

# Safe Drinking Water

## Will it be on tap during emergencies?

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# Outline

- Why be concerned?
- Identify the major threats to drinking water supplies
- Discuss the “routine” emergency response planning process
- Identify additional mitigation solutions during disaster situations
- Recognize restarting operations after a disaster is a slow and methodical process

# The risks

- Source water contamination
- Reduced supply
- Treatment system upsets
- Supply chain disruption
- Distribution system disruption and infrastructure access
- Operator incapacity

# The value of water

- Lack of access to water supplies can lead to death in a mere 3-5 days depending on conditions.
- Lack of food the body can survive much longer
  
- Haiti earthquake
  - 220,000 direct deaths due to quake
  - 300,000 cases of cholera, 5,000 deaths
- Hurricane Katrina
  - 1836 deaths
  - 1220 drinking water systems affected
    - 70% were off line for greater than 2 weeks (past electrical reconnection)

# Source water issues

- Landslide potential is problematic for some systems
- Intentional contamination is a plausible bioterrorist action
- non-intentional contamination (train derailment, truck spill) already occur
- Radiation on minds of many

# Reduced supply

- Surface water rechannelization (floods)
- Obstructive landslides
- Earthquake with aquifer disruption
- Obstruction in well, disruption of surface water diversion pathways, dam/berm breeches.

# Electrical disruption

- Most probable major upset.
- Expect as 'complication' of other disasters
- Backup electrical generation should be mandatory,
  - back-up generators have limitations

# Other treatment system failures

- Plant/Well flooding
- Integrity compromise – earthquake
- Chemical leak/explosion



# Supply system disruption

- Disinfection and other chemical requirements
- Replacement pieces and parts

# Distribution system and infrastructure disruption

- Pipeline integrity compromise (water main break)
- Access to compromised areas can be limited.
- Access to main infrastructure (treatment plant and reservoirs) can be limited

# Operator incapacity

- Any disaster impacts individuals and their families
- Operators are people too, and they have families. Their ability to respond to any disaster can be limited by personal situation.
- Events like pandemic influenza can impact multiple persons (aka operators) concurrently

# Emergency Response planning

- DWPA Section 10(a) ...the water supplier must have a written emergency response and contingency plan in accordance with the regulations, to be implemented in the event of an emergency or abnormal operational circumstances ...

# ERPs

- Step by step response. Includes phone numbers, whom to notify, how to respond to a variety of the most common upsets. Usually relatively standard
- Mechanism to handle unforeseeable emergencies – generally not well developed
- Emergency Program Act –
  - May work for systems owned by Local government
  - Shortcoming to systems not owned by local government

# BCERMS

- Standard BC approach to emergency response management.
- No current indication of how well prepared BC communities are for water system major upsets.

# Boil Water/Do Not Use

- Boiling water at point of use is a viable short term solution for system for microbiological risk reduction
  - 50-60% compliance
- Needs excellent communication system
- Do Not Use – requires an alternate source of safe drinking water

# The Good News

- Many systems have 2-7 days emergency water supply in storage. Water restrictions can extend this
- Gravity is your friend – many/most water systems are designed to maximize use for routine operation



# Restarting after a major disaster

- For damaged facilities, steps involved in restoring service include drying out and cleaning engines and pumps; testing and repairing waterlogged electrical systems; testing for toxic chemicals and harmful bacteria that may have infiltrated pipes and plants; restoring pressure (drinking water distribution systems); activating disinfection units; ... and cleaning, repairing, and flushing distribution ... lines.

- Congressional review of Hurricane Katrina

- Caution dictates the tempered and comprehensive assurance that system issues and contamination have been adequately addressed.
- Often a point of tension between operators, politicians and regulators.

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