Homeland Security Challenges Facing Small Water Systems in Texas

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The critical issue is to balance the need to inform residents of actual threats and steps they can take to protect drinking water and public health while at the same time not causing people to become afraid and panic.

Water systems of all sizes, including small systems, may be vulnerable to man-made and natural threats that can compromise normal operations and possibly pose health risks. Water systems must be concerned about contamination threats and incidents that have the potential to cause widespread panic among customers, harm public health and damage critical infrastructure. Contaminants that could be intentionally introduced to threaten the performance of water systems include pathogens (e.g., E. coli and polio virus), toxic metals, toxic organic compounds (e.g., ricin and pesticides) and radioactive materials.

The problem often stems from small water systems having insufficient staff that is adequately trained to deal with these crises. It's hard to have one member of a small staff concentrate on security concerns when that person also has to carry out daily maintenance, respond to customer complaints and perform endless additional tasks on a limited budget. It's also difficult for small systems to make their resources totally secure by installing fences and high-tech monitoring devices while having to keep the systems running smoothly.

A 2004 report by the National Infrastructure Advisory Council states that the security of water systems has the most immediate and pervasive impact upon the nation's health and welfare. The document cites data from federal agencies that suggests that terrorists have recently researched ways to attack water supplies, including physically destroying water systems, hacking into computers that control and monitor the operations of water systems, and disrupting and contaminating drinking water supplies.

Recognizing these problems, the United States Environmental Protection Agency (EPA) has funded Southeastern Technical Advisory Consortium (SE-TAC) to sponsor workshops to educate and train water system personnel about how to prepare for threats to water resources.

The Role of Federal Agencies

The most significant laws and regulations that affect how small water systems should respond to homeland security threats were passed in 2002 in the Public Health Security and Bioterrorism Preparedness and Response Act (Public Law 107-188). The legislation requires that community water systems must complete and submit vulnerability assessments. That same year, the President's National Strategy for Homeland Security was published. It establishes priorities and direction for securing the nation's water infrastructure.

In 2003 the federal government created a formal policy that listed water systems as one of 17 critical infrastructure areas that need to be protected from acts of terrorism. Known as Presidential Directive 7, it charges the Department of Homeland Security with developing a comprehensive plan to protect the nation's critical infrastructure, including water resources. It instructs the EPA to lead programs to protect drinking water and water treatment systems against terrorism.

Since that time, many federal agencies and water resources organizations have developed research, training and education programs to help water systems managers cope with these challenges. The EPA Office of Water includes a Water Security Division that was established in 2003 to provide leadership in developing and promoting programs that enhance the ability of water systems to prevent, detect, respond to and recover from terrorist attacks.

Within the Water Security Division, EPA created the National Homeland Security Research Center. The Center carries out research that helps water resources decision-makers prepare for, detect, contain and treat waters that have been intentionally contaminated. EPA's Water Infrastructure Protection Division publishes information and training materials to help water systems develop the capability to deal with potential terrorism acts and shares this information with the public.

The Federal Bureau of Investigation (FBI) is the lead law enforcement agency which acts on terrorism threats and incidents that can compromise the performance of water and wastewater infrastructure. To assist small water systems, the FBI has developed the Texas Coastal Region Advisory System. This is a web-based advisory system to spread advisories about homeland security threats as soon as they occur.

The EPA Region 6 staff in Dallas works with small water systems to develop voluntary assessments of the homeland security threats that they face. EPA provides assistance to small systems through education workshops and seminars, reports and guidelines, and tutorials on CD.

In 2005 EPA published the Water Security Action Plan, which outlines research needs to help water systems cope with possible terrorism challenges. The report recommends that EPA develop tools to inform water systems of the most likely threats and to provide advanced software to help guide them on how to conduct vulnerability assessments. The EPA

Response Protocol Toolbox (2004) describes a step-by-step process small water systems can use to best react to a homeland security incident. EPA now offers many of these tools and programs.

Texas Regulations and Programs

At the state level, the Office of the Governor leads initiatives pertaining to homeland security concerns that may affect water systems. One of them is the Division of Emergency Management, which reviews homeland security plans and provides training opportunities. The other initiative is the Texas Emergency Council, a network of 32 state agencies and organizations that advises the governor's office on emergency preparedness and disaster response.

Texas Senate Bill 9 established the Texas Homeland Security Council in 2004. It requires that public drinking water systems develop programs to protect critical infrastructure from terrorism incidents, natural disasters and accidents. SB 9 orders that small water systems notify law enforcement agencies and the Texas Commission on Environmental Quality (TCEQ) when incidents occur that may compromise water systems and critical infrastructure. It also mandates that vulnerability assessments and emergency response plans of small water systems be periodically reviewed.

The TCEQ Homeland Security Team assists with planning, developing, coordinating and implementing initiatives to detect, deter, respond to and recover from natural and man-made disasters. These initiatives include notifying drinking water systems, dam operators, refineries, petrochemical facilities and wastewater treatment plants of possible terrorism acts. TCEQ staff helps with planning, coordination and communication for homeland security preparedness.

The TCEQ Homeland Security Strike Team is comprised of highly trained environmental investigators who can offer specialized, long-term response capabilities to any region in Texas. The Strike Team provides personnel, equipment and expertise to respond to large-scale emergencies and natural disasters.

Responding to Homeland Security Threats

The EPA Water Security Handbook (2003) presents an overview of how water systems may be contaminated by natural and man-made sources. The following highlights of the publication include some recommendations:

- Each water system should designate the individual who will lead emergency response operations. Then, water systems should plan how they will respond to contamination threats and incidents. Each water system should develop guidelines about how it will deal with intentional contamination and how it will communicate that information to the public. Water systems should create a command structure that defines the roles of key personnel in these crises.
- Basically, a contamination threat is a suggestion or indication that water has been or will be contaminated. Examples of contamination threats are when suspicious containers have been left near a water treatment plant or when someone phones to express concern about a possible incident. Once a threat is received, water system personnel need to determine quickly if the threat is possible and credible. A contamination threat is *possible* if circumstances suggest that the event could occur. A *credible* threat is a risk that is believable, plausible and reliable. Consequently, a credible threat has the potential to be treated more seriously than a possible threat. On the other hand, a contamination incident occurs only after it is confirmed that water in one's system contains harmful levels of a pollutant that are greater than normal baseline conditions.
- After a threat is classified as being credible, water systems need to confirm the threat. Some ways to confirm a threat include sending water samples to laboratories and conducting additional sampling. Law enforcement agencies should be notified rapidly in cases where criminal activity may be involved.
- Throughout this process, it's especially important to consider how to communicate with the public through such tools as press releases, web sites and press confer-

ences. The critical issue is to balance the need to inform residents of actual threats and steps they can take to protect drinking water and public health while at the same time not causing people to become afraid and panic. Water systems should designate a spokesperson to communicate important information throughout the lifetime of a threat or incident. This individual should develop a public information plan before a crisis occurs, and announce and disseminate public health advisories during contamination threats and incidents. Results from a 2004 risk communication workshop developed by EPA suggest that water systems should work to build trust with customers and the public before a contamination event occurs by openly communicating with the public in a transparent and open framework, seeking public feedback and addressing customer concerns.

- Emergency response plans that are well organized and well practiced can significantly reduce the time needed to respond to contamination events and other emergencies. Research shows that there is often a lapse of nearly two weeks between the time a contaminant is reported and a water utility completes its response to such an incident. It also often takes 2 to 3 days to warn the public of contamination events. By improving risk communications, this response time can be reduced, thus better protecting the public from contamination threats.

- The final step is to remediate the water system by removing and inactivating contaminants that have been introduced. Then, the system can be restored to normal operating conditions.

Resources for Small Systems

Doing self-assessments is one of the most important exercises for small water systems to determine if improvements need to be made to provide better protection from terrorism acts. A 2006 EPA report suggests that many small water systems seem to be unaware of existing security related decision-making aids, including strategies to better communicate threats quickly.

The Association of State Drinking Water Administrators and the National Rural Water Association have published a guide to help small water systems identify homeland security threats. The publication provides users details on how to answer questions regarding such issues as the safety of water resources, restrictions to the public on entering sensitive areas and the security of computer systems. Similarly, the American Water Works Association and partnering agencies have developed a guide showing voluntary management, operations and design decision processes that can provide greater protection for water systems.

The following describes excellent helpful resources for small water systems from the Water Information Sharing and Analysis Center (Water ISAC) and the Water Security Channel (WSC):

- The Water ISAC is an internet-based system designed to notify drinking water and wastewater systems immediately about security threats and related developments mandated by Homeland Security guidelines issued in 2003. The system houses a comprehensive online library and delivers automatic updates about homeland security challenges facing water systems. The Water ISAC program has created tools to help system managers simulate a realistic terrorist attack. The goal is to help system personnel determine how prepared they are to respond to a homeland security crisis properly. By going to the Water ISAC web site, users can download and utilize a series of simple and advanced scenarios that EPA refers to as tabletop exercises.

- The WSC electronically disseminates bulletins and advisories from the EPA and the U.S. Department of Homeland Security. It also hosts a web-based library of federal security issues that can be accessed by water systems.

- Many of the Water ISAC and the WSC programs are free to small water systems.

Several resources exist to help small water systems immediately notify customers about homeland security incidents and natural disasters. The goal is to develop a climate where the public understands the critical need to look for terrorism threats and then quickly report them to the proper authorities.

One important tool is a handbook that EPA published in 2005. It provides hands-on advice about how small water systems can improve security practices, prepare for emergencies and communicate with customers when an incident occurs. It describes how water utilities can develop and implement a regional network of agencies that can share and disseminate timely information to the public.

EPA developed a guide in 2003 that focused on water security issues to help water systems prepare for and respond to drinking water contamination threats and incidents. Stakeholders can also share information regarding homeland security threats through the Water ISAC framework.

In 2006, a year after Hurricane Rita devastated much of southeast Texas, TCEQ established the Texas Water Agency Response Network (TxWARN). This group makes it easy to create a mechanism through which nearby utilities can provide assistance if other systems in their region are damaged by a homeland security incident or a natural disaster.

Several organizations are providing hands-on training to small water systems about how to deal with homeland security threats. After Hurricane Rita, the Community Resource Group worked on a 1-on-1 basis with small communities to bring water systems back online. The Texas Rural Water Association provides training and assistance to small water systems across Texas about homeland security and terrorism-related issues. Financial assistance for small systems seeking to better protect systems against terrorism threats may be available through the federal Department of Homeland Security, EPA and the Texas Water Development Board (TWDB) Drinking Water State Revolving Fund.

University Research and Outreach

Throughout Texas, universities are researching issues pertaining to homeland security. The Texas A&M University Integrative Center for Homeland Security coordinates research and graduate education programs on many topics, including terrorism concerns for water resources and other critical infrastructure. Graduate courses in homeland security-

related topics are offered online by the Center through the Bush School of Government and Public Service.

Texas Cooperative Extension (TCE) has formed an emergency task force to inform Texas residents when disasters strike. TCE is working with the National Extension Disaster Education Network to provide web-based information on topics related to man-made and natural disasters. This strengthens efforts by water systems and communities to be better prepared to cope with emergencies that may disrupt the operations of water systems.

Texas A&M University is developing graduate classes and certificates in homeland security education. The Integrative Center for Homeland Security facilitates research and education programs throughout The Texas A&M University System. The Center offers online courses that can lead to a professional certificate in such areas as critical infrastructure, terrorism and weapons of mass destruction. The Texas A&M University Board of Regents recently approved the development of undergraduate and graduate degree programs focusing on homeland security. Academic units across Texas A&M are now developing graduate classes on such areas as government programs related to homeland security, hazard mitigation, cybersecurity, public health and critical infrastructure protection related to water and wastewater systems.

The Texas Engineering Extension Service offers continuing education courses that cover such issues as an overview of terrorism, how to develop a vulnerability assessment, how to respond to a weapons of mass destruction event and how to recover from a terrorism attack. It offers the class "Public Works: Preparing for and Responding to a Terrorism Incident" at sites throughout Texas.

One area of research in the Texas A&M Civil Engineering Department is focusing on the extent to which terrorism acts and homeland security incidents can disrupt the water resources infrastructure needed for firefighting. The goal is to develop strategies to minimize these risks. Research results suggest that emergency public education plans need to be developed to make residents automatically aware of how to react quickly in these situations.

Summary

Although a lot of work has been done to help small water systems comply with homeland security regulations and protect their customers, challenges still remain. Some of the most important challenges include the need to develop and share more information on security issues; to develop new sources of funding to meet infrastructure challenges; and to provide more opportunities to train managers of small water systems charged with heading security efforts. However, universities, agencies and organizations throughout Texas are developing several promising programs that will help small water systems respond to these challenges.

For More Information

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Water Sector Security Workshops. 2006. Technical report R-06-47 published by the Environmental Protection Agency Office of Research and Development, Cincinnati, Ohio.

Web Sites

United States Environmental Protection Agency, Small Drinking Water Systems
http://www.epa.gov/safewater/smallsys.html

EPA Water Security Resources
http://www.epa.gove/watersecurity

Texas Coastal Regional Advisory System
http://www.tcras.org

The TEEX Domestic Preparedness Campus
http://www.teexwmdcampus.com

The Water Information Sharing and Analysis Center
http://www.waterisac.org

The Texas Emergency Disaster Education Network
http://eden.tamu.edu

The Texas A&M University Integrative Center for Homeland Security
http://homelandsecurity.tamu.edu

SE-TAC
Southeastern Regional Small Public Water Systems Technical Assistance Center

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