

An hourglass-shaped graphic with a globe inside. The top bulb is dark blue, and the bottom bulb is light blue. The globe is centered in the narrow neck of the hourglass. The top bulb has a dark blue cap, and the bottom bulb has a light blue cap. The globe is shown in a light blue color, with the continents visible. The hourglass is filled with a light blue liquid, with a single drop falling from the bottom bulb.

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*Safeguarding the Nation's Drinking Water: EPA and
Congressional Actions*

Mary Tiemann, Resources, Science and Industry Division

November 26, 2008

Abstract. Although EPA, states, localities, and water utilities have taken steps to address security concerns, the security of the nation's water supplies continues to attract congressional attention. Issues receiving attention have included the status of efforts by the water sector to improve security, whether to increase federal requirements, funding needs for water systems to make security improvements, the relative roles and responsibilities of EPA and DHS regarding the water sector, and the status of research and development of technologies to help water systems detect and address potential biological and chemical contaminants. This report reviews governmental and water utility efforts to improve drinking water security.

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CRS Report for Congress

Safeguarding the Nation's Drinking Water: EPA and Congressional Actions

Updated November 26, 2008

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Prepared for Members and
Committees of Congress

Safeguarding the Nation's Drinking Water: EPA and Congressional Actions

Summary

The events of September 11, 2001, focused heightened attention on the security status of the nation's drinking water supplies and the vulnerability of this critical infrastructure sector to attack. Congress since has enacted security requirements for public water systems and has provided funding for vulnerability assessments, emergency planning, and drinking water research. The Environmental Protection Agency (EPA), the lead federal agency for the water sector, has worked with water utilities, state and local governments, and federal agencies to improve the drinking water security.

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (P.L. 107-188) amended the Safe Drinking Water Act to require some 8,400 community water systems to assess vulnerabilities and prepare emergency response plans. It authorized funding for these activities and for emergency grants to states and utilities, and it directed EPA to review methods to prevent, detect, and respond to threats to water safety and infrastructure security. The act did not require water systems to make security upgrades to address potential vulnerabilities. Since FY2002, Congress has appropriated funds annually for EPA to work with states and the water sector to improve the security of drinking water supplies.

In the Homeland Security Act of 2002 (P.L. 107-296), Congress created a Department of Homeland Security (DHS) and gave the DHS responsibility for assessing and protecting the nation's critical infrastructures. However, the act did not transfer EPA's water security functions, and the 2003 Homeland Security Presidential Directive (HSPD-7) affirmed EPA's lead role in protecting the water infrastructure. Under this directive, EPA has responsibility for developing and providing tools and training on improving security to roughly 53,000 community water systems and 16,000 municipal wastewater treatment facilities.

In the 109th Congress, the Department of Homeland Security FY2007 appropriations act (P.L. 109-295) authorized the DHS to regulate for three years high-risk chemical facilities, but the law excluded from coverage drinking water and wastewater treatment facilities. In the 110th Congress, legislation was introduced bills, including a reported bill, S. 2145, proposed to expand water security requirements for certain high-risk water systems.

Although EPA, states, localities, and water utilities have taken steps to address security concerns, the security of the nation's water supplies continues to attract congressional attention. Issues receiving attention have included the status of efforts by the water sector to improve security, whether to increase federal requirements, funding needs for water systems to make security improvements, the relative roles and responsibilities of EPA and DHS regarding the water sector, and the status of research and development of technologies to help water systems detect and address potential biological and chemical contaminants. This report reviews governmental and water utility efforts to improve drinking water security.

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Safeguarding the Nation's Drinking Water: EPA and Congressional Actions

Background

Ensuring the security of the nations' drinking water supplies poses a substantial challenge, partly because the number of water systems is very large and also because the responsibility for protecting drinking water safety is shared among federal, state and local governments and utilities. Nationwide, there are some 158,000 public water systems, and these systems range greatly in size, serving from as few as 25 persons to more than 1 million persons. Roughly 53,000 of all public water systems are community water systems (CWSs) that serve the same residences year-round.¹ These 53,000 systems provide water to approximately 282 million people. Nearly 400 community systems serve more than 100,000 people and provide water to nearly half of the total population served. Because water supplies support many uses (from drinking water to fire suppression), their disruption could have significant impacts.²

A 1996 executive order on critical infrastructure protection (E. O. 13010), included water supply systems as one of eight national infrastructures vital to the security of the United States.³ In 1997, the President's Commission on Critical Infrastructure Protection, created by the executive order, issued a report on the vulnerabilities of these infrastructure sectors and strategies for protecting them. The Commission identified three attributes crucial to water supply users: water must be available on demand, it must be delivered at sufficient pressure, and it must be safe for use.⁴ Actions affecting any of these factors could be debilitating for the infrastructure and also for the communities that depend on it.

Major threats to water supplies include physical destruction of facilities or distribution systems, biological or chemical contamination of supplies, and cyber

¹ Another 19,174 public water systems are non-transient, non-community water systems (NTNCWS), such as schools or factories, that have their own water supply and generally serve the same individuals for more than six months but not year-round. More than 86,000 other public water systems are transient non-community water systems (TNCWS), such as campgrounds and gas stations, that provide their own water to transitory customers.

² For a broader review of security issues in the water resources sector (including dams and sewage treatment plants), see CRS Report RL32189, *Terrorism and Security Issues Facing the Water Infrastructure Sector*, by Claudia Copeland.

³ For a review of critical infrastructures, related security issues and protection initiatives, and activities within the Department of Homeland Security, see CRS Report RL30153, *Critical Infrastructures: Background, Policy, and Implementation*, by John D. Moteff.

⁴ The President's Commission on Critical Infrastructure Protection, *Critical Foundations: Protecting America's Infrastructures. Report of the President's Commission on Critical Infrastructure Protection*, Appendix A, Sector Summary Reports, October 1997, p. A-45.

attacks. The 1997 Commission found that drinking water systems had inadequate protection against the threat of chemical or biological contamination, and that technology was insufficient to allow detection, identification, measurement, and treatment of highly toxic, waterborne contaminants. Water utilities were also found to be vulnerable to cyber attacks as they rely increasingly on computers to control water flow and pressure. Information sharing was identified as the most immediate need, whereas warning and analytical capabilities and research and development all were found to be insufficient.

In response to these findings and related developments, President Clinton, in 1998, issued Presidential Decision Directive (PDD) 63 on critical infrastructure protection. Under this directive, a public/private partnership was established to put in place prevention, response, and recovery measures to ensure the security of the nation's critical infrastructures against criminal or terrorist attacks. PDD-63 designated the Environmental Protection Agency (EPA) as the lead federal agency for the water supply sector, and EPA appointed the Association of Metropolitan Water Agencies (AMWA) to coordinate the water sector. However, before September 11, 2001, the main focus of PDD-63 efforts for all critical infrastructure sectors was on cybersecurity. Subsequently, the breadth and depth of efforts to protect the nation's critical infrastructures have expanded significantly.

EPA Efforts To Increase Drinking Water Security

In 2003, President Bush issued Homeland Security Presidential Directive 7 (HPSD-7), which affirmed EPA as the lead federal agency for coordinating the protection of the nation's critical infrastructure for the water sector. Under this directive, EPA is responsible for developing and providing tools and training on improving security to roughly 53,000 community water systems and 16,000 municipal wastewater treatment facilities.

To carry out its water sector responsibilities, EPA established a Water Security Division within the Office of Ground Water and Drinking Water. This Division works with drinking water and wastewater utilities, states, tribes, and other stakeholders to improve the security of these utilities and improve their ability to respond to security threats and breaches. Among its responsibilities and activities, the Water Security Division provides security and antiterrorism-related technical assistance and training to the water sector. Although the Water Security Division was established in 2003, the Office of Water had provided assistance to its stakeholders for a number of years.

Security-related activities undertaken by EPA and the water sector have fallen into five general categories, including (1) establishing an information center for drinking water alerts or incidents, (2) developing vulnerability assessment tools, (3) identifying actions to minimize vulnerabilities, (4) revising emergency operations plans, and (5) supporting research on biological and chemical contaminants considered to be potential weapons of mass destruction. Several key government and private sector efforts are reviewed below.

Information Sharing and Analysis. One goal of PDD-63 in 1998 was to establish an Information Sharing and Analysis Center (ISAC) for each critical

infrastructure sector. With assistance from EPA and the Federal Bureau of Investigation, the Association of Metropolitan Water Agencies has led the effort to develop and implement an ISAC for water utilities. The WaterISAC provides a secure, Web-based communications link between the water sector and federal homeland security, law enforcement, intelligence, environmental, and public health agencies. This system gathers, analyzes, and disseminates threat information specific to the water sector, and is a comprehensive source of security and disaster preparedness information for drinking water and wastewater utilities.⁵ The WaterISAC is supported by membership fees and EPA grants. It has been supplemented with the Water Security Channel (WaterSC), which provides free email notification of water security alerts and other information issued by federal government agencies.

Tools and Technical Assistance. EPA has worked with its water sector partners to provide practical tools and technical assistance to utilities on a wide range of security matters. In 2000, the American Water Works Association Research Foundation (AWWARF) and the Sandia National Laboratories, with EPA support, initiated a project to develop a methodology for utilities to use to assess their vulnerabilities and develop plans to minimize identified risks. The project was expedited after September 11, 2001, and completed in November 2001, and many large water systems used this risk assessment methodology to conduct vulnerability assessments. States and drinking water organizations, in collaboration with EPA, developed additional vulnerability assessment tools, with a particular focus on the needs of smaller communities. To help cover the costs of conducting vulnerability assessments and preparing emergency response plans, EPA awarded a total of \$51 million in grants to community water systems that serve more than 100,000 persons.

While direct grants have not been available for smaller water systems, a considerable amount of technical assistance has been aimed at helping these systems, which typically may have less capacity to address security concerns. EPA has used “train-the-trainer” grants to build a pool of environmental professionals that has provided training and technical assistance to water systems serving fewer than 50,000 people.⁶ In addition, on-site assistance for vulnerability assessment and emergency response planning was made available to small and medium wastewater utilities at no cost through the Wastewater Operator Training Program.

Technical assistance also has been provided through numerous guidance documents designed to help water utilities address a range of security concerns.⁷ A key product is the *Response Protocol Toolbox: Planning for and Responding to*

⁵ For further information on the Water ISAC, see [<http://www.waterisac.org>].

⁶ EPA generally has not performed security training; rather, the agency has delivered training at locations across the country through stakeholder organizations and other federal partners. Organizations that have provided training include professional associations, such as the American Water Works Association, the Water Environment Federation, and the National Rural Water Association. Congress has provided some grant funds to these organizations, through EPA, to support their water security training activities.

⁷ Water security reports, guidance documents, directives, and information on EPA security activities are available at [<http://cfpub.epa.gov/safewater/watersecurity/index.cfm>].

Contamination Threats to Drinking Water Systems, which is intended to help public water systems respond to contamination threats and incidents. The “toolbox” includes separate modules that address water utility planning, contamination threat management, site characterization and investigation, water sample analysis, public health response, and remediation and recovery.⁸ Paralleling the toolbox, EPA developed response guidelines to help water utilities, emergency responders, and other officials during the management of an ongoing contamination threat or incident.

As a sector, drinking water utilities acted relatively quickly to assess vulnerabilities, upgrade emergency response plans, and take some initial steps to improve security of this critical infrastructure. The Office of Homeland Security’s 2003 *National Strategy for the Physical Protection of Critical Infrastructure and Key Assets* reported that the water sector had taken great strides to protect its critical facilities and systems, and had focused on categories of possible attacks that could have the greatest health or economic consequences.⁹ However, the report noted that the water sector needed better threat information to prioritize investments on security measures. It also reiterated the need for research and development of new monitoring and analytic capabilities to enhance detection of biological, chemical, and radiological contaminants that could be introduced to the water supply.

Research. EPA has participated in various research and development projects related to water security, including research to evaluate the ability of drinking water treatment systems to remove and inactivate biological and chemical agents. The agency also has supported research efforts to determine the fate and transport of contaminants within rivers and streams and within water treatment plants and distribution systems, and to develop biodetectors for detecting and quantifying biological contaminants in drinking water supplies.

To coordinate and oversee research involving prevention and response to terrorist attacks, EPA’s Office of Research and Development established the National Homeland Security Research Center (NHSRC) in 2002. The Center’s key areas of research involve water infrastructure protection, decontamination and consequence management, and threat and consequence assessment.

In 2004, the NHSRC’s Water Infrastructure Protection Division and the Office of Water’s Water Security Division developed a Water Security Research and Technical Support Action Plan to define a specific program of research and technical support for protecting drinking water and wastewater facilities from terrorist threats and attacks. The action plan, which was reviewed by the National Research Council

⁸ U.S. Environmental Protection Agency, *Response Protocol Toolbox: Planning for and Responding to Drinking Water Contamination Threats and Incidents*, August 2004. Available at [http://www.epa.gov/watersecurity/pubs/rptb_response_guidelines.pdf].

⁹ Office of Homeland Security, *The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets*, February 2003, p. 39. The categories included (1) physical damage or destruction of critical assets (including the intentional release of toxic chemicals), (2) actual or threatened contamination of the water supply, (3) cyber attack, and (4) interruption of services from another infrastructure (such as energy supply).

(NRC), addressed drinking water supply, water treatment, finished water storage, and distribution systems. It identified major research needs in the following areas:

- protecting physical and cyber infrastructure;
- identifying drinking water contaminants;
- improving monitoring systems and analytical methods for drinking water;
- containing, treating, decontaminating, and disposing of contaminated water and material;
- contingency planning;
- addressing infrastructure interdependencies;
- risk assessment and communication; and
- protecting wastewater treatment and collection systems.¹⁰

A key concern the NRC expressed regarding the action plan was that it did not discuss the financial resources that would be required to complete the proposed projects and to implement countermeasures needed to improve water security. The NRC recommended that EPA try to quantify the costs and benefits associated with the research and technical support projects. The NRC further noted that more emphasis was needed on communicating the value of water and increased security, because water rate increases would likely be needed to generate the resources needed to implement counter measures.¹¹

In a progress report on the action plan, EPA reported that more than 100 projects had been initiated to address the needs listed in the plan.¹² Projects have included a review of early warning systems, a tracer studies guide for use by water utilities, a treatability guide for biological contaminants in water, a review of emerging detection technologies for water contaminants, a review of the impacts of biological toxins on water systems, and performance verifications of the effectiveness of monitoring, treatment, and decontamination technologies. The Water Infrastructure Protection Division has lead responsibility for much of this research and has been producing tools, guides, and other products for use by water utility operators, public health officials, and emergency responders.

For several years, EPA's major water security research effort has involved the Water Security Initiative (formerly called the WaterSentinel Initiative), which is a demonstration project to develop a model contamination warning system for drinking water systems. The goal of the initiative is to establish pilot early warning systems through intensive water monitoring and surveillance in selected cities. As noted below, Congress has given partial support to the initiative. Using the resources available, EPA published interim guidance for the Water Security Initiative in May

¹⁰ U.S. Environmental Protection Agency, *EPA's Role In Water Security Research: The Water Security Research and Technical Support Action Plan*, EPA/600/R-04/063, March 2004.

¹¹ National Academy of Sciences, *A Review of the EPA Water Security Research and Technical Support Action Plan: Parts I and II*, National Academy Press, 2003.

¹² U.S. Environmental Protection Agency, *Water Security Research and Technical Support Action Plan — Progress Report for 2005*, p. 5-7.

2007, and established the first contaminant warning system pilot in July 2007. The agency plans to award grants for additional pilot projects in March 2008.

Funding for Drinking Water Security Activities

Since 2001, Congress has provided funds annually to EPA to improve the security of public water supplies. The *Emergency Supplemental Appropriations Act for FY2002* (P.L. 107-117) provided EPA with \$175.6 million for emergency expenses to respond to the September 11 attacks and to support counterterrorism activities. The accompanying conference report, H.Rept. 107-350, specified that approximately \$90 million was for improving security at EPA laboratories, performing drinking water vulnerability assessments, and anthrax decontamination activities. Another \$5 million was for state grants for counterterrorism coordinators to work with EPA and water utilities in assessing drinking water safety. Congress has continued to provide roughly \$5 million for these state grants each year.

During **FY2002**, EPA allocated roughly \$89 million of the amount provided in the emergency supplemental appropriation to support security enhancements at the nation's drinking water systems. Of this amount, EPA targeted approximately \$80 million to: (1) provide grants to the largest drinking water systems to conduct vulnerability assessments and enhance emergency response plans; (2) provide technical assistance on vulnerability assessments and emergency response plans to small and medium drinking water systems; and (3) refine security-related detection, monitoring, and treatment tools. Another \$4 million was used to accelerate the development and testing of counterterrorism tools, support vulnerability assessment training, provide technical assistance, and conduct and implement research on redesign and detection for collection and treatment systems. EPA also used funds to develop tools and provide training for medium and small drinking water systems to assess vulnerabilities and develop emergency response plans. In addition, EPA allocated \$5 million to the states to support homeland security coordination work involving EPA and drinking water utilities.

EPA awarded approximately \$51 million in water security grants to the community water systems that serve more than 100,000 individuals. Grants were made to roughly 400 publicly and privately owned community water systems for as much as \$115,000 per grant. Utilities were able to use their grants to develop vulnerability assessments, emergency response plans, and security enhancement plans and designs. Utilities also could use grant funds for in-house or contractor support; however, funds could not be used for physical improvements.

Although these grants were made only to large systems, EPA has worked with states and utilities to help meet the security needs of small and medium-sized drinking water systems. EPA provided roughly \$20 million of FY2002 supplemental funds directly to the states for technical assistance and training for drinking water systems serving fewer than 100,000 people.

For **FY2003**, EPA requested \$16.9 million to assist small and medium-sized systems with vulnerability assessments and emergency response plans, and \$5 million in grants to states to support homeland security coordination. The Consolidated Appropriations Resolution for FY2003 (P.L. 108-7), provided this

amount. It also contained several drinking water security earmarks, including \$2 million for the National Rural Water Association to help small water systems conduct vulnerability assessments and \$1 million for the American Water Works Association for water security training activities.

As requested for **FY2004**, EPA received approximately \$32 million for critical water infrastructure protection, including \$5 million for state homeland security grants in P.L. 108-199. This funding supported states' efforts to work with water and wastewater systems to develop and enhance emergency operations plans; conduct training in the implementation of remedial plans in small systems; and develop detection, monitoring and treatment technology to enhance water security. EPA used funds to assist the nearly 8,000 community water systems that serve water to populations between 3,300 and 100,000 and are subject to the Bioterrorism Act. P.L. 108-199 also included \$2 million for the Water ISAC to gather, analyze and disseminate sensitive security information to water and wastewater systems.

For **FY2005**, EPA requested \$5 million for state water security grants and \$6.1 million for other critical infrastructure protection efforts. EPA's budget justification explained that the \$21.3 million reduction reflected a shift in priorities from assistance and training on vulnerability assessments. (Under the Bioterrorism Act, community water systems were required to complete vulnerability assessments by June 30, 2004.) Congress provided the requested amount in the Consolidated Appropriations Act, FY2005 (P.L. 108-447). As in FY2004, the appropriated amount included \$2 million for the Water ISAC.

In the **FY2006** budget request, the President again requested \$5 million for state water security grants. The President also requested \$44 million to launch the Water Sentinel Initiative, a demonstration project to develop a model contamination warning system, now called the Water Security Initiative. EPA initiated this project to meet its responsibilities under Homeland Security Presidential Directive (HSPD) 9, which directed EPA to develop a surveillance and monitoring program to provide early detection in the event of a terrorist attack contaminating water. The goal of the initiative is to establish pilot early warning systems through intensive water monitoring and surveillance for certain chemical and biological contaminants in five cities. Further responding to HSPD-9, EPA proposed to form a laboratory network to support the monitoring and response requirements of the surveillance program.¹³

In EPA's FY2006 appropriations act (P.L. 109-54), Congress provided \$8.1 million (after rescissions) of the \$44 million requested for the Water Security Initiative. In recommending a large reduction, the House Appropriations Committee recommended that EPA develop clear goals for the initiative, seek the advice of the Science Advisory Board, and justify the request more clearly in the budget request

¹³ U.S. Environmental Protection Agency, *FY2006 Annual Performance Plan and Congressional Justification*, Science and Technology, Homeland Security: Critical Infrastructure Protection, pp. S&T-21 - S&T-23.

for FY2007.¹⁴ Congress also provided \$5 million (\$4.93 after rescissions) for state water security grants.

The **FY2007** budget request included \$4.95 million for state water security grants. Additionally, the request again included a significant amount, \$41.7 million (\$33.6 million more than Congress provided for FY2006), for the Water Security Initiative (WSI). In its justification for the request, the agency noted that the program is an essential component of its water security activities, and explained that its purpose is to demonstrate an effective contamination warning system that could be used by drinking water utilities of various sizes.

The EPA FY2007 funding bill, H.R. 5386, as passed by the House, would have provided \$16.7 million (or \$25 million less than requested) for the WSI. The Senate Appropriations Committee (S.Rept. 109-275) recommended \$18.13 million, which was \$23.6 million less than requested but \$10 million above the FY2006 enacted level. The House Appropriations Committee report for H.R. 5386 (H.Rept. 109-465) stated that the committee's recommended funding level for the initiative included money for one additional WSI pilot project, which should be located in a metropolitan area that is highly vulnerable from a homeland security threat perspective. Congress did not complete action on this appropriations bill. The final continuing appropriations resolution for FY2007 (P.L. 110-5, H.J.Res. 20) generally funded EPA at the FY2006 level, but EPA used its discretion and allocated \$27 million for the Water Security Initiative.

For **FY2008**, EPA requested \$25.6 million to support its water sector responsibilities to protect critical water infrastructure, including \$21.88 million for the WSI. The agency proposed to use the requested funds to support the existing pilot and to establish additional pilots, with a goal of having all planned pilots under way by 2008. EPA also proposed to continue providing special assistance to high-priority drinking water systems under the Water Alliance for Threat Reduction program. The goal of this assistance is to ensure that water utilities have tools and information to prevent, detect, respond to, and recover from terrorist attacks, other intentional acts, and natural disasters. The request again included \$4.95 million for state water security grants.

The House approved EPA's appropriations bill for FY2008, H.R. 2643 in June 2007. The committee report for H.R. 2643 (H.Rept. 110-187, p. 98) recommended reducing the amount requested for the WSI by \$3.88 million. The House Appropriations Committee explained that late action on the 2007 budget had delayed the obligation of funds for pilot projects until FY2008. In the Senate, the Appropriations Committee recommended a \$10 million decrease for the initiative (S. 1696, S.Rept. 110-91, p. 52), also noting that EPA plans to carry forward a large balance of unobligated funds. Both the House and Senate committees urged EPA to be prepared to report to the committees on the status and accomplishments of the WSI pilot projects. After applying the 1.56% rescission, the Consolidated

¹⁴ U.S. Congress, House Committee on Appropriations, *Department of the Interior, Environment, and Related Agencies Appropriation Bill, 2006*, report to accompany H.R. 2361, 109th Cong., 1st sess., H.Rept. 109-80, p. 94.

Appropriations Act for FY2008 (P.L. 110-161) provided \$11.7 million for the WSI and \$4.87 million for state grants.

For **FY2009**, EPA requested \$21.4 million for the Water Security Initiative, \$1.3 million for the Water Alliance for Threat Reduction, and \$4.9 million for state grants. EPA proposed to use WSI funds to support two more pilots, for a cumulative total of five pilots. Additionally, EPA planned to continue working with sector partners to establish the Water Laboratory Alliance (WLA). The alliance would provide a network of laboratories that would be able to help confirm and speed responses to intentional contamination events. EPA further proposed to use FY2009 funds to continue to support research to develop methods to detect chemical and biological contaminants and to evaluate event detection software. The agency estimated that 90% of high-concern contaminants lack validated analytical methods.¹⁵ Congress did not pass specific EPA appropriations; rather, the consolidated appropriations act for FY2009 (P.L. 110-329) generally extended funding for federal programs at FY2008 levels through March 6, 2009.

Thus far, Congress has not provided funding in EPA appropriations for grants to public water systems specifically for making security improvements. However, EPA has identified numerous security measures that are eligible for funding through the Drinking Water State Revolving Fund (DWSRF) program.¹⁶ Eligible measures include making facility improvements, such as adding fencing, cameras, and lighting; securing chemical and fuel storage; hiring guards; and adopting enhanced filtration and disinfection treatment. Congress has provided approximately \$840 million annually for this program in recent years. However, it is uncertain how readily funds might become available for security measures, as the key purpose of the DWSRF is to facilitate compliance with federal drinking water regulations, and competition for these funds can be considerable.

Another potential source of funding for community water systems is the State Homeland Security Grant Program, administered by the Department of Homeland Security (DHS). Congress provided \$525 million for FY2007 and \$950 million for FY2008 for this program, which provides assistance to states to detect, prevent, and respond to terrorist attacks. States are required to allocate 80% of the grant funds received under this program to localities, in accordance with their approved homeland security plans. Funds may be used for homeland security-related training and for protecting critical infrastructure, including making physical security improvements. Local public works agencies, including water districts, are eligible to receive funding from the state; however, most of these funds have been used to support first responders.¹⁷

¹⁵ U.S. Environmental Protection Agency, *FY2009 Annual Performance Plan and Congressional Justification*, Science and Technology, Homeland Security: Critical Infrastructure Protection, p. 70.

¹⁶ See EPA Fact Sheet, *Use of the Drinking Water State Revolving Fund (DWSRF) to Implement Security Measures at Public Water Systems*, EPA 816-F-02-040, November 2001. Available at [<http://www.epa.gov/safewater/dwsrf/pdfs/security-fs.pdf>].

¹⁷ For information on DHS grant programs, see CRS Report RL32348, *Selected Federal* (continued...)

Bioterrorism Preparedness and Response Act of 2002

In 2002, two major laws were enacted that address the security of the nation's critical infrastructure. While the Homeland Security Act of 2002 broadly addressed critical infrastructure protection, the Bioterrorism Preparedness and Response Act of 2002 specifically aimed at improving the security of drinking water supplies.

Title IV of the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (P.L. 107-188, 42 U.S.C. 300i) amended the Safe Drinking Water Act (SDWA) to require community water systems serving more than 3,300 individuals to conduct an assessment of their system's vulnerability to terrorist attacks or other intentional acts to disrupt the provision of a safe and reliable drinking water supply. These water utilities were required to certify that they had conducted a vulnerability assessment and to submit a copy of the assessment to EPA. The act also required the utilities to prepare or revise emergency response plans incorporating the results of the vulnerability assessments no later than six months after completing them. (**Table 1** outlines the schedule for the roughly 8,400 water systems that were required to submit vulnerability assessments to EPA and complete emergency response plans.) As required, EPA issued guidance on conducting vulnerability assessments, preparing emergency response plans, and addressing threats to assist smaller water systems that were not covered by the Bioterrorism Act.¹⁸ EPA reports that the large- and medium-sized water systems achieved 100% compliance with the act's requirements, while smaller systems achieved nearly 100% compliance.

Table 1. Community Water System Requirements under the Bioterrorism Act

System size by population served (est. no. of systems)	Date for completing vulnerability assessments	Date for completing emergency response plans
100,000 or more (approx. 400)	March 31, 2003	September 30, 2003
50,000 - 99,999 (approx. 460)	December 31, 2003	June 30, 2004
3,301 - 49,999 (approx. 7,500)	June 30, 2004	December 31, 2004

The act exempted the contents of the vulnerability assessments from disclosure under the Freedom of Information Act (except for information contained in the

¹⁷ (...continued)

Homeland Security Assistance Programs: A Summary, by Shawn Reese; and CRS Report RL34181, *Distribution of Homeland Security Grants in FY2007 and P.L. 110-53, Implementing Recommendations of the 9/11 Commission Act*, by Steven Maguire and Shawn Reese.

¹⁸ EPA published *Water Security Strategy for Systems Serving Populations Less than 100,000/15MGD or Less* (July 2002).

certification that identified the system and the date of the certification). As required by the Bioterrorism Act, EPA developed protocols to protect the vulnerability assessments from unauthorized disclosure. The act provides for civil and criminal penalties for inappropriate disclosure of information by government officials.

The Bioterrorism Act authorized \$160 million for FY2002, and such sums as may be necessary for FY2003-FY2005, to provide financial assistance to community water systems to conduct vulnerability assessments, to prepare response plans, and for expenses and contracts to address basic security enhancements and significant threats. (Security enhancements could include purchase and installation of intruder detection equipment and lighting, enhancing security of automated systems, personnel training and security screening of employees or contractors, etc. Funding could not be used for personnel costs, plant operations, monitoring or maintenance.)

For grants to states and water systems to assist in responding to emergency situations, the act authorized \$35 million for FY2002, and such sums as may be necessary thereafter. Finally, the act authorized \$15 million for FY2002, and such sums as may be necessary for FY2003 through FY2005, for EPA to review methods by which terrorists or others could disrupt the provision of safe water supplies, and methods for preventing, detecting, and responding to such disruptions.

EPA and DHS Water Infrastructure Security Roles

The *Homeland Security Act of 2002* (P.L. 107-296) combined the functions of all or parts of 22 federal agencies and departments into a new Department of Homeland Security (DHS). The act gave key responsibility for critical infrastructure protection to the DHS, but did not transfer EPA water security functions to the new department.¹⁹

With the establishment of DHS, which has overall responsibility for critical infrastructure vulnerability assessment and protection, the relative roles and responsibilities of EPA and DHS were not clear. In late 2003, the White House issued Homeland Security Presidential Directive 7 (HSPD-7), which superseded PDD-63. This Directive established national policy and outlined the roles and responsibilities of federal departments and agencies regarding critical infrastructure protection. It identified EPA as the federal agency (Sector-Specific Agency (SSA)) with lead responsibilities for ensuring the protection of the water infrastructure sector from terrorist attacks or sabotage. Under HSPD-7, DHS is responsible for overall coordination and integration of national critical infrastructure protection efforts by federal, state, and local governments and the private sector, whereas EPA is responsible for developing and providing water security tools and training for the nation's community water systems and municipal wastewater treatment facilities.

Some additional articulation of EPA's role was provided by HSPD-9, which established a national policy to defend the nation's water, agriculture, and food

¹⁹ For a review of DHS reorganization actions related to critical infrastructure protection, see CRS Report RL30153, *Critical Infrastructures: Background, Policy, and Implementation*, by John D. Moteff.

systems against terrorist attacks, major disasters, and other emergencies. This directive instructed EPA to develop a comprehensive surveillance and monitoring program to provide early detection of contaminants in water systems. HSPD-9 also directed EPA to develop an integrated network of water quality laboratories to support the surveillance program. EPA has pursued these responsibilities through its Water Security Initiative and Water Alliance for Threat Reduction program.

As both EPA and DHS have responsibilities for protecting critical water infrastructure, the potential for overlap and duplication is perhaps unavoidable. EPA and DHS, for example, have separate communications and information-sharing networks, and have had different policy advisory groups. In recognition of the need for a coordinating entity for the water sector, the major drinking water and wastewater organizations established the Water Sector Coordinating Council (WSCC) in 2004. This council is associated primarily with DHS, but coordinates with both agencies. In 2005, EPA and DHS facilitated the formation of a parallel Water Sector Government Coordinating Council (GCC) to enable interagency and cross-jurisdictional coordination. Members include DHS, EPA, the U.S. Army Corps of Engineers, the Bureau of Reclamation, the Federal Energy Regulatory Commission, the Centers for Disease Control and Prevention, state water and wastewater associations, and others. Chaired by EPA and co-chaired by DHS, the GCC coordinates strategies, activities, policies, and communication across government entities. The WSCC and GCC work together to coordinate critical infrastructure protection activities within the water sector.

A key requirement for DHS under HSPD-7 was to develop a national strategy to protect all critical infrastructure and key resources (CI/KR). In June 2006, DHS issued the National Infrastructure Protection Plan (NIPP). The NIPP is intended to provide a unifying structure for integrating CI/KR protection efforts into one national program. More specifically, it describes processes for 1) setting security goals; 2) identifying key assets; 3) assessing risks; 4) prioritizing assets as a basis for allocating resources; 5) implementing protection programs; and 6) measuring the effectiveness of CI/KR protection efforts.²⁰

The NIPP called for each sector's lead agency to work with its sector to develop Sector Specific Plans (SSPs) consistent with the NIPP. All 17 SSPs were released in May 2007, and EPA's Water SSP is one of seven plans that are publicly available.²¹ Taken together, the NIPP and the SSP are intended to provide the structure necessary to coordinate and synchronize activities under various laws, presidential directives, strategies, and initiatives into a unified national approach to protecting critical infrastructure. The goal of the Water SSP is to develop the sector's strategy and programs to protect CI/KR assets, identify priorities based on risk analysis, describe the resources needed to protect CI/KR, track progress, identify gaps, establish research and development priorities, and work with DHS to continuously improve the NIPP. The SSP also helps define the roles and responsibilities of EPA (as the Water Sector SSA) and other sector partners. Overall,

²⁰ The NIPP can be found at [http://www.dhs.gov/xprevprot/programs/editorial_0827.shtm].

²¹ The Water Sector-Specific Plan is available online at [http://www.epa.gov/safewater/watersecurity/pubs/plan_security_watersectorspecificplan.pdf].

the Water SSP is intended to assist drinking water and wastewater utilities to be better prepared to prevent, detect, respond to, and recover from terrorist attacks, other intentional acts, natural disasters, and other hazards. The plan's overarching goals are to 1) sustain protection of public health and the environment; 2) recognize and reduce risks in the water sector; 3) maintain a resilient infrastructure; and 4) increase communication, outreach, and public confidence.

Issues and Legislation

The 110th Congress considered several bills addressing the security of public water supplies, but legislation was not enacted. A key water sector issue has involved the status and adequacy of public and private efforts to improve the security of public water systems. Because of actions on the part of drinking water utilities, EPA, and the Congress, vulnerability assessment and planning efforts in the water sector have proceeded more rapidly than those in certain other sectors (such as chemical facilities); however, it is unclear how much has been done within the sector to implement security upgrades. Although the Bioterrorism Preparedness and Response Act required community water systems to conduct vulnerability assessments and prepare emergency response plans, it did not require systems to make security upgrades to address any identified vulnerabilities.²²

Chemical Facility Security. An issue relevant to the water sector that has received significant legislative attention for several years involves the security of chemical facilities, including certain water utilities that are located where a terrorist attack could cause harm to nearby populations. For water utilities, the primary concern is the onsite storage hazardous, gaseous chemicals (such as chlorine) that pose potential risks to local communities if released.

The 109th Congress. Several bills in the 109th Congress targeted such high-consequence facilities within the water sector. S. 2855 proposed to amend SDWA to require community water systems to replace hazardous, gaseous chemicals with inherently safer technologies (IST), for example, switching from the use of chlorine gas to liquid chlorine). S. 2855 also would have required EPA to provide grants to high-consequence facilities for use in paying capital expenditures needed to make the transition to the use of IST. S. 2781 and S. 1995 proposed to amend the Clean Water Act to address security at wastewater treatment facilities.

The Senate Committee on Environment and Public Works reported a wastewater treatment facilities bill, S. 2781 (S.Rept. 109-345), which did not contain IST requirements but did authorize grants to wastewater treatment facilities for security-related efforts, including conducting vulnerability assessments, preparing

²² SDWA §1433(b) states that emergency response plans “shall include, but not be limited to, plans, procedures, and identification of equipment that can be implemented or utilized in the event of a terrorist or other intentional attack on the public water system. The emergency response plan shall also include actions, procedures, and identification of equipment which can obviate or significantly lessen the impact of terrorist attacks or other intentional actions on the public health and the safety and supply of drinking water provided to communities and individuals.” (42 U.S.C. 300i-2)

site security plans, and making security upgrades. An identical bill was offered in the 110th Congress (S. 1303).

Broader chemical facility security bills also were offered in the 109th Congress that had implications for water utilities. These bills generally would have authorized the Secretary of the Department of Homeland Security to regulate chemical facilities, including water treatment plants, that pose certain risks. S. 2145, as reported by the Senate Homeland Security and Governmental Affairs Committee (S.Rept. 109-332), and its companion bill, H.R. 4999, would have directed the Secretary of DHS to issue rules designating which chemical facilities would be subject to regulation, and establish security performance standards such facilities. Under these bills, facilities would have been required to submit to the DHS vulnerability assessments, security plans, and emergency response plans for terrorist incidents. H.R. 5695 (H.Rept. 109-707) shared several similarities with S. 2145 but would have exempted water facilities covered by the legislation from redundant requirements (such as conducting vulnerability assessments), unless the DHS determined that more stringent security requirements were needed. S. 2486 proposed to cover a wider range of facilities and establish a general duty to ensure that facilities would be designed, operated, and maintained in safe manner; the bill defined this obligation to include use of inherently safer technology to the maximum extent practicable. H.R. 1562 would have required consultation between DHS and EPA, and would have imposed stronger security and emergency planning measures, rather than requiring changes in technology. H.R. 2237 would have expanded EPA's existing authority to oversee chemical facilities but would have required consultation with DHS.

Several local government and water organizations, including the American Water Works Association (AWWA), sought exemptions from S. 2145 and other bills that proposed to give the DHS authority to regulate water utilities that use hazardous chemicals (such as chlorine gas). These stakeholders argued that EPA already has an established water security program and has been designated the lead agency for water infrastructure security. In general, the AWWA has opposed legislation that would require water utilities to switch treatment processes without considering specific utility circumstances and local water and climate characteristics. Others have argued that mandating the adoption of safer technologies is warranted because of the potential risk that hazardous chemicals, particularly gaseous chlorine, may pose to communities.

The 109th Congress included a chemical facility security provision in the DHS FY2007 appropriations act (P.L. 109-295, Section 550). The provision authorized the department to regulate, for three years, high-risk chemical facilities, *excluding* drinking water and wastewater treatment facilities and facilities in ports. The act directed DHS to establish risk-based security performance standards for designated chemical facilities, and to require these facilities to prepare vulnerability assessments and security plans.

To implement this provision, the DHS promulgated regulations in June 2007 that established Chemical Facility Anti-Terrorism Standards (CFATS). These standards require chemical facilities to report the amounts and types of chemicals on site so that DHS can determine whether a facility will be further regulated by CFATS rules. Regulated facilities are placed into one of four tiers, based on risk and

performance. The facilities placed in the highest-risk tier will be subject to the most stringent security required. Pursuant to P.L. 109-295, the CFATS regulations will sunset in October 2009.

The 110th Congress. Because of the scope and time limitation of the Department's authority to regulate chemical facilities, as well as implementation issues, chemical facility security remained on the congressional agenda. In particular, the interim final rule issued by DHS stated that it might preempt future state and local chemical facility security regulations. In response to this preemption language, the 110th Congress amended P.L. 109-295 in the Consolidated Appropriations Act, 2008 (P.L. 110-161) to establish a state's right to promulgate chemical facility security regulations that are at least as stringent as the federal chemical facility security regulations. P.L. 110-161 further provided that state regulations would be preempted only in the case of an actual conflict between federal and state regulations.

Several other bills were introduced to modify DHS authority to regulate chemical facilities. Perhaps of most interest to the water sector was H.R. 5577 (H.Rept. 110-550), the Chemical Facility Anti-Terrorism Act of 2008. Reported, amended, from the House Committee on Homeland Security in March 2008, H.R. 5577 would have revised, expanded, and made permanent DHS's authority to regulate chemical facility security. Currently, water and wastewater facilities are explicitly exempt from P.L. 109-295 and the CFATS regulations; however, these utilities were not categorically exempt under H.R. 5577. This legislation would have directed the DHS Secretary to maintain a list of covered chemical facilities determined to be of sufficient security risk, based on several criteria: 1) the likelihood that the facility will be the target of an attack; 2) the potential extent and likelihood of death or injury, or harm to the environment, critical infrastructure, national security, or the economy that could result from an incident; and 3) the proximity of the chemical facility to population centers. The bill also would have authorized DHS to designate any chemical substance as a "substance of concern" and to establish and revise the threshold quantity for designated substances.

Further, H.R. 5577 proposed to require owners and operators of covered facilities to conduct vulnerability assessments and to develop and implement DHS-approved security plans. To address the possibility of redundant federal requirements, DHS would have been authorized to consider whether requirements under other laws (such as the Bioterrorism Preparedness Act) satisfied these requirements. Another provision would have required owners and operators of affected facilities to complete an analysis of "methods to reduce the consequences of a terrorist attack" (the bill did not use the term "inherently safer technologies"), and would have authorized the DHS Secretary to require higher risk facilities to implement such methods or technologies under certain conditions. As amended in markup, the Secretary would not been authorized to order drinking water or wastewater facilities to implement inherently safer technologies unless DHS provided funding to assist with the conversion. Also of relevance to the water sector was the provision authorizing DHS to order a facility assigned to the high-risk tier to cease operations if the facility failed to comply with a DHS compliance order. As reported, H.R. 5577 would have

authorized DHS to order the shut down of a water facility only if the facility's continued operation presented a clear danger to homeland security.²³

The House Committee on Energy and Commerce, which traditionally has held jurisdiction over drinking water safety issues, was granted an extension for consideration of H.R. 5577 through May 2008. The bill was not referred to the House Committee on Transportation and Infrastructure, which has key jurisdiction over wastewater utilities. No further action occurred on this legislation.

Assistance for Security Measures. Also at issue is the availability of funding for water systems to make security upgrades needed to address risks identified in their vulnerability assessments. Based on a limited assessment, EPA reported in 2005 that community water systems would need more than \$1 billion to make security improvements.²⁴ The AWWA estimated that municipal water systems would have to spend more than \$1.6 billion just to ensure control of access to critical water system assets.²⁵ Congress has not provided funding specifically for this purpose.²⁶ Although community water systems potentially are eligible to receive funding from the states through the DHS State Homeland Security Grant Program, competition for funds has been severe, and funds largely have gone to meet the needs of first responders. In an effort to address one element of this funding issue, the conference report for the Department of Homeland Security Appropriations Act for FY2005 (P.L. 108-334, H.Rept. 108-774) modified the definition of “local unit of government” specifically to include water districts.²⁷ Congress provided \$525 million for this grant program for FY2007 (P.L. 109-295), and \$950 million for FY2008 (P.L. 110-161).

In the 110th Congress, the Water Security Act of 2007, S. 1968, would have authorized EPA to provide grants to drinking water and wastewater systems for security-related measures including vulnerability assessments, implementation of security enhancements, and developing or upgrading emergency response and site security plans. S. 1968 also proposed to provide technical assistance to small utilities, and to require research on specific security topics. A similar bill, S. 1303, specifically targeted wastewater treatment facilities. S. 1303 would have authorized EPA to make grants to municipal wastewater treatment utilities for vulnerability assessments,

²³ For more information on this and other bills, see CRS Report RL33847, *Chemical Facility Security: Regulation and Issues for Congress*, by Dana A. Shea and Todd B. Tatelman.

²⁴ U.S. Environmental Protection Agency, *Drinking Water Infrastructure Needs Survey and Assessment: Third Report to Congress*, June 2005. EPA 816-R-05-001. EPA noted that many water systems had not adequately captured security needs when this assessment was conducted in 2003. The agency anticipates that security needs will be reported more completely in the next assessment.

²⁵ American Water Works Association, *Protecting Our Water: Drinking Water Security in American After 9/11*, Executive summary, 2003.

²⁶ As discussed on page 9 above, some security projects are eligible for funding under the EPA-administered drinking water SRF program.

²⁷ For information on DHS grant program funding for FY2008, see CRS Report RS22596, *FY2008 Appropriations for State and Local Homeland Security*, by Shawn Reese.

security enhancements, emergency response plans, and facility security plans. The bill also would have directed EPA to conduct research on wastewater infrastructure security. The chemical facility security bill, H.R. 5577, would have authorized \$225 million over three years to provide assistance to facilities that are required to adopt safer technologies to reduce the consequences of an attack.

Water Supply Security Research. A major security concern for the water sector has been the need for research to develop real-time monitoring methods to detect contaminants, and to develop technologies to remove or inactivate them. The water industry and security experts have identified a particular need for research to develop monitoring technologies that can quickly detect contaminants in water that has already left a treatment plant for distribution to consumers.

EPA has focused homeland security research on the detection, containment, and decontamination of chemical and biological agents that could be used in attacks on water systems. These efforts received limited support during the 109th Congress. For FY2006, EPA had requested \$44 million for the Water Sentinel program (renamed the Water Security Initiative) to help address water utilities' concerns regarding their ability to detect and respond to chemical and biological contaminants.²⁸ The agency has considered this initiative to be a key element of its effort to meet its water security responsibilities under HSPD-9,²⁹ however, Congress provided just \$8.1 million for the program for FY2006. In recommending a large reduction, the House Appropriations Committee commented that EPA should develop clear goals for the initiative, and justify the request more clearly in the budget request for FY2007.³⁰

For FY2007, the Water Security Initiative (WSI) again failed to receive the requested support (\$41.7 million) from House and Senate appropriators. Action was not completed on the EPA funding bill, and the continuing resolution for FY2007 (P.L. 110-5) generally funded EPA programs at the FY2006 level. However, EPA used its discretion and allocated \$27 million to the Water Security Initiative, considerably more than the FY2006 appropriation.

Similarly in the 110th Congress, the House and Senate appropriations committees recommended reductions in the amount requested for this initiative for FY2008, but explained that the reductions were in response to the delayed obligation of FY2007 funds. Both committees urged EPA to be prepared to report on the status and accomplishments of the initiative's pilot projects. The Consolidated Appropriations Act, 2008 (P.L. 110-161), included \$11.7 million for the initiative.

²⁸ U.S. Environmental Protection Agency, *FY2006 Annual Performance Plan and Congressional Justification*, Science and Technology, Homeland Security: Critical Infrastructure Protection, p. S&T-21 - S&T-23.

²⁹ Homeland Security Presidential Directive-9 directs EPA to develop a comprehensive and fully coordinated surveillance and monitoring system for drinking water, including a laboratory network to support surveillance and response activities.

³⁰ U.S. Congress, House Committee on Appropriations, *Department of the Interior, Environment, and Related Agencies Appropriation Bill, 2006*, report to accompany H.R. 2361, 109th Cong., 1st sess., H.Rept. 109-80, p. 94.

EPA requested \$21.4 million for the Water Security Initiative for FY2009, and proposed to use the resources to support two new WSI surveillance and monitoring pilots, bringing the total number of pilot projects to five. In its budget justification, the agency explained that five projects would be sufficient to generate the range of data needed for the program to have broad application to a variety of utilities in high-risk cities nationwide.³¹ EPA also proposed to continue supporting research evaluating analytical methods for high risk contaminants and developing a network of laboratories to help confirm and speed responses to intentional contamination events; the agency estimated that 90% of contaminants of high concern lack validated detection methods. Specific EPA appropriations were not enacted, and the consolidated appropriations act for FY2009 (P.L. 110-329) generally extended funding for federal programs at FY2008 levels through March 6, 2009.

³¹ U.S. Environmental Protection Agency, *FY2009 Annual Performance Plan and Congressional Justification*, Science and Technology, Homeland Security: Critical Infrastructure Protection, p. 68-69.