

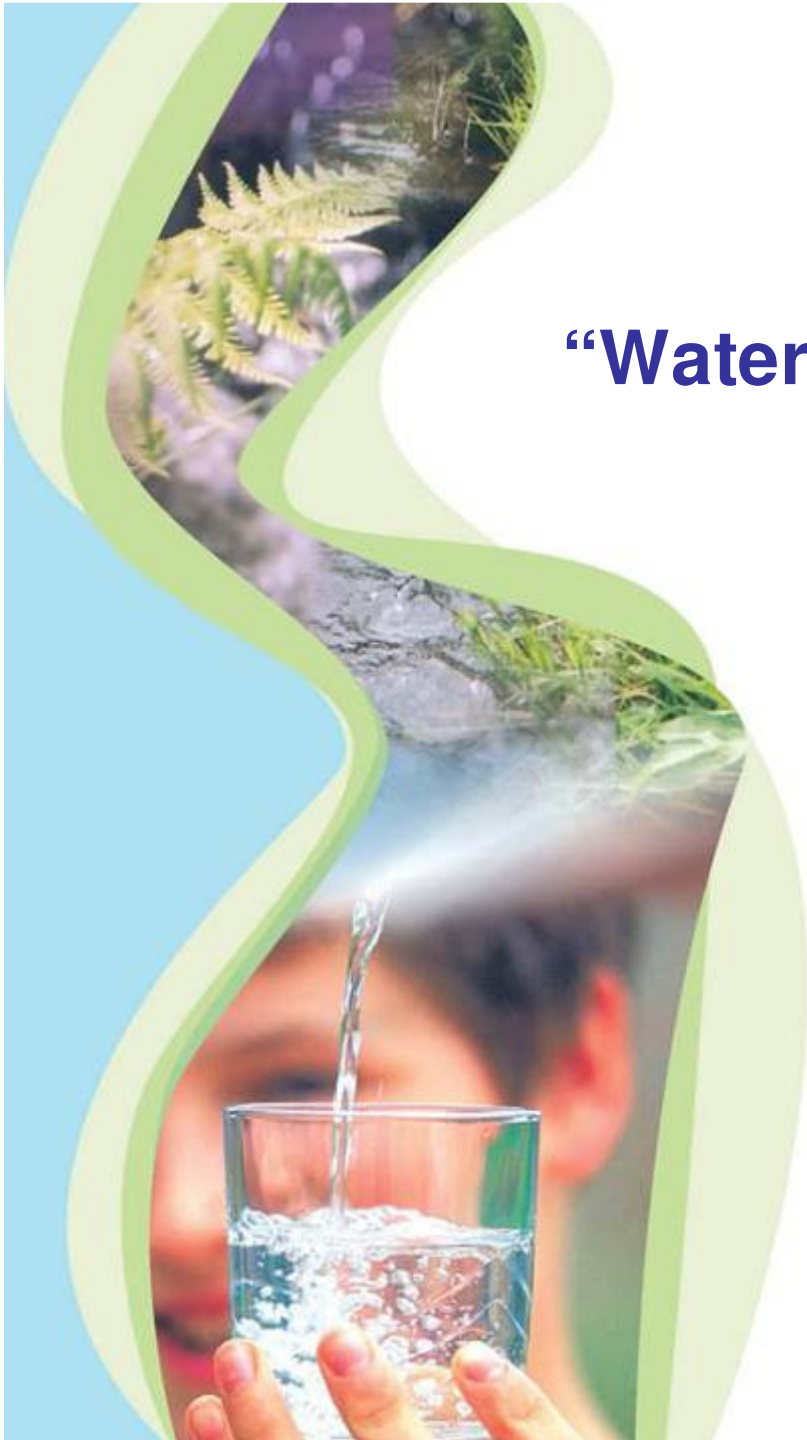
“Water Supply Security Issues and Trends”

Thematic week:
“Water Services for Supply and Sanitation”

Thematic axis 5:
“Efficiency as Paradigm for Citizen,
Management’s Practices and Development”

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INTRODUCTION TO WATER SUPPLY SECURITY

Where water supply has been developed, citizens are used to rely on others for ensuring their usual and basic needs for water.

The likelihood of suffering large and persistent interruption of the water supply varies mainly according to:

- ⇒ the geographical situation,
- ⇒ the availability of the resource,
- ⇒ the growing of the needs.

The paradoxes:

- ⇒ The concern of the population with the water supply failure possibility is generally reversely proportioned to the level of service.
- ⇒ Water infrastructure is generally very expensive, but most people consider that the acceptable cost for water supply should be very low.

RISK MANAGEMENT IN THE WATER SUPPLY: WHY ?

- Pressure drops or interruption of water distribution may rapidly lead to sanitation problems and degradation of daily life; fire fighting is also a major issue.
- Ingestion, contact or breathing of inappropriate water may result in diseases and could cause death.

Whenever a drinking water supply service has suffered interruption of distribution, or insufficient pressure, or bad water quality:

Water suppliers will be held responsible:

- for their lack of anticipation,
- for their lack of preparation,
- for their inappropriate or insufficient reaction.

RISK MANAGEMENT IN THE WATER SUPPLY: WHAT RISKS ?

- Water supply activity related risks:
pollutions, breaks, backflow.... « part of the job »
- Indirect risks as a result of interdependency:
interruption of power supply, communications, ...
delivery failure of reagents,
transportation strikes...
- Natural Hazards depending on location and more or less
predictable: potentially high level of damages.
- In a dangerous world, water supply is a potential target.

« An impossible error is just an error that has not been made yet »

RISK MANAGEMENT IN THE WATER SUPPLY: WHAT RISKS ? (2)

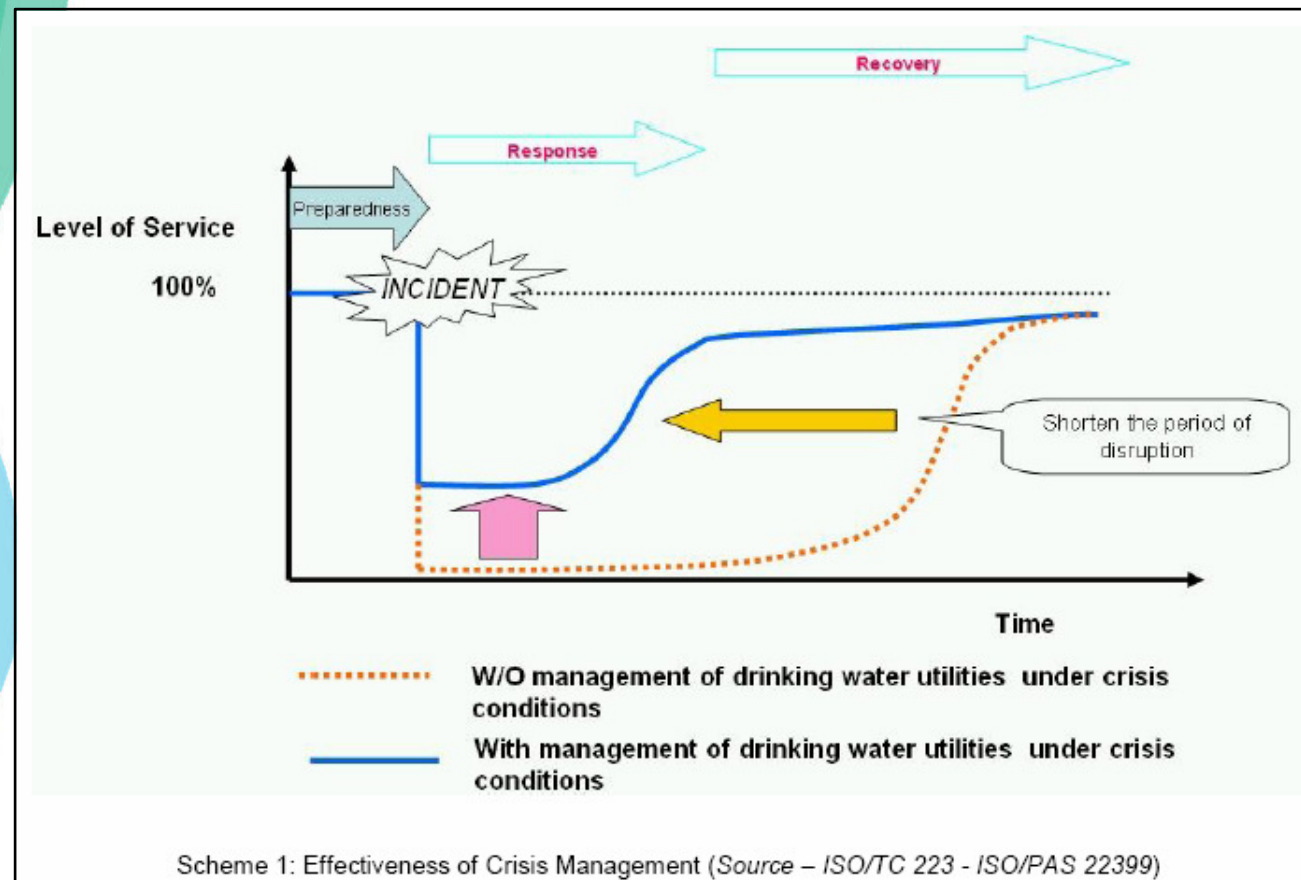
- For natural hazards that have already been recorded in the past in the same region, the question is not « IF », but « WHEN » it will come again.
- The risks vary from immediate effect to longer time to fully expand:
 - earthquakes = minutes
 - floods = days
 - droughts = weeks
 - man made threats = ?
- The concentration of human population and economic activity in urban centers raises the level of consequences of the risks.

QUESTIONS

- How can the water supplier be prepared against a situation he has never met before ?
- Natural catastrophe or terrorist risk are beyond the water utility's grasp; we can't protect against everything. What is the limit ?
- What is the appropriate time scale to take into account for the sizing of protection means?
- When does the involvement of the authorities starts ?
- Who is in charge with what ?
- What protection for what cost ?
- How the new technologies can help ?

CRISIS MANAGEMENT

A crisis corresponds to a period of **loss of control**; its duration is not therefore generally known at the exact moment it begins. One thing is certain: it will come to an end when its effects are no longer felt.



SOME PRINCIPLES CONCERNING SECURITY

- **Principle of early detection** (alerts on thresholds, remote control)
- **Principle of proximity** (seriousness increased with consumers proximity)
- **Principle of risk assessment**
 - availability of indispensables parts of the system
 - consequences of potential incidents (real or imagined)
 - specific risks (flooding, earthquakes...)
 - permeability of the facilities
 - sound risk analysis methods (HACCP...)
- **Principle of traceability**
- **Principle of feedback from experiences**
- **Principle of partnership developments**
- **Principle of sub-contractors control**

REQUIREMENT FOR THE OPERATION OF A WATER SUPPLY

To ensure the public water service, one generally needs:

- a resource in sufficient quantity and of minimum quality,
- operational treatment infrastructures,
- consumables (chemicals, vehicles...),
- « fluids » (energy, communication...),
- reservoirs,
- a distribution network (pipes, service pipes, pumping stations, hydraulic apparatus),
- qualified staff at the workplace and on call.

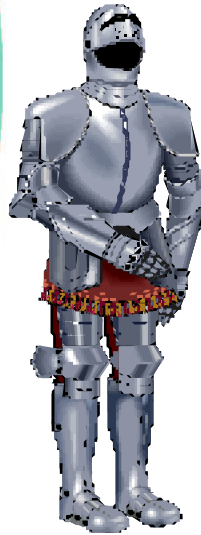
→ A sound water security management will assess the availability for each of these components, and their resilience as well.

MORE PRINCIPLES CONCERNING SECURITY

Good operational principles must be put in place at installations level:

- redundancy of the critical installations,
- maintenance of security stocks (reagents, parts...),
- search for independence in regard to fluids such as energy, communications (note the risks of saturation of certain networks in times of crisis), transportation...
- optimised planning of limitations for maintenance or works (residual capacity potential and requirements to be satisfied),
- distribution of strategic knowledge among multiple individuals,
- passive and active security management.

PASSIVE SECURITY vs ACTIVE SECURITY



Passive Security

- depends on the infrastructure
- stable in time whenever due maintenance is made
- generally heavy investments
- responds to a given level of risks

Basic level of security

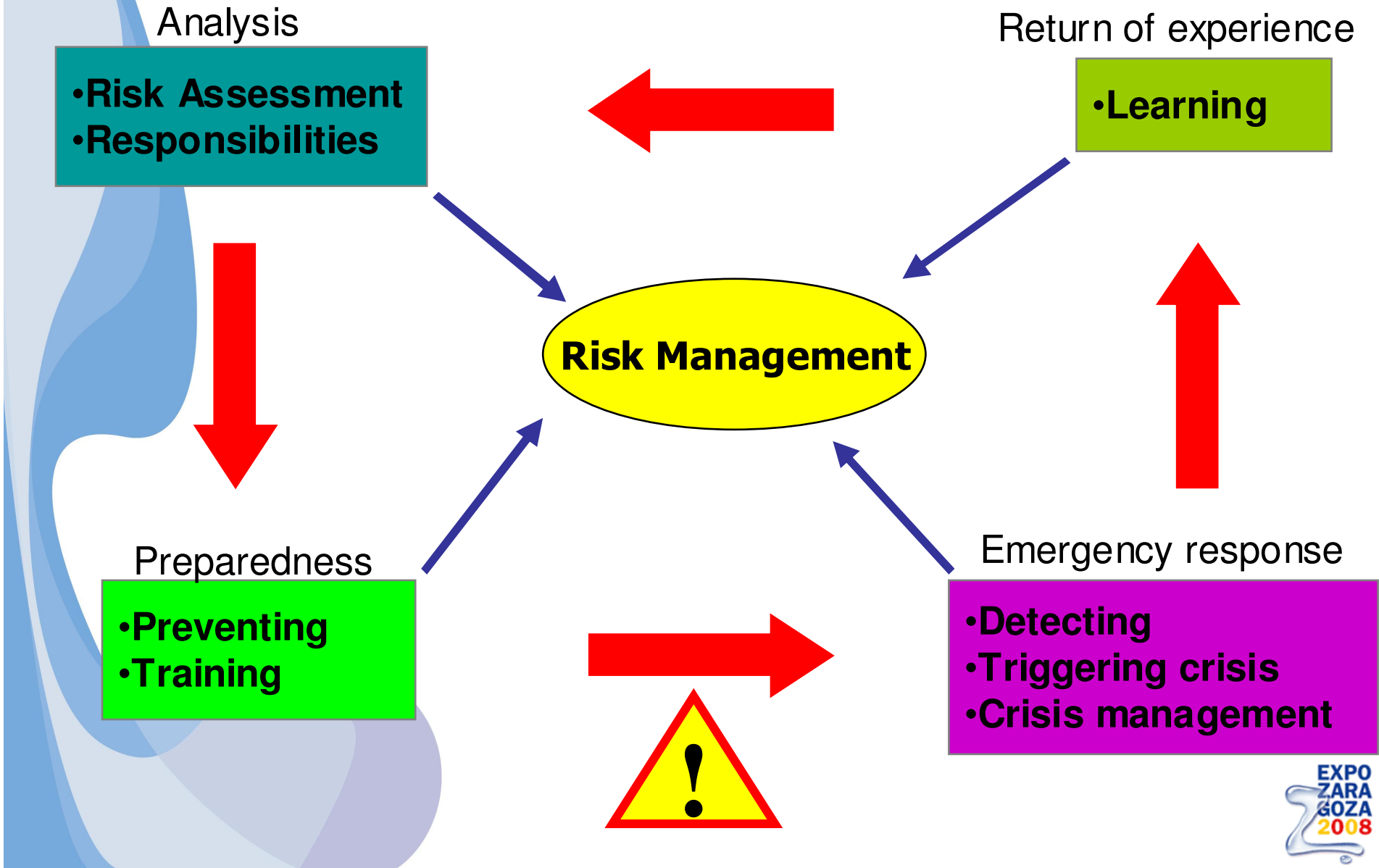


Active Security

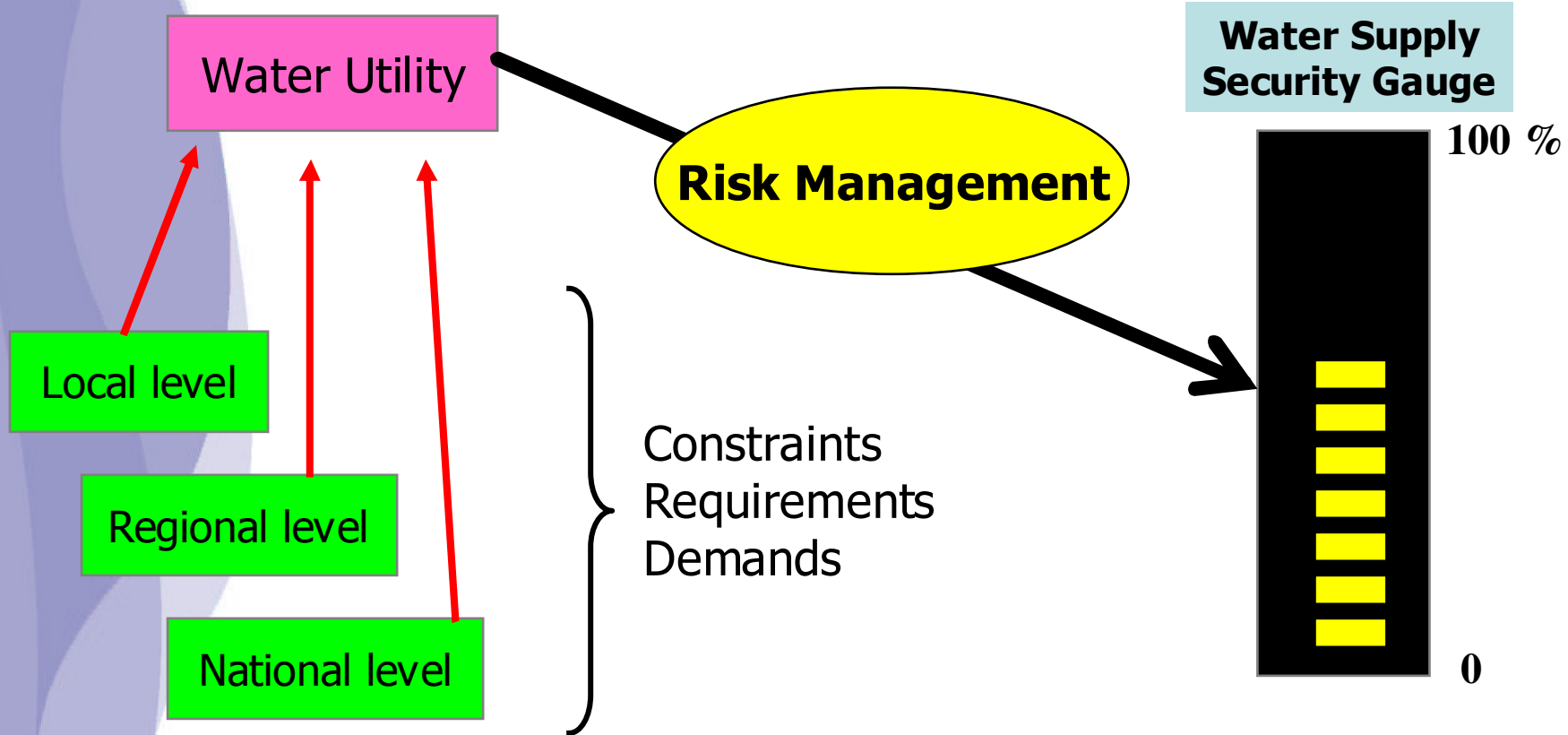
- depends on the people
- requires continuous training and motivation
- lesser cost
- adapted to unforeseen situations

Possible increase or decrease of security level depending on risk probability

THE RISK MANAGEMENT LOOP



RISK MANAGEMENT AND SECURITY LEVEL



Risk management never leads to 100% security or zero risks.
It just helps water suppliers to know at what level they are and if this level fits with their goals.

WATER SUPPLY TARGETED BY MALICIOUS ACTS

- Deliberate acts for deteriorating the level of service of the population's water supply are not a hypothetical vision of the mind.
 - These are real possibilities, not necessary linked to terrorism but to vandalism or revenge against the utility.
 - The protection of the infrastructure requires new skills that generally don't exist within the water utilities.
 - However, the development of new technologies will provide efficient tools at an affordable cost for the protection of our infrastructure.
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- “Guidelines for the Physical Security of Water Utilities”, American Society of Civil Engineers (ASCE) and the American Waterworks Association (AWWA), December 2006.
 - “Guidelines for the self-assessment of vulnerabilities of drinking water supply systems”, French Ministry of Health, March 2007.

SAFETY AND SECURITY OF SENSITIVE SITES (1)

Definition of a sensitive site

These are the facilities which because of their object or location represent a major node in the drinking water supply scheme for a single part or for the whole of the distribution system.

The « sensitivity » of a site raises with :

- the proximity to the consumer ;
- the open air situation of water volumes (service reservoirs) ;
- the concentration of large water volumes.

The main sensitive sites are the treatment plants, the service reservoirs, the lift pumping stations, the chlorine boosters, the control rooms in general...and the offices where restricted information is stored.

SAFETY AND SECURITY OF SENSITIVE SITES (2)

Assessing the seriousness of an incident

3 criteria for the assessment of a security incident:

- Operational criteria: does the facility still have the capacity of doing its purpose ?
- Analytical criteria: has the incident shown unseen weaknesses in the system ?
- Contextual criteria: is the incident isolated or aggravated with multiple occurrences ?

A minor defect qualified on the sole operational criteria could eventually be significantly rated at the end if the other criteria are used at the same time.

The good circulation of information is therefore essential

EXERCICES

- Exercises constitute an indispensable and essential factor in the preparation for crises.
- They make it possible to judge and subsequently improve the scheduled operational response in the face of critical situations.
- To assist the operators in the United States, USEPA is putting online kits for the carrying out of crisis exercises.
- Heightened awareness may on occasion emerge during these exercises.
- The exercises lessen the emotional load and stress of the agents when confronted in real life with already played situations.
- The human factor is at the same time often the weakest point but it also has a unique capacity for imagination and adaptation.

NATIONAL AND INTERNATIONAL COOPERATION

Cooperation in Water Security Management has a potential for improving the preparedness and response of utilities:

- experience sharing during conferences or working group meetings;
- mutual aid agreements for emergency water supply;
- definition of common best practices and standards.

The **W-Smart** group (Water Security Management Assessment Research & Technology) created after the 9-11 attack aims at providing a unique platform between large utilities for studying and sharing experience, concern and know-how on man-made threats.

The IWA Specialist Group on **Water Security and Safety Management** (W2SM).

Workgroup of experts (WG7) of the **ISO TC224** (services in DWS and WWS) to work on the area of “Crisis Management of Water Utilities”



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Thank you for your attention



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