A Water Security Handbook:

Planning for and Responding to Drinking Water Contamination Threats and Incidents

Water

Security

Incidents

Threats

Printed on Recycled Paper

Note to Readers: The U.S. Environmental Protection Agency (EPA) prepared this guide to help you enhance the security of your water system. This document does not impose legally binding requirements on EPA, states, tribes, or the regulated community, and it may or may not apply to a particular situation, depending on the circumstances. EPA and state decision-makers retain the discretion to adopt approaches on a case-by-case basis that may differ from this guide where appropriate. Any decisions regarding a particular community water system should be made based on the applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this guide to a particular situation, and EPA will consider whether the recommendations or interpretations in this guide are appropriate in that situation based on the law and regulations. EPA may change this guide in the future. To determine whether EPA has revised this guide or to obtain additional copies, contact the Safe Drinking Water Hotline at 1-800-426-4791 or visit the EPA's Water Security website at www.epa.gov/watersecurity.

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List of Acronyms and Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
CWC	Chemical Weapons Convention
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERP	Emergency Response Plan
ETV	Environmental Technology Verification Program
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FOIA	Freedom of Information Act
FRMAC	Federal Radiological Monitoring and Assessment Center
Handbook	this *Water Security Handbook*
HazMat	Hazardous materials specialists, including specialists from government agencies and private contractors
HHS	U.S. Department of Health and Human Services
HSIN-CS	Homeland Security Information Network for Critical Sectors
ICS	Incident Command System
LEPC	Local Emergency Planning Committee
LRN	Laboratory Response Network
MOU	Memorandum of Understanding
NEMI	National Environmental Methods Index
NEMI-CBR	National Environmental Methods Index for Chemical, Biological and Radiological Contaminants
NHSRC	National Homeland Security Research Center
NIC	National Incident Management System (NIMS) Integration Center
NIH	National Institutes of Health
NIMS	National Incident Management System
NRC	National Response Center
NRP	National Response Plan
NRT	National Response Team
QA/QC	Quality Assurance and Quality Control
Toolbox	*Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents*
TSWG	Technical Support Working Group
TTEP	Technology Testing and Evaluation Program
USAMRIID	U.S. Army Medical Research Institute for Infectious Diseases
USCG	United States Coast Guard
WaterISAC	Water Information Sharing and Analysis Center
WaterSC	Water Security Channel
WCIT	Water Contaminant Information Tool
WMD	Weapons of Mass Destruction
WUERM	Water Utility Emergency Response Manager

Overview

What is the Water Security Handbook?

As a water utility manager, your role in water security planning and threat response is critically important. This *Water Security Handbook* was developed by the U.S. EPA to help you, the water utility official, protect your water system and respond effectively to threats and contamination incidents involving your water system.

EPA also wrote this Handbook in response to calls for a short, simplified document that summarizes the comprehensive document entitled *Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents* (also known as the *Response Protocol Toolbox*).

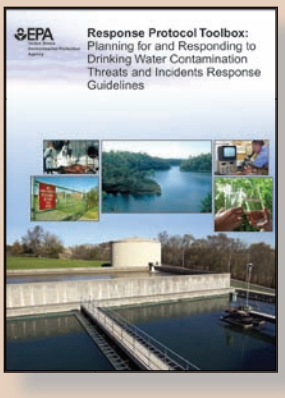
The Handbook is also intended to be a companion to EPA's *Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents: Response Guidelines*. The *Response Guidelines* provides many forms and checklists to help you organize and carry out your emergency response and planning efforts. This Handbook describes the basic concepts and procedures involved in water security planning and threat response. Together, the Handbook and *Response Guidelines* provide succinct recommendations concerning water security planning and response actions.

While the *Response Protocol Toolbox* is aimed at all utilities, agencies and other organizations that may be involved in responding to drinking water threats and incidents, this Handbook is aimed primarily at water utility managers and staff. This Handbook should help you to:

- Understand the "basics" of responding to contamination threats and incidents;
- Plan for responding to water contamination threats and contamination incidents;
- Learn about key concepts of water security covered in the *Response Protocol Toolbox;* and
- Learn how to use the *Response Protocol Toolbox,* the *Response Guidelines,* and other available tools to help you provide water security.

You can use this Handbook as a guide to the *Response Protocol Toolbox,* because chapters in this Handbook correspond to modules in the Toolbox:

Handbook Chapter	Toolbox Module
1	1. Water Utility Planning Guide
2	2. Contamination Threat Management Guide
3	3. Site Characterization and Sampling Guide
4	4. Analytical Guide
5	5. Public Health Response Guide
6	6. Remediation and Recovery Guide



Why Is This Handbook Important?

Contamination of a drinking water system can cause illness, disease, or even death. A water system can be contaminated, damaged or disrupted through intentional terrorist or criminal actions or by an accident. Intentional contamination poses one of the most serious threats to a water system because of the intent to harm human health or cause damage. **When a contamination threat is received or a contamination incident happens, it is critical that you act quickly and effectively to protect public health and the environment.**

This Handbook should help you to develop your own utility's plan for quickly and effectively responding to contamination threats or contamination incidents, even in situations where information may be limited.

How Can This Handbook Help Me?

This Handbook should help you in the following ways:

- Help you to plan for unforeseen emergencies involving your water system;
- Help you to review and improve your water utility's Emergency Response Plan (ERP) on an ongoing basis to address contamination threats and intentional incidents. Federal law required that drinking water systems serving more than 3,300 customers develop an ERP (see the "Public Health Security and Bioterrorism Preparedness and Response Act of 2002", also known as the Bioterrorism Act of 2002). Although the deadlines for certifying ERPs for approval have passed, all utilities should continue to review and improve their plans as their water system infrastructure, staff, technology and capabilities change.
- Provide pointers on how to respond to contamination threats and incidents; and
- Introduces and summarizes the more comprehensive *Response Protocol Toolbox.*

Please note that this Handbook provides general advice and general procedures for responding to a water system contamination threat or contamination incident. Because every water system and incident will be different, it would be impossible to develop a one-size-fits-all emergency response template. The steps described in this Handbook are recommendations, not rules.

Although this Handbook is not a regulatory document nor is it a template for an Emergency Response Plan, it can help you to review, update and implement your own ERP, because it describes the planning you would do to create such a plan. For example, in your ERP, you should provide answers to the following questions:

Emergency Response Plans (ERPs):

For more information on ERPs, see EPA's document entitled *Emergency Response Plan Guidance for Small and Medium Systems to Comply with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002,* the *Emergency Response Plan Outline,* and other emergency response planning documents. These documents can be downloaded from EPA's water security website at www.epa.gov/watersecurity. You may also obtain a copy by calling EPA's Safe Drinking Water Hotline at 1-800-426-4791 or by sending a request to the Hotline via e-mail at www.epa.gov/safewater/hotline.

- Who will respond?
- What level of personal protection do responders need in order to protect their health and safety?
- Who can I call for help and advice?
- When and where should samples be collected?
- Who will collect samples?
- Who will analyze water samples to identify the contaminant(s)?
- Who will make public health decisions?
- Who will manage remediation and recovery activities?

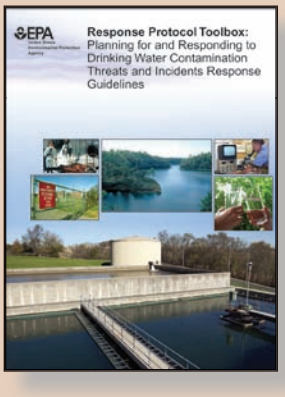
Addressing these kinds of questions should help you to update your own ERP for responding to a water contamination threat or incident. Utilities may also want to share their ERPs with local response partners in order to improve coordination when an incident or emergency actually occurs.

Who Should Read This Handbook?

This Handbook was written for water system owners and managers, water utility emergency response managers (WUERMs), and utility staff who maintain public and private drinking water systems, regardless of their size. In addition, anyone who may be involved in an emergency response concerning drinking water, such as public health officials, emergency responders, law enforcement officials, environmental protection officials and other government officials should read this Handbook. Utility managers in the wastewater sector may find this Handbook useful because it describes a general process for threat and incident response.

In the next chapter, water security planning is discussed.

Where To Get More Information:



For more information on a specific topic, please refer to the full *Response Protocol Toolbox.* You can download the entire Toolbox, this Handbook, the *Response Guidelines,* and other water security documents from the EPA Water Security website at www.epa.gov/watersecurity. This frequently updated website also contains other useful information on water security planning, requirements and training opportunities. You can also request a copy of these documents by calling EPA's Safe Drinking Water Hotline at 1-800-426-4791 or by sending a request to the Hotline via e-mail at www.epa.gov/safewater/hotline. Finally, the section on "Additional Resources" at the end of this Handbook describes many useful water security resources.

Water Utility Planning Guide

1

Water Utility Planning Guide

Introduction

This chapter discusses why you, as a water utility manager or officer, should know about water security planning for effective response to contamination threats and incidents. This chapter also defines water contamination threats and incidents and describes how water security planning is done. Chapter 1 corresponds to Module 1 of the *Response Protocol Toolbox*. See EPA's Water Security website at www.epa.gov/watersecurity for more information.

The first water security planning step is to designate an individual to be the lead emergency response manager for your utility, as well as an alternate. At a small utility, you may be this individual. The second step is to plan your utility's response to a contamination threat or contamination incident. In responding, you should decide if the threat or incident is **'possible'**, **'credible'**, or **'confirmed'**. If the threat is **'confirmed'**, then it becomes a contamination incident, requiring remediation (cleanup). Following successful remediation, the system is returned to normal safe operations (recovery).

Why is Water Security Planning Important?

Water security planning is critical because of the increased threat of terrorism and other intentional attacks since 9/11. There are many ways in which water systems can be threatened by contamination or be intentionally contaminated. Responding to contamination threats and contamination incidents requires careful planning and preparation.

What Are Contamination Threats and Contamination Incidents?

There are two kinds of water contamination problems that you may have to deal with: **contamination threats** and actual **contamination incidents**.

A **contamination threat** is a suggestion or an indication that water has been or will be contaminated, but no conclusive proof has been collected yet to confirm that contamination has actually occurred. A threat may be written, verbal, or based on observations or other evidence.

Here are some examples of contamination threats:

1) A suspicious empty container with an unknown residue is left next to a reservoir. This is a contamination threat. In this case, there is physical evidence that suggests something has potentially been added to the water supply, but contamination has not yet been **'confirmed'** through testing or other conclusive evidence.

2) Someone phones to say that they observed someone adding something to the water reservoir. As before, you have become aware of a threat and there is not yet any proof that the contamination has actually occurred.

A contamination incident has occurred if you analyze water from the reservoir, distribution system or another part of your water system and find that the water contains levels of a harmful

contaminant above baseline or background levels. This is no longer a contamination threat, but an actual contamination incident. In short, a contamination threat has not yet been proven (or **'confirmed'**), while a contamination incident has already occurred. Be alert to the possibility that field or lab testing may not be comprehensive enough to detect the contaminant that may be present; for example, a Microtox® analysis should tell you whether or not there is a toxin present, but it does not measure radioactive materials or metals.

A drinking water **contamination incident** occurs when the presence of a harmful contaminant has been 'confirmed'; that is, verified.

To protect your water system, you should be ready to respond to both contamination threats and contamination incidents. You might not know whether a threat constitutes a contamination incident until you get more information. However, if you ignore a threat and it turns out to be a contamination incident, public health and/or the water system might be harmed. You should always investigate a threat and determine whether or not a contamination incident has occurred.

Should We Be Concerned About Contamination Threats and Contamination Incidents?

Contamination threats and contamination incidents could impact the public in the following ways:

- Cause harm to public health (illness, disease, or death);
- Cause fear or loss of public confidence;
- Disrupt the water system or cause long-term shortage of clean, safe water to customers or prevent use of the water supply for fire fighting;
- Disrupt businesses and services that depend on a safe water supply;
- Cause damage to the water system infrastructure (e.g., water plant, pumps, pipes, wells, treatment system, distribution system, electrical system or computer network) resulting in contamination or interference with treatment or delivery;
- Create a need to remediate and replace portions of the water system to make it safe, which could in turn create water shortages or outages;
- Result in significant costs for remediation or replacement; and
- Impact other critical infrastructures that rely on safe water, due to interdependencies (e.g., food processing and refineries, among others).

Since any one of these impacts could have serious consequences, you should be concerned about contamination threats and incidents.

Is Intentional Contamination Possible or Probable?

How likely is intentional contamination of the drinking water system? Could it happen again? How serious would it be? These are the kinds of questions you should consider when planning for water security.

It is possible to intentionally contaminate a water supply in many ways. However, "possible" and "probable" are two different cases. It is always possible that intentional contamination could be carried out, but the probability of this actually happening should be determined at each individual water system.

Question: Compared with other possible terrorist targets, how likely is an intentional contamination incident involving a water system?

Answer: The likelihood of an intentional contamination incident occurring may be low, but the likelihood that a contamination threat will occur is high. In fact, such threats have occurred often and are well documented.

Security experts have warned that terrorist organizations may be considering water systems as possible targets for weapons of mass destruction, known as WMD. WMD include some chemical, biological and radiological contaminants whose purpose is to cause harm. It has always been possible to intentionally contaminate a water system, but 9/11 and other recent events have suggested that the likelihood that an intentional contamination incident will happen has increased. This is why we all should plan and prepare to protect our drinking water.

How Serious Could Intentional Water Contamination Be?

There are many ways in which water can be intentionally contaminated, just as there are many different contaminants. Each contaminant has different effects on humans, animals and the environment, depending on its concentration (level) and toxicity (harmfulness).

Examples of Possible Contaminants:

Pathogens are harmful microorganisms that can impact human health, such as E. coli, Cryptosporidium, polio virus, Hanta virus, smallpox virus, and the microorganisms responsible for anthrax, bubonic plague, cholera and other illnesses;

Toxic metals such as arsenic, cadmium, mercury, osmium, and others;

Toxic organic compounds such as biotoxins (Ricin), pesticides, chlorinated compounds such as dioxin, or volatile organic compounds such as mustard gas; and

Radioactive materials such as radioactive isotopes used in hospitals, research labs, universities and nuclear reactor fuels.

A few contaminants are so dangerous that very small amounts could sicken or kill many humans or animals. These include certain pathogenic bacteria and viruses, some biotoxins, and some highly toxic chemicals that can persist in water for a long time before they break down into

less harmful chemicals. Other contaminants could cause death or illness in people who are especially at risk, such as children, the elderly, those who are already ill due to other causes or others who are particularly sensitive. There are hundreds of contaminants that could disrupt normal operations and cause the public to lose confidence in the water system, but which would not cause illness or death.

What is Due Diligence?

How will you know when you have done enough to evaluate and respond to a contamination threat or incident? This is where **due diligence** comes in. Due diligence involves a careful evaluation of any contamination threat and an appropriate response based on the evaluation. The response flow chart on the back cover of this Handbook shows what steps to take when a threat or incident occurs. Carrying out each of these steps in a responsible, careful, efficient and timely manner should help to ensure due diligence.

Due diligence should be determined locally, and local authorities should decide what level of risk is reasonable in a threat situation. If the threat is **'possible'**, appropriate responses to a threat could include immediate operational response actions and site characterization. If the threat is **'credible'**, more significant response actions may be needed, such as restrictions on water use. For a **'confirmed'** incident, authorities may be faced with a potential public health crisis, and response actions should include all steps necessary to protect public health, supply an alternate source of drinking water, and begin remediation of the system.

Due diligence means that you have done everything suitable, sensible and responsible to evaluate a contamination threat or incident and respond appropriately.

It is up to you and your response partners to decide when due diligence has been exercised, because response capabilities vary. As part of this decision, you should decide how much risk is acceptable. You may also want to ask for help in responding to a threat. Keep in mind, however, that over-responding to a threat may cause problems too, especially if it is a false alarm.

How Do I Prepare For A Contamination Threat or Incident?

You can prepare for contamination threats and incidents by taking these steps:

- ❏ Develop your own guidelines for dealing with intentional contamination at your utility. Make these guidelines easy to use. Emphasize action items. Know your roles and responsibilities. Include all necessary forms and checklists, as well as contact information for important people. Be sure to keep this information up-to-date. The *Response Guidelines* provide short summaries of specific responses that can be taken to specific threats.

- ❏ Set up your Incident Command structure ahead of time so everyone knows who will be in charge during an emergency and everyone knows what to do. Again, know your roles and responsibilities in advance. The structure should be based on the Incident Command System (ICS), which is

used throughout the nation for responding to natural disasters or emergencies. See Chapter 2 for further discussion of ICS.

- ❏ Establish partnerships and clarify roles with local emergency responders, such as your state drinking water primacy agency, law enforcement, public health agencies, HazMat, fire and your local emergency response network. Coordinate closely with your local first responders as a preparedness step.

- ❏ Develop a communication plan that includes a communication and notification system for threats and incidents and a plan for public communication and outreach. Keep contact information up-to-date.

- ❏ Develop contingency plans for alternate water supplies in advance, through such means as mutual aid agreements, Memoranda of Understanding (MOUs) and intermunicipal agreements, for example.

- ❏ Be familiar with your water system from top to bottom. Know its construction, operation, maintenance, hydraulics, chemicals used, distribution system, employees, customers, nearby roads, buildings, and other features.

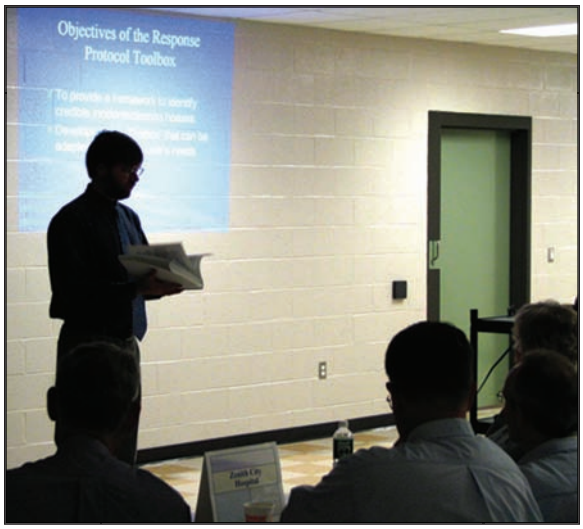
- ❏ Maintain accurate, up-to-date information, plans and other records concerning your water system. This should help prepare you and your response partners to deal with a threat or incident.

- ❏ Keep accurate records concerning any contamination threat or incident. See the *Response Guidelines* for an example of a "Security Incident Report Form", "Threat Evaluation Worksheet", and other forms and checklists that can help you to document a threat or incident and track evaluation, remediation, and recovery.

- ❏ Conduct baseline water quality monitoring during "normal", non-threat times to monitor the quality of water entering, passing through and leaving the system to customers. Baseline monitoring is done in order to establish "normal" water quality values.

- ❏ Prepare for contamination threats and intentional contamination incidents by including possible contamination scenarios in your Emergency Response Plan. Discuss these scenarios and possible responses with your staff.

- ❏ Practice emergency response by conducting training workshops, tabletop exercises, drills and field exercises.

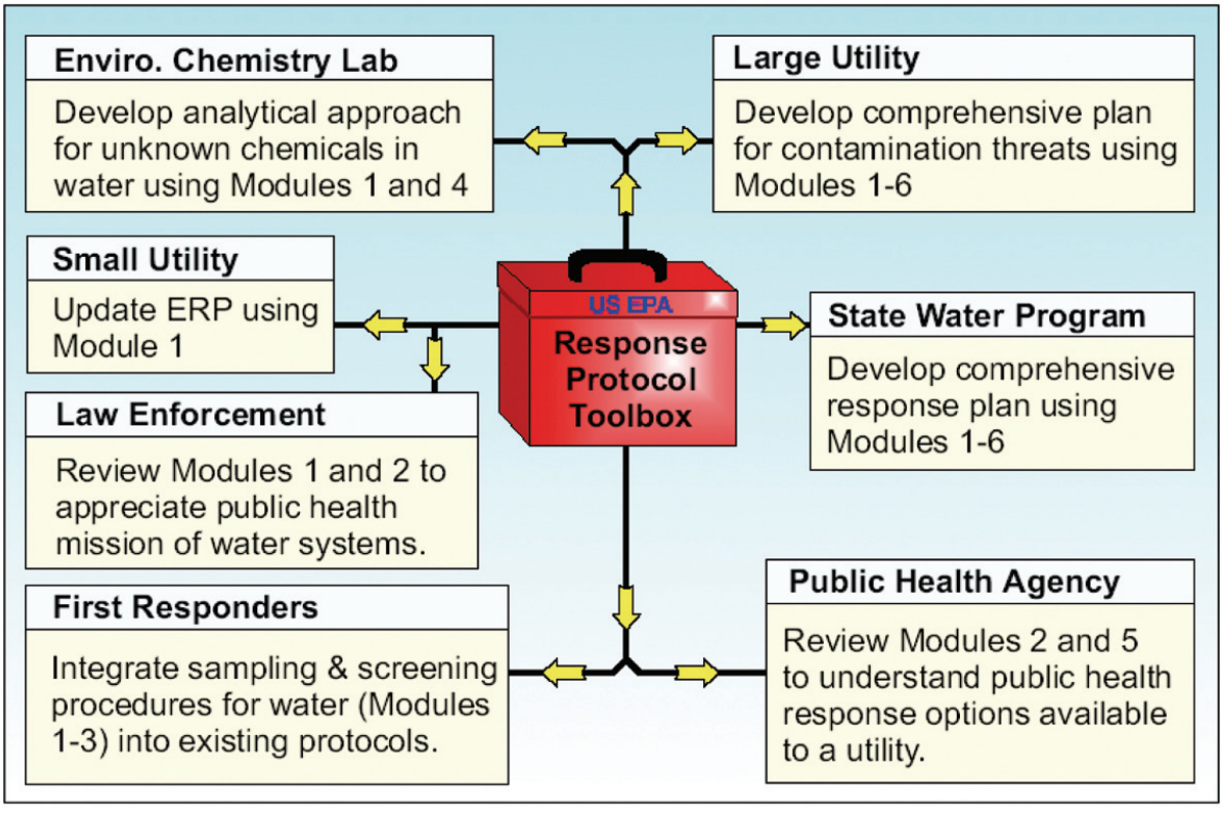


- ❏ Information on drinking water protection from services such as WaterISAC, WaterSC, InfraGard, and from other utilities and agencies can help you to prepare for a contamination threat or incident. See the section on "Additional Resources" at the end of this Handbook.

- ❏ Seek out support and training by contacting your state drinking water primacy agency and technical assistance providers (e.g., state rural water association).

The next chapter describes a general game plan for managing the response to a contamination threat or intentional incident.

The diagram below shows the intended audience for each module of the Toolbox.



Contamination Threat Management Guide

2

Contamination Threat Management Guide

Introduction

If a contamination threat or incident occurs, you should act quickly to protect public health and limit the spread of the contaminant, based on the best information you have at the time. You should also avoid over-reaction or false alarms that might inconvenience your customers and harm your credibility. You may not have all the information needed to determine whether the water has been contaminated or not, because this may require water testing, which takes time. As new information becomes available, however, you might change the way in which you are dealing with the threat or incident.

In this chapter, you will learn about a general, yet systematic approach for evaluating contamination threats and managing the overall response to a contamination threat or incident. You will learn how to manage a threat response in a timely manner to protect public health, using due diligence. For effective contamination threat management, this systematic approach or general game plan for threat response is perhaps the most important planning tool covered in this Handbook.

Chapter 2 covers the following topics:

- Roles and responsibilities;
- A general plan for responding to contamination threats and incidents;
- How to evaluate a water contamination threat;
- How to make the right decisions and when;
- Types of information needed to evaluate threats;
- Response actions to protect public health; and
- Exercising care in response actions.

Chapter 2 summarizes Module 2 of the Toolbox, which can be obtained at EPA's Water Security website at www.epa.gov/watersecurity.

Roles and Responsibilities

The vast majority of threats and incidents will likely be handled by individual utilities working together with their local responder network. Some incidents may be elevated to the federal level, especially incidents involving terrorism or an incident of national significance, such as a severe hurricane. This section of Chapter 2 briefly outlines roles and responsibilities from the federal level down to the utility level.

Federal Roles:

The National Response Plan (NRP)

The **National Response Plan**, or **NRP**, establishes a comprehensive all-hazards approach to manage domestic incidents. The NRP brings together individual federal agency response plans, the Concept of Operations Plan, the Federal Response Plan and the Federal Radiological Emergency Response Plan into a single, comprehensive approach.

The NRP includes the best practices and procedures from several incident management disciplines (e.g., homeland security, emergency management, law enforcement, fire fighting, public works, public health, responder and recovery worker health and safety, emergency medical services, and the private sector) and combines them into one. The NRP outlines how federal departments and agencies should work together and how the federal government should coordinate with state, local, and tribal governments and the private sector during incidents.

As an example, the NRP designates the U.S. Department of Health and Human Services (HHS) as the lead federal agency in response to a disease outbreak (which could be the result of intentional water contamination) requiring federal assistance. The NRP recognizes, however, that state, local, and tribal governments are primarily responsible for detecting and responding to disease outbreaks and implementing measures to minimize the health, social and economic consequences of such an outbreak. Coordination between HHS and local authorities would occur as necessary to determine current medical and public health assistance requirements.

EPA supports HHS by providing technical and policy assistance in matters involving drinking water supplies. To learn more about the NRP, visit the Department of Homeland Security website at www.dhs.gov.

Federal, State and Local Roles:

The National Incident Management System (NIMS)

During an incident, the **National Incident Management System,** or **NIMS,** further defines roles and responsibilities. NIMS has established standardized incident management processes, protocols, and procedures that all responders (federal, state, tribal, and local) should use to coordinate and conduct response actions. The use of standardized procedures should enable you and other responders to focus on incident management when a water security incident occurs. These standardized procedures apply whether the incident is related to terrorism, an accident or a natural disaster.

NIMS is maintained by the NIMS Integration Center (NIC) that, under the direction of DHS, provides strategic direction and oversight for NIMS. One function of the NIC is to help establish general training requirements and to develop national-level training standards and course materials associated with NIMS.

The overwhelming majority of emergency incidents will be handled on a daily basis by a single jurisdiction at the local level. However, there will be some instances, such as terrorist attacks, accidents or nationally significant natural disasters, in which successful incident management requires the involvement of emergency responders from multiple jurisdictions, as well as personnel and equipment from other states and the federal government. These instances require effective and efficient coordination across many organizations and activities. The Incident Command System (ICS), as described below, provides the management framework to achieve this coordination.

To ensure further coordination during incidents involving multiple jurisdictions or agencies, the principle of Unified Command (defined below) has also been incorporated into NIMS via the ICS.

To learn more about NIMS and training opportunities, visit the FEMA website at www.fema.gov/nims/.

Federal, State and Local Roles:

The Incident Command System (ICS)

Under NIMS, the **Incident Command System (ICS)** is the national standard for the **command, control,** and **coordination** of a response. The flexible nature of the ICS structure allows for the numbers and types of people on the response team to change over time as the need for resources and skills changes.

The ICS organization can expand or contract to address a particular incident, **but all incidents, regardless of their size or complexity, will initially have a single Incident Commander. The Incident Commander is the individual responsible for managing the overall response to the crisis.** The Incident Commander frequently oversees a group of people, often from his or her own organization as well as other agencies or organizations, who are responsible for responding with due diligence to the contamination threat or incident.

To learn more about NIMS and ICS training opportunities, visit the FEMA website at www.fema.gov/nims/.

Local Role:

Incident Command at the Water Utility

If a threat or incident is discovered first by water utility personnel, you or an appropriate designated person should be the Incident Commander, at least initially. As additional responders arrive in response to your notifications, command may transfer to an agency that has primary authority for overall control of the threat or incident or to a more senior or better qualified first responder. At the transfer of command, you should give the incoming Incident Commander a full briefing and notify all staff of the change in command.

Organizations that may provide an Incident Commander include:

Water Utility: Every water system should designate a lead emergency response coordinator and an alternate. This point person can be known as the **Water Utility Emergency Response Manager (WUERM)** or by some other title as defined by the utility. **This individual (which may be you) is responsible for managing the water utility's internal emergency response procedures and may initially be responsible for Incident Command.**

Drinking Water Primacy Agency: If the utility does not have all the resources needed to manage the threat, the drinking water primacy agency may take the lead after being notified by the water utility. The roles of the utility and the drinking water primacy agency should be defined during the planning stage.

Public Health Agency (state or local): This agency may take the lead in Incident Command if there is a public health crisis and no criminal act is involved or at least not initially suspected.

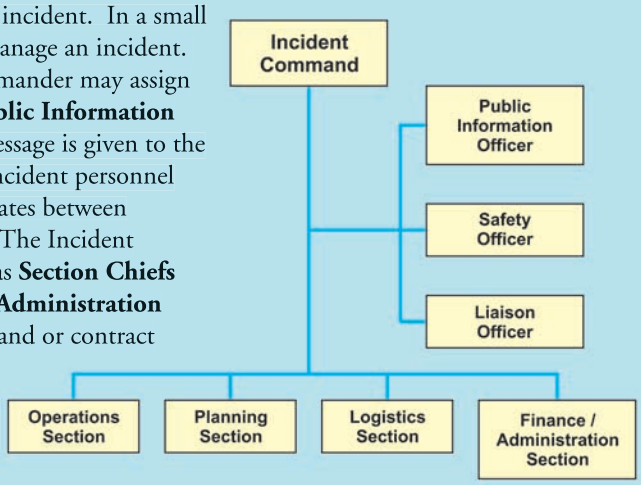
Local Law Enforcement: May take on Incident Command if the site of an incident is a crime scene.

HazMat/Fire Department: If the incident involves a hazardous material or spill, an individual from one of these organizations may assume Incident Command.

FBI: The FBI may assume Incident Command if the FBI determines that a federal crime (e.g., terrorism or an incident crossing state lines) has been committed.

How does the ICS organization grow or shrink to fit the incident?

The **Incident Commander** has overall control over the incident. In a small incident, he or she may be the only person needed to manage an incident. In larger or more complex incidents, the Incident Commander may assign other members of the **Command Staff,** including a **Public Information Officer** (vital in assuring that an accurate, consistent message is given to the public), a **Safety Officer** (responsible for the safety of incident personnel and operations) and/or a **Liaison Officer** (who coordinates between incident command and the various response agencies). The Incident Commander also may assign **General Staff,** who serve as **Section Chiefs** for the **Operations, Planning, Logistics** and **Finance/Administration Sections**. The Section Chiefs have the authority to expand or contract their sections as the resource (people and equipment) demands of the incident increase or decrease.



Federal, State and Local Roles:

Unified Command

In most cases, more than one organization or agency has jurisdiction or statutory authority in managing a response, and a **Unified Command** may be established. Unified Command is a team effort that allows all agencies with responsibility for the incident, either geographic or functional, to manage an incident together by establishing a common set of incident goals and strategies. Unified Command not only coordinates the efforts of many jurisdictions, but provides for and ensures joint decisions on plans, priorities and public communications. Unified Command does not have a single Incident Commander; instead, representatives from several responding agencies contribute to the command process. Unified Command does not mean losing or giving up any of your individual agency's authority, responsibility, or accountability.

Free Online Training in NIMS, NRP and ICS:

FEMA offers free online training courses to help you become familiar with NIMS, the NRP, ICS, and the duties of being an Incident Commander. Examples of courses include:

National Incident Management System: NIMS is now the nationwide standard for incident management, and NIMS certification (by September 30, 2006) is required in order to be eligible for federal preparedness grants. FEMA's online courses include IS-700 National Incident Management System and others.

National Response Plan: The NRP is based on NIMS; together, they provide a template for effective threat prevention and response. FEMA's online courses include IS-800 National Response Plan and others.

Incident Command System: Use of ICS is recommended under NIMS. FEMA's online courses on ICS include IS-100 (Introduction to the Incident Command System), and IS-200 (Basic Incident Command System). There is also IS-100.PW (Introduction to the Incident Command System for Public Works).

To enroll in these courses, visit FEMA's website at http://training.fema.gov/EMIWeb/IS.

Your Role and Responsibilities

As the utility emergency response manager or utility manager, you should make decisions and carry out your utility's pre-existing plans for responding to an incident. Depending on the situation, you may also assume the role of Incident Commander. As each incident is unique, your role in the ICS may change. In one incident, you may provide information to the Incident Commander from another agency to carry out a response. In another incident, your input may be included as part of the Unified Command decision-making process.

Figure 1 shows how your role may change at various stages during an incident. At the **'possible'** threat stage, you will most likely be the Incident Commander. At the **'credible'** threat stage, the figure shows that Incident Command will be dictated by the situation and that command may shift as more becomes known about the situation. It is highly likely that any **'confirmed'** contamination threat (especially if terrorism related) will be managed by a Unified Command, and you may be in Unified Command or in a supporting role.

The textbox on the following two pages provides an example that shows how your role may change throughout the process of threat evaluation and response.

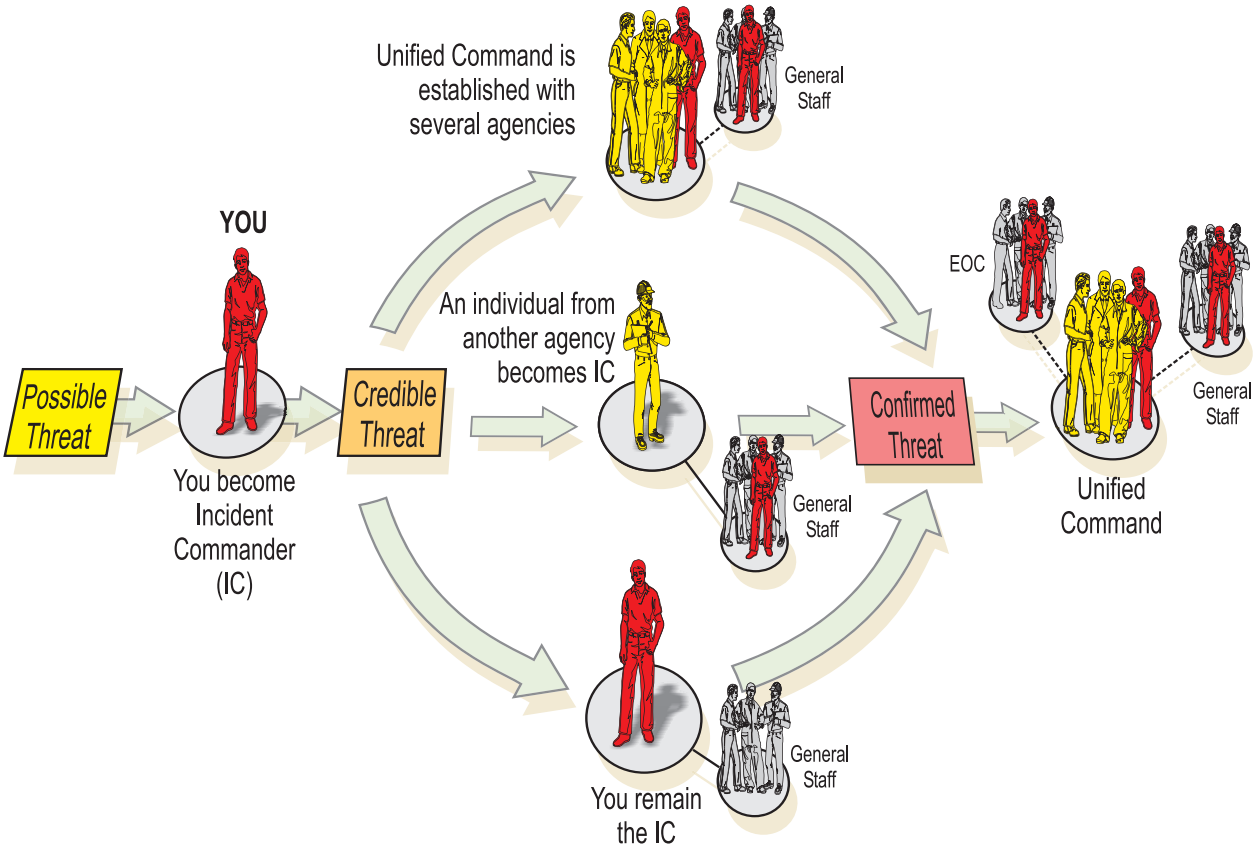


Figure 1. How Your Role May Change

Example of How Your Role May Change During Threat Evaluation and Response: You have just received a phone call from an unknown individual claiming to have contaminated one of your water tanks. Once you decide that this threat is **'possible'** based on the details of the threat warning and your knowledge of the water tank in question, you should next determine if the threat is **'credible'**. You may also consider initiating **operational response actions,** such as isolating the suspect water tank, if feasible. You may wish to consult with outside resources, such as your state primacy agency or police, to help you determine if the threat is **'credible'**.

Next, you or one of your staff and another employee may drive to the water tank to begin an initial **site characterization** to see if there is anything unusual (see Figure 2 on page 18 describing threat evaluation and response). Other employees may be sent to collect water samples from the distribution system. On arrival at the water tank, you discover that the fence is cut, ripped-open bags with a white powdery residue are scattered about, protective suits and latex gloves are piled in a heap, and the tank hatch is open.

Recognizing that this is potentially a crime scene and not knowing how dangerous the powder is, you may decide to call the police to the scene of what now appears to be a **'credible'** threat. Once the police arrive, you may decide to relinquish incident command to the responding law enforcement officer, who is probably better qualified to address the potential criminal and HazMat issues. However, you should assist law enforcement officials in the ensuing response and investigation. You should also continue to direct your own staff within your utility's internal ICS structure.

As the situation unfolds, you might receive a call from the local public health agency, which informs you that people in the area of the water tank are reporting to the local hospital complaining of similar illness symptoms. You should instruct the public health agency to notify the Incident Commander via the Liaison Officer.

Meanwhile, the Incident Commander has already called the National Response Center, a single point of contact for all pollution incident reporting, and a regional HazMat team to do a more intensive site characterization that includes rapid field screening of the white powder. Preliminary indications are that the powder is some form of poison. Although you or Incident Command do not yet have any lab results from water samples to **'confirm'** that this potential poison is in the water, the Incident Commander decides that a preponderance of evidence now exists to determine that the threat is **'credible'**.

At this point, having determined that the threat is **'credible'**, the Incident Commander notifies the public, through the Public Information Officer, that they should not drink the water. The Incident Commander also informs the public of what is being done to provide an alternate supply of safe drinking water. He or she may also notify the FBI and activate the **Emergency Operations Center (EOC)** to support the response.

What is an Emergency Operations Center?

The **Emergency Operations Center**, or **EOC**, is a pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response to an emergency. It is not a part of on-scene incident management, but rather supports the on-scene Incident Commander or Unified Command by arranging for needed resources.

By now, many more agencies have been notified by the Incident Commander or the EOC, and a Unified Command may be formed to lead the response. In this situation, Unified Command may have members from the police, FBI, HazMat, state, EPA and other agencies having jurisdiction over the incident. At this point, you may report to the EOC to assist in their response efforts. However, someone should be designated as the utility's internal Incident Commander, who will undertake operational responses at your utility in support of Unified Command.

In this example, Unified Command will continue to work with appropriate laboratories, including laboratories only accessible by federal agencies such as the FBI, to **'confirm'** the contamination incident. Once the white powder has been positively identified and detected in the water system and the threat or incident has been **'confirmed',** Unified Command will update or revise their public notifications. Unified Command will most likely direct you to undertake appropriate operational and **remediation and recovery** activities at your utility.

Even if the contaminant is never positively identified in the water, Unified Command, in consultation with public health, may still determine that the contaminant was introduced into the water system, based on a preponderance of evidence.

Tip: Your local emergency plans may differ from the example presented here. This is why it is very important for you to talk with other first responders in your area so that you will understand where you "fit in" in various emergency scenarios.

Keep in mind that ICS is a flexible system and will be uniquely established by the Incident Commander (which may be you or someone from another agency) or Unified Command for each incident. The example given above is only one of the many ways in which ICS may be used to effectively manage a water supply incident. Your local and state policies and procedures may require different actions than those described in the example given above. This is why it is important for you to include your local first responders, local emergency planning committee (LEPC), public health and state primacy agencies in your emergency response planning efforts.

Remember: Regardless of the organization responsible for incident command, the utility has an ongoing responsibility to serve as a technical advisor to the Incident Commander or Unified Command for issues related to the operation of the water system and ensuring water quality.

A General Plan for Threat Response and Threat Management

The goals of threat response and threat management are to: 1) evaluate the threat, 2) take necessary steps to protect public health while the threat is being evaluated, 3) 'confirm' the threat, 4) remediate the water system if necessary, and 5) return the system to safe, normal operation as soon as possible.

To achieve these goals, the response to a contamination threat or incident should be efficiently managed. Threat response and management involves a number of steps, actions and decision points. The most important lesson of this chapter is to understand these key elements and how to proceed from one decision point to the next to achieve these goals. The key elements of threat response are summarized below and in Figure 2, with key terms in bold:

Step 1. Decide if a threat is **'possible',** take appropriate preliminary response actions to protect public health, and proceed to Step 2.

Step 2. Determine if a **'possible'** threat is **'credible'** through consultation with other utilities, the drinking water primacy agency, public health and other agencies. If it is **'credible',** notify the necessary agencies and the public, take appropriate response actions to further protect public health, and proceed to Step 3.

Step 3. 'Confirm' a **'credible'** threat (which results in a **'confirmed'** contamination incident), take appropriate public health and other response actions, and proceed to Step 4.

Step 4. Remediate the water system; and

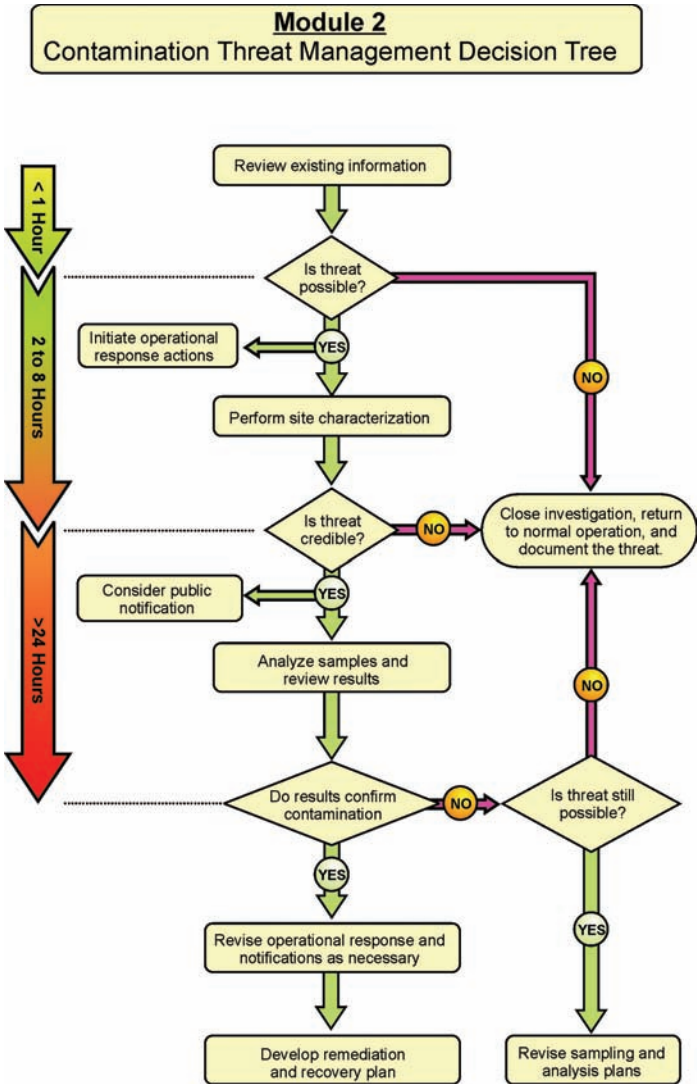


Figure 2. Process of Threat Evaluation and Response

Step 5. Return the water system to normal, safe operation (recovery).

Each of these steps is described in more detail below and in Module 2 of the Toolbox.

Please note that your responsibility, as the water utility manager (or emergency response manager), is to operate and maintain a safe water system, ensure a safe water supply

and provide public notification regarding impaired drinking water quality. In a threat situation or contamination incident, a different Incident Commander or Unified Command structure may be in charge of Steps 2 through 5, as explained previously. You can serve an important role by providing technical advice on your water system to the Incident Commander or Unified Command.

A detailed **Decision Tree** for responding to a contamination threat or incident is available in Module 2 of the *Response Protocol Toolbox.*

Step 1: Decide if the Threat is 'Possible'

After receiving a threat, the first step is to decide if the threat is **'possible'**. This is the first decision-point and the lowest threat level.

A water contamination threat is **'possible'** if the circumstances suggest that contamination could have occurred. If the threat is found to be impossible, then the investigation is closed, the incident is documented, and operations are returned to normal. However, if the contamination threat is **'possible',** then further investigation is needed. It is likely that most contamination threats will be classified as **'possible'**.

To decide whether a threat is **'possible'** or not, you need reliable information in the one hour you have to make a decision. Often, the threat warning itself can provide much information.

If the threat warning is **'possible'**, then go on to Step 2 (see below). However, if the threat warning is not believable because it comes from an unreliable source or the situation does not lend itself to such contamination, you may decide that contamination is not **'possible'**. If the threat warning is not **'possible'**, then your response actions are to note the incident and the reasons for the decision to return to normal operations.

How much time do I have to decide if a threat is 'possible' or not?

Speed is critical for protecting public health. Once a threat warning is received, you should act with due diligence to manage the threat. You should decide quickly if a contamination threat is **'possible'** within one (1) hour from the time you receive the threat warning. You may have to make a decision based on the limited information available at the time.

A threat warning is an indication that something may be wrong. Examples of different threat warnings that may be classified as **'possible'** are:

- **Security breach** – evidence of an unauthorized entry into a secured facility, such as an alarm, cut fence, etc.
- **Witness account** – someone directly witnesses suspicious activity and notifies the utility.
- **Direct notification by perpetrator** – the perpetrator sends a verbal or written threat to the utility.
- **Notification by news media** – a threat is sent to the media, or the media may learn of a threat and pass it on to the utility.
- **Notification by law enforcement** – a law enforcement agency may pass along information about a threat to a utility.
- **Unusual water quality** – on-line monitoring, grab sampling or an early warning system indicate unusual water quality results.
- **Consumer complaints** – an unusual or unexplained increase in consumer complaints may indicate contamination.
- **Notification by public health agencies** – health agencies or health care providers observe increased illness, disease or death rates, which may indicate a contaminated water supply.

Who Do I Notify Once A Threat is 'Possible'?

Once you decide that a threat is **'possible'**, you should notify other utility staff. You may also want to consult with or notify your local law enforcement agency and drinking water primacy agency, depending on the nature of the threat. Be aware of your state's reporting requirements.

Remember:

- Use due diligence at all times.
- Encourage staff to immediately report any and all threat warnings to you, 24 hours a day, 7 days a week, 365 days a year.
- Within one (1) hour of receiving the threat warning, you should decide whether the incident is **'possible'** or not.
- Practice notification and reporting procedures ahead of time to be prepared for a real emergency.
- Most threats will end up being **'possible',** unless you are able to absolutely rule out the possibility of contamination.

Step 2: Determine if the Threat is 'Credible' and Protect Public Health

Once you have decided that the threat is **'possible',** you should immediately do two things:

- Determine if the threat is **'credible'** or not; and if it is **'credible',** then
- Protect public health through operational responses.

These two actions should be carried out together, because your first and highest priority is to protect public health, so you should move quickly to determine if the threat is **'credible'** or not.

The word **'credible'** means believable, plausible or reliable. A contamination threat is **'credible'** if the threat is both **'possible'** and other reliable information shows that there is reason to believe that the threat warning is real and that contamination is likely. **A 'credible' threat is a much higher threat level than a 'possible' threat.**

How much time do I have to decide if a threat is 'credible' or not?

As a general rule, once you have decided that the threat is **'possible',** you should determine within 2 to 8 hours whether the threat is also **'credible',** based on site information, the nature of the threat, the circumstances and other reliable information.

It is crucial to make this assessment quickly, because if the threat does turn out to be **'credible',** public health and safety are at stake. Here are some actions you can take to determine if a threat is **'credible'** or not:

1) Conduct a **site characterization** by collecting more information about the site of the **'possible'** contamination to help decide if the **'possible'** threat is also a **'credible'** threat. This step should probably involve sample collection to find out if contaminants are present and to help **'confirm'** the threat. Proper sample collection should help to ensure that lab analyses provide useable data. Law enforcement agencies may be investigating the site as well, and you should assist them in protecting a crime scene. See Chapter 3 of this Handbook to learn more about site characterization.

2) Check to see if there have been previous security incidents similar to the current **'possible'** threat, including previous incidents at your utility and/or elsewhere.

3) Consult early with other agencies and organizations to get information to help you evaluate the threat. Some useful sources of information are listed below (Note that not all of these may be relevant, depending on your locality and the threat or incident under investigation):

- Your state drinking water primacy agency;
- EPA Regional Office;
- The National Response Center;
- Law enforcement agencies and your regional FBI Joint Terrorism Task Force;
- Neighboring utilities;
- Public health agencies (local, state, and federal – the latter includes the CDC, ATSDR, and NIH);
- 911 call centers;
- Homeland Security Warnings and Alerts (see the DHS website at www.dhs.gov);
- Water Information Sharing and Analysis Center, or WaterISAC, which can assist in threat evaluation (see the WaterISAC website at www.waterisac.org);
- Contaminant information from EPA's Water Contaminant Information Tool (WCIT) at www.epa.gov/wcit;
- Use the Contamination Threat Management Matrices (see Module 2, p.54 of the Toolbox) and the *Response Guidelines* to help you collect and organize information and evaluate the threat; and
- Other resources listed in the "Additional Resources" section of this Handbook.

You should now decide if the threat warning is **'credible'** or not. However, because of the types of information needed, the determination of credibility of the threat will most likely involve more parties than your utility alone.

If the threat warning is not **'credible'**, then the investigation is closed, the incident is documented and water system operations are returned to normal.

If you determine that the threat warning is **'credible',** then you should notify appropriate agencies and the public, undertake suitable response actions to protect public health and **'confirm'** the threat (see below).

To protect public health, provide **immediate operational responses** to prevent or limit public exposure to the (potentially) contaminated water. See Chapter 5 for examples of operational responses that may include isolating suspect water or increasing levels of disinfection. For a **'credible'** threat warning, the public health goal is to minimize public exposure to the suspected contaminated water. If it is not possible to provide an operational response that effectively reduces the possibility that the public will be exposed to the suspected contaminant, then you should speed up your assessment of the credibility of the threat.

Collecting and Organizing Information For Threat Evaluation:

"Contamination Threat Management Matrices"

To help you collect and organize the information to help determine if a threat is **'possible', 'credible',** or **'confirmed',** see Module 2 of the Toolbox for the "Contamination Threat Management Matrices". Each matrix covers:

- Information and factors considered in assessing a threat;
- Possible notifications; and
- Possible response actions.

These generalized matrices can be customized to your utility or to specific incidents. Customized matrices can be used in your utility's Emergency Response Plan.

Response Guidelines

The *Response Guidelines* is a companion to this Handbook and contains emergency response planning checklists, standard report forms and other forms to help you manage and organize your emergency response. Visit www.epa.gov/watersecurity to download this document.

Who Do I Notify Once the Threat is 'Credible'?

Once you decide that the threat is **'credible,'** you should report the threat to your drinking water primacy agency, public health agencies, law enforcement agencies and others, if you have not done so already. They will need some basic information, such as your name, contact information, a description of the threat, incident or event, and its location. You may also need to notify the public. Be aware of your state's reporting requirements.

Step 3. 'Confirm' the Threat

Once you decide that a threat warning is **'credible',** you should work with your drinking water primacy agency, public health agencies and law enforcement agencies to **'confirm'** the threat. Here are some steps in confirming the threat:

1) **Send water samples collected during site characterization to a laboratory for analysis and identification of unknown or suspected contaminants in the water.** The best way to **'confirm'** contamination is to provide factual evidence of contamination by measuring contaminants through laboratory analyses of water samples. Laboratory analysis can potentially identify and/or **'confirm'** contaminants(s), although it is important to keep in mind that not all contaminants can be identified and/or **'confirmed'** by every laboratory (see Chapter 4 of this Handbook). Lab data can also be useful in planning and implementing remediation activities (see Chapter 6). However, if laboratory analysis of samples is not possible for some reason, the standard for **'confirming'** a **'credible'** threat is that a "preponderance of evidence exists" to confirm an incident. **A preponderance of evidence means that most of the evidence available points in this direction.**

2) **Conduct additional site characterization and sampling if needed to 'confirm' a contamination incident.** You may need more information after your initial site characterization to **'confirm'** the incident. For example, your initial site characterization and sampling may indicate that the contaminant was introduced somewhere outside the area where you first sampled. (Note: If the **'credible'** contamination threat cannot be **'confirmed',** then the additional site characterization and water sampling is done to make sure the water is safe and to support the decision to return to normal operations).

3) **Notify law enforcement agencies in the event that criminal activity is involved, if you have not done so already.** Law enforcement agencies may need to collect evidence and samples to determine whether or not criminal activity occurred. You should continue to help ensure a safe water supply and work together with law enforcement agencies to obtain evidence that could help to **'confirm'** whether contamination occurred or not.

Once you have lab results and other information, you should decide whether the threat can be **'confirmed'** or not. When a threat is **'confirmed'**, you should immediately notify appropriate public health agencies (if you have not done so already). This sets the stage for public health agencies to make public health recommendations. Review the public health protection measures that may already have been provided (when the threat was found to be **'credible'**), and provide additional protection measures if needed. You may also be required to notify the public. See Chapter 5 of this Handbook for more information on public health.

Public notification may be required at any stage of the threat evaluation process under the National Primary Drinking Water Regulations: Public Notification Rule, which says that the public should be notified when there is a *"situation with significant potential to have serious side effects on human health as a result of short term exposure."* (see www.epa.gov/safewater/pn.html).

Public health advisories may be issued, such as:

- "Boil water";
- "Do not drink the water";
- "Do not use water" (including no flushing of toilets and no use of water for fire fighting).

Remember, **'confirming'** a **'credible'** threat represents an important and necessary decision-making step. Once a threat is **'confirmed'** and it becomes a contamination incident, decisions should be made concerning public health responses, and remediation and recovery. Keep in mind that it may take several rounds of information collection and evaluation to **'confirm'** a threat.

If the threat cannot be **'confirmed'** because there is not enough information, the process of collecting information should be continued until a preponderance of evidence indicates that the threat either can be **'confirmed'** or, alternatively, the threat cannot be **'confirmed'** because it is an empty threat.

Why should I 'confirm' a 'credible' threat?

You should **'confirm'** a **'credible'** threat because responding to a **'credible'** threat is an important decision that could affect public health, affect your water system, involve different agencies and require resources. To **'confirm'** a **'credible'** threat, you should be certain, based on definitive lab results or a "preponderance of evidence" that the threat is plausible and believable. **Once a threat is 'confirmed', it becomes a contamination incident.**

Step 4. Remediate the Affected Water System

In this step, the goal is to remediate the contaminated water system to remove or inactivate the contaminant and test the water to make sure that the remediation has worked. Remediation is discussed in more detail in Chapter 6.

By this time, if the threat has been **'confirmed'** to be a contamination incident, a Unified Command structure will probably be established and other agencies and organizations will be responsible for overseeing the response and remediation. During remediation, your role as water utility manager will most likely be to work with the remediation team and Unified Command to help ensure recovery of the water system.

Step 5. Recovery of the System

In this step, the goal is to return your water system to safe, normal operation, which is also called recovery. Recovery of your water system can begin as soon as remediation is complete. If a portion of your water system is remediated, you may be able to resume normal operation of that portion provided that it does not affect remediation of other affected parts of the system. Keep in mind that your customers may still be experiencing residual contamination from within their home or business plumbing. As the water system is remediated and returned to normal, it is important to keep your water utility customers informed. Recovery is discussed in more detail in Chapter 6.

Now that the general process of threat response has been described, the following chapters will describe site characterization, sample analysis, the public health response, and remediation and recovery in more detail.

Remember, successful response involves:

- Planning before an incident occurs;
- Responding in a timely manner and using due diligence;
- Protecting public health;
- Investigating and documenting the incident;
- Identifying the contaminant;
- Basing your decisions on a "preponderance of evidence" if sample analyses are not conclusive;
- Choosing the right remediation in collaboration with others; and
- Returning the system to normal, safe operation (recovery).

Site Characterization And Sampling Guide

3

Site Characterization and Sampling Guide

Introduction

In this chapter, you will learn about site characterization and sampling to obtain the information needed to decide whether a threat is **'credible'** and/or **'confirmed'**. Site characterization involves investigating the site to find out the **what, where, when, who, why** and **how** of the contamination threat. A site could be your entire water system or a component of it, such as the distribution system, source water, treatment facility, storage tanks or some other area that may have been contaminated. Site characterization activities include site investigation, field safety screening, rapid field testing of the water and sampling.

Chapter 3 summarizes Module 3 of the Toolbox, which can be obtained at EPA's Water Security website at www.epa.gov/watersecurity.

Investigating the Site

To determine if a threat is **'credible'** and to **'confirm'** a **'credible'** threat, you will need factual evidence concerning the nature of the threat, what the contaminant is, and how serious the contaminant may be in terms of public health. Site characterization and sampling are done to help you get this factual information.

Site characterization results are important to get, but it is just as important to make sure that the site is safe to enter. You should decide if it is safe to proceed with site characterization, whether other equipment or specially trained personnel are needed, whether another approach is needed and many other issues.

Because a utility probably will not have staff trained to deal with all hazards, you should

decide ahead of time what you can and cannot do and whether you may need help from other organizations or agencies. For example, you may be able to do visual inspections and test basic water quality at low hazard sites, but you may not have the equipment and/or training to test for more hazardous substances. You may need to call a HazMat team which has the equipment and training to safely deal with hazardous materials.

Good planning calls for your utility to make prior arrangements with a laboratory to provide sample kits with appropriate, clean sample containers, before any threat or incident occurs. Utilities should keep pre-staged sample kits on hand. Refer to Chapter 4 for more information. You should then be better prepared if a threat warning is received or an emergency occurs. **Arrangements with other organizations should be made ahead of time to respond effectively to a threat. The best way to prepare is to communicate, plan, and practice.**

Who Does the Site Characterization and Sampling?

The answer to this question depends on what stage of site characterization and sampling you are in. You or another designated utility emergency response lead may carry out the first steps of site characterization and sampling. Or, an Incident Commander from another agency may oversee the threat response, beginning with site characterization and sampling.

The **Site Characterization Team** is the group that actually performs site characterization and sampling activities. This team may include people from the water utility, police and fire, HazMat specialists, environmental response teams from government agencies, public health officials, FBI and EPA criminal investigators, civil support teams and other agencies.

> The **Incident Commander** or the WUERM manages the site characterization and sampling. The site characterization team carries out the investigation. The utility remains involved at all times, but its role may change as a particular investigation progresses.

Ensuring Safety and Protection for Personnel

Protecting the safety of the Site Characterization Team during site characterization is critical. Team members must have the proper training, protective gear, clothing and other equipment needed to safely inspect and sample the site. If there is a threat to safety, then the team should stop until the proper gear, personnel, or equipment can be obtained.

What Does Site Characterization Involve?

First, the Site Characterization Team develops and uses a customized site characterization plan as a set of guidelines for investigating the threat. Each threat or incident will be different, so every site characterization plan will be different. However, all plans will share certain features in common. You may already have a generic site characterization plan which should contain the following five elements:

1) Hazard evaluation (including an initial hazard assessment before entering the site and ongoing reassessment of the hazard as you collect more information);
2) Approaching the site and doing a field safety screening;
3) Characterizing (investigating) the site;
4) Collecting samples; and
5) Leaving the site.

Each of these elements is described below.

Initial Hazard Assessment Before Entering the Site

The first step in developing a specific site characterization plan is to decide if the site is safe to enter and investigate further. This is done by making an **initial hazard assessment** before the team is sent to the site. You or the Incident Commander (which may be you) should make this initial hazard assessment, based on the available data and initial threat evaluation. A decision is made regarding the potential need for special hazardous material handling techniques or equipment. This is a very important step that protects the safety of anyone who enters the site. People should not be sent into a dangerous area without protection. Response plans should document who would be called to respond to contamination threats under different hazard conditions.

Some possible hazard categories are described in the textbox. Although these hazard categories are based upon tentative identification of the particular type of contaminant at the site, there may be enough information in a threat warning to allow you to judge that a particular hazard category may apply to the situation, thus helping you to make an initial hazard assessment. As you get more information from the site characterization and sampling, you may want to revise your initial hazard assessment (and take appropriate precautions). Hazard evaluation is an ongoing and iterative process.

Possible hazard categories:

Low Hazard – there are no obvious signs of radiological, chemical, or biological contaminants at the site, in the air, or on surfaces. Contaminants that may be present in the water are assumed to be dilute and confined to the water.

Radiological Hazard – radiological isotopes or emitters are identified at the site or in the water (i.e., through the use of a field radiation detector).

Chemical Hazard – presence of highly toxic chemicals (e.g., chemical weapons or biotoxins) or volatile toxic industrial chemicals is potentially identified at the site or in the water, with a possible risk of exposure through dermal or inhalation routes.

Biological Hazard – presence of pathogens is potentially identified at the site, with a possible risk of exposure through dermal or inhalation routes.

The initial hazard assessment is also important for deciding who should be on the Site Characterization Team, because the team should have the skills, experience and equipment needed to deal with the hazards that may exist on the site. Some suggestions for possible staff are given below:

- If the site appears to be a "Low Hazard" site, the water utility staff may do the site characterization.
- If there are clear signs of greater hazard (radiological, chemical, or biological hazard), then HazMat professionals trained in hazardous materials safety and handling techniques may need to do the initial hazard assessment and the entire site characterization as well.
- The HazMat team may do the initial hazard assessment, find that the site is safe enough for others to enter, and allow the utility staff or other agency staff to enter the site to continue the site characterization.

The threat warning itself may suggest what the hazard is. Be alert to the possibility of "red herrings", where the threat warning suggests one type of hazard, yet the site actually contains a different hazard. Another example would be misleading clues designed to confuse the investigation. If this occurs, the contamination threat or incident is most likely intentional.

Approaching the Site and Doing a Field Safety Screening

In this step following the initial hazard assessment, the Site Characterization Team approaches the site and conducts a **field safety screening**. Field safety screening is done to observe site conditions and, in particular, to detect any immediate threats to the response team from contaminants in the atmosphere or on surfaces. Field safety screening might include field testing for radioactivity, chemical and biological agents. The site characterization team should already have been trained in the use of safety screening equipment. Because such equipment can be expensive, you may have to call in a HazMat specialist with the proper equipment and training to conduct such screening. Consider due diligence in all of your decisions and actions.

The first step in a field safety screening is to define the perimeter of the site before approaching it. The site perimeter should include the immediate area of the incident as well as a buffer zone for safety. Beginning at some distance outside the site perimeter, the Site Characterization Team carefully proceeds towards the site perimeter with appropriate personal protective equipment and field monitoring equipment and notes anything out of the ordinary. Signs of contamination could include dead or sick animals, discarded chemical containers, or other indicators.

Minimize risks by following common-sense safety practices, such as:

- Approach the site from upwind;
- Do not eat, drink or smoke at the site;
- Do not drink, smell, touch or taste the suspect water;
- Use appropriate personal protective gear (e.g., splash-proof goggles, respirator, disposable gloves, disposable shoe covers, and a disposable lab coat);
- Avoid skin contact with suspect water;
- Fill sample containers slowly to avoid splashing or creating spray or droplets of water that could spread the contamination; and
- Do not spend any more time than needed to characterize the site and get samples.

If there are signs of hazards, the team should stop their investigation and immediately contact the Incident Commander (who may be you). You should then decide how to proceed. It is recommended that the site be evacuated immediately and that a properly trained and equipped HazMat team be brought in to investigate.

If there are no obvious signs of hazards, the team should still contact the Incident Commander (who may be you) before crossing the site perimeter and entering the site. In most cases, you should be able to tell the team to enter the site and proceed with site characterization and collection of water samples to determine the nature of the threat or incident.

Characterizing the Site

After the field safety screening has been completed and if it appears safe to proceed, the team may continue the site characterization. The team should also do a **detailed visual inspection** of the site. They should perform **rapid field testing** of the water suspected of being contaminated. Recommended **core field testing** consists of monitoring for radiation, cyanide, chlorine residual, conductivity and pH of the suspect water.

Rapid Field Testing and EPA's Technology Testing and Evaluation Program (TTEP)

Rapid field testing of water suspected of being contaminated is done to try to identify the type of contaminant, so that the right laboratory analyses can be done. Equipment and instruments for rapid field testing are described on pages 27-30 of Module 3 of the Toolbox.

Information on field testing technologies is also available from the EPA's National Homeland Security Research Center (NHSRC), through its Technology Testing and Evaluation Program (TTEP). The TTEP is an outgrowth of EPA's successful and internationally recognized Environmental Technology Verification (ETV) Program. TTEP rigorously tests technologies for detection, monitoring, treatment, decontamination, computer modeling, and other tools for protecting water infrastructure and decontaminating structures and the environment.

For more information on TTEP, visit the NHSRC website at www.epa.gov/nhsrc/tte.htm.

There is no single field testing kit that tests for all possible radiological, chemical or biological contaminants. Because there is no way to test for everything, field testing should be used only as a guide, not as the final answer. A negative result during field testing may mean that there is no contaminant, or it may mean that your field screening kit is not sensitive enough to detect the contaminant or was not designed to measure the particular contaminant that is present.

Remember: To conclusively prove (or 'confirm') that water is either safe or contaminated, you must have water samples analyzed by a laboratory that is qualified to do such testing. Water samples should always be collected if there is any question that the water might be contaminated. These samples can be analyzed later by a laboratory.

Collecting Samples

After rapid field testing of the water, samples of the suspect water may be collected in case they are needed for later laboratory analysis. (Note that if a serious hazard is apparent, a HazMat responder may be needed to collect samples). Depending on the outcome of the threat evaluation, the Incident Commander (who may be you) may decide to send the samples to a laboratory or not. If the threat is **'credible'**, then the samples should be sent immediately to a laboratory for analysis. But if the threat is not 'credible', then the samples should be stored in a safe place for a specific period of time in case it later becomes necessary to analyze them. Keep in mind that sample holding times for radiological, biological and chemical contaminants can vary widely.

More information on sample collection, packaging and transporting can be found on pages 20-27 of Module 3 of the Toolbox.

Exiting the Site

After finishing the site characterization, the team should prepare to leave the site. Before leaving, the team should make sure that they have:

- Documented their findings;
- Collected all samples needed;
- Collected all equipment; and
- Re-secured the site (lock doors, hatches, gates, etc.).

There may be other actions to take before leaving the site. If the site is a possible crime scene, follow guidelines from law enforcement agencies to restrict or block access to the site and to protect any evidence from disturbance. If the site contains hazardous materials, it may be necessary to decontaminate the entire team and their equipment.

In the next chapter, you will learn about analyzing samples for contaminants, types of contaminants, and types of analytical laboratories.

Analytical Guide

4

Introduction

Chapter 4 is aimed at water utility staff who will plan, order and interpret laboratory analyses of water samples collected from the site of a suspected incident. In this chapter, you will learn how to plan for sample analyses before a contamination threat or incident happens, what to ask the lab to analyze for, how to set data quality goals and what precautions to take when handling or shipping samples. The following topics are covered:

1) What you should know about laboratory analyses and testing;
2) Safety considerations for handling suspected contaminated water samples;
3) Types of laboratories, the analyses they perform and how to access labs;
4) Making sure that analyses are conducted in a manner that ensures high-quality, useable results;
5) Screening approaches to determine if contaminants are present in a sample; and
6) Threat response planning for analytical laboratories.

Chapter 4 summarizes Module 4 of the Toolbox, which can be obtained at EPA's Water Security website at www.epa.gov/watersecurity.

What Do I Need to Know About Laboratory Analyses?

To plan effectively for threat response, you need to be familiar with the general types of contaminants, how samples are analyzed, what laboratories can perform such analyses, what to look for in the data and how to use the results in decision-making. It is not enough for you to simply "leave it up to the lab to decide what to analyze" because:

- The threat warning, the circumstances surrounding the threat, or information collected during site characterization or field safety screening may provide clues to the nature of the contaminant or compound. You should pass on such information to the laboratory so the right analyses can be performed.

- Different contaminants may need different sampling, preservation, handling or shipping methods, otherwise the samples may be compromised, resulting in poor quality data or useless data. You should be familiar with these differences so that your samples arrive at the laboratory in useable condition. Refer to Module 4 of the *Response Protocol Toolbox* for more information on sampling, preserving samples and shipping.

- In response planning and decision-making, you should take into account the time needed by a laboratory to analyze the sample for contaminants. This time will vary depending on the analyses and the nature of the contaminant and other factors.

- You should work with the laboratory to choose the analyses to be done, determine if the lab can do the analyses and specify the data quality goals (e.g., accuracy, precision, range).

Most importantly, you should work together with the laboratory to understand what the analytical results mean and the limitations of the data.

Safety Considerations for Water Utilities and Others

Contact with contaminated water, soil or other materials may pose serious threats to your health or safety and that of other water utility staff, emergency responders, Site Characterization Team members, transport staff, laboratory staff or others. Anyone who may be collecting, handling or analyzing samples that may contain unknown contaminants should plan ahead of time to ensure their own safety and that of their staff.

Utilities and laboratories should develop and routinely use Health and Safety plans ahead of time. You, the Site Characterization Team and the laboratory should discuss and clearly identify any potential risks associated with the suspect water to allow all parties to take appropriate safety measures. The laboratory should also have an internal hazard communication plan to ensure that everyone handling suspect samples is aware of the potential danger and takes adequate precautions.

Types of Labs and Analyses Performed

There are several ways to classify analytical testing laboratories in the U.S. Labs can be classified by sector, such as:

- **Utility labs**, such as your water utility's own lab, which may be the first to respond to most contamination threats;
- **Non-utility labs**, such as **commercial labs** that can analyze many kinds of contaminants in water, tissue, soil or air; **specialized labs** such as commercial, government or university labs that do highly specialized analyses; and **government labs** run by cities, counties, states, the EPA, FBI, Centers for Disease Control and Prevention (CDC) and other public agencies.

If your utility has a lab for testing water quality, then your lab will probably be the first lab to analyze samples suspected of being contaminated. Other non-utility labs can provide support by confirming your lab's analysis or by performing analyses that your lab may not be able to perform.

Sometimes your utility lab may not be able to analyze the samples, especially if site characterization suggests that the samples do not fall in the "Low Hazard" category described in Chapter 3. You may therefore decide that the samples should not be analyzed by your utility lab but should instead be analyzed by a non-utility lab that is certified to handle and analyze hazardous samples.

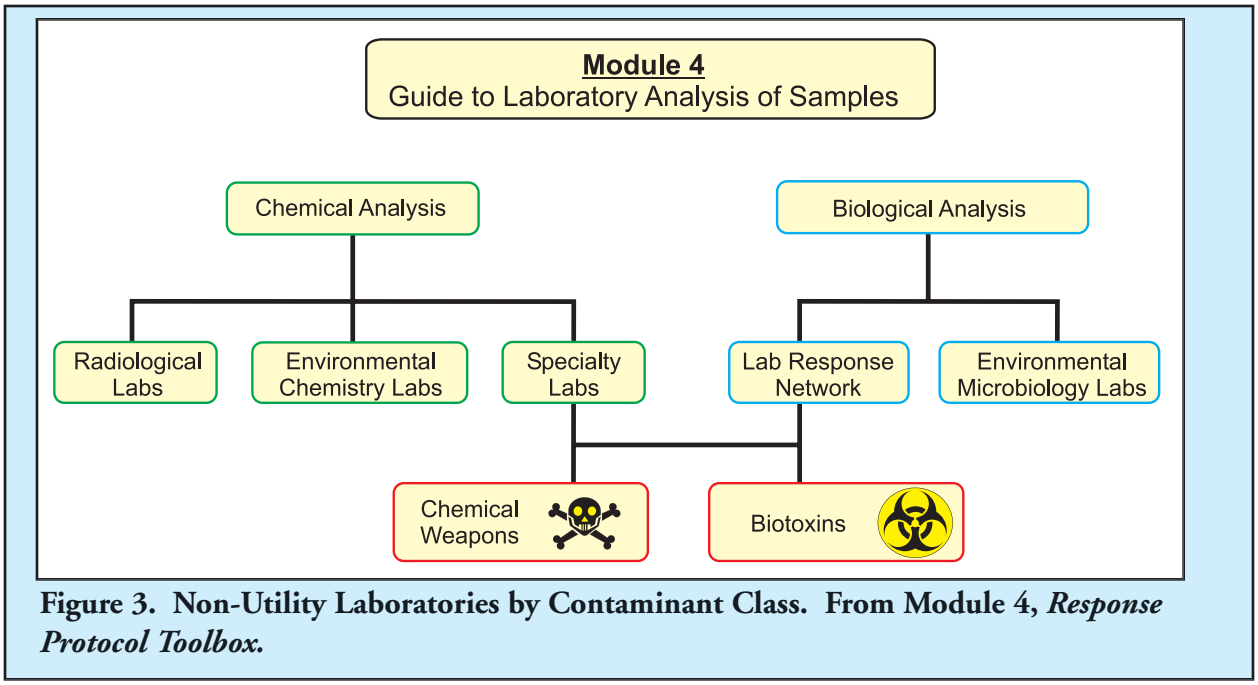


Figure 3. Non-Utility Laboratories by Contaminant Class. From Module 4, *Response Protocol Toolbox.*

You should also keep in mind that certain contaminants may potentially contaminate lab equipment, which could cause contamination of future tests. For this reason, it is important to get as much information concerning the possible contaminant as is feasible from the threat warning, the field safety screening and site characterization. This information should be shared with the laboratory staff in order to plan for analyses and to ensure both safety and good results.

Non-utility analytical laboratories can be classified according to the kinds of analyses they perform (Figure 3). Different analytical capabilities are briefly described below.

Non-Utility Laboratories That Perform Chemical Analyses

Radiological Labs: Radiological labs analyze and identify radioactive substances and contaminants such as radioactive isotopes (also known as radioisotopes), radionuclides, radiochemical compounds and radiological weapons. The EPA, Department of Energy (DOE), states and some commercial firms have labs that can analyze radioactive materials. The Federal Radiological Monitoring and Assessment Center (FRMAC), maintained by DOE, can provide information on analyzing radioactive materials.

Environmental Chemistry Labs: This group includes many EPA, state and commercial labs that test water samples to see if they meet federal and state drinking water standards under the Safe Drinking Water Act, Clean Water Act or other relevant environmental laws. Under these regulations, government-certified labs should use certain analytical methods that have been standardized and approved for use.

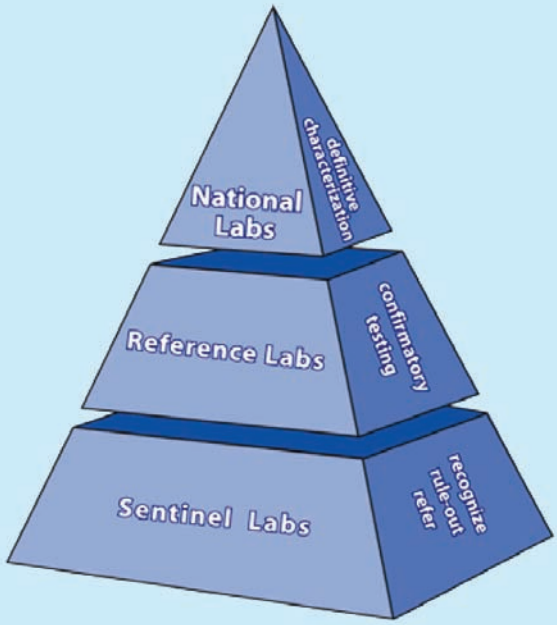
Specialty Labs: Specialty labs include both chemical weapons labs and biotoxin labs. Chemical weapons, defined by the Chemical Weapons Convention (CWC), can only be analyzed by labs that have the appropriate capability and legal authority. Nationwide, there are only a few of these labs, and analyses should usually be arranged by the proper authorities, such as the FBI or certain other federal agencies. Few laboratories currently exist which can perform chemical weapons analyses. Biotoxins, produced by animals or plants, can be analyzed by certain government or university labs. Some commercial environmental chemistry labs may also be able to perform certain biotoxin analyses.

Non-Utility Laboratories That Perform Biological Analyses

Laboratory Response Network (LRN) Labs: The Laboratory Response Network (LRN) was specifically developed to address bioterrorism threats. The LRN was set up by the CDC, the Association of Public Health Laboratories and the FBI. LRN labs include certain city, county, state and federal public health labs. Some labs that are part of the LRN can perform analyses of pathogens, some biotoxins and a "Select List" of particularly dangerous pathogens. During the planning stage, a utility should partner with such labs in order to jointly plan for threat or incident response; this should make it easier to quickly access lab services during an actual incident.

Environmental Microbiology Labs: These labs test for microbiological pathogens such as disease-causing bacteria, certain protozoans, viruses, fungi and other microorganisms. An environmental microbiology lab, state water quality lab, hospital lab, medical lab, public health lab or a lab that belongs to the LRN will probably be able to analyze pathogens in water samples. However, not all of these labs may be able to analyze contaminants resulting from bioterrorism, depending on what the contaminant is.

Diagrammatic Representation of the Laboratory Response Network



The LRN membership is organized into "Sentinel Labs" which recognize a contaminant, rule it out and/or refer the sample to the next level for confirmatory testing by "Reference Labs". At the top of the pyramid are "National Labs" (such as the CDC and the U.S. Army Medical Research Institute for Infectious Diseases, or USAMRIID), which are capable of definitive characterization of even the most hazardous biological agents. See Module 4, *Response Protocol Toolbox.*

Obtaining High-Quality Lab Results

Laboratory analyses of samples are performed to get accurate factual information on whether samples are contaminated or not. This factual information is needed to make important decisions which can affect many people. It is crucial that the analyses be performed in a manner that is credible, accurate and repeatable and that the results are of sufficient quality to be useful for decision-making.

(If the data will be used for a criminal investigation, refer to Section 3.5 of Module 4 of the Toolbox for further information).

Some steps to obtain high-quality analytical results include the following:

- Plan for analyses before a threat or incident occurs. Some labs may be able to run certain analyses with little or no advance notice. However, many labs should be contacted well before the analysis is done so they can prepare for the analysis;
- Choose a reputable, experienced and certified laboratory;
- Maintain communication with the Incident Commander, public health officials and the laboratory to ensure that the right analyses are performed;
- Use standard protocols for sample collection, storage, transport and processing;
- Use analytical methods which have been standardized to the greatest extent possible (e.g., EPA methods and other standardized methods);
- Work with the lab and drinking water primacy agency to define both data quality goals to ensure good, accurate results and suitable detection limits that can measure both background and harmful, elevated concentrations of the compound;
- Collect enough samples from appropriate locations to obtain meaningful, representative results; and
- Maintain good records, such as the chain-of-custody, sample locations, date and time of sampling, who sampled, shipping information, lab contact information, types of analyses requested and any observations.

EPA's Compendium of Environmental Testing Laboratories

This database of laboratories describes lab analytical capacities and capabilities. The database is designed to assist EPA and other users to identify qualified and appropriate laboratories that analyze chemical, biological, and radiological agents. Users must be registered to access the database. To log on, visit the website at www.epa.gov/compendium or contact your regional EPA laboratory.

Approaches to Analytical Screening For Unknown Contaminants

What should you ask the lab to analyze for when the contaminant is not known? **Screening is a systematic scientific approach to try to identify unknown contaminants that may be present in a sample.** Screening involves progressively analyzing a sample to try to identify an unknown contaminant(s) through skilled, systematic laboratory analysis. This can be very difficult when there may be thousands of possible contaminants. Contaminant identification may be even more difficult if there is no information from the threat warning, site characterization or field safety screening to indicate the nature of the contaminant, if any.

Unfortunately, there is no one screening process that can detect all known contaminants or compounds. In addition, different laboratories may have slightly different approaches to screening. Thus, the judgment and experience of an individual emergency response planner, Incident Commander or public health official can be extremely important in helping the lab to plan and/or implement the right screening approach that will result in identifying the contaminant(s) present, if any. This is another reason why everyone involved in emergency planning and response should understand at least the basics of laboratory analyses of samples.

Screening a sample that may contain contaminants involves sifting through evidence to narrow the list of unknowns down to a few suspected contaminants. Screening is done in two steps. The first step is the **Basic Screen** and the second step is the **Expanded Screen**.

The **Basic Screen** is a broad-spectrum screen for common chemical contaminants ("the usual suspects"). The Basic Screen uses widely-used methods to analyze the sample for a variety of contaminants of concern. However, these methods do not cover all contaminants that may potentially be used to contaminate water; for example, there are no standard tests for all biotoxins in water. Make sure that the laboratory has all the information from field screening before it undertakes a basic screen.

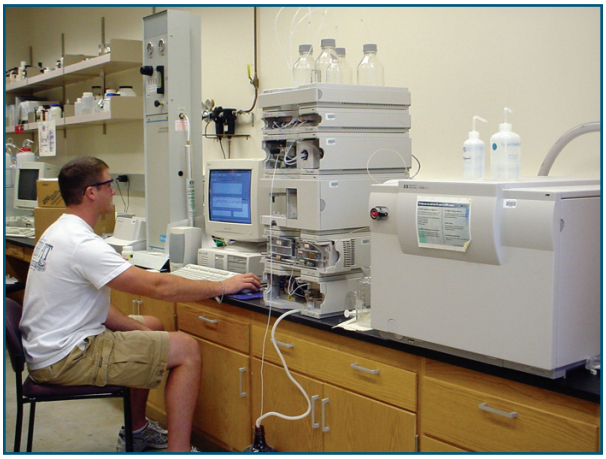
Basic screening for radiological contaminants is done by measuring radioactivity; for example, by using a Geiger counter. A Geiger counter can be used as a field screening tool, or it can be used in the lab. If radioactivity is detected, the chemical identity of the radionuclide should be determined through further analysis.

To cover the shortfalls of the Basic Screen, the **Expanded Screen** tests for more unusual chemical or biological contaminants. The Expanded Screen "explores" to find out what might be in the water sample and looks for contaminants that the Basic Screen may have missed.

Microbiological screening is similar to screening for chemical contaminants or biotoxins, except that it targets pathogenic microorganisms. It involves four steps:

1) Rapid field testing. The sample is tested in the field to see if the pathogen is present. Keep in mind that rapid field testing equipment for pathogens may be limited.
2) Sample concentration and recovery in the field. Large volumes of suspect water are collected and the sample is concentrated down to a smaller volume to improve the chances of finding a pathogen;
3) Testing at a "Sentinel Laboratory", which is a laboratory certified for analysis of certain pathogens; and
4) Testing at a "Reference Laboratory", if necessary, to compare the pathogen to known pathogens kept in "reference collections" (much as reference books are kept in a library).

Although laboratory analyses may seem complex, it is crucial for threat response managers to be aware of analytical capabilities and limitations so that you can use the information to make important decisions. If laboratory testing **'confirms'** the presence of a contaminant in the water system, public health response actions should be initiated. These are discussed in the next chapter.



Why Analytical Laboratories Should Plan for Threat Response

Laboratories are a key part of our nation's response to water contamination threats and incidents. Like water utilities and public agencies, laboratories should be ready to respond to an emergency by quickly and accurately analyzing samples suspected of being contaminated and producing reliable results. These results should be used by you, the Incident Commander, Unified Command, public health agencies and others to make important decisions that could have far-ranging effects.

Labs that may someday be involved in analyzing samples during a water contamination threat emergency should develop their own Laboratory Response Plans. A Laboratory Response Plan is a plan prepared by a laboratory detailing their approach and capabilities for the 24/7 processing of emergency water samples. Such a plan should always be tailored to local needs, facilities and skills, and it should be reviewed and accepted before use. Module 4 of the Toolbox describes laboratory response planning in detail. The "model screening procedure", for example, can help labs plan for screening samples.

In the next chapter, public health response activities are described.

Public Health Response Guide

Introduction

A primary goal of threat response planning is to protect public health and safety to the greatest extent possible. This chapter describes public health response planning and public notification in the event of a contamination threat or incident. This chapter discusses:

- Who is responsible for undertaking public health response actions;
- The role of the water utility; and
- The need for cooperation and interaction between public health officials, utilities, drinking water primacy agencies and others to protect public health and deliver good information to the public.

As a water utility manager or emergency response manager, you should read this chapter to ensure that you understand how to help protect public health and safety in the event of a contamination threat or incident.

Chapter 5 summarizes Module 5 of the Toolbox, which can be obtained at EPA's Water Security website at www.epa.gov/watersecurity.

Response Planning for Protection of Public Health

Water utilities, public health agencies and other threat response managers should plan together for protection of public health. Such mutual planning is crucial.

There are five steps to consider in planning for effective public health response:

1) Plan the public health response to a contamination threat or incident before a threat or incident occurs;
2) When a threat or incident occurs, determine the public health consequences;
3) Carry out operational response actions to contain the contaminant and protect public health;
4) Communicate effectively with other agencies, utilities and the public through a communication and notification plan; and
5) Provide an alternate short-term water supply (your utility's ERP should provide options for an alternate water supply).

Each of these steps is summarized below.

Step 1. Plan the Public Health Response Before A Threat Occurs

Long before a threat is received, your utility, together with local public health agencies, should plan and coordinate the public health response. State and local public health agencies typically develop Public Health Response Plans that cover responses to all kinds of public health emergencies, including water emergencies. Examples of response planning are provided below, modified for water utilities.

Use public health planning in your own utility's Emergency Response Plan (ERP): Each utility should examine how public health response plans of local and state health agencies address water contamination. Utilities should use relevant parts of the public health response plans in their own ERPs.

Know which agencies will be involved in the public health response: Water utility emergency response planners should know which agencies will be involved in the public health response and what these agencies will be doing. The appropriate responsible agencies can vary significantly by locality. You should coordinate your emergency response planning with appropriate agencies and take advantage of training offered by others.

Agencies that may be involved in the public health response to a water contamination incident include:

- Water and wastewater utilities;
- Drinking water primacy agency;
- Local, state and federal public health and environmental agencies;
- Hospitals, clinics, doctors and poison control centers;
- Local, state and federal emergency services;
- U.S. Environmental Protection Agency;
- Centers for Disease Control and Prevention;
- Agency for Toxic Substances and Disease Registry;
- Federal Emergency Management Agency; and
- U.S. Army Corps of Engineers, National Guard and/or other military organizations.

Develop a communication and notification plan for your utility: Fast, reliable communication is the key to success in coordinating the public health response. Before an incident occurs, water utilities should develop a communication and notification plan. Communication and notification plans should include other agencies, utility staff, utility customers and the public. For example, you should report a contamination threat to the appropriate drinking water primacy agency and public health agencies. Public health agencies may in turn alert doctors, clinics and hospitals to be on the lookout for public health symptoms and to report these to the public health agency. Public health agencies should report symptoms of contaminated drinking water to utilities.

Your utility's communication and notification plan should specify:

- Agencies, organizations and individuals to contact or notify;
- Who will send and receive information;
- Contact information;
- The kinds of information to be communicated;
- When and how to notify your staff, drinking water primacy agency and other agencies and organizations;
- When and how to notify the public; and
- A backup communication and notification system.

Identify possible operational response actions during the planning process: During the planning process, your utility should identify possible operational response actions to respond to possible public health threats. During an actual contamination threat or incident, you should act quickly to protect public health and prevent the contaminant from spreading.

Operational response actions are described below in Step 3.

Step 2. When a Threat or Incident Occurs, Determine the Public Health Consequences

Once a contamination incident has been **'confirmed'**, you should find out more about the contaminant and its health effects in order to choose the right course of action to keep the contaminant from spreading and to protect public health. EPA's Water Contaminant Information Tool (WCIT) can provide useful information to help you make these decisions.

Water Contaminant Information Tool (WCIT)

The **Water Contaminant Information Tool** is a secure, on-line database developed by the U.S. EPA that provides information on contaminants of concern for water security. WCIT contains the most up-to-date, reliable information on water contaminants, such as contaminant names, fate and transport, health effects and toxicity, medical information, drinking water treatment effectiveness, potential water quality and environmental indicators, sampling and analysis, helpful response activities for utilities and other useful information.

To learn more about WCIT, download the WCIT Fact Sheet from EPA's water security publications website at cfpub.epa.gov/safewater/watersecurity/tools.cfm , or connect to the WCIT website at www.epa.gov/wcit. Access to the WCIT database is controlled.

What You Need To Know To Make The Right Public Health Decision:

- Potential acute (severe short-term) health effects of the contaminant;
- Potential chronic (less severe but longer-lasting) health effects of the contaminant;
- Contaminant concentrations that can cause these effects;
- Exposure pathways (ingestion, inhalation or skin contact); and
- How long the contaminant will remain in water, what causes the contaminant to break down, what the breakdown product is and how toxic this breakdown product is compared to the original substance.

As the utility manager, you should work with public health agencies to determine how fast the contaminant can spread throughout the water system, whether there are points at which the spread of contaminants can be stopped and what public health response actions to take. For example, you should have up-to-date information on your water distribution system, such as water flow volumes and flow rates, locations of shutoff valves and access points and so on, so that you can determine where and how fast contaminated water might spread in the event of a contamination incident. Getting this information and keeping it up to date may be challenging, but the benefit should be an improved ability to protect public health.

If it is possible, the public health agency should also try to estimate how much contaminant remains after a given period of time has passed, how dangerous this amount is, what health precautions to take, and when and where these precautions apply.

Estimating Terrorist Impacts on Water Systems:

EPA and others have developed tools, such as hydraulic models, to help utilities estimate the effects of a terrorist incident on drinking water systems. If your utility decides to use such tools, you should be aware that such models may involve costs and require training and time to apply them. Practice using such tools before an incident occurs so that you can act quickly and with due diligence when a real incident occurs.

Step 3. Carry Out Operational Response Actions

Operational response actions are actions that protect public health by reducing exposure to the suspect water. Operational response actions are often carried out while more information is being collected to determine whether or not the threat is **'credible'**. It is critical to work with local agencies and elected officials when initiating operational response actions.

Example: The Mayor receives a call that a water tank has been contaminated. The Mayor then phones you at the water utility and you decide, as the water utility manager, that contamination of a particular water tank is **'possible'** because that tank is on-line and the fence around the tank is old and decrepit. Your immediate operational response is to shut the valves on pipes leading into and out of the water tank to isolate the water tank from the rest of the water system (if feasible), thus preventing any contaminant from spreading to the rest of the system. You may need to notify your state drinking water primacy agency immediately. Also, in addition to the federal Public Notification Rule, local notification rules can vary by locality and all other appropriate parties should be notified (e.g., public health agency, law enforcement, and others).

Containment of suspect water should be done as soon as possible, ideally during the first stage of threat evaluation when you are determining if the threat is **'possible'** or not. If you cannot contain the suspect water quickly, then you should accelerate the determination of whether or not the contamination threat is **'credible'**.

Deciding on operational responses can be tricky, because there could be unforeseen consequences of the action taken. For example, restricting water use or water delivery could result in portions of the service area, including hospitals and schools, being deprived of water. This could lead to poor sanitation or a host of other effects. To deal with these other effects, you should plan well in advance of a contamination threat or incident.

For Water Utilities: Possible Operational Response Actions to Protect Public Health

- ❑ Isolate and contain the suspect water so it doesn't spread and contaminate other parts of the water system;
- ❑ Increase levels of disinfection; for example, by using a mobile disinfection unit to treat a part of the water system or by adding more chlorine to the system;
- ❑ Notify the public to take precautions, such as "Boil water", "Do not drink", or "Do not use" in coordination with your state primacy agency, public health officials and other officials, as appropriate.
- ❑ Distribute bottled water or water from neighboring utilities as a safe alternative to the contaminated or suspect water.

Step 4. Notify the Public

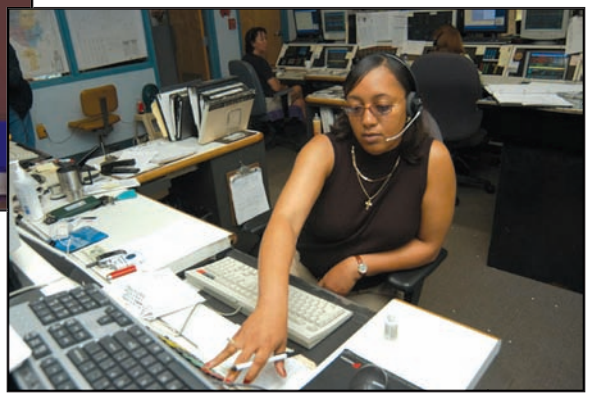
If the contamination threat is **'credible'**, then you should coordinate with your drinking water primacy agency and public health agencies to decide whether to issue a public notice or not. It is critical to work with local agencies and elected officials when planning public notification.

One way to help the public minimize their exposure to contaminated water is to issue a public notice to avoid drinking or using the water. The Federal Public Notification Rule under the National Primary Drinking Water Regulations requires public notification when there is a *"situation with significant potential to have serious adverse effects on human health as a result of short term exposure"* (40 CFR § 141.202).

Once you have decided to notify the public to reduce their exposure, you should decide what type of notification to issue, based on the threat or incident and the contaminant potentially involved. Examples of public notices are described in the table on page 44.

Public Notification Procedure under the National Primary Drinking Water Regulations, Federal Public Notification Rule (Tier 1, 40 CFR 141.202):

- ❏ Notify the public as soon as practical, but no later than 24 hours after you learn of the water quality violation or credible contamination threat;
- ❏ Discuss the threat with your drinking water primacy agency as soon as practical, but no later than 24 hours after you learn of the situation, in order to find out if any additional public notification is required; and
- ❏ Provide any additional public notification as required by your drinking water primacy agency. Examples might be repeat notices, providing direction on how long the notices are in effect, how often the notices are to be issued, the form and timing of public notices, and other actions to reach all your water system users. Requirements may vary by state. (see www.epa.gov/safewater/pn.html).



Examples of Public Notices About Drinking Water

Type of Notice	When To Use This Notice	Relative Burden on Public
Boil Water Before Use	Use if boiling will make the water safe to drink and boiling does not create other health problems, particularly through routes of exposure other than drinking (e.g., inhalation or skin contact with water vapor).	Least burden. Facilities which use large amounts of water for drinking or food preparation will be most affected.
Do Not Drink	Use if boiling is not an option and if water vapor and skin contact do not pose risks.	More burden – an alternate water supply for drinking and food preparation will be needed.
Do Not Use	Use if the contaminant is unknown, if treatment is not possible at the moment or if the contaminant poses a health risk through inhalation of water vapor or through skin contact with affected water.	Greatest burden – an alternate water supply for all uses, including fire fighting and flushing toilets, will be needed.

Because water use restrictions can have unintended health consequences, you should weigh the potential public health consequences of restricting water use against the public health threat posed by the contaminant.

Step 5. Provide an Alternate Water Supply for the Short Term

If the decision is made to issue a "Do Not Drink" or "Do Not Use" order, utilities should be prepared to provide alternate safe sources of water such as bottled water, potable water trucked to distribution points, or water provided by an interconnection. You may need assistance from federal, state and/or local emergency responders to distribute water. Keep in mind that providing an alternate water supply can pose a significant logistical challenge and should be planned in advance. Consider the use of mutual aid agreements to provide backup water from other municipalities or sources, a memorandum of understanding (MOU) with other water suppliers, and/or contracted services to provide alternate water.

In the next chapter, you will learn about the key issues involved in remediation and recovery of a water system.

Remediation and Recovery Guide

Introduction

In this chapter, you will learn about the key issues involved in remediation of a contaminated water system and how to return the system to normal, safe operation. Understanding the remediation process is important because, although you may not necessarily be responsible for overseeing remediation, you should be seeking ways to provide safe water while remediation is ongoing. Other parties involved in remediation should include public health agencies and drinking water agencies that will monitor water quality and the remediation, and remediation specialists who will conduct the technical work of contaminant cleanup.

Once a contamination threat or incident has been **'confirmed'**, the contamination must be cleaned up, or remediated. **Remedial response actions are actions that reduce or eliminate the contaminant.** By this time, remediation experts should be on hand to clean up the contaminant.

When the remediation is completed and the water system is demonstrated to be safe, your responsibility should be to return the water system to normal, safe operation as quickly as possible. **Recovery refers to the return to normal operations after remediation.**

Chapter 6 summarizes Module 6 of the Toolbox, which can be obtained at EPA's Water Security website at www.epa.gov/watersecurity.

Who is Responsible?

Once a contamination threat is **'confirmed'** and the contamination has been contained, it is likely that a Unified Command structure will oversee remediation and recovery actions. Unified Command will manage a team of specialists from different agencies and organizations who know how to remediate the particular contaminant involved. Specialists should be able to tell you when it is safe to return to normal operations.

Refer to Chapter 2 for information on the National Response Plan, National Incident Management System, Incident Command and Unified Command.

You should be working to support Unified Command to provide technical assistance and to help in recovery. It is possible that your utility may be more involved in protecting the remaining unaffected water system and ensuring safe water from another source than in the actual remediation activities.

Remediation and Recovery

There are nine steps in the remediation and recovery process. Each of these steps is briefly described below. Keep in mind that it is critically important to keep the public informed throughout the entire remediation and recovery process.

Step 1. Find an Alternate Water Supply for the Long Term

If remediation and recovery actions are going to take some time, safe water should be provided for the public in the meantime. An alternate safe water supply should be identified during the planning process, before a contamination incident happens. If your utility, working with local agencies, cannot provide a long-term alternate water supply, then you should request help from state and federal emergency planning agencies such as EPA, FEMA, or the Army Corps of Engineers. Be aware of the challenges and planning details that may be involved.

Step 2. Do a System Characterization and Feasibility Study

After the contamination has been contained, Unified Command will most likely need more information to choose the right remediation method, such as the identity of the contaminant involved and how much of the water system is contaminated. Command should also identify possible remediation options and find out how effective and feasible those options are. Doing a System Characterization and Feasibility Study should provide this information. Because no single agency is likely to have all the resources needed to carry out remediation and recovery, it is likely that several agencies will be involved in remediation and recovery. Under Unified Command, the utility should coordinate with their drinking water primacy agency, public health agencies and other agencies involved in protecting public health and drinking water.

Step 3. Do a Risk Assessment

It is important to find out how risky the incident site is to workers and the public. Unified Command should do a quick risk assessment. This quick risk assessment should also be useful for deciding what response actions to take and setting remediation goals. Any risk, together with risk reduction measures, should be communicated by the Incident Commander or Unified Command to your utility, public health agencies, drinking water primacy agency and the public.

Step 4. Evaluate Remediation and Rehabilitation Alternatives

Once a System Characterization and Feasibility Study (Step 2 above) has been carried out, Unified Command can begin to evaluate and compare possible remedial actions, remediation technologies and rehabilitation methods to

restore the water system to normal. Remediation can also be done in stages, such as emergency short-term remediation to reduce dangerous levels of a contaminant to a safer level, followed by long-term remediation to remove any remaining low levels of the contaminant.

Step 5. Choose the Right Remediation Technology

Unified Command should select a remediation technology that will:

- Protect human health and the environment;
- Comply with all applicable regulations (such as the Safe Drinking Water Act); and
- Be feasible, affordable and cost-effective to the extent possible.

Step 6. Design the Remediation

After remediation actions and technology are selected, the engineering design, planning and documentation of the remediation begins. Your water utility and other technical support staff should be involved in providing technical assistance in the design of the remediation to help prevent unforeseen impacts on the remaining unaffected water system.

Step 7. Do the Remediation

Once the remedial design has been approved, the remediation and rehabilitation of the contaminated parts of the water system are carried out. Contractors may assist in these procedures. Your expertise in the normal operation of the water system will be essential during this step to avoid unforeseen impacts on the water system.

Step 8. Do Post-Remediation Monitoring

After remediation is completed, both water quality and the water system should be monitored to ensure that the remediation was effective. If the remediation was not effective, the problem should be fixed and the water tested again.

Step 9. Communicate with the Public to Restore Confidence

During all stages of remediation, you and Unified Command should keep the community informed about the remediation process, who is in charge, how it could affect human health, what is being done to restore safe water, and when things are expected to return to normal. Otherwise, the public may continue to use unsafe water, hoard water, or act in other ways that could cause unforeseen problems and even interfere with remediation.

The Final Step - Full Recovery

The final step is the resumption of safe, normal system operations and the provision of safe water to the public. With full recovery of your water system, you have achieved a key goal of effective response.

Final Thoughts

Planning for water security and emergency response may seem overwhelmingly complex. However, several key points can help you deal effectively with a contamination threat or incident:

1) Your first priority is protecting public health and safety;

2) There are many resources for assistance. These should be identified as part of the planning process, before a threat or incident occurs;

3) Always use due diligence in planning for and responding to a threat;

4) For a successful response, it is critical to have cooperation and good communication between your utility and other agencies and response organizations;

5) Plan and practice emergency response procedures ahead of time to ensure that an actual emergency response will go as quickly and smoothly as possible;

6) You should make decisions in a timely manner, based on the best information available to you at the time; and

7) You can help to ensure legally defensible decisions through organization, timeliness, quality control and good record-keeping.

Remember, if you manage a utility or its emergency response program, you are responsible for protecting public health and the environment. However, you are not alone in this mission. Establish communications now with the agencies that can help you during an emergency, and begin to plan and train for contamination threats and incidents.

www.epa.gov/watersecurity

Glossary of Terms

Basic Screen - A broad-spectrum screen to identify common chemical contaminants that may be present in a suspect water sample. The Basic Screen employs widely-used methods to analyze the sample for a variety of contaminants of concern. See Chapter 4.

Commercial labs - Labs that perform testing and analyses of samples as a business. Commercial labs may be able to analyze many kinds of contaminants in water, tissue, soil and air. See Chapter 4.

'Confirmed' - A 'confirmed' threat is a 'credible' threat that has been verified through sample analyses that prove that the water is contaminated with a harmful substance. Alternatively, in the absence of analytical data, a threat is 'confirmed' when a preponderance of evidence indicates that a contamination incident has occurred. A 'confirmed' threat becomes a contamination incident. See Chapter 2.

Contamination threat - A suggestion or an indication that water has been or will be contaminated, but no conclusive proof has been collected yet to confirm that contamination has actually occurred. A threat may be written, verbal, or based on observations or other evidence. See Chapters 1 and 2.

Contamination incident - A contamination incident has occurred when the presence of a harmful contaminant or other substance in drinking water has been 'confirmed' (i.e., verified through sample testing or by a preponderance of evidence). See definition of 'confirmed' (above) and Chapters 1 and 2.

Contamination Threat Management Matrices - Module 2 of the *Response Protocol Toolbox* contains these matrices to assist in collecting and organizing the information needed to help determine if a threat is 'possible', 'credible' or 'confirmed'. Each matrix covers: 1) Information and factors to be considered in assessing a threat; 2) Possible notifications to make; and 3) Possible response actions. These generalized matrices can be customized to a specific utility or incident. See Chapter 2.

Core field testing - The minimal recommended monitoring activities to perform when conducting a site characterization, including monitoring for radiation, cyanide, chlorine residual, conductivity and pH of the suspect water. See Chapter 3.

'Credible' - A 'credible' threat is a 'possible' threat that is believable and plausible, based on reliable information that shows there is reason to believe that the threat warning is real and that contamination is likely to have happened. A 'credible' threat is a much higher threat level than a 'possible' threat. See Chapter 2.

Due diligence - Due diligence has been exercised when all suitable, sensible and responsible actions have been taken to evaluate a contamination threat or incident and respond appropriately. See Chapter 1.

Emergency Operations Center (EOC) - A pre-designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response to an emergency. It is not a part of on-scene incident management, but supports the on-scene Incident Commander or Unified Command by arranging for needed resources. See Chapter 2.

Emergency Response Plans (ERPs) - The 2002 Public Health Security and Bioterrorism Preparedness and Response Act required water systems serving more than 3,300 customers to develop and maintain Emergency Response Plans (ERPs) to prepare for responding to contamination threats and intentional contamination incidents. See Overview.

Environmental chemistry labs - Labs that analyze environmental samples to see if they contain chemical contaminants of concern or meet federal and state regulations for quality and safety. Many EPA, state and commercial labs perform environmental chemistry analyses. Labs performing such analyses should be government-certified to use standardized, pre-approved analytical procedures. See Chapter 4.

Environmental microbiology labs - Labs that analyze environmental samples (usually water, soil or food) to determine if pathogenic microorganisms are present, such as disease-causing bacteria, protozoans, fungi, viruses or others. See Chapter 4.

Expanded Screen - To address the limitations of the Basic Screen (see above), an Expanded Screen tests for more unusual chemical or biological contaminants or contaminants that may have been missed by the Basic Screen. See Chapter 4.

FEMA (Federal Emergency Management Agency) - The national agency that coordinates emergency and disaster relief responses. FEMA is one of several agencies included in the Department of Homeland Security. See "Additional Resources".

Field safety screening - A safety screening procedure that is performed by the Site Characterization Team in the field, before entering the site of a possible threat or contamination incident. The field safety screening is done to observe site conditions and to detect any immediate threats to the team from contaminants. It may include field testing for radioactivity, chemical agents and/or biological agents. See Chapter 3.

Government labs - Laboratories that are operated by government agencies at the city, county, state or federal level. Examples of the latter include labs operated by the EPA, FBI, and Centers for Disease Control and Prevention (CDC). A common role of government labs is to test samples to determine if regulatory standards are met. See Chapter 4.

Hazard categories (Low Hazard, Radiological Hazard, Chemical Hazard, Biological Hazard) - The hazard posed by a contamination threat or incident may be classified according to the type of hazard, the cause of the hazard, and the risks posed. Examples of hazard categories include Low Hazard (no obvious signs of contaminants; contaminants are probably diluted and not widespread), Radiological Hazard (radiation is tentatively identified at the site or in the water, posing potential risk), Chemical Hazard (highly toxic chemicals such as WMD or volatile toxic industrial chemicals are tentatively identified at the site or in the water, posing potential risk), and Biological Hazard (pathogenic microorganisms are tentatively identified, posing potential risk). See Chapter 3.

Incident Command System (ICS) - This is the national standard for the command, control and coordination of a response to a threat, incident or emergency of any kind. It requires that an individual Incident Commander, from an agency that is responsible for responding to the emergency or threat, manage the response activities. See Chapter 2.

Incident Commander - In the Incident Command System, the Incident Commander is the individual who is responsible for managing the overall response to the emergency. See Chapter 2.

Initial hazard assessment - Before the Site Characterization Team is sent to investigate the site of a threat or contamination incident, the Incident Commander should make an initial hazard assessment to evaluate potential risks and the need for special protective gear or equipment for handling hazardous materials or sampling. This initial assessment should be based on available information and an initial evaluation of the threat (i.e., is the threat 'possible' or 'credible', or not). See Chapter 3.

Laboratory Response Network (LRN) Labs - A network of labs that was specifically set up to address bioterrorism threats. The LRN was created by the Centers for Disease Control and Prevention (CDC), the Association of Public Health Laboratories, and the FBI. LRN labs include certain city, county, state and federal public health labs that can perform analyses of pathogens, some biotoxins, and other particularly dangerous pathogens. In order to have samples analyzed by an LRN lab, arrangements should be made during the response planning stage. See Chapter 4.

Non-utility labs - Laboratories that are not run by water or wastewater utilities. Examples include government labs, commercial labs, university or research labs, specialty labs and other types of labs. See Chapter 4.

National Response Plan (NRP) - The NRP provides a comprehensive, all-hazards approach to managing the response to domestic incidents or emergencies. It provides the basis for federal agency coordination with state, local and tribal governments and with the private sector to address incidents or emergencies. The NRP is based on the National Incident Management System (NIMS) for managing incident response (see below); together they provide a template for effective threat prevention and response. See Chapter 2 and "Additional Resources".

National Incident Management System (NIMS) - NIMS provides a comprehensive national framework and standard for incident management. NIMS incorporates the Incident Command System as the management system to deal with threats, emergencies and incidents. See Chapter 2 and "Additional Resources".

Operational response actions (also known as immediate operational responses) - Actions that protect public health by reducing exposure to the suspect water. Operational response actions are often carried out while a threat is being evaluated in order to protect public health in the event that the threat is confirmed to be an incident. Examples include preventing the spread of suspected contaminated water, increasing disinfection, notifying the public to take precautions, or distributing bottled water. See Chapters 2 and 5.

'Possible' - After a threat is received, the first step in evaluating the credibility of a threat is to decide if it is 'possible'. A 'possible' threat is one where the circumstances suggest that contamination could have occurred and that further investigation is needed. If the threat is found to be not 'possible', then the investigation is closed, the threat is documented, and operations are returned to normal. See Chapter 2.

Preponderance of evidence - Most of the available evidence points in a certain direction. See Chapter 2.

Public notification procedures - Procedures for notifying the public in the event that a water contamination threat or incident has occurred where there is "significant potential to have serious adverse effects on human health as a result of short-term exposure" (40 CFR § 141.202, known as the Federal Public Notification Rule under the National Primary Drinking Water Regulations). Public notification procedures include issuing a public

notice identifying the potential contaminant and providing directions for avoiding drinking or using the water. See Chapter 5.

Radiological labs - Labs that analyze and identify radioactive substances and contaminants such as radioactive isotopes, radionuclides, radiochemical compounds and radiological weapons. The EPA, Department of Energy (DOE), states and some commercial firms have radiological labs. FEMA operates the Federal Radiological Management Center (FRMAC) which can provide information on analyzing samples for radioactive materials. See Chapter 4.

Rapid field testing - Testing that is done in the field by the Site Characterization Team to try to identify the type of contaminant that may be present so that the right laboratory analyses can be done. Field testing is done to obtain preliminary information, and should be followed up by laboratory testing to 'confirm' whether contamination is present or not. See Chapter 3 and the EPA's Technology Testing and Evaluation Program (TTEP) in "Additional Resources" (under EPA NHSRC) to learn about equipment for rapid field testing.

Recovery - The return to normal operations after remediation of a contaminated water system or site has been completed. See Chapter 6.

Remediation, remedial response actions - Response actions that reduce or eliminate the contaminant from the affected water system or site. Remediation is usually performed by remedial specialists overseen by agencies with remediation oversight responsibilities. See Chapter 6.

Response Guidelines - An EPA document that contains all of the forms, checklists, and report formats from the comprehensive *Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents*. The *Response Guidelines* and this Handbook were designed as companion documents to be used together for response planning. See "Overview" and "Additional Resources".

Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents **(Toolbox, or RPTB)** - A comprehensive guidance document developed by the EPA for the water sector, the Toolbox describes planning measures to prepare for and respond to drinking water contamination threats and incidents. The chapters in this Handbook correspond to modules in the Toolbox. See "Overview" and "Additional Resources".

Site characterization - Site characterization involves the investigation of the site of a threat or incident to find out the "what, where, when, who, why and how" of the threat or incident. After the initial hazard assessment, site characterization activities include field safety screening, site investigation, rapid field testing of the water, and sampling. A site could be an entire water system or a component, such as the distribution system, source water, treatment facility, storage tanks or some other area that may have been contaminated. See Chapter 3.

Site characterization team - The group of individuals that performs site characterization and sampling activities following receipt of a threat or incident report. The team may include people from the water utility, police, fire, HazMat specialists, environmental response teams from government agencies, public health officials, FBI and EPA criminal investigators, civil support teams and representatives of other agencies. See Chapter 3.

Specialized or specialty labs - Commercial, government or university labs that perform highly specialized analyses that are not commonly performed by other labs. Examples

include chemical weapons labs and biotoxin labs. Nationwide, there are only a few chemical weapons or biotoxin labs, and analyses should usually be arranged by the proper authorities, such as the FBI or certain other federal agencies. See Chapter 4.

Threat warning - An indication that something may be wrong with water quality or the drinking water system. Threat warnings may include any, some or all of the following: security breach, witness account, direct notification by the perpetrator, notification by the news media, notification by law enforcement, unusual water quality, consumer complaints, and/or notification by public health agencies. See Chapter 2.

Unified Command - In ICS, Unified Command is a unified team effort which allows all agencies with responsibility for the incident, either geographic or functional, to manage the incident by establishing a common set of goals and strategies. This is accomplished without losing or giving up agency authority, responsibility, or accountability. See Chapter 2.

Utility labs - Labs that are run by water utilities. Utility labs routinely perform water quality monitoring to ensure that drinking water is safe for customers. See Chapter 4.

Water Utility Emergency Response Manager (WUERM) - An individual who is responsible for managing the water utility's internal emergency response procedures (also known as the water utility's emergency response coordinator). This individual may also serve as the utility's Incident Commander during emergencies. See Chapter 2.

Additional Resources

This section provides information on resources that may help you in planning and responding to contamination threats and incidents. Information was current at the time of publication of this Handbook.

Agency for Toxic Substances and Disease Registry (ATSDR): ATSDR is a national public health agency which compiles information on contaminants and disease-causing agents. See their website at www.atsdr.cdc.gov/.

Centers for Disease Control and Prevention (CDC): See the CDC website at www.cdc.gov/ or call the CDC Hotline at 1-800-CDC-INFO. CDC compiles and tracks information on diseases, illness, outbreaks, contaminants, health effects, emergency preparedness and response, the national Laboratory Response Network (LRN), bioterrorism agents and other topics.

Compendium of Environmental Testing Laboratories: This laboratory compendium is a database of laboratories, developed by the EPA, which describes the analytical capabilities and capacities of labs nationwide. The database was designed to assist EPA and other users to identify qualified and appropriate laboratories to analyze chemical, biological and radiological agents. To register on-line or to obtain additional information, visit www.epa.gov/compendium. Access to the laboratory compendium is controlled.

Department of Homeland Security (DHS): See the DHS website at www.dhs.gov/. The website provides extensive information concerning threats and posts threat levels and other bulletins. It also contains links to the National Incident Management System (NIMS), Homeland Security Information Networks for Critical Sectors or HSIN-CS, and information regarding the Freedom of Information Act (FOIA).

EPA National Homeland Security Research Center (NHSRC): The NHSRC provides technical information on methods, tools and technologies to assist in protecting public health and safety in the event of a terrorist attack. Examples include the EPA's Technology Testing and Evaluation Program (TTEP), the *Standardized Analytical Methods for Use During Homeland Security Events* and the *Security Information Collaborative – A Guide for Water Utilities*, described elsewhere in this section. See the EPA NHSRC website at www.epa.gov/nhsrc/.

EPA Safe Drinking Water Hotline: This hotline is a service of the Office of Ground Water and Drinking Water. It provides the general public, regulators, medical and water professionals, academia and media with information about drinking water and ground water programs authorized under the Safe Drinking Water Act. You can reach the hotline at 1-800-426-4791 or ask a question at the Hotline's website at www.epa.gov/safewater/hotline.

EPA Water Security Division: See EPA's website at www.epa.gov/watersecurity for information on emergency response planning, training workshops, tools and useful links. The website includes links to information on Emergency Response Plans (ERPs), the *Response Protocol Toolbox,* this Handbook, and many other water security resources.

Emergency Response Plan Guidance for Small and Medium Systems, Emergency Response Plan Outline, and other emergency response planning documents can be downloaded from EPA's water security website at www.epa.gov/watersecurity or by calling EPA's Safe Drinking Water Hotline at 1-800-426-4791 or by sending an e-mail via the Hotline's website at www.epa.gov/safewater/hotline.

Emergency Response Tabletop Exercises for Drinking Water and Wastewater Systems CD: This CD, developed by the EPA, contains tabletop exercises to help train water and wastewater utility workers in preparing and carrying out emergency response plans. The exercises provided on the CD can help strengthen relationships between a water supplier and their emergency response team (e.g., health officials, laboratories, fire, police, emergency medical services, and local, state and federal officials). Users can also adapt the materials for their own needs. Explore the CD at www.epa.gov/watersecurity.

Federal Emergency Management Agency (FEMA): See the FEMA website at www.fema.gov/ or call 1-800-621-FEMA. This national agency coordinates emergency and disaster relief response. Their website contains links to the National Response Plan, the National Incident Management System (NIMS), the Federal Radiological Emergency Response Plan and many other useful emergency response links.

InfraGard: This is an FBI-sponsored information sharing and analysis effort serving the interests and combining the knowledge base of a wide range of members. At its most basic level, InfraGard is a partnership between the FBI and the private sector. InfraGard is an association of businesses, academic institutions, state and local law enforcement agencies and other participants dedicated to sharing information and intelligence to prevent hostile acts against the United States. Learn more at www.infragard.net.

National Response Center (NRC) and National Response Team (NRT): The NRC is the federal point of contact for reporting incidents related to oil, hazardous material discharges, suspicious activity, security breaches or terrorism occurring in the United States. The NRT is an organization of 16 Federal departments and agencies responsible for coordinating emergency preparedness and response to oil and hazardous substance pollution incidents. The Environmental Protection Agency (EPA) and the U.S. Coast Guard (USCG) serve as Chair and Vice Chair, respectively. Call the NRC at 1-800-424-8802 or 1-202-267-2675 or see the NRT's website at www.nrt.org.

National Incident Management System (NIMS): The NIMS integrates effective practices in emergency preparedness and response into a comprehensive national framework for incident management. The NIMS will enable responders at all levels to work together more effectively to manage domestic incidents no matter what the cause, size or complexity. See the DHS website at http://www.dhs.gov/interweb/assetlibrary/NIMS-90-web.pdf for the full NIMS document.

National Response Plan (NRP): The NRP establishes a comprehensive all-hazards approach to enhance the ability of the United States to manage domestic incidents. It provides the basis for federal government coordination with state, local and tribal governments and the private sector during incidents. The NRP can be downloaded from DHS's website at www.dhs.gov/dhspublic/interapp/editorial/editorial_0566.xml.

National Environmental Methods Index for Chemical, Biological and Radiological Contaminants (NEMI-CBR): NEMI and CBR Methods Advisor are two tools which will provide information on chemical, biological and radiological contaminants and analytical methods of detection, analysis and identification. These tools are being developed by the U.S. EPA. The National Environmental Methods Index (NEMI) is a free, searchable Internet-based database of environmental methods that allows comparison of methods, performance, cost and other information. NEMI is already available on the Internet at www.nemi.gov. NEMI-CBR incorporates the CBR Methods Advisor, which can help a user to quickly assess a threat, evaluate the site of the incident, collect samples and choose the best method for a given situation when there is limited information available regarding the possible identity of a contaminant.

Physician On-Line Reference Guide for Waterborne Disease: This on-line reference provides information on water-related diseases and other medical and health emergency response information. See the website at www.WaterHealthConnection.org/index.asp.

Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (also known as the Bioterrorism Act of 2002): Title IV of the Act addresses drinking water security and safety, and required drinking water systems serving more than 3,300 persons to develop response measures to incidents that could disrupt safe water supplies. To learn more, visit the EPA website on water security legislation and directives at http://cfpub.epa.gov/safewater/watersecurity/legislation.cfm.

Response Guidelines (Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents: Response Guidelines): This EPA document is a companion to this Handbook and contains many forms, checklists and report formats to help a water system organize information for emergency response planning. These documents can be downloaded from EPA's Water Security website at www.epa.gov/watersecurity.

***Response Protocol Toolbox: Planning For and Responding to Drinking Water Contamination Threats and Incidents*:** The EPA developed and wrote the Toolbox, building on the experience and expertise of several drinking water utilities, particularly the Metropolitan Water District of Southern California. Organized in modular format, the Toolbox assists with emergency response preparedness and will be of value to drinking water utilities, laboratories, emergency responders, state drinking water programs, technical assistance providers and public health and law enforcement officials. It can be downloaded at www.epa.gov/watersecurity.

Security Information Collaborative – A Guide for Water Utilities: This short (40-page) booklet, developed by the EPA, describes how water and wastewater utilities can form beneficial collaboratives to share information on water security. Case studies are combined with step-by-step suggestions for utilities to coordinate with key water security partners. The booklet may be downloaded from the EPA's National Homeland Security Research Center's publications website at www.epa.gov/nhsrc/pubs.htm.

Standardized Analytical Methods for Use During Homeland Security Events: This comprehensive compendium of analytical methods was developed by the EPA for use during an intentional contamination event. The document, EPA Publication No. EPA/600/R-04/126, is available from the EPA NHSRC website at: www.epa.gov/nhsrc/pubs/reportSAM092904.pdf.

U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID): This Army lab conducts research on infectious diseases. For more information, visit their website at www.usamriid.army.mil/ or write to: Commander, USAMRIID, 1425 Porter Street, Frederick, MD 21702-5011.

U.S. Technical Support Working Group (TSWG): The TSWG is a federal working group that provides information on security products and tools, such as the U.S. Department of Energy's *21 Steps to Improve Cyber Security of SCADA Networks.* This document and other useful products can be downloaded from the TSWG's website at www.tswg.gov/tswg.

Water Contaminant Information Tool (WCIT): EPA developed WCIT, which is a secure on-line database that provides information on contaminants of concern for water security. To learn more about WCIT, download the WCIT Fact Sheet from EPA's water security publications website at http://cfpub.epa.gov/safewater/watersecurity/tools.cfm or connect to the WCIT website at www.epa.gov/wcit. Access to the WCIT database is controlled.

Water Information Sharing and Analysis Center (WaterISAC): This is a water security information-sharing system which is accessible via a website at www.waterisac.org. The WaterISAC website has a public portion and a secure membership-only portion available to subscribing utility personnel. WaterISAC is designed for disseminating alerts and warnings, receiving incident reports and sharing water-related information among water and wastewater utilities.

Water Security Channel (WaterSC): WaterSC is a free service of the WaterISAC which was designed to disseminate basic security information, as developed by the federal government, via e-mail and a secure website. To sign up, visit www.watersc.org.

List of Contacts for States, Commonwealths, and Territories

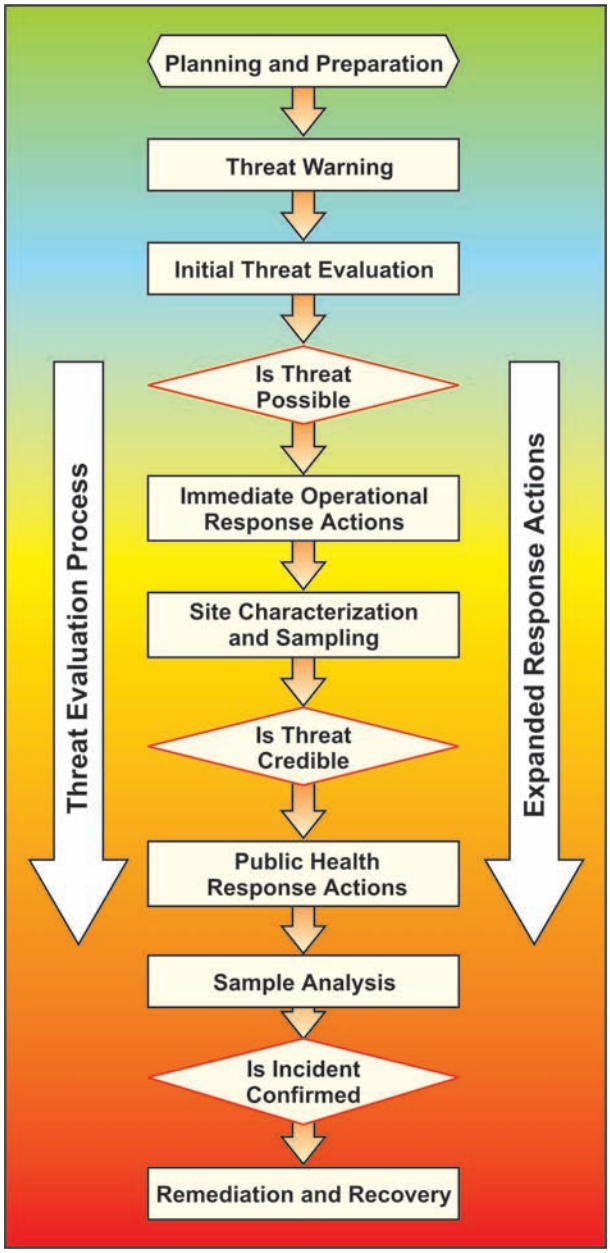
State	Drinking Water Program Website	Phone Number
Alabama	Department of Environmental Management: Water Supply Branch http://www.adem.state.al.us/WaterDivision/Drinking/DWMainInfo.htm	(334) 271-7700
Alaska	Department of Environmental Conservation: Drinking Water Program http://www.state.ak.us/dec/eh/dw/	(907) 269-7647
American Samoa	Environmental Protection Agency http://www.epa.gov/Region9/cross_pr/islands/samoa.html	(684) 633-2304
Arizona	Department of Environmental Quality: Safe Drinking Water Program http://www.azdeq.gov/environ/water/dw/index.html	(602) 771-2300 (800) 234-5677
Arkansas	Department of Health: Division of Engineering http://www.healthyarkansas.com/eng/	(501) 661-2623
California	Department of Health Services: Division of Drinking Water and Environmental Managementhttp://www.dhs.ca.gov/ps/ddwem/technical/dwp/dwpindex.htm	(916) 449-5577
Colorado	Department of Public Health and Environment: Drinking Water Program http://www.cdphe.state.co.us/wq/Drinking_Water/Drinking_Water_Program_Home.htm	(303) 692-3500
Connecticut	Department of Public Health: Drinking Water Section http://www.dph.state.ct.us/BRS/Water/DWD.htm	(860) 509-7333
Delaware	Department of Health and Social Services: Division of Public Health http://www.dhss.delaware.gov/dhss/dph/about.html	(888) 459-2943 (302) 744-4700
District of Columbia	Environmental Protection Agency, Region 3 http://www.epa.gov/reg3wapd/drinkingwater/DCdrinking/index.htm	(215) 814-5781
Florida	Department of Environmental Protection: Drinking Water Program http://www.dep.state.fl.us/water/drinkingwater/index.htm	(850) 245-8336
Georgia	Department of Natural Resources: Water Resources Branch http://www.gaepd.org/Documents/index_water_wrb.html	(404) 657-5947 (888) 373-5947
Guam	Environmental Protection Agency: Water Programs Division http://www.guamepa.govguam.net/programs/water/sdw.html	(671) 475-1638
Hawaii	Department of Health: Environmental Health Division, Safe Drinking Water Branch http://www.hawaii.gov/health/environmental/water/sdwb/index.html	(808) 586-4258
Idaho	Department of Environmental Quality: Drinking Water Program, Water Quality Division http://www.deq.state.id.us/water/prog_issues/drinking_water/overview.cfm	(208) 373-0289
Illinois	Environmental Protection Agency: Bureau of Water, Division of Public Water Supplies http://www.epa.state.il.us/water/index.html	(217) 785-8653
Indiana	Department of Environmental Management: Drinking Water Branch http://www.in.gov/idem/water/dwb/	(317) 232-8603 (800) 451-6027
Iowa	Department of Natural Resources: Water Supply Program http://www.iowadnr.com/water/drinking/index.html	(515) 725-0282
Kansas	Department of Health and Environment: Bureau of Water, Public Water Supply Section http://www.kdhe.state.ks.us/pws/	(785) 296-5503
Kentucky	Department for Environmental Protection: Division of Water http://www.water.ky.gov/dw/	(502) 564-3410

State	Drinking Water Program Website	Phone Number
Louisiana	Office of Public Health: Safe Drinking Water Program http://www.oph.dhh.louisiana.gov/engineerservice/safewater/	(225) 765-5038
Maine	Maine Department of Health and Human Services: Drinking Water Program http://www.state.me.us/dhs/eng/water/	(207) 287-2070
Maryland	Department of the Environment: Water Supply Program http://www.mde.state.md.us/Programs/WaterPrograms/Water_Supply/index.asp	(410) 537-3000 (800) 633-6101
Massachusetts	Department of Environmental Protection: Drinking Water Program http://www.mass.gov/dep/water/drinking.htm	(617) 292-5500
Michigan	Department of Environmental Quality: Water Bureau http://www.michigan.gov/deq/0,1607,7-135-3313_3675---,00.html	(517) 335-4176
Minnesota	Department of Health: Drinking Water Protection Section http://www.health.state.mn.us/divs/eh/water/index.html	(651) 201-4700
Mississippi	Department of Health: Water Supply Division http://www.msdh.state.ms.us/msdhsite/_static/44,0,76.html	(601) 576-7518
Missouri	Department of Natural Resources: Water Protection Program http://www.dnr.mo.gov/wpscd/wpcp/index.html	(573) 751-1300 (800) 361-4827
Montana	Department of Environmental Quality: Public Water Supply Program http://www.deq.state.mt.us/wqinfo/Index.asp	(406) 444-4071
Nebraska	Department of Health and Human Services: Public Water Supply Program http://www.hhs.state.ne.us/enh/pwsindex.htm	(402) 471-0521 (402) 471-2541
Nevada	State Health Division: Safe Drinking Water Program http://ndep.nv.gov/bsdw/index.htm	(775) 687-9515
New Hampshire	Department of Environmental Services: Water Division http://www.des.state.nh.us/wseb/	(603) 271-2513
New Jersey	Department of Environmental Protection: Water Supply Administration http://www.state.nj.us/dep/watersupply/	(609) 292-5550
New Mexico	Environment Department: Drinking Water Bureau: http://www.nmenv.state.nm.us/dwb/dwbtop.html	(505) 476-8625 (877) 654-8720
New York	New York State Department of Health: Drinking Water Protection Program http://www.health.state.ny.us/nysdoh/water/main.htm	(518) 402-7650
North Carolina	Department of Environment and Natural Resources: Public Water Supply Section http://www.deh.enr.state.nc.us/pws/	(919) 733-2321
North Dakota	Department of Health: Division of Municipal Facilities, Drinking Water Program http://www.health.state.nd.us/MF/index.html	(701) 328-5257
Ohio	Environmental Protection Agency: Division of Drinking and Ground Water http://www.epa.state.oh.us/ddagw/	(614) 644-2752
Oklahoma	Department of Environmental Quality: Water Quality Division http://www.deq.state.ok.us/WQDnew/index.htm	(405) 702-8100
Oregon	Department of Human Services: Drinking Water Program http://oregon.gov/DHS/ph/dwp/index.shtml	(971) 673-0405
Pennsylvania	Department of Environmental Protection: Office of Water Management http://www.depweb.state.pa.us/watermgmt/site/default.asp	(717) 772-4018
Puerto Rico	Department of Health: Public Water Supply Supervision Program http://www.epa.gov/safewater/dwinfo/pr.htm	(787) 754-6010
Rhode Island	Department of Health: Office of Drinking Water Quality http://www.health.ri.gov/environment/dwq/index.php	(401) 222-6867

State	Drinking Water Program Website	Phone Number
South Carolina	Department of Health and Environmental Control: Drinking Water Program http://www.scdhec.net/eqc/water/	(803) 898-4300 (888) 481-0125
South Dakota	Department of Environment and Natural Resources: Drinking Water Program http://www.state.sd.us/denr/des/drinking/dwprg.htm	(605) 773-3754
Tennessee	Department of Environment and Conservation: Division of Water Supply http://www.state.tn.us/environment/dws/	(615) 532-0191
Texas	Texas Commission on Environmental Quality http://www.tceq.state.tx.us/nav/util_water/	(512) 239-4691
Utah	Department of Environmental Quality: Division of Drinking Water http://www.drinkingwater.utah.gov/	(801) 536-4200
Vermont	Vermont Agency of Natural Resources, Water Supply Division http://www.anr.state.vt.us/dec/watersup/wsd.htm	(802) 241-3400 (800) 823-6500
Virginia	Department of Health: Office of Drinking Water http://www.vdh.state.va.us/dw/	(804) 864-7500
Virgin Islands (U.S.)	Department of Planning and Natural Resources: Division of Environmental Protection http://dpnr.gov.vi/dep/PublicWaterSup.htm	(340) 774-3320 (340) 773-1082
Washington	Division of Environmental Health: Office of Drinking Water http://www.doh.wa.gov/ehp/dw/	(360) 236-3100
West Virginia	Bureau for Public Health: Department of Health and Human Resources http://www.wvdhhr.org/oehs/eed/	(304) 558-6715
Wisconsin	Department of Natural Resources: Bureau of Drinking Water and Ground Water http://www.dnr.state.wi.us/org/water/dwg/index.htm	(608) 266-0821
Wyoming	EPA Region 8: Wyoming Drinking Water Program http://www.epa.gov/region08/water/dwhome/wycon/wycon.html	(307) 777-7072

List of EPA Regional Contacts

EPA Region	EPA Region Website	Phone Number
EPA Region 1	http://www.epa.gov/NE/eco/drinkwater/dw-security.html	(617) 918-1694
EPA Region 2	http://www.epa.gov/region2/water/	(212) 637-3879
EPA Region 3	http://www.epa.gov/reg3wapd/	(215) 814-5668
EPA Region 4	http://www.epa.gov/region4/water/	(404) 562-9446
EPA Region 5	http://www.epa.gov/region5/water/	(312) 886-0190
EPA Region 6	http://www.epa.gov/Arkansas/6wq/swp/security/	(214) 665-2776
EPA Region 7	http://www.epa.gov/region7/security/index.htm	(913) 551-7585
EPA Region 8	http://www.epa.gov/region8/compliance/security/secure.html	(303) 312-7021
EPA Region 9	http://www.epa.gov/region9/water/	(415) 947-8707
EPA Region 10	http://yosemite.epa.gov/R10/WATER.NSF/webpage/Water+Issues+in+Region+10	(206) 553-1389



U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water
Washington, D.C. 20460

EPA Publication No. 817-B-06-001
www.epa.gov/watersecurity
April, 2006