Structure and Elements of a Water Security Plan for European Utilities

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Allocation of a Water Security Plan

- The Water Security Plan targets at prevention, preparation, real-time detection and fast response to anthropogenic contamination events.
- To be established as a separate but well synchronized plan, additional to conventional consumer protection by good practice (SOPs), European directives, national standards, and eventually established Water Safety Plans.
- To be integrated into the existing operational framework from source water over drinking water treatment to the consumer's tap.

Principles of a Water Security Plan

- **Sustainability**
- **Adaptability** and **flexibility,** also for small utilities
- **Synchronicity** to existing operations
- Economical **efficiency**
- Operator **acceptability**

What is a Water Security Event ?

- Accidental or intentional, but typically anthropogenic source of contamination.
- Low probability, high impact, acutely toxic.
- Fast rise of dosage and concentration -> fast (real-time) detection and response mandatory.
- "No time to lose."

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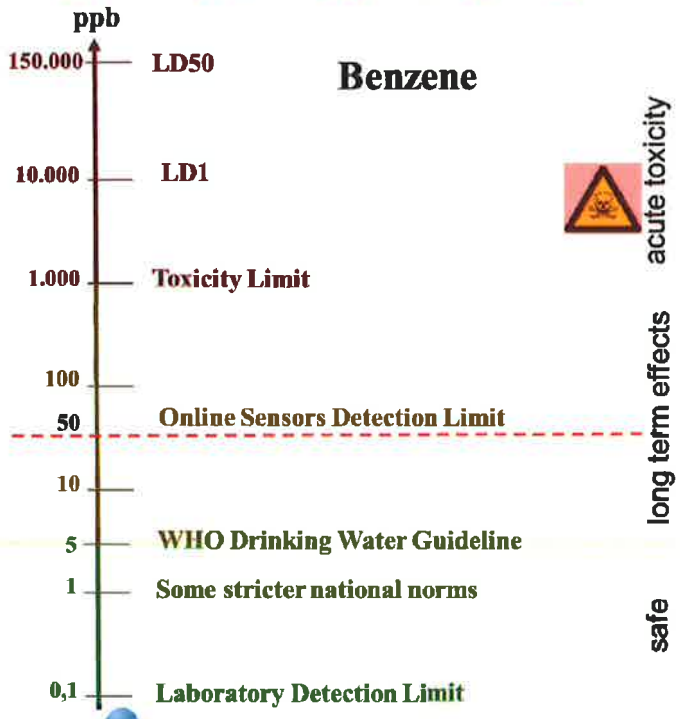
What is a Water Security Event ?



Elements of a Water Security Plan

1. Decision (of water utility) to establish a Water Security Plan
2. Vulnerability assessment
3. Define wanted protection level
4. Protection level to be activated by use of existing capacity
5. Gap Analysis
6. Design of Event Detection and Protection System
7. Use of Water Security System to support daily operation
8. (Dock to) Emergency response plan

Elements of a Water Security Plan

1. Decision to establish a Water Security Plan

- Every water utility, independent of size, should be encouraged to go through an evaluation process.
- The process and its elements should be standardized on a European level, considering the size of the utility and assumed hazards.
- The resulting plan should from the beginning dock onto other existing plans, like water safety plan, emergency response plans, and/or other risk assessment plans.

Elements of a Water Security Plan

2. Vulnerability Assessment

- To define, describe and quantify hazards
- Factors to be looked at are size, age and quality of infrastructure, accessibility and exposedness (e.g. number of open channels, tanks, hydrants), potential contamination sources, special land use, dangerous infrastructure, history of events, existing protective resources, etc.
- The extent and depth of investigation should co-relate to size of utility and anticipated hazards.
- European standards for aspects to look at, depth of analysis, frequency etc., would be valuable.
- Outcome would ideally be quantitative in tables, and visualized in maps in order to increase acceptance.

Elements of a Water Security Plan

3. Define Wanted Protection Level

- The target protection level will be an individual political decision and should be set into proportion to other known hazards, and to other health risk related guidelines.
- One basic idea would be that drinking a glass of water in a small town should not pose a higher risk - from a security perspective - than in a large city.
- The standardization of protection levels might be a long term target; reference can be found in other existing health / risk related guidelines.
  -> The water-related **Criteria** should be standardized.
  -> Acceptable **Levels / Numbers** could be defined by experience accumulating over time.

Elements of a Water Security Plan

4. Protection to be activated by use of existing capacity

First, fast, and cost efficient step to increase security- and protection level = Analyze and activate the existing capacity in terms of protection purposes:

- Existing water infrastructure /protection
- Existing monitoring systems
- Data communication and analysis systems
- Available staff / training, re-focusing
- Good practice / re-focusing
- Extension of existing processes / SOPs

Elements of a Water Security Plan

5. Gap Analysis

Compare

Activated protection level ⇔ Target protection level

- Describe the vulnerability gap
- Define missing resources & capacity to close the gap
- Design a proposal / plan to fill the gap

Elements of a Water Security Plan

6. Design of Event Detection and Protection System

- Analysis of tools for event detection: sensors, software, and communication tools
- Selection, positioning and integration of (additional) sensors, software and related infrastructure
- Automated data collection, validation, reporting and escalation program
- Automated data analysis and alarming program

Elements of a Water Security Plan

7. Use of Water Security Plan to support daily operation

Experience (mainly in the USA) shows that Security Plans need to be fully integrated into daily operation, to provide additional information related to water quality, to be used for improvement of general water quality management and operation; otherwise it will not be maintained in a sustainable manner.

- Integration into daily operation and existing communication systems
- Reach sustainability (training, recurring checks, audits)

Elements of a Water Security Plan

8. Emergency Response Plan

- Often exists except in very small utilities
- needs to be adapted according to the special characteristics of water security (events)
- especially in terms of necessary speed of response and communication management,
- possible high impact from contamination,
- and alternatives to supplying drinking water from the distribution network.
- Clear logistics are important to enable fast action when such a plan needs to be executed.

Keys to sustainability

Lessons learned /in the USA:

- Only Multi-purpose systems work: Use water security infrastructure for daily operation, so there is a visible pay back.
- Use the equipment every day so it is well maintained, and it will be working also in the case of a real security event.
- Water security can not be 100% addressed by existing capacity. Additional water security assets can only be maintained by additional capacity.
- Resulting costs can be covered by 1) savings from operations due to better efficiency, 2) savings from reduced costs of event recovery due to early detection of eventual events, 3) funding, 4) increase water prices.
- Cities using (partly) their own money were more motivated and more sustainable in the USA.

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Conclusions, Recommendations

- Adapt technologies to the "normal" operators: Make existing technologies stable, simple, easy to use, friendly to the user:
- Turn sensors and software into every-day tools - integrate the collected data into daily operations.
- Introduce minimum regulating framework, just to move the topic over the awareness level especially of the smaller utilities. But we do need regulation / motivation, otherwise Security will be considered an extra effort that will not be invested before something really happens.
- Even if Water Security is only partly redundant with the domain of Water safety, it might not be wise to open a new, totally separate field but suggest an extension to existing plans.
- At the same time, carrier projects will be important references from the top to the bottom.
- Involve and convince the water utility associations especially in the German speaking countries.

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