Risk assessment case studies – Summary report
Executive summary

Introduction

The present report provides an overview of the main results from risk assessment methods applied in six case studies. The resources needed are estimated and a discussion on when the different methods are most applicable and useful is also provided. The case studies were performed within Work Area 4 (WA4), *Risk Assessment and Risk Management,* in the TECHNEAU project. The main purposes of the case studies were to assess the specific drinking water systems, evaluate methods and tools developed in WA4 and provide good examples on risk assessment practice.

Importance

Risk assessments providing relevant and informative results to assist decision-makers are essential for an efficient risk management. The World Health Organization concludes in their Water Safety Plan document that the most effective way to guarantee safe drinking water to consumers is an integrated risk management approach, including the entire drinking water system from source to tap. Drinking water systems differ in terms of both system structure, e.g. type of source water, treatment steps and distribution system, and the type of risks they are exposed to. Consequently, one risk assessment method cannot be developed and applied at all systems to assess all problems. Instead, a set of tools is necessary to assist water utilities' risk assessment and risk management work.

Approach

A set of different methods were applied in the case studies, including quantitative and qualitative methods. Some of the methods are designed to analyse entire systems, from source to tap, and some are more focused on specific parts of the system.

Results

The case studies show that both the qualitative and the quantitative methods provide useful results. Qualitative methods generally require less input data and other resources compared to the quantitative methods. The quantitative methods, on the other hand, are shown to provide more detailed results. When deciding what method to apply it is important to consider what information the risk assessment shall provide and what resources are available.

More information

The results of this work are presented in the report "Risk assessment case studies – Summary report".

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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**	**Risk Management / Consumers**	
- Spring water	- Screening	- Disposal	- Organic compounds		
- Storm water	- Microstraining	**Chemical dosing**	- Inorganic compounds	**Risk analysis**	
- Brackish/seawater	**Primary treatment**	- pH adjustment	- Disinfection by-products	- Hazard identification	x
- Wastewater	- Sedimentation	- Coagulant	- Corrosion	- Risk estimation	x
Raw water storage	- Rapid filtration	- Polyelectrolyte	- Scaling	**Risk evaluation**	
- Supply reservoir	- Slow sand filtration	- Disinfectant	- Chlorine decay	- Risk tolerability decision	x
- Bankside storage	- Bank filtration	- Lead/plumbosolvency	**Microbiological**	- Analysis of options	x
Water treatment	- Dune infiltration	**Control/instrumentation**	- Viruses	**Risk reduction / control**	
- Pretreatment	**Secondary treatment**	- Flow	- Parasites	- Risk reduction options	
- Primary treatment	- Coagulation/flocculation	- Pressure	- Bacteria	- Decision making	
- Secondary treatment	- Sedimentation	- pH	- Fungi	- Implementation	
- Sludge treatment	- Filtration	- Chlorine	**Aesthetic**	- Monitoring	
Treated water storage	- Dissolved air flotation(DAF)	- Dosing	- Hardness / alkalinity	**Risk Communication**	
- Service reservoir	- Ion exchange	- Telemetry	- pH	- Communication strategies	
Distribution	- Membrane treatment	**Analysis**	- Turbidity	- Potential pitfalls	
- Pumps	- Adsorption	- Chemical	- Colour	- Proven techniques	
- Supply pipe / main	- Disinfection	- Microbiological	- Taste	**Trust**	
Tap (Customer)	- Dechlorination	- Physical	- Odour	- In water safety/quality	
- Supply (service) pipe	**Treated water storage**			- In security of supply	
- Internal plumbing	- Service reservoir		**Water Quantity**	- In suppliers	
- Internal storage	**Distribution**			- In regulations and	

					regulators	
	- Disinfection			**Source**	**Willingness-to-pay/acceptance**	
	- Lead/plumbosolvency			- Source management	- For safety	
	- Manganese control			- Alternative source(s)	- For improved taste/odour	
	- Biofilm control			**Management**	- For infrastructure	
	Tap (Customer)			- Water balance	- For security of supply	
	- 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)*				
Database		Simple technology		*Organisation(s)*				
Spreadsheet		No/low skill requirement		*Contact name*				
Model		No/low energy requirement		*Contact email*				
Research		No/low chemical requirement		*Quality controller name*				
Literature review		No/low sludge production		*Quality controller organisation*				
Trend analysis		Rural location		Source				
Case study / demonstration	x	Developing world location		*Date prepared*				
Financial / organisational				Date submitted (TKI)				
Methodology	x			Date revised (TKI)				
Legislation / regulation								
Benchmarking								