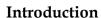
Methods for risk analysis of drinking water systems from source to tap

- Guidance report on Risk Analysis

Executive summary



This report provides a complete overview of risk analyses methods for water utilities. The main target groups of the report are management and operational personnel of water utilities with some basic understanding of the main concepts of risk management.

Importance

The report aims at demonstrating the application of various risk analysis methods for water utility systems. Thus, it can serve as a guidance report for management of a water utility regarding which analyses are most relevant in various decision situations. The report is intended to give insight into the capabilities, the use and potential results of the various methods for risk analysis.

Approach

The report will refer to the TECHNEAU Case studies and other literature to give details on the various risk analysis methods. It also refers to the TECHNEAU Hazard Data Base (THDB) and to the TECHNEAU report, "Generic framework and method for integrated risk management in water safety plans".

Results

The main steps of a complete risk analysis are discussed:

- Scope / analysis objective
- System description
- Identification of hazards and hazardous events
- Estimation of risk (probabilities and consequences). Consequences with respect to both water quality and water quantity are considered.

More information

Generic framework and methods for integrated risk management in water safety plans, Deliverable 4.1.1, TECHNEAU, 2007.

TECHNEAU Hazard database (THDB) - Deliverable 4.1.4, TECHNEAU, 2008.

Deliverable number: D 4.2.4

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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	\vdash		
- 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	х		
- Wastewater	- Sedimentation	- Coagulant	- Corrosion	- Risk estimation	х		
Raw water storage	- Rapid filtration	- Polyelectrolyte	- Scaling	Risk evaluation			
- Supply reservoir	- Slow sand filtration	- Disinfectant	- Chlorine decay	- Risk tolerability decision	х		
- Bankside storage	- Bank filtration	- Lead/plumbosolvency	Microbiological	- Analysis of options			
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
- Dis	infection	Source	Willingness-to- pay/acceptance
- Lea	d/plumbosolvency	- Source management	- For safety
- Mai	nganese control	- Alternative source(s)	- For improved taste/odour
- Biot	film control	Management	- For infrastructure
Tap	(Customer)	- Water balance	- For security of supply
- Poir	nt-of-entry (POE)	- Demand/supply trend(s)	
- Poir	nt-of-use (POU)	- Demand reduction	

TKI Categorisation (continued)

Contains		Constraints	Meta data		
Report	х	Low cost	Author(s)		
Database		Simple technology	Organisation(s)		
Spreadsheet		No/low skill requirement	Contact name		
Model		No/low energy	Contact email		
		requirement			
Research		No/low chemical	Quality controller name		
		requirement			
Literature review	x	No/low sludge production	Quality controller		
			organisation		
Trend analysis		Rural location	Source		
Case study / demonstration		Developing world location	Date prepared		
Financial / organisational			Date submitted (TKI)		
Methodology	х		Date revised (TKI)		
Legislation / regulation					
Benchmarking					
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