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OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

EPA Needs a Better Strategy to Measure Changes in the Security of the Nation's Water Infrastructure

Report No. 2003-M-00016

September 11, 2003

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Abbreviations

DHS	Department of Homeland Security
EPA	Environmental Protection Agency
ISAC	Information Sharing and Analysis Center
VA	Vulnerability Assessment



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE INSPECTOR GENERAL

MEMORANDUM

SUBJECT: Final Evaluation Report: EPA Needs a Better Strategy to Measure Changes in the Security of the Nation's Water Infrastructure
Report No. 2003-M-00016

FROM: Nikki L. Tinsley

A handwritten signature in cursive script that reads "Nikki L. Tinsley".

TO: G. Tracy Mehan, III
Assistant Administrator for Office of Water

As part of our ongoing evaluation of Environmental Protection Agency (EPA) activities to enhance the security of the Nation's water supply, we noted an issue that requires your attention. Specifically, we suggest that EPA develop specific measurable performance indicators of water security activities. We propose this action because, during our preliminary research,¹ we obtained information that indicates EPA has neither:

- Articulated measurable goals for EPA's water security efforts; nor
- Obtained or analyzed data to develop a baseline for water security.

It is important for EPA to develop measures to monitor the security of our Nation's water supply and to ensure Federal funds are not spent without clear goals or expectations. To effectively perform its lead agency responsibilities, EPA needs to collect and analyze data that depicts the changes in security levels at water utilities.

Our observations and suggestions are based on information obtained from our interviews with water security experts, water utility officials, and EPA headquarters and regional representatives; attendance at water vulnerability assessment training; and a review of EPA's *Strategic Plan for Homeland Security*, dated September 2002. We are performing our evaluation in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States.

EPA Designated as Lead Agency for Water Security

The Nation's water supply is one of our most vital natural resources. Potential threats to this resource include contamination with biological, chemical, or radiological agents, or destruction of physical infrastructure. The water supply is also dependent on other critical infrastructures,

¹The EPA Office of Inspector General is conducting preliminary research on an evaluation of water system security activities in support of the Agency's *Strategic Plan for Homeland Security*.

such as energy and transportation. Presidential Decision Directive 63, issued in May 1998, designated EPA as the lead agency responsible for the water sector and for accomplishing the following functions:

- Establish and maintain channels of communication with all private and public entities having an infrastructure assurance interest in the sector;
- Facilitate the selection of a Sector Infrastructure Assurance Coordinator;
- Assist the Sector Coordinator in establishing and operating an effective information-sharing program;
- Draft new legislation and regulations, as required, and propose the use of Federal incentives to facilitate private investment in assurance programs, if appropriate;
- Promote infrastructure assurance education and training, to include advocating use of best practices, within the sector;
- Assist in developing plans for prevention (long-term reduction of vulnerabilities and short-term defensive actions), mitigation, restoration, and reconstitution; and
- Coordinate, in support of the Federal Response Plan, as amended, management of the consequences of a successful infrastructure attack and prepare for various contingent attacks through participation in training and exercise programs.

EPA's Efforts to Improve Water Security

To better execute its responsibilities after the terrorist attacks on September 11, 2001, EPA developed a strategy for improving the security of water utilities. EPA's Strategic Plan focuses on preparedness and prevention, assisting those responsible for critical infrastructures in assessing and reducing vulnerabilities and maximizing their response capabilities. Also, EPA intends to develop technologies to improve the Nation's critical infrastructure and key responders' abilities to detect and monitor environmental threats. Through this work, EPA plans to "significantly improve the Nation's overall capacity to protect critical infrastructure from terrorist attacks." EPA will rely on relationships with water utilities, water-related governmental entities, and associations to assist utilities, and the Agency has already taken the following steps:

- Facilitated the development of vulnerability assessment methodology and training;
- Provided threat guidance to utilities to help them conduct vulnerability assessments and identify possible threats to critical assets;
- Provided financial assistance to large drinking water systems to conduct one-time vulnerability assessments;
- Funded research on technology development and verification; and
- Facilitated the development of a secure Information Sharing and Analysis Center for the water utility sector (Water-ISAC) to exchange threat/incident information.

EPA's Strategic Plan is organized into four mission-critical areas, the first being "Critical Infrastructure Protection." This area states that EPA will work with the States, tribes, drinking water utilities, and other partners to enhance the security of water utilities. The Strategic Plan articulates both the tactics to execute the Plan as well as the anticipated results. The following table illustrates selected tactics and results.

Selected Water Infrastructure Protection Tactics	Anticipated Results
<p><u>Technical Assistance and Grants</u></p> <p>EPA will provide tools, training, and technical assistance to assist water utilities in conducting vulnerability assessments, implementing security improvements, and effectively responding to terrorist events.</p> <p>EPA provided grants to large drinking water utilities for vulnerability assessments, security enhancement designs, and/or emergency response plans.</p>	<p>By the end of fiscal 2003, all water utility managers will have access to basic information to understand potential water threats, and basic tools to identify security needs. By 2005, unacceptable security risks at water utilities across the country will be significantly reduced through completion of appropriate vulnerability assessments, design of security enhancement plans, development of emergency response plans, and implementation of security enhancements.</p>
<p><u>Terrorism Methods and Prevention Techniques</u></p> <p>EPA will work with the Department of Homeland Security (DHS), other Federal agencies, universities, and the private sector to:</p> <ul style="list-style-type: none"> - Solicit and review methods to prevent, detect, and respond to chemical, biological, and radiological contaminants that could be intentionally introduced in drinking water systems; - Review methods and means by which terrorists could disrupt the supply of safe drinking water or take other intentional actions against water collection, pretreatment, treatment, storage, and distribution facilities; and - Review methods and means by which alternative supplies of drinking water could be provided in the event of a disruption. 	<p>Starting in fiscal 2003, water utilities, key response agencies, and policymakers will have improved information and knowledge to make timely and effective analytical and technological decisions to enhance security, detect contamination, and respond to incidents.</p>
<p><u>Security Practices</u></p> <p>EPA will work to implement water security practices in ongoing water utility operations. EPA will also work to build security concerns into ongoing review systems (e.g., sanitary survey, capacity development, operator certification, and treatment optimization program for drinking water systems).</p>	<p>Beginning in fiscal 2003, water utilities will incorporate security measures as a standard aspect of day-to-day operations and EPA, States, and tribes will review security measures at water utilities on a continuous basis. Through ongoing practice and review, water utility managers and employees will optimize security measures.</p>

Selected Water Infrastructure Protection Tactics	Anticipated Results
<p><u>Communication with Utilities</u></p> <p>EPA will work with other government agencies, utility organizations, and water utilities to establish formal communication mechanisms to facilitate the timely and effective exchange of information on water utility security threats and incidents.</p>	<p>Starting in fiscal 2003, water utilities, law enforcement agencies, and State and Federal response and prevention programs will have timely and accurate security threat information and incident analysis to make effective decisions for water security preparedness and response.</p>
<p><u>Coordination with First Responders</u></p> <p>EPA will work in coordination with DHS to foster coordination among Federal, State, tribal, and local emergency responders, health agencies, environmental and health laboratories, the medical community, and the law enforcement community at all levels (Federal, State, and local) concerning response to potential terrorist actions against water utilities. This will be achieved through training and support of simulations and emergency response exercises.</p>	<p>In the majority of water security incident responses and exercises, the decision-making and communication structures of response agencies will function smoothly (without critical errors).</p>
<p><u>Coordination with Other Critical Infrastructures</u></p> <p>EPA will work with other critical infrastructure sectors to further understand and reduce the impact to water utilities of terrorist attacks on related infrastructures as well as the impacts of attacks on water utilities to other critical infrastructures.</p>	<p>Water sector vulnerabilities and impacts resulting from attacks on other critical infrastructure sectors will be reduced and vice versa.</p>

EPA Has Not Articulated Measurable Goals for Water Security

The Office of Water has not outlined how resources, activities, and outputs will achieve the water security program's goals. EPA's Strategic Plan lacks fundamental components, such as measurable performance results and information and analysis, to ensure the greatest practicable reductions in risks to the critical water sector infrastructure. We based our observations on key program management practices consistent with the President's Management Agenda and the Government Performance and Results Act.²

²The EPA Office of Inspector General has compiled these program management principles in *Assessing Organizational Systems: A User's Guide*, OAI/OPE-5, November 5, 2002. The *Guide* identifies seven areas requiring management attention for a successful program. The seven areas consist of Leadership, Strategic Planning, Customer/Stakeholder and Market Focus, Information and Analysis, Human Capital, Process Management, and Performance Results.

Because EPA lacks the indicators that define the baseline for water security, EPA cannot monitor program performance against goals. Without this baseline, EPA cannot determine whether its strategy resulted in improved water security. Officials we interviewed at the Office of Management and Budget and DHS also endorsed the need for EPA to establish performance indicators to determine the effectiveness of its water security activities.

In the absence of specific measurable water security goals, the Agency has focused on compliance with legislative requirements. For example, EPA states, "By 2005, unacceptable security risks at water utilities across the country will be significantly reduced through completion of appropriate vulnerability assessments; design of security enhancement plans; development of emergency response plans; and implementation of security enhancements." The completion of these documents, however, does not equate to the outcome of reducing unacceptable security risks.

EPA Needs to Obtain and Analyze Information to Measure Changes in Security

For EPA to develop performance indicators that measure changes in security, EPA needs to collect and analyze information from water utilities. However, the Agency believes that it: (1) lacks the authority to ask for information directly from water utilities or utilize information in the Water-ISAC that would show changes in security levels, and (2) cannot analyze information in vulnerability assessments because that would violate the Public Health Security and Bioterrorism Preparedness and Response Act (Bioterrorism Act).

However, we believe that EPA does in fact have the authority, as well as the responsibility, to collect and analyze necessary information from these sources. Information obtained anonymously, through the Water-ISAC, or through coordination with DHS, would provide EPA with data to benchmark changes in security levels. EPA needs to review the vulnerability assessments to identify and prioritize threats to water utilities. Subsection 6(A) of the Bioterrorism Act appears to contemplate review and analysis of vulnerability assessments by duly authorized Agency officials. Further, additional support for vulnerability assessment analysis is found in the legislative history of the Bioterrorism Act. Specifically, congressional members showed bipartisan support for EPA's review of the vulnerability assessments to develop plans to protect drinking water supplies, and noted the Agency's discretion to review the assessments and make recommendations to improve water security.³

- Representative Frank Pallone, Jr. (D-NJ) stated that EPA's review of the findings of the vulnerability assessments would "help the government understand the threats to our water systems and develop plans to protect our safe drinking water supply."
- Representative Michael Bilirakis (R-FL) stated that EPA could use the assessments "to address the threat of terrorism and for any other lawful purpose."

³Floor Action on H.R. 3448, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, in the Senate on May 23, 2002, and in the House on May 22, 2002.

- Senator James Jeffords (I-VT) stated that “there is not a restriction on EPA’s discussing the content of the assessments with persons who may benefit from information about the security of our Nation’s water supply, such as state and local officials, nor is there restriction intended by this bill upon a water system’s voluntarily sharing information with other systems, emergency responders or communities. Our attempt to provide a safeguard against broad disclosure of sensitive information does not lead us to conclude that our citizens should not have the information they need to protect and inform themselves.”

EPA could also utilize information from DHS to develop performance indicators that illustrate changes to security at critical infrastructures. An official at DHS stated that the Department is developing performance indicators for other critical infrastructures, such as the chemical industry. According to *The National Strategy for the Physical Protection of Critical Infrastructure and Key Assets* (February 2003), DHS coordinates with Federal agencies to assess threats to critical infrastructure and evaluate preparedness. The National Strategy places responsibility with DHS for gathering threat and vulnerability information. However, EPA has only recently allowed DHS to review drinking water utilities’ vulnerability assessments.

Suggestions

We suggest that EPA:

- (1) Develop specific, measurable goals, objectives, and performance indicators for its water security programs; and
- (2) Utilize available sources of information to collect and analyze data to develop a baseline for water security.

Agency Comments and Office of Inspector General Evaluation

In its response to our draft report, EPA agreed with our assessment that the Agency’s *Strategic Plan for Homeland Security* lacks clearly defined performance measures for critical water infrastructure protection activities. EPA indicated that it will be actively involved in developing more outcome-focused performance indicators in its revised strategic plan.

EPA also agreed with our assessment that it needs to develop a baseline for water security. EPA said it will analyze a sample of vulnerability assessments to develop the baseline. EPA also plans to use this information to assist in identifying tools that need to be developed, and to research priorities and appropriate security enhancements for water utilities. EPA indicated it will share this analysis with Congress and the Department of Homeland Security.

We commend EPA’s commitment to create outcome-focused performance measures and a baseline to measure and monitor changes in water security. However, the necessary information required for these initiatives may not reside solely in the water system vulnerability assessments. As the lead agency for water security, we suggest that EPA partner with the utilities and collect and analyze information from additional sources such as the Water-ISAC and through

coordination with DHS so that the appropriate actions could be taken to enhance the security of the Nation's water infrastructure.

The full Agency response is provided in Appendix A.

If you or your staff have any questions regarding this report, please call me at (202) 566-0847 or Kwai Chan, Assistant Inspector General for Program Evaluation at (202) 566-0828.

Agency Response

August 22, 2003

MEMORANDUM

SUBJECT: Response to OIG Concerns regarding "EPA Needs a Better Strategy to Measure Changes in Utilities Water Security"
DRAFT: Report No. 2003-M-00016

FROM: G. Tracy Mehan, III /signed/
Assistant Administrator

TO: Jeffrey K. Harris
Director for Program Evaluation, Cross-Media Issues
Office of Inspector General

I am responding to the two principal issues and concerns that were stated in your July 23, 2003, memorandum/report to me. Your preliminary research on performance measures of water security activities indicates that EPA has neither:

- articulated measurable goals for EPA's water security efforts; nor
- obtained or analyzed data to develop a baseline for water security.

I agree with your assessment that the Agency's *Strategic Plan for Homeland Security*, dated September 2002, lacks clearly defined performance measures for critical water infrastructure protection activities. I believe this document should be considered a blueprint of near-term (2002 and 2003) homeland security activities rather than a strategic plan in the strict sense of that term. Attachment 1 highlights our significant accomplishments under this near-term plan. I am a strong proponent of EPA's Office of Homeland Security's recently-announced initiative to develop a revised strategic plan. This exercise may serve as the opportunity to identify longer-term goals, objectives, and measurable performance indicators for all EPA programs involved in high priority activities to protect public health and the environment from terrorist and other intentional acts. I assure you that my staff will be very active participants in this endeavor and will devote significant attention to the challenge of developing outcome-focused performance measures. For the FY 2005-2010 Agency-wide strategic plan, I assigned my Senior Advisor for Water Policy to work with all water programs to shift from a predominance of output-oriented performance measures to ones that will demonstrate more direct results and benefits to public health and environmental protection. We made considerable

progress and will continue to make improvements in all water programs including critical water infrastructure protection.

In addition to the limited performance measures in the *2002 Strategic Plan for Homeland Security*, the Agency's FYs 03 and 04 annual performance plans have contained annual performance goals and measures. (Attachment 2) Because these measures are indeed outputs not indicators of outcomes, I and my staff would welcome any specific recommendations and direct assistance from you as we proceed to formulate water security program goals and appropriate performance measures.

With respect to your second issue/concern on obtaining and analyzing data to develop a baseline for water security, I want to clarify the Office of Water's position on examining vulnerability assessments (VAs) submitted by some 9,000 community water systems as required by the Bioterrorism Act of 2002. I personally identified to the few members of the Water Protection Task Force who have been designated by me to have access to the VAs three specific purposes for reviewing and analyzing them. The first is that all VAs should be reviewed to determine both compliance with the statutory requirements for submission/ certification of completion and necessary enforcement action. Second, a **representative sample** (based on the total number of systems in each size of systems as stipulated in the statute) of VAs should be examined for: a) compliance (and subsequent enforcement, if any) with the statutory requirement that the VA address all applicable parts of a system (e.g., pipes, physical barriers, treatment, etc.) and b) determination that drinking water systems used a "reasoned process" (e.g., a tool like RAM-W) to evaluate their vulnerabilities. Third, **aggregated data** are to be compiled and analyzed to assist in identifying tools that need to be developed, research priorities and appropriate security enhancements. In addition, this aggregated information will help us develop a baseline for water security, which is consistent with your suggestion as well as OW's emphasis on improving performance indicators and measures for all its programs. Besides using this aggregated data to inform and guide our future actions, we intend to share this information (mindful of the restrictions imposed by the Bioterrorism Act of 2002) with Congress and other decision makers, e.g., the Department of Homeland Security.

I appreciate the opportunity to respond to your draft report. Should you have any questions or need additional information, please contact Michael Mason, the Office of Water's liaison to OIG, on 564-0572.

Attachments

**ACCOMPLISHMENTS OF THE WATER PROTECTION TASK FORCE
UNDER EPA'S HOMELAND SECURITY STRATEGIC PLAN**

7/24/03

EPA has and is continuing to support a number of activities to improve security of both drinking water and wastewater utilities using approximately \$90 million and \$23 million appropriated in Fiscal Years '02 and '03, respectively. Examples of these activities include:

- ▶ Developed vulnerability assessment tools for both drinking water and wastewater utilities and supported extensive training for thousands of utility operators.
- ▶ Provided more than \$50 million in grants to more than 400 of the Nation's largest drinking water systems to undertake vulnerability assessments and do related security planning. Visited 30 of the largest cities to discuss water security. Received 463 of the 466 vulnerability assessments required to be submitted to EPA in March 2003.
- ▶ Provided more than \$24 million to the States and non-profit organizations to provide training and technical assistance to small and medium water utilities on vulnerability assessments.
- ▶ Developed and distributed *Baseline Threat Information for Vulnerability Assessments of Community Water Systems*.
- ▶ Met statutory deadline to implement protocol to protect vulnerability assessments.
- ▶ Supported establishment of a state-of-the-art, secure information sharing system (the WaterISAC) to share up-to-date threat and incident information between the intelligence community and the water sector. Provided several water-specific advisories.
- ▶ Developed guidelines on what actions utilities should take under DHS-specified threat levels.
- ▶ Developed and began testing/distribution of *Riverspill* and *Pipeline Net* models to determine fate and transport of contaminants in both source water and drinking water systems.
- ▶ Supported establishment of a water security emphasis for the Environmental Technology Verification Program and the WATERS test site to evaluate water security technologies.
- ▶ Collaborated with ORD in development of the Water Security Research and Technology Development Action Plan, currently under Review by the National Academy of Science.
- ▶ Developed initial guidance on emergency response notification protocols. Currently developing detailed guidance on revising emergency response plans to meet Bioterrorism Act requirements, as well as a protocol to respond to a drinking water contamination event.
- ▶ More information on EPA's Water Protection Task Force water security program can be found at: www.epa.gov/safewater/security

***Annual Performance Goals and Measures for Critical Water Infrastructure Protection
(Drinking Water and Wastewater Utilities)***

Drinking Water

FY 03:

Annual Performance Goal

Enhance public health protection by securing the Nation's critical water infrastructure through support for counter-terrorism preparedness.

Percent of the population and the number of community water systems - - serving 100,000 or more people - - that have certified the completion of their vulnerability assessment and submitted a copy to EPA.

Percent of the population and the number of community water systems - - serving 100,000 or more people - - that have certified the completion of the preparation or revision of their emergency response plan.

FY 04:

Annual Performance Goal

Enhance public health protection by securing the Nation's critical water infrastructure through support for counter-terrorism preparedness.

Annual Performance Measures

Percent of the population and the number of community water systems - - serving more than 50,000 but less than 100,000 people - - that have certified the completion of their vulnerability assessment and submitted a copy to EPA.

Percent of the population and the number of community water systems - - serving more than 50,000 but less than 100,000 people - - that have certified the completion of the preparation or revision of their emergency response plan.

Percent of the population and the number of community water systems - - serving more than 3,300 but less than 50,000 people - - that have certified the completion of their vulnerability assessment and submitted a copy to EPA.

Annual Performance Goals and Measures for Critical Water Infrastructure Protection

Wastewater

FY 03:

Annual Performance Goal

Enhance public health and environmental protection by securing the Nation's critical water infrastructure through support for counter-terrorism preparedness including system operator training.

Annual Performance Measure

Percent of the population and the number of large and medium size (10,001 and larger) of Publicly Owned Treatment Works (POTWs) that have been taken for homeland security preparedness.

FY 03:

Annual Performance Goal

Enhance public health and environmental protection by securing the Nation's critical water infrastructure through support for counter-terrorism preparedness including system operator training.

Annual Performance Measure

Percent of the population and the number of large and medium size (10,001 and larger) of Publicly Owned Treatment Works (POTWs) that have been taken for homeland security preparedness.

Distribution

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