbosolvency			- Source management	- Proven techniques
	- Manganese control			- Alternative source(s)	
	- Biofilm control			**Management**	
	Tap (Customer)			- Water balance	
	- Point-of-entry (POE)			- Demand/supply trend(s)	
	- Point-of-use (POU)			- Demand reduction	

TKI Categorisation (continued)

Contains		**Constraints**	**Meta data**			
Report	x	Low cost	*Author(s)*	x	All WA3 partners (Ed.: Margreet Mons, Kiwa Water Research)	
Database		Simple technology	*Organisation(s)*			
Spreadsheet		No/low skill requirement	*Contact name*		Margreet Mons	
Model		No/low energy requirement	*Contact email*		Margreet.mons@kiwa.nl	
Research		No/low chemical requirement	*Quality controller name*		All WA3 partners	
Literature review		No/low sludge production	*Quality controller organisation*			
Trend analysis		Rural location	Source			
Case study / demonstration		Developing world location	*Date prepared*		June 2008	
Financial / organisational			Date submitted (TKI)			
Methodology			Date revised (TKI)			
Legislation / regulation						
Benchmarking						