



Water Infrastructure Protection

Dr. Peter W. Preuss ~ Dr. John J. Vandenberg ~ Dr. Abdel-Razak Kadry
National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Washington, DC

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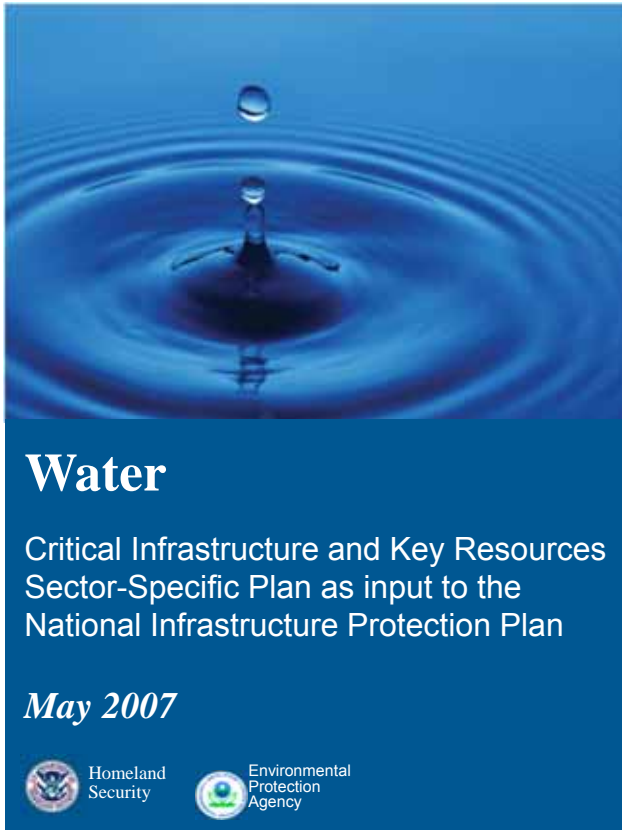




U.S. EPA's mission is to protect human health and the environment.

- This has been broadened to include responsibility for protecting the United States against the environmental and health consequences of terrorist acts.
- Established U.S. EPA's National Homeland Security Research Center (NHSRC) in September 2002
- Established Water Infrastructure Protection Division (WIPD) within NHSRC





- The new Department of Homeland Security (DHS) was established March 2003 and is made up of offices from 22 other government agencies.
- One of the mandates of DHS is water infrastructure protection.
- U.S. EPA has been designated the lead federal agency.
- In May 2007, DHS announced the completion of 17 **Sector-Specific Plans** (SSPs) in support of the National Infrastructure Protection Plan (NIPP).
- The NIPP outlines a comprehensive risk management framework that defines critical infrastructure protection **roles and responsibilities** for all levels of government and private industry.
- Each SSP is tailored to **unique risk characteristics of that sector** to promote greater consistency of protective programs and resources within the sectors.



Importance of Protecting Drinking Water Systems

- Drinking water is consumed directly; health effects associated with contamination have long been major concerns.
- Interruption or cessation of the drinking water supply can disrupt society, impacting human health and critical activities such as fire protection.
- General public correctly perceives drinking water as central to the life of an individual and of society.
- Consumers are highly sensitive to the threat of contamination or disruption.





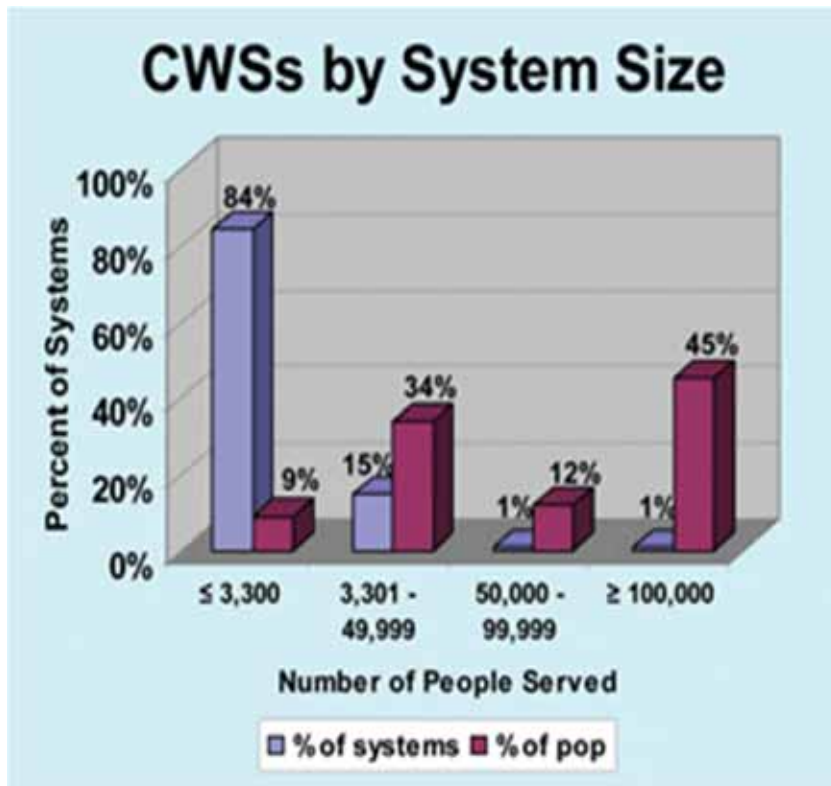
Importance of Protecting Drinking Water Systems

- There are approximately 160,000 public water systems (PWSs) in the United States, each of which regularly supplies drinking water to at least 25 persons or 15 service connections.
- 84% of the total U.S. population is served by PWSs, while the remainder is served primarily by private wells.
- PWSs are divided into community water systems (CWSs) and non-community water systems (NCWSs).
 - Examples of CWSs include municipal water systems that serve residential communities or mobile home parks.
 - Examples of NCWSs include schools, factories, and churches, commercial campgrounds, hotels, and restaurants.



Importance of Protecting Drinking Water Systems

- Community water systems serve by far the largest proportion of the U.S. population - 273 million out of a total population of 290 million (as of 2003).

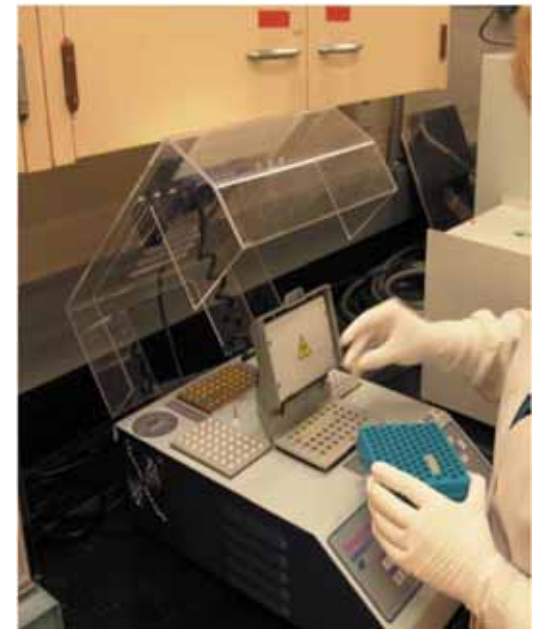


- 84% of the systems serve 3,300 persons or fewer and these systems provide drinking water to only 9% of the population served by CWSs.
- Systems that serve 3,301 persons or more, and are required to conduct vulnerability assessments under the Bioterrorism Act, provide drinking water to 91% of the population served by CWSs.



U.S. EPA Efforts Focused on Water Infrastructure Protection

- U.S. EPA conducts research and provides reports on ways to protect the nation's water infrastructure.
- U.S. EPA research addresses drinking water supply, water treatment, finished water storage, and drinking water distribution infrastructure.
- It also addresses wastewater treatment and collection infrastructure, including sanitary and storm sewers and combined sanitary/storm sewer systems, wastewater treatment, and treated wastewater discharges.



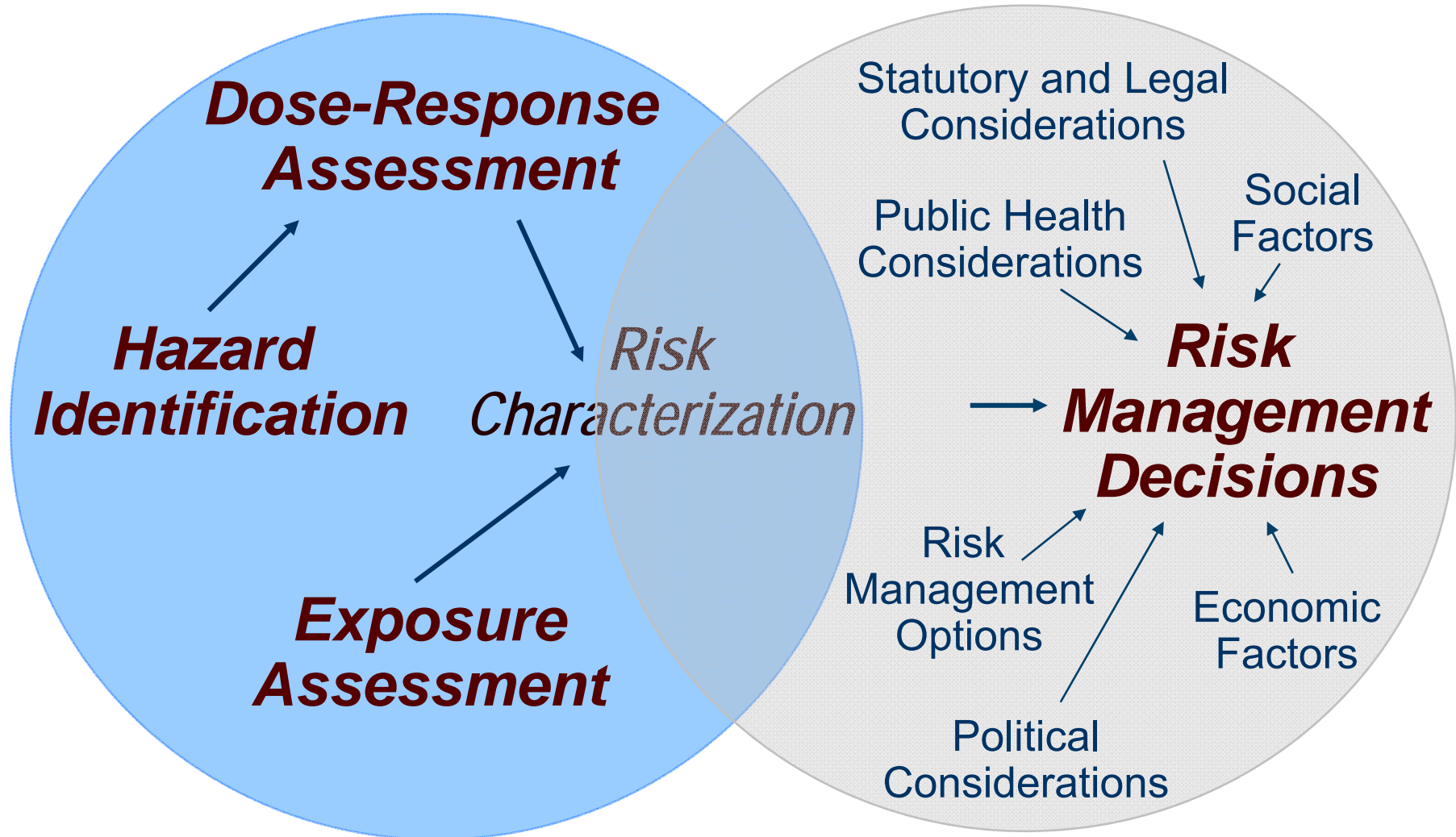


U.S. EPA Research Needs for Water Infrastructure Protection

- Protecting physical and cyber infrastructure
- Identifying drinking water contaminants
- Improving analytical methodologies and monitoring drinking water systems
- Containing, treating, decontaminating, and disposing of contaminated water and materials
- Planning for contingencies and addressing infrastructure interdependencies
- Protecting wastewater treatment and collection systems to ensure that all avenues were examined
- Identifying impacts on human health
- Informing the public about risks



Risk Assessment / Risk Management





CARVER + shock

What is CARVER + Shock?

- CARVER + Shock is an offensive targeting prioritization tool adapted from the military version (CARVER) for use in the food industry.
- Can be used to assess the vulnerabilities within a system or infrastructure to an attack.
- By conducting a CARVER + Shock assessment of a food production facility or process, the user can determine the most vulnerable points in their infrastructure, and focus resources on protecting the most susceptible points in their system.

www.cfsan.fda.gov

How Can CARVER + Shock Be Applied as a Food Defense Tool?

- CARVER + Shock method has been used to evaluate the potential vulnerabilities of farm-to-table supply chains of various food commodities, as well as individual facilities or processes.
- These evaluations are carried out during face-to-face meetings of representatives from a particular segment of the food processing industry and U.S. Government and State food safety agencies.
- Using a scale from one to ten for each of the seven CARVER + Shock attributes, the participants score the "target attractiveness" of each segment, or "node", on a process flow diagram of the commodity or facility being evaluated.



Human Health Chemical Risk Assessment

- Fundamental to U.S. EPA's approach to analysis of potential risk from exposure to environmental contaminants
- Essential for U.S. EPA regulatory decision-making
- Can be used to help address ***“criticality”***; measure public health impacts of an attack
- Evolving in the face of new understandings about uncertainty, mode of action, metabolism, susceptibility, etc.
- Addressing emerging science and new science challenges





U.S. EPA's Integrated Risk Information System

- IRIS provides qualitative and quantitative health effects information on over 540 substances
- Many high-profile, first applications of risk assessment guidelines and science policy
- Reference Dose (RfD)/Reference Concentration (RfC) for non-cancer effects
- Cancer risk: Hazard characterization, oral slope factors, and oral and inhalation unit risks
- Assessments are subjected to public review and comment and independent external peer review



Human Health Risk Assessment Tools

Integrated Risk Information System www.epa.gov/iris

Exposure Factors Handbook www.epa.gov/ncea

Child-Specific Exposure Factors Handbook (External Review Draft) www.epa.gov/ncea

A Framework for Assessing Health Risk of Environmental Exposures to Children (Final Report)

<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=158363>

Risk Assessment Guidelines www.epa.gov/raf

Guidelines for Carcinogen Risk Assessment

Guidelines for Chemical Mixtures Risk Assessment

Guidelines for Ecological Risk Assessment

Guidelines for Neurotoxicity Risk Assessment

Guidelines for Reproductive Toxicity Risk Assessment

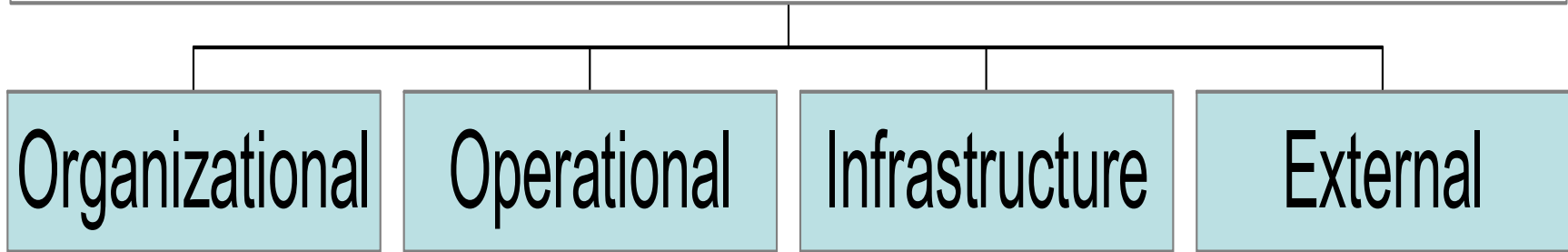
Guidelines for Exposure Assessment

Guidelines for Developmental Toxicity Risk Assessment

Guidelines for Mutagenicity Risk Assessment

Framework for Metals Risk Assessment www.epa.gov/raf

Active and Effective Water Security Programs



Organizational

- Water facilities should create an explicit, visible, easily communicated, enterprise-wide commitment to security
- Developing an enterprise-wide security policy, or set of policies.
- Water facilities should use the process of making a commitment to security as an opportunity to raise awareness of security throughout the organization
- Promote security awareness throughout the organization conducting employee training
- Making security a routine part of organization planning
- Identify managers and employees who are responsible for security and establish security expectations for all staff
- Explicit identification of security responsibilities is important for development of a security culture with accountability



Operational



- Assess vulnerabilities and periodically review and update vulnerability assessments.
- Basic elements of sound vulnerability assessments:
 - **Characterization of the water system, including its mission and objectives;**
 - **Identification and prioritization of adverse consequences to avoid;**
 - **Determination of critical assets that might be subject to malevolent acts that could result in undesired consequences;**
 - **Assessment of the likelihood (qualitative probability) of such malevolent acts from adversaries;**
 - **Evaluation of existing countermeasures; and**
 - **Analysis of current risk and development of a prioritized plan for risk reduction.**
- Identify security priorities; employ protocols for detection of contamination consistent with the recognized limitations in current contaminant detection, monitoring, and surveillance technology.

Infrastructure

- Establish physical and procedural controls to restrict access to utility infrastructure to only those conducting authorized, official business and to detect unauthorized physical intrusions.
- Water facilities should establish the means to readily identify all employees including contractors and temporary workers with unescorted access to facilities.
- Define security-sensitive information; establish physical, electronic, and procedural controls to restrict access to security-sensitive information; detect unauthorized access; and ensure information and communications systems will function during emergency response and recovery.



External



- Develop and implement strategies for regular, ongoing security-related communications with employees, response organizations, rate setting organizations, and customers.
- Effective communication strategies consider key messages; who is best equipped/trusted to deliver the key messages; the need for message consistency, particularly during an emergency; and the best mechanisms for delivering messages and for receiving information and feedback from key partners.
- The key audiences for communication strategies are: utility employees, response organizations, and customers
- Forge reliable and collaborative partnerships with the communities served, managers of critical interdependent infrastructure, response organizations, and other local Water facilities.



To create a sustainable effect, the sector as a whole must not only adopt and actively practice the features, but also incorporate the features into “business as usual.”





Products Available from U.S. EPA Related to Water Infrastructure Protection

- Methodologies and Tools for Conducting Vulnerability Assessments
- Risk Assessment Methodology for Water Utilities (RAM-WSM)
- Vulnerability Self Assessment Tool (VSAT™) — Version 3.1
- Interim Guidance and Voluntary Design Standards to Improve Security at Drinking



Products Available from U.S. EPA Related to Water Infrastructure Protection

- Response Protocol Toolbox
- Security Product Guides
- Environmental Laboratory Compendium
- Inactivation/Removal Capabilities of Treatment and Disinfections Technologies for Biological Contaminants
- Effectiveness of Chlorination on Vegetative and Spore Forms of Bacterial Bioterrorist Agents
- Environmental Technology Verification (ETV) Program, Water Supply, Point of Use, and Wastewater Treatment
- Wastewater Baseline Threat Document



Further Information on U.S. EPA's Water Security Program

<http://www.epa.gov/nhsrc/>

<http://cfpub.epa.gov/safewater/watersecurity/index.cfm?CFID=601225&CFTOKEN=36311788&jsessionid=b230fa79b06d5e263661TR>

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Thank you

*Peter W. Preuss, Ph.D., Director
National Center for Environmental Assessment (8601P)
Office of Research and Development
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460 USA*

Email: preuss.peter@epa.gov

www.epa.gov/ncea

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