United States Environmental Protection Agency

Water Security Initiative: Interim Guidance on Developing Consequence Management Plans for Drinking Water Utilities

Office of Water (MC 4608T)   EPA 817-R-08-001   October 2008   www.epa.gov/safewater

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Foreword

The Water Security initiative is a U.S. Environmental Protection Agency (EPA) program that addresses the risk of intentional contamination of drinking water distribution systems. Initiated in response to Homeland Security Presidential Directive 9, the overall goal is to establish recommendations for the design and deployment of contamination warning systems for voluntary adoption by drinking water utilities. EPA is implementing the Water Security initiative in three phases: (1) development of a conceptual design that achieves timely detection and appropriate response to drinking water contamination incidents; (2) demonstration and evaluation of the conceptual design in full-scale pilots at drinking water utilities; and (3) issuance of guidance and conduct outreach to promote voluntary national adoption of effective and sustainable drinking water contamination warning systems. **Figure F-1** summarizes this process.

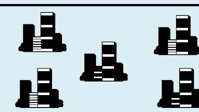
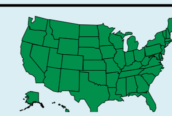
Phase	DESIGN	DEMONSTRATE		EXPAND
	System Architecture	Initial Pilot	Additional Pilots	Voluntary National Adoption
Approach	Conceptual design	Apply to *single* pilot utility → Evaluate → Refine and enhance	Applied by *multiple* utilities → Evaluate → Refine and enhance	Convert to guidance for *any* utility
Scope	Not applicable			
Design Specificity	Low	High - Applies to pilot utility only	High – Applies to each pilot	Medium – Applies to range of utilities
Funding	EPA Funds			Utility Funds

Figure F-1. Overview of EPA's Water Security Initiative

A contamination warning system should be a proactive approach to managing threat warnings that uses advanced monitoring technologies/strategies and enhanced surveillance activities to collect, integrate, analyze, and communicate information. However, it should not be merely a collection of monitors and equipment placed throughout a water distribution system to alert of intrusion or contamination, but rather an exercise in information acquisition and management. Different information streams should be captured, managed, analyzed, and interpreted to recognize potential contamination incidents in time to respond effectively. While the contamination warning system should be designed by the drinking water utility, some data sources may be outside of the utility, and in this case, cooperation with partners would likely be important to the success of a contamination warning system. **Figure F-2** illustrates the recommended components of a contamination warning system, as briefly described below:

- **Online water quality monitoring** involves monitoring for typical water quality parameters throughout the distribution system, and comparison with an established base-state to detect possible contamination incidents.
- **Sampling and analysis** involves the collection of distribution system samples that are analyzed for various contaminants and contaminant classes for the purpose of establishing a baseline of contaminant occurrence (contaminants detected, levels detected, and frequency of detections) and method performance, as well as for the purpose of investigating suspected contamination incidents triggered by other monitoring and surveillance components.

- **Enhanced security monitoring** includes the equipment and procedures that detect and respond to security breaches at distribution system facilities.
- **Consumer complaint surveillance** enhances and automates the collection and analysis of consumer calls reporting unusual water quality concerns and compares trends against an established base-state to detect possible contamination incidents.
- **Public health surveillance** involves the analysis of health-related data sources to identify illness in the community that may stem from drinking water contamination.

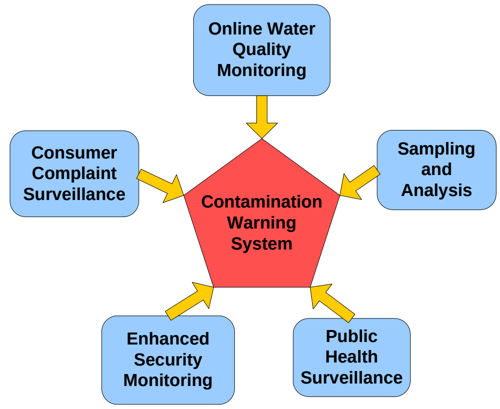


Figure F-2. Multi-Component Approach to a Contamination Warning System

Developing a contamination warning system should also include extensive consequence management planning to develop procedures for investigating and responding to possible contamination incidents detected through the recommended routine monitoring and surveillance components. Once a possible contamination incident has been identified, the consequence management plan should define a process for establishing the credibility of the suspected incident, the response actions that may be taken to minimize public health and economic consequences, and a strategy to ultimately restore the system to normal operations.

In the context of the Water Security initiative, the deployment of a contamination warning system should include the six phases illustrated in **Figure F-3**. EPA is developing a suite of guidance to assist utilities through this process, all of which will be available at EPA's Water Security initiative website (http://cfpub.epa.gov/safewater/watersecurity/initiative.cfm) upon publication.

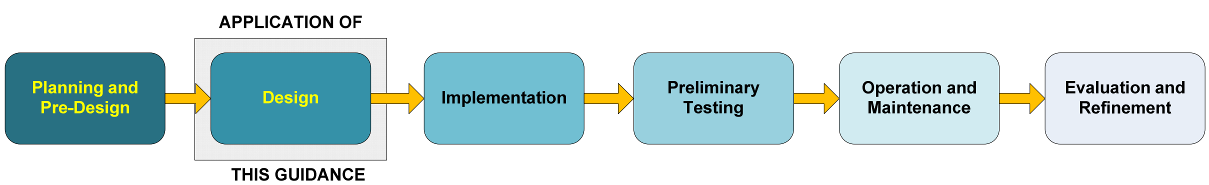


Figure F-3. Recommended Stages of Contamination Warning System Deployment

The document that follows, *Interim Guidance on Developing Consequence Management Plans for Drinking Water Utilities*, was written to assist utilities with the development of plans to guide the utility and partner agencies through the processes of validating, responding to, and recovering from a contamination incident in the distribution system. This interim guidance manual will be revised as needed based on findings of the demonstration pilots and public comment prior to being issued in final form. A companion document, *Interim Guidance on Developing an Operational Strategy for Contamination Warning Systems*, was written to assist utilities with the development of recommended standard operating procedures for day-to-day operations of the monitoring and surveillance components of a contamination warning system. Together, the operational strategy and the consequence management plan should comprehensively document procedures that guide operation of the contamination warning system.

Disclaimer

Note to Readers: The U.S. Environmental Protection Agency (EPA) prepared this guidance 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, state decision-makers, and drinking water utilities retain the discretion to adopt approaches that may differ from this guidance. Any decisions regarding a particular community water system should be made based on applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this guidance to a particular situation, and EPA will consider whether the recommendations or interpretations in the guidance are appropriate in that situation based on the law and regulations. EPA may change this guidance 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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Request for Comments

EPA is soliciting suggestions and recommendations to make this interim guidance manual more complete and user-friendly. Commenters are encouraged to be as specific as possible and to provide references where appropriate. Submit suggestions by e-mail to: watersecurity@epa.gov and indicate that the message relates to the "Interim Guidance on Developing an Operational Strategy for Contamination Warning Systems."

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List of Acronyms

The list below includes acronyms approved for use in this guidance document. Acronyms are defined at first use in the document.

ASTDR	Agency for Toxic Substances and Disease Registry
AWWA	American Water Works Association
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CID	Criminal Investigation Division (U.S. EPA)
CMP	Consequence Management Plan
EMA	Emergency Management Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERT	Environmental Response Team (U.S. EPA)
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
FBI	Federal Bureau of Investigation
HASP	Health and Safety Plan
HazMat	Hazardous Material
HSEEP	Homeland Security Exercise Evaluation Program
IC	Incident Commander
ICS	Incident Command System
JIC	Joint Information Center
JOC	Joint Operations Center
LEPC	Local Emergency Planning Committee
LRN	Laboratory Response Network
NDT	National Decontamination Team (U.S. EPA)
NIMS	National Incident Management System
NRC	National Response Center
NRF	National Response Framework
NRT	National Response Team
OSC	On-Scene Coordinator (U.S. EPA)
OSHA	Occupational Safety and Health Administration
PIO	Public Information Officer
PN	Public Notification
PPE	Personal Protective Equipment
RLRP	Regional Laboratory Response Protocol
RPTB	Response Protocol Toolbox
RRT	Regional Response Team
SCADA	Supervisory Control and Data Acquisition
SERC	State Emergency Response Commission
SOP	Standard Operating Procedure
UC	Unified Command
U.S. DHS	United States Department of Homeland Security
U.S. EPA	United States Environmental Protection Agency
WaterISAC	Water Information Sharing and Analysis Center
WARN	Water/Wastewater Agency Response Network
WCIT	Water Contaminant Information Tool (U.S. EPA)
WLA	Water Laboratory Alliance
WS	Water Security initiative
WUERM	Water Utility Emergency Response Manager

Section 1.0: Introduction

This document is part of a series of guidance documents developed to support EPA's Water Security (WS) initiative (formerly known as WaterSentinel). Initiated in response to Homeland Security Presidential Directive 9, the overall goal of the Water Security initiative is to establish recommendations for the design, deployment, and evaluation of contamination warning systems for drinking water utilities. Additional information on the objectives of the Water Security initiative and contamination warning systems can be found in *Water Sentinel System Architecture* (USEPA, 2005). Additional information is also available on the Water Security initiative website at: http://cfpub.epa.gov/safewater/watersecurity/initiative.cfm.

What is the purpose of this document?

The purpose of this document is to assist drinking water utilities with planning, designing, implementing, and maintaining an effective Consequence Management Plan (CMP) as part of a contamination warning system. This is based on the model developed under EPA's WS initiative.

Consequence management is a key aspect of a contamination warning system and consists of actions taken to plan for and respond to potential drinking water contamination incidents in the distribution system. These actions are meant to minimize response and recovery timelines through a pre-planned, coordinated effort. Investigative and response actions initiated upon determination of a possible contamination threat are used to establish credibility, minimize public health and economic impacts, and ultimately return the utility to normal operations.

The CMP serves as a guide for the utility that describes the actions that should be taken upon discovery of a possible contamination threat, as detected by one of the contamination warning system monitoring and surveillance components. In the event of a confirmed contamination incident, the plan provides information on remediation and recovery steps to return the utility to normal operation. The CMP relies on extensive pre-planning efforts to both establish clear roles and responsibilities with local, State, and Federal response organizations and define strategies for communicating with the public.

What is the Role of Consequence Management in a Contamination Warning System?

A contamination warning system should provide drinking water utilities with a proactive approach to managing threat warnings in the distribution system. It should use advanced monitoring and surveillance strategies to collect, integrate, analyze, and communicate information to provide timely warning of potential water contamination threats, while also outlining response actions to minimize public health and economic impacts. As illustrated in **Figure 1-1,** there are two major operational phases associated with an effective contamination warning system: *Routine Operation* and *Consequence Management*.

Routine operation generally refers to the normal, day-to-day activities that occur at the component level. These activities include, from left to right in Figure 1-1, monitoring and surveillance strategies (first box), along with event detection and initial trigger validation to determine possible contamination (second box). Routine operation should be governed by defined standard operating procedures for each of the monitoring and surveillance strategies, and is detailed in the *Interim Guidance on Developing an Operational Strategy for Contamination Warning Systems* (USEPA, 2008).

Consequence management (the third, fourth, and fifth boxes in Figure 1-1) provides a decision-making framework used to establish credibility, implement response actions, minimize public health and economic impacts, and ultimately return the system to normal operations, and is the focus of this guidance document.

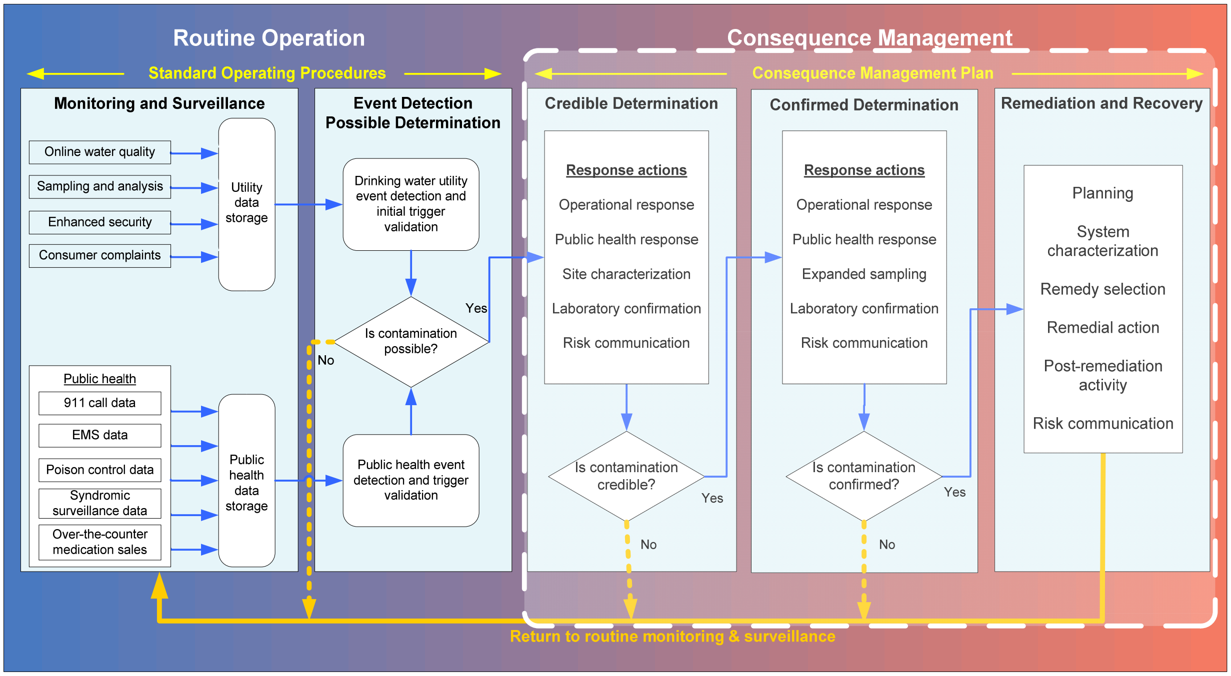

Figure 1-1. Contamination Warning System Architecture

Why should a drinking water utility develop a CMP?

A CMP is a critical component of a contamination warning system. While monitoring and surveillance strategies can provide timely warning of potential water contamination threats, they do not support the initiation of response actions to minimize public health and economic impacts. Therefore, without a well-defined CMP, monitoring and surveillance activities are of limited value.

In order to protect public health, drinking water utilities should have adequate plans in place to respond to possible contamination threats in the distribution system. Unintentional incidents, such as cross-connections with non-potable water, permeation of contaminated water through leaking pipes in areas of low distribution system pressure, and chemical reactions or microbial growth within the distribution system pipes, can result in degradation of distributed water quality and may occur with some regularity. Additionally, intentional contamination incidents, or even the threat of contamination, can have significant, widespread impacts. The CMP specifically outlines the response actions the utility should consider taking in the event of a possible drinking water contamination incident. .

Development of a CMP can also provide concurrent, or dual-use, benefits to a utility. For example, many of the response partner agencies typically involved in developing a CMP for a contamination warning system are the same partners who would be engaged in other emergencies, such as natural disasters. Thus, CMP development affords the opportunity to improve coordination, communications, and move towards an integrated all-hazards response. Regardless of the presence or level of maturity of related plans (e.g., emergency response plans, communication plans, incident-specific response plans), the broad and comprehensive nature of a CMP makes it very valuable to utility operations.

How does the CMP relate to the Response Protocol Toolbox?

EPA previously provided guidance on response to drinking water contamination in a suite of six modules that composed the *Response Protocol Toolbox* (USEPA, 2004). Many of the concepts presented in the Response Protocol Toolbox (RPTB) are applicable to development of a CMP for contamination warning systems and are referenced throughout this document. In particular, this guidance document adopts the "Possible," "Credible" and "Confirmed" progressive stages of a contamination incident, and applies them to development of specific guidelines for responding to contamination threats or incidents as detected by a contamination warning system.

How does the CMP relate to the Emergency Response Plan?

The CMP should serve as a component of a utility's overall emergency response plan specifically focusing on an incident-specific action plan for response and recovery to a drinking water contamination incident in the distribution system. **Figure 1-2** outlines the generic relationship between the emergency response plan and the CMP.

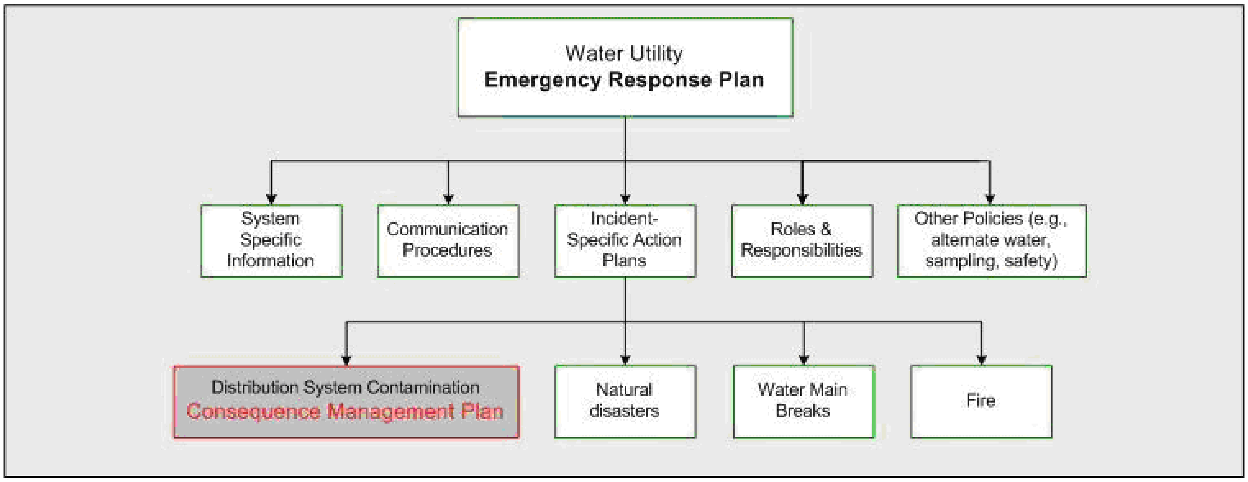

Figure 1-2. Relationship of Emergency Response Plan and CMP

Although Figure 1-2 portrays the CMP as a separate incident-specific action plan, it can also play an integral part in the response and recovery of other incidents as well. For example, if a natural disaster, water main break, or a fire causes contamination within the distribution system, the CMP response and recovery protocols can be applied.

Who should use this document?

The CMP guidance document has been developed for utilities involved in or planning for contamination warning system deployment. While the primary focus of this document and the WS initiative at this time is on large utilities, there are many applications and considerations that may be applicable to medium and small utilities as well. The CMP guidance document should also serve as a useful tool for other organizations, such as wastewater utilities and emergency responders, to understand water contamination preparedness. In addition, this document provides a framework for integration of a CMP with existing plans, training scenarios, and outreach efforts to local, State, regional, and Federal response partner agencies.

How do I use this document?

As described in **Table 1-1**, this document is divided into five sections that provide guidance for developing, implementing and maintaining a CMP for a drinking water utility contamination warning system. It provides recommendations, details, and background on the content of the plan; a framework or approach for developing, implementing, and testing the plan; and discusses how to align a contamination warning system CMP with existing emergency response plans. Tips and success stories are also highlighted throughout the document to draw attention to useful processes.

Table 1-1. Summary of Consequence Management Plan Guidance Section Topics

Section Title	Section Number	Topics
CMP Overview	2.0	Provides an overview of the CMP, describes roles and responsibilities, and outlines the relationship to other external emergency response plans.
Constructing the CMP	3.0	Describes the four steps involved with constructing a CMP: 1) Self assessment of existing plans and how to integrate them into the CMP; 2) development of the internal CMP framework; 3) identification of key response partner agencies; and 4) engagement of response partner agencies and stakeholders. Discussion in this section is supported by example decision tree templates in Appendix B to aid in plan development.
Communications	4.0	Provides guidance for developing general and risk communication plans and an information management strategy, which are essential components of a contamination warning system and CMP. This includes developing plans, defining roles, and identifying resources and equipment. Additional templates for developing communication plans along with supplemental information can be found in Appendices C and E.
Training and Exercises	5.0	Describes methods to implement the CMP through training and exercises. Provides references to established training courses and guidance materials that can be used when planning training program for employees and response partner agencies. It also provides general high-level exercise materials and includes references to other guidance material specifically for exercise design and implementation.
Implementation, Maintenance, and Updates	6.0	Describes the process of implementing and maintaining the CMP. Implementation will address the integration and sustainability of the plan within the utility and surrounding community. Maintenance of the water contamination CMP will address the need to schedule regular reviews and updates.

In addition to the sections described above, this document includes appendices described in **Table 1-2**.

Table 1-2. Summary of Consequence Management Plan Guidance Document Appendices

Appendix	Title	Description
A	Glossary	Terms and definitions.
B	CMP Decision Tree Templates	Provides templates to be used as a guide and starting point for developing the “utility-specific” CMP framework (as described in Section 3.0).
C	Public Information Action Plan	Provides a template to be used when outlining the public information actions for each response phase of a contamination warning system.
D	Roles and Responsibilities	Describes utility roles under the Incident Command System structure and describes roles and responsibilities of response partner agencies.
E	Tools and Resources	Provides references to additional guidance materials and tools.

Section 2.0: Consequence Management Plan Overview

This section provides the background information for developing and constructing a utility-specific CMP. It provides an overview of a CMP and its components, describes potential roles and responsibilities for the utility and response partner agencies, and outlines the relationship to other external emergency response plans and guidance documents.

2.1 Overview of the Consequence Management Plan

Figure 2-1 provides a general overview of an effective CMP and how it can relate to the monitoring and surveillance components of a contamination warning system. A utility-specific CMP should include sections to address all phases of consequence management, including credible determination, confirmed determination, and remediation and recovery. Information should also be included to address utility and risk communication issues.

Figure 2-1 also provides an approximate timeline for an effective consequence management process. This timeline represents an estimate only, since the consequence management process and response efforts are dependent on the specific circumstances surrounding a contamination incident.

Each of the consequence management phases is described below:

Credible Determination Planning and Actions

This initial stage of consequence management should involve gathering additional information about the possible water contamination threat through further review of all contamination warning system components, site characterization activities and other external resources when available and relevant. Some preliminary response actions may also be initiated during the credible determination process to limit or minimize impacts of suspected contamination. Based on additional information gathered, contamination is either ruled out and the system returns to routine monitoring and surveillance activities, or contamination is deemed credible, and additional confirmatory and response actions should be initiated.

Confirmed Determination Planning and Actions

In this stage of consequence management, additional information should be gathered and assessed to confirm drinking water contamination. Response actions initiated during credible determination should be expanded, and additional response activities may be implemented. Confirmed determination also includes the utility consulting with its drinking water primacy agency to determine if public notification (e.g., boil water, do not drink, do not use) is required.

Remediation and Recovery Planning and Actions

Remediation and recovery should occur once contamination is confirmed and the immediate threat to the public and property has been mitigated. This involves actions that should be taken to quickly restore the drinking water utility to service. These actions generally include characterization of the contaminated area and the processes for remediation and return to service. It may also include activating mutual aid and assistance agreements [e.g., local and State agreements, Water/Wastewater Agency Response Networks (WARNs)] to assist in providing an alternate water supply, issuing long-term water use guidance to customers, and decontaminating the water system.

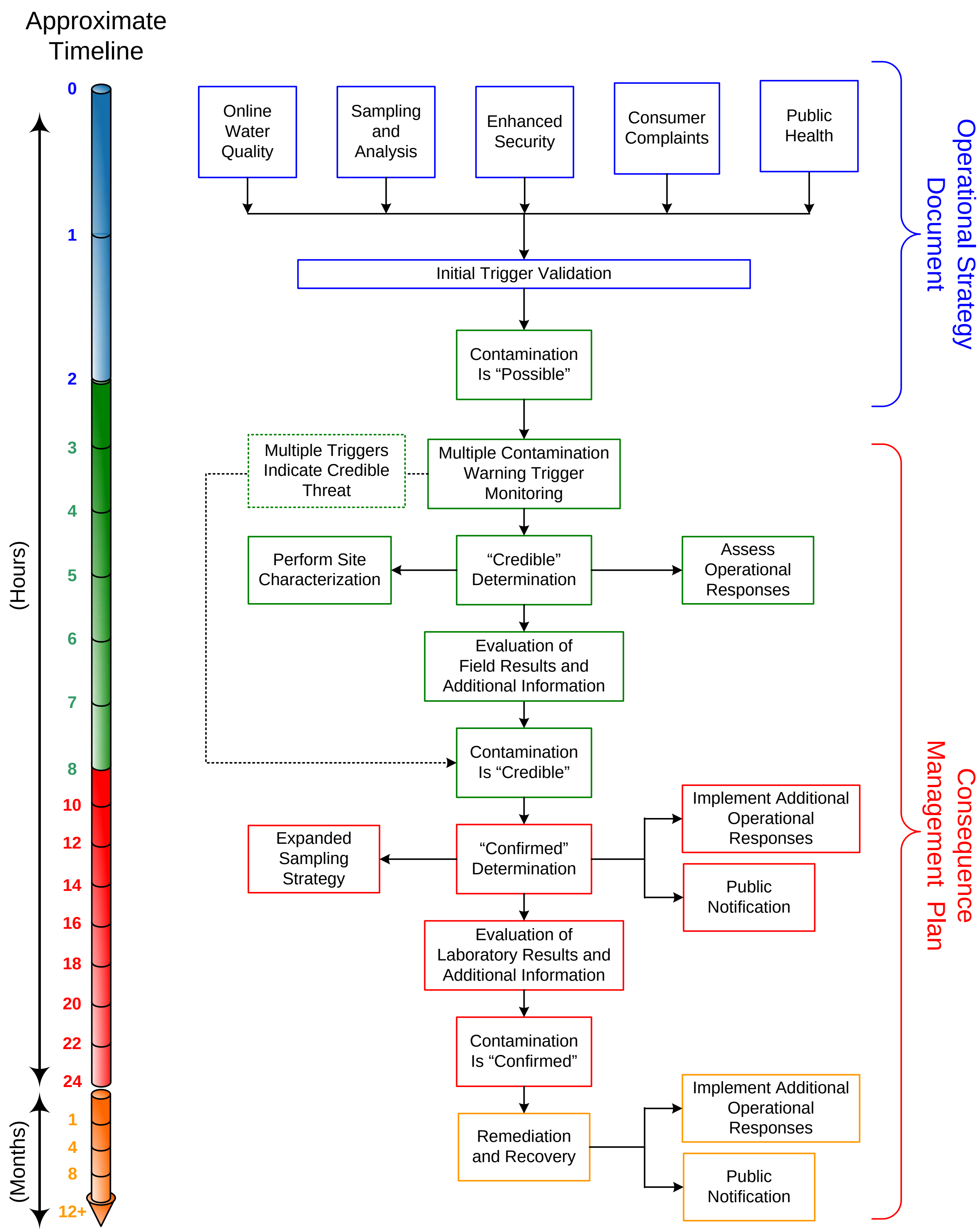

Figure 2-1. Overview of a Contamination Warning System Decision Tree Structure

Risk Communication Plan

As part of the CMP, the utility should also develop a comprehensive risk communication plan and consider additional resources that may be needed to supplement the plan. The purpose of a risk communication plan is to guide the utility and its partners on when and how to make notifications, how to work with the media, how to define what the message will be and establishment of delivery systems for the message (e.g., media, radio, television, auto-dialer telephone systems).

Development of the risk communication plan should be lead by the utility Public Information Officer (PIO) and confirmed through counterparts at external partner agencies. The utility and other agencies may already have much of this information covered in existing risk communication or public notification plans, but roles and responsibilities may still need to be coordinated and confirmed amongst the groups. The goal is to coordinate communication across agencies to promote messages that are clear, consistent and concise (i.e., messages do not give out superfluous or contradictory information).

SUCCESS STORY

The WS initiative pilot utility developed a crisis communication plan to supplement their CMP. This plan detailed the responsibilities of the PIO during all phases of a contamination incident and covered communication both within the utility and with external agencies, the press, and the public. The plan included an overview of basic crisis communication principles, CMP decision trees adapted for use by the PIO, and a section with tools and resources that included templates, sample notification documents, and contact information.

2.2 Application of National Incident Management System and Incident Command System within the Consequence Management Plan

The National Incident Management System (NIMS) provides a systematic, proactive approach guiding government agencies at all levels, the private sector, and nongovernmental organizations to work seamlessly to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property. The NIMS contains five major components: Preparedness, Communications and Information Management, Resource Management, Command and Management, and Ongoing Management and Maintenance. The components of NIMS are adaptable to any situation, from routine, local incidents to those requiring coordinated federal response. This flexibility is essential for NIMS to be applicable across the full spectrum of potential incidents, including those that involve multi-agency, multi-jurisdictional, and/or multidisciplinary coordination. NIMS concepts are used and applied throughout the CMP Guidance (where possible) to ensure that plans developed based on this guidance are consistent with NIMS.

The Command and Management component, which describes the Incident Command System (ICS), is a key aspect of NIMS that should be integrated into the CMP. The ICS is a widely applicable management system designed to enable effective and efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. ICS is used to organize field-level operations for a broad spectrum of emergencies from small to complex incidents, both natural and manmade. As a system, the ICS is extremely useful; not only does it provide an organizational structure for incident management, but it also guides the process for planning, building, and adapting that structure. Using ICS for every incident or scheduled event helps hone and maintain skills needed for the large-scale incidents.

The CMP should contain provisions for the utility to implement an ICS to help manage a response to a contamination incident that goes outside of its normal operations. One of the first steps should be to ensure that response staff has basic NIMS and ICS training. The training and implementation of NIMS should be consistent with the guidance developed by the Federal Emergency Management Agency's (FEMA's) NIMS Integration Center (http://www.fema.gov/emergency/nims/nims_compliance.shtm).

Additional information and clarification on NIMS compliance and NIMS and ICS training can be obtained through the State Emergency Management Agency (EMA) or Office of Homeland Security.

Additional information pertaining to both NIMS and ICS is provided in Section 5.0 and Appendices D and E.

2.3 Roles and Responsibilities

Effective operation of a CMP involves the participation of a variety of utility personnel and response partner agencies, each having well-defined roles and responsibilities. The utility CMP should identify the roles, duties and responsibilities in a manner that works well for the individual utility while matching the roles and responsibilities of the ICS and response partner agencies. The roles and responsibilities outlined in the CMP should provide the utility with a description of what they should be prepared to do and what is expected from local, State and Federal supporting agencies to respond to a contamination incident. Roles and responsibilities of supporting agencies should be worked out prior to completion of the CMP.

This section provides a general description of the roles and responsibilities of the personnel (utility and support agencies) involved with implementing a CMP. **Table 2-1** provides a general overview of the roles and responsibilities that response partners may play in implementing the CMP. Note that Table 2-1 is an approximation only, since response partner roles may vary among localities. Refer to Appendix D for more detailed information concerning roles and responsibilities.

Table 2-1. Summary of Potential Utility and Primary External Response Partner Roles

Potential Response Partners	CMP Activities							
	Operational Response	Public Health Response	Site Characterization	Criminal Investigation	Expanded Sampling	Laboratory Analysis	Risk Communication	Remediation and Recovery
Drinking water utility	✔	✔	✔	✔	✔	✔	✔	✔
Drinking water and wastewater primacy agencies		✔	✔		✔	✔	✔	✔
Local health department	✔	✔	✔		✔	✔	✔	✔
Local law enforcement	✔			✔			✔	✔
Local civil government	✔	✔	✔	✔	✔	✔	✔	✔
Local emergency planning committees and emergency management agencies	✔		✔	✔	✔		✔	✔
Local fire, EMS, and HazMat		✔	✔		✔		✔	✔
Local wastewater utility	✔				✔		✔	✔
Neighboring utilities (water and/or wastewater)	✔		✔		✔	✔	✔	✔
Mutual aid and assistance partners	✔				✔	✔		✔
Media							✔	
State government							✔	✔
State environmental and/or public health laboratories			✔		✔	✔		✔
State health department		✔						
State emergency responders					✔		✔	✔
State emergency management and homeland security agencies							✔	✔
State law enforcement				✔	✔		✔	✔
Department of Homeland Security (DHS)				✔			✔	✔
EPA regional offices and/or laboratories			✔		✔	✔	✔	✔

Potential Response Partners	CMP Activities							
	Operational Response	Public Health Response	Site Characterization	Criminal Investigation	Expanded Sampling	Laboratory Analysis	Risk Communication	Remediation and Recovery
EPA Criminal Investigation Division (CID)				✔	✔	✔	✔	✔
EPA On-Scene Coordinators (OSC)	✔		✔		✔	✔	✔	✔
Federal Bureau of Investigation (FBI)				✔	✔	✔	✔	✔
Centers for Disease Control and Prevention (CDC)		✔		✔	✔	✔	✔	✔
National Response Center (NRC)				✔	✔		✔	✔

Drinking Water Utility Roles

As indicated in Table 2-1, the drinking water utility should be involved in all aspects of consequence management in response to a contamination incident. Thus, it is important to assign CMP roles and responsibilities to the appropriate utility personnel. Although roles and responsibilities will likely vary based on the circumstances of each utility, roles should be clarified similar to the way they are listed in the ICS. This includes assigning utility personnel to the ICS roles identified in Figure D-1 in Appendix D. These job functions are generic, allowing drinking water utilities to map specific CMP roles and responsibilities to their unique organizational functions.

For the purposes of this guidance document, we use the term *"appropriate utility personnel"* when addressing specific utility roles in relation to the ICS. It is ultimately up to the utility to decide the appropriate personnel responsible for these roles and modify them based on their own organizational structure. For example, in the U.S. EPA RPTB, it is recommended that utilities designate a water utility emergency response manager (WUERM) as the Incident Commander (IC) when a threat is reported. In some utilities, the WUERM is an individual (or several individuals) with designated responsibility for managing the utility's response to a contamination threat or incident. Although it is important to recognize and appoint an individual responsible for being the IC, the use of the term WUERM for the IC is optional and dependent on utility preference.

Response Partners

As indicated in Table 2-1, local, State, and Federal support agencies will typically have various response roles during a drinking water contamination incident. For example, the local fire department may be called on to provide hazardous material (HazMat) support and State/local laboratories to assist in analyzing potentially contaminated drinking water samples. Other support agencies may include local health departments, law enforcement agencies, local governments and local/State/Federal regulatory agencies. Utilities should identify key partners and stakeholders when developing their CMP in order to define the roles, responsibilities and assistance capabilities.

Refer to Section 3.0 for information on identifying and engaging response partners and Appendix D for further information concerning response partner roles.

2.4 Relationship to Other Guidance Documents and Programs

As previously stated, EPA provided guidance on response to drinking water contamination in a suite of six modules that composed the *Response Protocol Toolbox* (USEPA, 2004). Many of the concepts presented in the RPTB are applicable to development of a CMP for contamination warning systems. This guidance document adopts the RPTB progressive stages of a contamination incident, which include “Possible,” “Credible,” and “Confirmed.”

The CMP also integrates concepts and information presented by local, State and Federal guidance documents. These additional guidance documents and tools are referenced in Appendix E.

Section 3.0: Constructing the Consequence Management Plan

This section is intended to serve as a roadmap for the user in developing and constructing a utility-specific CMP. The construction of a comprehensive CMP should include the following four sequential steps:

1. Assessment and integration of existing plans and operations
2. Development of the CMP framework
3. Identification of key response partners and stakeholders
4. Engagement of response partners and stakeholders

3.1 Step 1: Assessment and Integration of Existing Plans and Operations

The first step in developing a CMP should be to conduct a self assessment of the utility's existing emergency response plans and overall preparedness. The purpose of the self assessment is to identify existing procedures regarding planning and preparedness that may serve as a starting point for constructing a CMP. This will allow the utility to expand existing material, strengthen existing plans, and integrate current operations into the CMP.

> **IMPORTANT DEFINITION**
>
> According to NIMS, preparedness is defined as "a continuous process that involves the integration of planning, training, exercising, personnel qualification and certification standards, and equipment certification standards in an effort to build, sustain, and improve operational capabilities."

The utility should review existing plans and operations to determine potential elements of a CMP. A CMP developed in support of a contamination warning system should be a sub-set of the utility's existing emergency response plan, focusing specifically on the contamination threat to the distribution system. For example, utilities may have developed action plans and/or specific protocols and procedures within their emergency response plans for responding to the following:

- Water contamination, such as *Cryptosporidium* and *Giardia*, cross connections, chemical spills, intentional contamination, and "white powder" plans
- Increased consumer complaint calls
- Facility alarms, suspicious persons, or threats made to the system
- Depressurization, power outage, adjusting water treatment parameters, or other operational problems
- Severe weather
- Civil disorder
- Mutual aid and assistance with other utilities
- Need for water-use restrictions
- Public notification/Risk communication

As plans are reviewed, a list or matrix should be constructed that captures the title of the plan, the situation it addresses, and what utility divisions and outside agencies are involved. This will help to identify gaps that need to be addressed during consequence management planning activities.

In addition to an assessment of existing operational plans, the utility should conduct an assessment of response resources and capabilities. This should involve identifying assets (e.g., staff, equipment) as well as training needs that are required to carry out the existing plans and operations. Throughout the development of the CMP, the utility should maintain a list of items or resources that need to be acquired, enhanced, or improved. Later, during the final drafts of the plan and implementation, the list can be addressed and shortfalls in training, equipment and other resources can be resolved.

Table 3-1 illustrates a matrix that was used during an actual assessment of utility plans. It identifies the type of plans and response resources available, areas where gaps may be located, and possible interaction points. The notes and comments in the list are for illustration purposes.

Table 3-1. Example Matrix Documenting Utility Plans, Equipment, and Training

Type of Plan and Comments	Does the plan contain protocols for response to a water contamination?	Does the plan contain a list of external partners?	Is the plan up to date?	Does the plan have steps that can be included in the CMP?	Notes
Emergency Response Plan	✓	✓	✓	✓	This plan covers water contamination and has a good list of potential response partners, including a contact list.
Security Standard Operating Procedure (SOP)		✓		✓	This plan contains detailed information on working with local law enforcement that could be included in the CMP, although contact numbers need to be updated.
Cryptosporidium Response Plan	✓		✓		This plan contains specific protocols for responding to water contaminated by *Cryptosporidium*. The process portion will link to CMP and it has excellent response information.
Alternate Water Supply Plan					This plan is currently being developed. When completed, it should be linked to the CMP.
Existing Equipment	**Quantity**	**Needed for CMP?**	**Comments**		
2-way Radios	18	Yes	Not enough radios and all radios are for field use. Communication is only through dispatch. The radios are old and may need to be replaced. Radio communication does not work east of town.		
Training	**Type**	**Needed for CMP?**	**Comments**		
Incident Command (all 4 courses – IS 200, 400, 700, 800)	FEMA	Yes	Two people have taken all the specific recommended courses. Seven people have taken the intro course. Talk to Training about expanding this.		
Site Characterization	Utility	Yes	Head of Operations has taken the course but no field operators have taken it. Needs to be expanded.		
Exercise(s)	Local	Yes	Participated in small exercise 2 years ago. Once the CMP is completed, will have to set up exercise(s) to test its implementation. Talk to City Manager about city exercises.		

As each existing plan is reviewed, consider how they are connected to each other and how they are likely connected to the CMP. When drafting the CMP, use a matrix similar to Table 3-1 to establish links from the corresponding plans to the relevant CMP sections. Then use the material from the existing response plans as a starting point for developing that CMP section.

For example, the utility emergency response plan may contain a comprehensive list of response partners (e.g., under the communication plan section) that may be integrated into the CMP. The emergency response plan may contain detailed information on alternate water supply planning that can be integrated as well. In this way, all the utility emergency response plans will be connected and reflect one another.

3.2 Step 2: Development of the CMP Framework

After assessing the utility's existing plans and overall preparedness, the next step is to develop an initial draft of the CMP. Developing an initial draft will allow the utility's consequence management design team (i.e., designated utility personnel assigned to develop the CMP) to begin conceptualizing the later stages of a response and determine when response partners should be engaged. This will also guide the utility in identifying key staff and/or utility divisions that should be involved in the development process (refer to Section 2.3, Roles and Responsibilities). Development of the initial draft should occur before defining external agency involvement as outlined in Steps 3 and 4.

The initial draft should be based on the utility's self-assessment of existing plans and procedures outlined in Step 1. This includes identification of where the initial draft will most likely be connected to previously existing plans. The design team should then identify any gaps and areas of the draft CMP that need to be expanded or developed. For example, the utility may incorporate their existing *Cryptosporidium* response plan into their CMP or may realize that their risk communication plan should be enhanced and updated.

The initial draft of the CMP should include the development of decision trees for response actions during an incident, as well as remediation and recovery following an incident. This should include specific decision trees for determining whether a contamination incident is credible and/or confirmed, and for remediation and recovery efforts. The decision trees should run through the time period up to and past the point where response partner agencies are contacted for assistance. The initial draft should identify the major steps, actions, decision points, communications points, and expected contributions by partners that occur. Decision trees or other visuals will be helpful in representing this information.

> **IMPORTANT TIP**
>
> Appendix B contains examples of CMP decision trees that should be used as a guide when developing a utility-specific plan. Decision trees are invaluable in the design phase of consequence management planning, as well as during response.
>
> After reviewing the information under Step 2, proceed to Appendix B to develop the appropriate decision trees for the utility-specific plan.

The following sections provide guidance for the development of the credible, confirmed, and remediation and recovery portions of a utility-specific CMP. Example decision tree templates are provided in Appendix B to further assist in the development of each CMP section.

Credible Determination Planning and Actions

Credible determination is the process for validating a possible threat warning. A possible water contamination threat warning should be characterized as credible if additional information collected during the utility's investigation corroborates the threat warning received from a monitoring and surveillance component(s), and the collective information indicates that contamination is likely. For example, if the threat warning comes in the form of a security alarm and additional signs of contamination are observed during the alarm investigation (e.g., broken lock or hatch), the threat would likely be considered credible. While many threat warnings may result in possible contamination threats, a small percentage of possible threats are expected to become credible.

Credible determination should begin when the utility person identified as the point of contact within the response team is notified of a validated monitoring or surveillance alarm, or possible contamination threat. Depending on the organizational structure, this point of contact could be the division chief, manager, or director. Under ICS, this person is the IC. The credible investigation should involve several activities including notification of internal and external parties, assessment and implementation of immediate operational responses (e.g., limited system isolation), site characterization, coordination with internal/external laboratories and laboratory sample analysis, and review of other contamination warning triggers. The credible investigation should also include a close-out mechanism for situations determined to be non-incidents (i.e., investigations shows that no contamination occurred).

Figure 3-1 provides a generic overview of the credible determination process. Credible determination activities may not occur in sequential order and may start at different times, run concurrently, be revisited when addition investigation information is received, or occur after credible determination. For example, if field results from site characterization (e.g., site hazard assessment, field safety screening, and rapid field tests) indicate the presence of a contaminant, the incident may be deemed credible and implementing the sampling strategy may actually occur during the confirmed determination investigation.

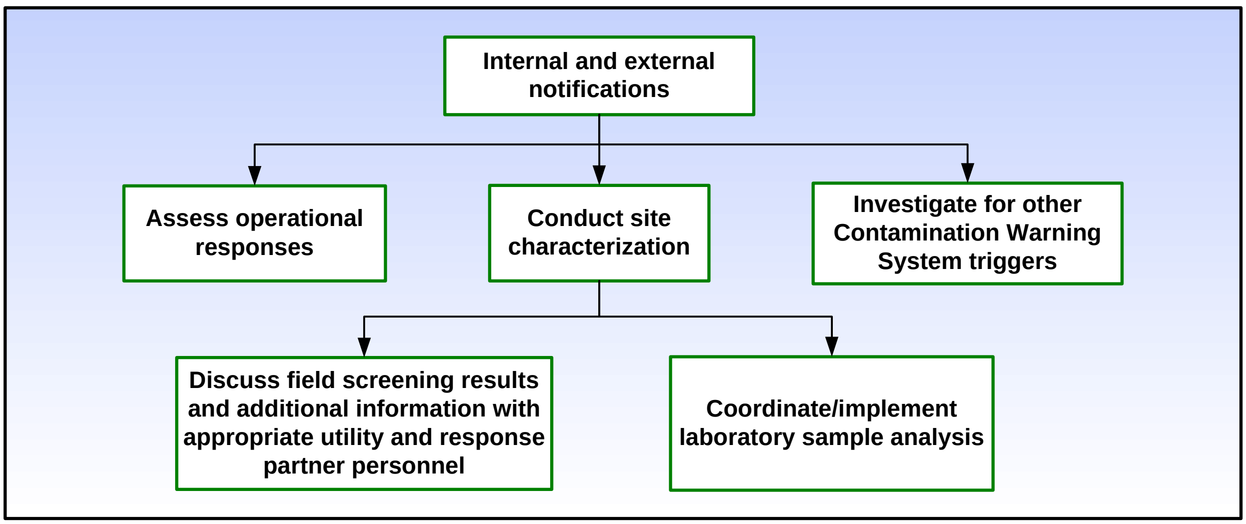

Figure 3-1. Credible Determination Process Overview

Each utility should develop its own process or plan for determining whether an incident is credible based on the activities presented in Figure 3-1. The credible determination plan and material should be written to represent and reflect the specific utility organizational structure and capabilities. A credible determination decision tree is a clear and efficient way to connect investigation steps from phase to phase. Appendix B.1 contains an example decision tree that can be modified when developing the utility-specific process for credible determination. Example decision trees for operational response and site characterization are found in Appendices B.2 and B.3, respectively.

The following sub-sections provide general information to consider when developing the specific sections of the credible determination plan as outlined in Appendix B.1.

Internal and External Notifications

During the credible investigation, it is critical to work with both internal utility personnel and external response partner agencies to investigate, control, and respond to a contamination threat. The utility should first notify key utility personnel (e.g., ICS personnel) who will be responsible for assisting in the credible determination process.

External response partner agencies may also want to be notified at this stage of an incident. There are several reasons for contacting and involving external agencies including access to information, tools, and resources.

IMPORTANT TIP

During development of the credible determination portion of the CMP, it is critical that all response agencies be identified (e.g., those who might need to be notified at this stage of a contamination incident). Even if an agency is not going to be immediately involved, they may wish to be notified early on during the incident so they can prepare their resources for a response. They may also have access to information of which the utility is unaware. Refer to Step 3 in this section for information on identifying response agencies.

When developing the credible determination plan, it is important to make assumptions about when to contact external agencies. If events warrant response actions, external parties may wish to be notified that a potential problem is being investigated. At this point, it may be necessary to notify law enforcement (e.g., local law enforcement, EPA Criminal Investigation Division, local Joint Terrorism Task Force) to determine whether the incident was intentional, due to negligence, or resulting from another cause.

Refer to Steps 3 and 4 for information on identifying and engaging response partner agencies. Also, refer to Section 4.1 for information on developing the external communication plan, and consider the example action items provided in Appendix B.1 (Credible Determination Decision Tree Template) to serve as a starting point.

Investigate for Other Contamination Warning System Triggers

Upon receipt of a possible contamination threat, the utility should investigate whether other contamination warning triggers are activated from the monitoring and surveillance components. Other contamination warning triggers activated during an investigation may increase the likelihood that a threat is credible. Identifying multiple triggers may speed response actions that mitigate public health exposures and economic/environmental impacts.

Assess Operational Responses

At this stage of the credible determination investigation, the utility should consider operational response actions that may be used to mitigate potential public health and economic impacts. Operational response actions considered should specifically include whether the contaminant can be isolated within the distribution system, flushing options, and the relative impact such response actions may have on customers and utility operators (e.g., minimal number of customers affected, pressure reduction compared to minimum pressure requirements, potential period of impact). Although sufficient information may not be available at this time (e.g., source, type, and spread of contaminant) to support these specific operational response actions, it is important to at least consider all options in case the threat or incident escalates to credible or confirmed.

Under certain circumstances, an immediate isolation response may be appropriate during the credible determination phase. This includes specifically determining whether the contamination incident occurred at a fixed location, such as a storage tank or pump station. If so, and it is determined that the impacts of isolation are negligible, the utility may be able to quickly and easily isolate the storage tank or pump station by closing accessible valves, filling tanks, or otherwise altering the distribution hydraulic grade. If contamination did not occur at these locations, then the utility should continue to consider potential operational response actions until further information is obtained. Outlining the impacts of isolating certain areas of the system prior to an incident can be invaluable during an actual incident, and should be considered as part of the CMP pre-planning efforts.

Appendix B.2 contains more detailed information concerning operational response activities, along with an example decision tree template. This decision tree can be modified based on each utility's unique process for performing operational responses during the credible and confirmed stages of a contamination incident.[1]

Conduct Site Characterization

Site characterization is a critical step in the credible determination process and involves collecting information from an investigation site to support the evaluation of a drinking water contamination threat. This helps to characterize the incident once a threat, accidental or criminal, is suspected. Site characterization involves careful planning and execution, oftentimes with external agencies and response partners.

IMPORTANT TIP

Proper safety practices are essential for minimizing risk to the site characterization team and should be established prior to an incident in order to be effective. Field personnel should have appropriate safety training and basic good safety practices should be incorporated into a set of concise guidelines or formalized into a health and safety plan (HASP). Further information on HASPs is available in Appendix E.

The site characterization plan should describe the activities of the parties involved and highlight their roles and responsibilities. The plan should cover activities starting with performing a site hazard assessment when approaching a suspected contamination site(s) to collecting water samples and exiting the site. Recommended site characterization activities are summarized in **Table 3-2**.

Table 3-2. Summary of Recommended Site Characterization Activities

Activity	Purpose	Actions	Result
Site Hazard Assessment	Minimize the risk to the site characterization team.	Determine hazards using information from the initial threat evaluation.	If site hazard is Low, the utility (i.e., Incident Commander) may dispatch the site characterization team to the site for field safety screening. If the site hazard is High, the utility may refer the situation to a HazMat team.
Field Safety Screening	Determine if additional safety precautions are necessary at the site as site characterization activities proceed.	Perform a radiation screen and/or air quality tests.	Appropriate utility personnel (e.g., IC) decide on whether or not to instruct the team to proceed with sample screening.
Sample Screening	(1) Provide additional information to assess the credibility of the threat; (2) Tentatively identify contaminants that need to be confirmed by laboratory testing; (3) Determine whether hazards identified in Step 2 require special precautions during sampling.	Screen water samples using water testing equipment methods designed for rapid results.	Appropriate utility personnel (e.g., IC) decide on whether or not to instruct the team to proceed with sample collection.
Sample Collection	Provide water samples to the laboratory for confirmatory analyses.	Collect water samples using approved methods and document procedures. SOPs should be updated to reflect additional procedures.	Ability to proceed with confirmatory laboratory analyses.

[1] *Refer to the U.S. EPA Response Protocol Toolbox, Module 2, Contamination Threat Management Guide (EPA-817-D-03-002) for further information on operational response actions.*

Appendix B.3 contains more detailed information concerning site characterization activities, along with an example decision tree template. This decision tree can be modified based on each utility's unique process for performing site characterization during a possible contamination incident.[2]

Discuss Field Screening Results

Field screening results from site characterization, including site hazard assessment, field safety screening, and sample screening/rapid field tests, will aid in determining whether an incident is credible. They should be reviewed and discussed by the appropriate utility personnel (e.g., IC and ICS Planning Section) and response partners. This should not, at this time, include results of laboratory analyses conducted on samples collected at the end of the site characterization process. However, the sample screening results may provide information as to which analytical methods to use on the water samples.

Coordinate/Implement Laboratory Sample Analysis

After site characterization has been completed and samples have been collected, the utility should coordinate the laboratory analyses of the water samples. This includes deciding on the analytical methods to be used, as well as coordinating with predetermined laboratories that will perform the procedures. Factors such as sample preservation, filtering techniques, holding times and chain of custody forms should be accounted for.

Laboratories used for sample analysis should be established well in advance of an incident and notified at the beginning of the credible determination phase to ensure that roles and responsibilities are established. This effort should be coordinated in the same manner as with other utility response partners to ensure responsive, efficient and accurate handling of water samples collected from the suspected contamination site. The utility sampling strategy should be well-integrated with the plans and operations of the laboratories in their network (e.g., local/private, State, public health laboratories).

Nationally, laboratories are implementing processes under the Water Laboratory Alliance (WLA). The WLA is expected to provide the water sector with an integrated nationwide network of laboratories with the analytical capabilities and capacity to support monitoring and surveillance, response, and remediation in the event of intentional and unintentional drinking water supply contamination involving chemical, biological, and radiological contaminants. The WLA is expected to build upon on existing networks such as the Centers for Disease Control and Prevention Laboratory Response Network (LRN). It is expected to leverage existing laboratory network capability, capacity, and infrastructure to fill gaps in national laboratory preparedness for drinking water analyses. Laboratory infrastructure likely to be leveraged from other networks includes analytical methods, membership criteria, and critical materials, such as laboratory reagents.

The foundation of the WLA has been developed by creating laboratory response plans in each of the EPA Regions and Hawaii. The Regional Laboratory Response Plans (RLRPs) provide a framework for a coordinated laboratory response to drinking water incidents, and have been customized and tested using table top exercises in each Region (2006-2007). These plans are being further refined in 2008 by conducting functional exercises in each Region involving actual sample shipments to laboratories, analyses, data transfer and communication among laboratories.

The RLRPs are expected to be consolidated into a national response plan for drinking water incidents. This national plan would constitute the framework of operations for the WLA.

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[2] *Refer to the U.S. EPA Response Protocol Toolbox, Module 3: Site Characterization and Sampling Guide (EPA-817-D-03-003) for further information on site characterization.*

Confirmed Determination Planning and Actions

Once it has been determined that a contamination threat is credible (e.g., additional information obtained during credible investigation corrobortaes the contamination threat), steps should be taken to confirm and respond accordingly. Confirmation transitions from a threat to an actual incident and relies on definitive or nearly definitive information demonstrating that the water has been contaminated.

The most reliable means of confirming a contamination threat are water sample analytical results showing the presence of a contaminant. However, under some circumstances, it may be appropriate to confirm a contamination threat in the absence of definitive analytical data. This is particularly true in cases where analytical confirmation may be impractical because of challenges in collecting a representative sample (e.g., uncertainty about the point of contaminant introduction or the time that elapsed between the introduction of the contaminant and receipt of the threat warning). If analytical confirmation is deemed impractical, it may be necessary to rely on a preponderance of evidence to confirm an incident.

Preponderance of evidence to confirm a contamination incident may include:

- Field sample results collected during site characterization;
- Results and observations of site characterization;
- Information from public health officials, area hospitals, or 911 call centers; and/or
- Targeted information from external sources (such as law enforcement intelligence) based on the collective knowledge of the threat.

If the threat evaluation yields no conclusive evidence of contamination, then the IC may decide that the threat is no longer credible and return the system to normal operation. Each situation will be unique, so the judgment and experience of the IC and supporting staff is necessary to decide whether a credible threat should be elevated to a confirmed incident, dismissed as not credible, or investigated for additional information.

Confirmed determination typically begins by evaluating field screening results (e.g., rapid field test results, laboratory analysis of water samples collected during site characterization) with incident command and other response partner agencies, as appropriate. As information is reviewed, response teams may implement or revise operational responses in order to isolate the contaminated area or mitigate the consequences of contamination. The utility must also consult with its drinking water primacy agency regarding the development or implementation of the public notification strategy (e.g., boil water, do not drink, do not use). Confirmed determination activities also include additional field investigations, as well as development and/or execution of expanded sampling plans, health and safety plans, risk communication plans, alternate water supply plans, and any other tools that are required for the particular incident.

Figure 3-2 provides a generic overview of the confirmed determination process. Although presented in sequential order, confirmed determination activities may start at different times or run concurrently.

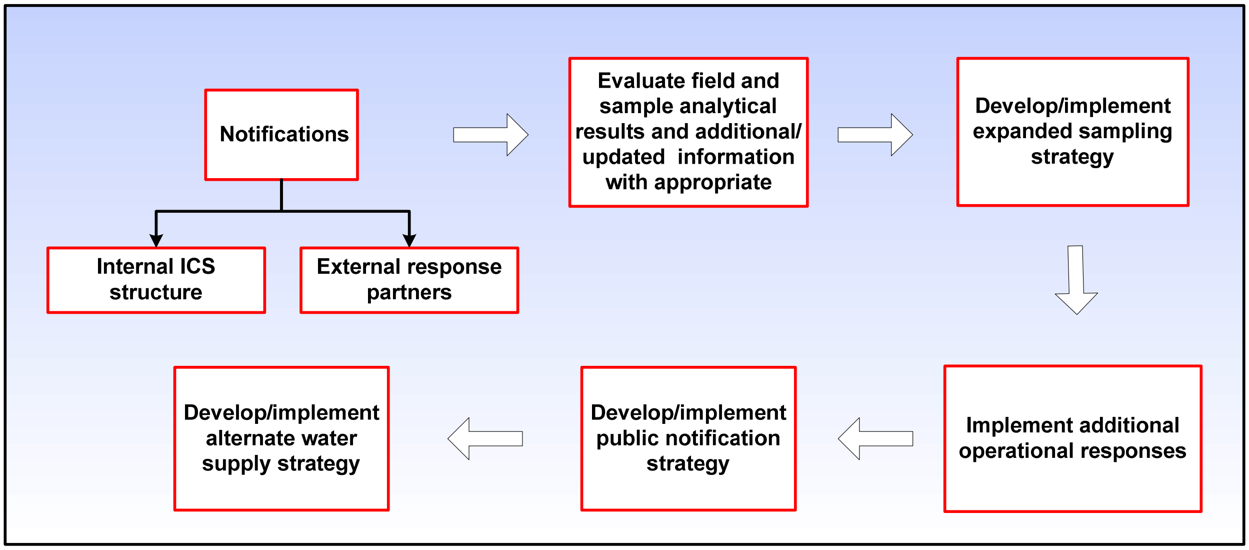

Figure 3-2. Confirmed Determination Process Overview

Each utility should develop its own process or plan for determining whether an incident is credible based on Figure 3-2 activities. The confirmed determination plan and material should be written to represent and reflect the specific utility organizational structure and capabilities. A confirmed determination decision tree is a clear and efficient way to connect investigation steps from phase to phase. Appendix B.4 contains an example decision tree that can be modified when developing the utility-specific process for confirmed determination. Example decision trees for operational responses and public notification can also be found in Appendices B.5 and B.6, respectively.

The following sub-sections provide general information to consider when developing the specific sections of the confirmed determination plan, as outlined in Appendix B.4.

Internal and External Notifications

Response actions during a confirmed determination investigation require extensive coordination with internal and external groups. Consequently, the CMP should resolve any issues pertaining to who will be contacted, at what point they will be notified, and what their roles and actions will be so that notification and coordination procedures are well defined prior to an incident.

If multiple organizations are authorized to respond to a water contamination incident, the utility and all outside partners should operate under a single command structure. This is referred to as Unified Command (UC), where local, State, and Federal agencies work together with the utility to manage an incident under one ICS structure. If a UC is established, consider providing communication and update reports for various response partners as part of the process, and be sure to incorporate laboratories. The laboratories' ability to provide support relies heavily on coordination efforts and information from the field.

IMPORTANT TIP

Effective communications, information management, and intelligence sharing are critical aspects of incident management. NIMS describes four types of reports that can be used to provide incident information to utility personnel and response partners during an incident. This includes incident notification and situation reports, status reports, analytical data, and geospatial information. For further information go to pages 56-57 of the NIMS document: http://www.fema.gov/pdf/emergency/nims/nims_doc_full.pdf

If many organizations are involved, the local Emergency Operations Center (EOC) will likely activate and facilitate agency coordination, most directly with resource requests. EOCs may be organized by major functional disciplines (e.g., fire, law enforcement, and medical services), by jurisdiction (e.g., State, regional, county, city, tribal, Federal), or some combination thereof.

Joint Information Centers (JICs) and Joint Operations Centers (JOCs) may also be established at this stage of a contamination incident. The JIC provides a structure for developing and delivering coordinated messages; it develops, recommends, and executes public information plans and strategies; advises on public affairs issues that could affect a response effort; and responds to rumors and inaccurate information that could undermine public confidence in the emergency response effort. When in place, the JIC coordinates all incident-related public information activities. It is the central point of contact for all news media at the scene of an incident. PIOs from all participating agencies/organizations should co-locate at the JIC.

A JOC is essentially a federal equivalent to the local EOC. Established by the FBI, a JOC would be activated during a bioterrorist or weapons of mass destruction event. The incident command post will still retain on-scene control over the incident, but FBI agents would join the ICS at the local level in order to feed information back to the JOC.

Refer to Section 4.1 for more information on developing the external communication plan and consider the example action items provided in Appendix B.4 (Confirmed Determination Decision Tree Template) and D.1 to serve as a starting point.

Evaluate Field and Sample Analytical Results

The first step in the confirmed determination process should be to evaluate the field results obtained during site characterization. This may include results from field safety screening and rapid field tests. All results should be discussed and evaluated with incident command, the drinking water primacy agency, EPA region, public health departments and any other partners and external agencies that request to be notified. The utility IC or designee should prepare a brief summary of the field results, as well as other pertinent information about the incident, to aid in determining whether to confirm the incident.

At this stage, laboratory coordination and operations may have also been initiated during credible determination. The timeline for sample processing may vary depending on when site characterization is completed and the type of analysis being conducted (e.g., chemical, biological, radiological). In many cases, chemical contaminants can be identified and confirmed within a short period of time, while biological contaminants require several days of laboratory testing to provide conclusive results.

All analytical results should be discussed and evaluated with incident command, the drinking water primacy agency, EPA region, public health departments and any other partners and external agencies that request to be notified. Laboratory partner involvement may also be valuable in examining quality assurance/quality control data for the analyses. Positive laboratory analysis results should be considered when confirming the contamination threat.

Develop/Implement Expanded Sampling Strategy

After evaluating the field screening results, an expanded sampling strategy should be considered. Expanded sampling is used to determine the extent of the contamination for response and remediation efforts.

In some cases, hydraulic modeling tools can be used to determine where to sample after the initial sampling events. System characterization maps and hydraulic models can identify areas of the system that have a higher probability of being impacted depending on the entry point during the incident.

Although not all incidents and situations can be planned for in advance, the utility may want to pre-identify logical sampling points across the system, such as those downstream of tanks and reservoirs.

Implement Additional Operational Responses

If the contamination threat is still considered credible after further evaluation of field screening results, additional operational responses should be considered and planned. Operational response at this stage should continue to involve the decision process for contaminant isolation based on how much is known about the contamination incident. This includes the critical decision of whether enough information is present to isolate portions of the distribution system, as well as consideration of other operational procedures, such as flushing.

> **IMPORTANT TIP**
>
> If available, distribution system hydraulic models can be used to develop confirmatory water distribution system sampling maps which show the potential spread of contamination at various time intervals. This pre-existing information can greatly speed development of expanded sampling plans and complement institutional knowledge in trying to determine contaminant transport through the distribution system. It can also inform decisions regarding areas in which to issue use restriction notices, if needed.

If the contamination source is known, appropriate utility personnel (e.g., utility ICS Planning or Operations Section) should first estimate the spread of the contamination using distribution system models or knowledge of the system. Once the spread of the contamination has been estimated, the utility should consider the feasibility of isolating the contaminated area. If feasible, the utility should take the appropriate isolation measures (e.g., closing valves, tanks) and notify impacted customers and appropriate external agencies (in accordance with regulatory practices and guidelines). Outlining the impacts of isolating certain areas of the system prior to an incident can be invaluable during an actual incident, and should be considered as part of the CMP pre-planning efforts.

Listed below are four general types of isolation response actions that can be taken, depending on whether the contamination source is known and whether the distribution system configuration is conducive to isolation (e.g., valve placement, grid structure). In all cases, it is critical that the utility have an accurate inventory of distribution system valves, and that the valves are exercised at regular intervals, to ensure effective and timely response.

- Isolation from the contamination source (e.g., a contaminated storage tank);
- Isolation of one area of the system from another (e.g., where a system uses two different sources of treated water where one has contamination);
- Isolation by “valving off” specific customers (e.g., a “dead end” neighborhood with water delivery controlled by one or a limited number of valves); and
- Generalized isolation of the entire system with a community-wide “do not use” order.

> **IMPORTANT TIP**
>
> Pre-planning efforts, supported by hydraulic and pressure modeling and monitoring, should be used to characterize isolation options and determine whether the basic system configuration is conducive to isolation. Pre-planning efforts should also verify staff availability (e.g., appropriate adjustments to labor contracts), establish isolation protocols, describe a pre-determined incident decision structure (including internal and external ICS-related communication and decision-making protocols), and describe notification needs.

Once implemented, a successful isolation response will leave potentially contaminated water in the distribution system that is *still accessible by customers*. Therefore, thorough and effective customer notification following an isolation response is critical to minimize the existing contamination contact risk.

If the contamination cannot be isolated, then the utility should consider other operational procedures such as flushing. Although flushing is typically a routine operation that utilities are familiar with, flushing during a credible contamination incident should be implemented with care as the type and concentration of the potential contaminant may be unknown at this time. Thus, worker safety/protection measures should be taken and possible impacts to the environment due to discharged water should be considered. The drinking water primacy agency should be consulted for any planned discharges to a wastewater collection system or surface waters. Utilities should consider coordinating with their State regulators concerning flushing activities during a credible contamination incident as a pre-planning step during CMP development.

Conditions under which a utility could consider undertaking a flush operational response include:

- The utility has obtained the needed regulatory clearances (e.g., State regulators have been consulted and concur with flushing);
- Isolation is infeasible (e.g., contaminant source/spread unknown or contamination has dispersed to system areas lacking the technical capacity or configuration to support isolation);
- Customer notification is anticipated to have limited effectiveness (e.g., contamination spread involves the notification of many, widespread users); and
- The weight of evidence suggests contamination is compatible with a flush response (e.g., the contaminant type and concentration are sufficiently well known and deemed low risk in a release context or, in the absence of this specificity, there are strong indications that a release from the system will have no tolerable environmental, general public health, and sewer system impacts).

Another potential operational response action that may be considered by utility personnel involves increasing the disinfectant dose at a water treatment plant or boosting the disinfectant dose in the field, particularly for suspected biological contaminants. However, unless the contaminant type and location are confirmed, this undirected response could be ineffective (if the contaminant is non-responsive) or exacerbate the incident, as chlorine reactions with some contaminants may form by-products that are just as, if not more, toxic than the original contaminant.

Increased disinfectant concentrations at the water treatment plant will also have a low probability of contacting a contaminant slug that is already in the distribution system. Targeted chlorine boosting in the system may be effective, but would require availability and transport of portable disinfectant booster equipment and chemicals (not available to many utilities), unless contamination coincidently occurs in close proximity to an existing booster station. Other concerns with disinfection as an operational response include:

- Since effective disinfection requires a dynamic hydraulic process (flow through the system), its use would bar any isolation response;
- Higher than normal disinfectant levels may cause a spike in consumer complaints, raise injection concerns, and could mask the problem (assuming a drop in free and total residual is a key indicator of potential problems in the system); and
- Disinfection may introduce future de-chlorinization needs, all of which may complicate the credibility determination process.

Thus, the primary role for disinfection should come in the remediation and recovery phase of consequence management.

Appendix B.5 contains more detailed information concerning operational response activities, along with an example decision tree template. This decision tree should be used as a guide when developing the operational response steps of a utility-specific plan.

Develop/Implement Public Notification Strategy

As part of the confirmed determination process, the utility must consult with its drinking water primacy agency to determine whether public notification (PN) is required. A PN strategy may include issuing messages such as “boil water,” “do not drink,” or “do not use,” in order to minimize the potential for exposure of the public to the suspect water.[3] The utility IC and PIO, in coordination with the drinking water primacy agency and local public health officials, should be responsible for developing this strategy once it has been determined necessary.

PN in response to a water contamination threat or incident may be required under the PN Rule (40 CFR 141, Subpart Q). Specifically, the rule requires PN for “situations with significant potential to have serious adverse effects on human health as a result of short-term exposure as determined by the primacy agency either in its regulations or on a case-by-case basis.” See Section 4.2 for more details on PN Requirements.

Appendix B.6 also contains more detailed information concerning PN activities along with an example decision tree template. This decision tree should be used as a guide when developing the PN steps of a utility-specific plan.

Develop/Implement Alternate Water Supply Strategy

It is critical to have an alternate water supply strategy in place and ready to implement in the event that water contamination seriously undermines the utility’s ability to deliver services. Alternate water supplies will be needed to support public demands, fight fires, and meet the demands of medically-sensitive populations. While this plan is important for water contamination incidents, alternate water supply plans can also apply to many other hazards and situations (e.g., natural disaster, drought).

Remediation and Recovery

Remediation and recovery actions should be performed if a contamination incident is confirmed. The goal of remediation and recovery is to return the drinking water utility to service as quickly as possible while protecting public health and minimizing disruption to normal life. During the remediation and recovery stage, the immediate urgency of the situation has passed, and the magnitude of the remedial action requires careful planning and implementation. While rapid recovery of the system is crucial, it is equally important to follow a systematic process that establishes remedial goals acceptable to all stakeholders, implements the remedial process in an effective and responsible manner, and demonstrates that the remedial action was successful. **Figure 3-3** provides a generic overview of the remediation and recovery process.

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[3] *Refer to the U.S. EPA Response Protocol Toolbox, Module 5, Public Health Response Guide (EPA-817-D-03-005) for example notifications.*

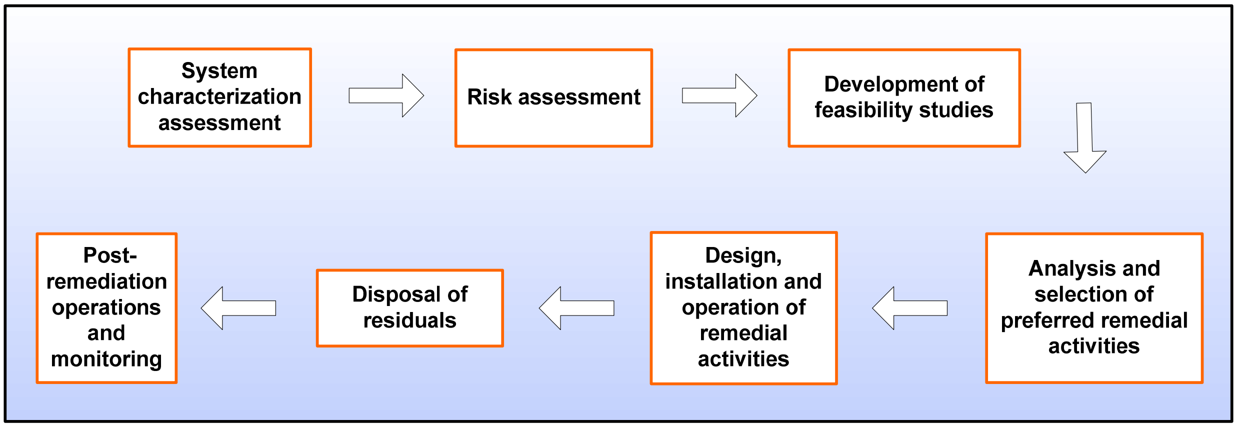

Figure 3-3. Remediation and Recovery Process Overview

The remediation and recovery process is designed to address contamination at concentrations that pose immediate and/or long-term risks to human health and the environment. The process is described as a sequence of steps that includes system characterization, risk assessment, remediation, and return to service. Whether these actions are carried out with response partners or another agency assumes management of the process, the utility should still be involved in each of the steps described in the plan, which are outlined in **Table 3-3.**

The remediation and recovery activities may not necessarily occur in sequential order, and may start at different times, run concurrently, reoccur, or start before the remediation and recovery phase (shown in Figure 3-3). For example, risk assessment may begin during initial response and run through remediation and recovery. Also, initial site characterization sampling results may be used to begin developing information on contaminant type, concentration, viability, and may continue in more detail under system characterization.

IMPORTANT TIP

Because of the myriad of potential contamination incident scenarios, developing a remediation and recovery plan for a specific event in advance is unrealistic. Instead, personnel from the utility, state drinking water primacy agency, public health agencies, EPA regional office, and state and county EMAs and homeland security offices should meet as a group to identify and address regulatory issues, provisions for long-term alternative water supplies,

The extent to which the remediation and recovery process follows the steps depends on the nature and extent of contamination. For example, if the contamination is contained through immediate operational response and is confined to a well-defined area, then extensive system characterization may not be necessary; the initial site characterization may provide sufficient information to guide remediation and recovery efforts. Similarly, if treatment options for the contaminant of concern are known and well-defined, then the feasibility study and detailed analysis of available alternatives could be combined.

Table 3-3. Summary of the Typical Remediation and Recovery Process

Action	Description
System characterization and assessment	System characterization should be used to identify the nature, extent, and fate of particular contaminants in the water system and components to support the selection of appropriate remediation actions. The scope of system characterization is broader and more detailed than the initial site characterization which gathered information to determine whether the threat was credible.
Risk assessment for remediation and recovery	Risk assessment is the qualitative and quantitative evaluation of the risk posed to human health and/or the environment based on a contamination incident. Risk assessment activities should be conducted to: 1) evaluate risk reduction resulting from immediate operational response actions; 2) help establish Preliminary Remediation Goals and Final Remediation Goals; and 3) assess potential risk reductions from implementation of a long-term remedy (if necessary).
Development of feasibility studies	The feasibility study is the mechanism for development, screening, and evaluation of alternative remedial actions. It is conducted concurrently with system characterization and involves identifying remedial action objectives, identifying potential treatment technologies or other response actions that will satisfy these objectives, and screening the candidate technologies.
Analysis and selection of preferred remedial activities	The remediation and recovery plan should include directions for the selection of alternatives for the treatment of contaminated water as identified in the feasibility studies.
Design, installation and operation of remedial activities	After the final remediation response is selected, plans for the remedial design, installation and operation of remedial activities should be developed.
Disposal of residuals	Once the specific contaminant has been identified, the utility should create a plan that provides instructions in the management, classification, and disposal of remedial waste according to applicable regulations. Remedial waste could include contaminated surface or ground water, decontamination fluids, water treatment residuals (e.g., biosolids), contaminated equipment (pipes, home water filters, ice makers, water heaters, and garden hoses), and personal protection equipment.
Implementation of post-remediation operations and monitoring	To ensure continued compliance with the remediation objectives, the utility should create a plan to conduct post-remediation monitoring and operation. This will necessitate quantitative verification that the contaminant concentration has been reduced to acceptable levels, through methods specified by the lead agency.
Return to service and public involvement	After the water source and/or distribution system has been treated and rehabilitated, the utility should continue sampling and monitoring activities to confirm that the remediation goals have been attained. Based on sampling and analysis results, the water utility and the responsible agency (i.e., primacy agency and/or health department) should determine whether the contamination problem is mitigated and the water system can be returned to normal operations.

Source: U.S. EPA Response Protocol Toolbox, Module 6, Remediation and Recovery Guide, EPA-817-D-03-006

Depending on the circumstances, remediation and recovery efforts will include support from a range of disciplines including HazMat, law enforcement, and local health departments. Multiple jurisdictions may also be involved, ranging from city, county, regional, State or Federal response partner agencies.

The utility should develop a comprehensive remediation and recovery plan as part of the CMP.[4] Appendix B.7 provides an example of a decision tree for the remediation and recovery process. This decision tree should be used as a guide when developing the sections of the utility-specific plan. The remediation and recovery plan and material should be written to represent and reflect the specific utility organizational structure and capabilities.

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4 *Refer to the RPTB Module 6, Section 6: Remediation and Recovery Guide (EPA-817-D-03-006) for further information on remediation and recovery activities.*

3.3 Step 3: Identification of Key Response Partners and Stakeholders

When constructing the initial draft of the CMP, the utility should identify partners and stakeholders that may be involved in the development of the CMP and corresponding response activities. Teaming with partners and stakeholders significantly streamlines response efforts and allows all parties the opportunity to understand the official processes and procedures used in the event of a drinking water emergency. It should also ensure that the CMP is integrated and consistent with external emergency response plans. **Figure 3-4** provides an overview of potential partners involved in the development and implementation of a CMP.

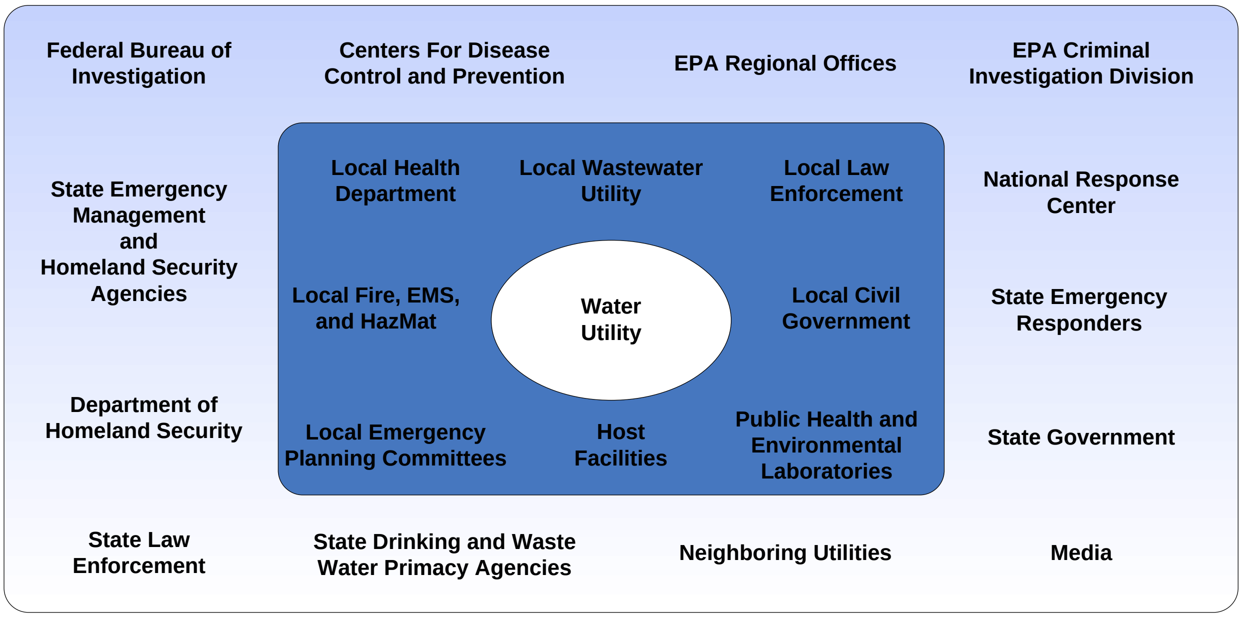

Figure 3-4. Potential Contamination Warning System Partners

As illustrated in Figure 3-4, the number and scope of partners potentially involved in responding to a contamination incident can be significant. The figure includes local responders in the inner circle, with State, regional and Federal partners in the outer circle. This configuration mirrors how a contamination incident is initially investigated at the utility and local responder level, before involving State, regional and Federal partners as the incident escalates or when local capabilities are overwhelmed.

When identifying partners, the utility should first consider those partners involved as "first responders" based on the CMP. These may include local partner organizations such as local law enforcement, public health and fire services. State, regional, and Federal partners should also be considered after local responders are identified.

Specific responsibilities of partners and when they are engaged will vary by utility and jurisdiction. However, Appendix D.2 provides a summary of possible local, State, regional and Federal response partners and their potential role in design, implementation and/or response.

3.4 Step 4: Engagement of Response Partners and Stakeholders

When developing and implementing a comprehensive CMP, the external response partners identified in the previous step should not only be specifically identified, but also effectively engaged. The utility should collaborate with external response partner agencies to confirm and determine roles and responsibilities, solidify lines of communication, identify shared resources, and ensure that the draft CMP matches operational response plans held by other response partners. The utility should meet with and confirm that other agencies agree with the earliest points of contact, have the correct contact information and that expected response actions are correct.

Engaging the numerous partners involved in setting up a contamination warning system and the corresponding CMP is a daunting challenge on its own, without the myriad of other tasks the utility implementation team may be occupied with. It is not uncommon for the service area of a utility to extend beyond city limits and county borders, and into the jurisdictions of numerous police, fire, and public health agencies, not to mention the umbrella jurisdictions of hierarchical agencies such as county and State emergency management, public health, and homeland security agencies, to name just a few. Therefore, it is important to take full advantage of the existing groups and organizations in which these partners may already participate. **Figure 3-5** illustrates the recommended approach for engaging partners.

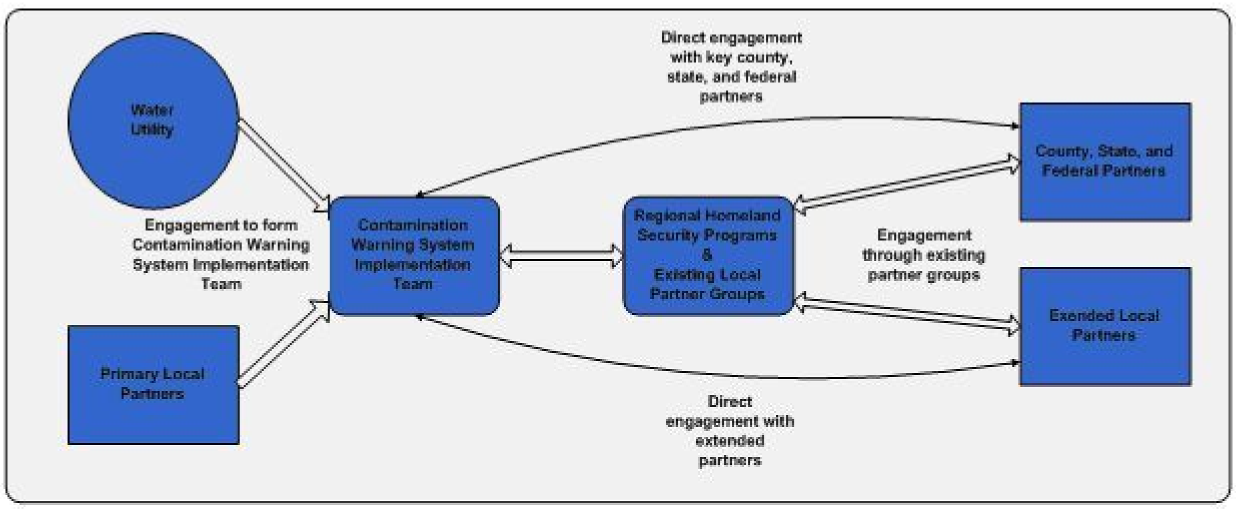

Figure 3-5. Recommended Strategy for Engaging Consequence Management Plan Partners

It is recommended that primary local partners should be engaged first, followed by the county, State, and Federal level agencies. During this process, the utility and partners should also try to identify and leverage existing communication and response networks that may have been established by other programs, such as Local Emergency Planning Committees (LEPCs).

The reason for engaging local partner agencies first is two-fold. First, local agencies will likely be the first responders to potential contamination incidents that originated in their jurisdiction. Second, because they are the first responders, they will be providing the initial response resources, including staffing and equipment. As a result, the utility should know what resources are at its disposal during the early stages of an incident. The next step should be developing new supporting materials and organizing meetings with expanded response partners, including county, State, and Federal agencies.

Lesson Learned

Many utilities serve wide-ranging areas that cover numerous jurisdictions, counties, and even states, making coordination activities quite challenging. For the initial pilot utility, engagement of local response partners was limited to the two largest jurisdictions in the service area. This approach allowed for the CMP to be developed in a comprehensive manner while keeping the size of the effort manageable in the early phases. Once established, the CMP was presented to corresponding response partners in neighboring jurisdictions to incorporate their roles into consequence management activities.

Partner Meetings

When developing the CMP, partners can be engaged either through one-on-one contact and meetings, workshops with all partners, or a combination of both. It will be up to the utility to assess the method that is most appropriate for its environment and situation. During these meetings, the utility, along with local and expanded partners, should agree on response actions and decisions that will likely occur both before response partner involvement as well as after response partners are contacted for assistance. The ability to verify available capabilities and resources should also be confirmed, along with contact information for all meeting participants. This process is also part of integrating the CMP with other existing plans and operations that may be initiated during an incident.

For those agencies that cannot attend the planning meetings, an effort should be made to provide them with copies of the draft plan, support materials, and revised plans for their input and comment. It is often useful to use a scenario as a descriptor in covering this material, as it provides a context for decision making. Scenarios addressed with these partners should include the process of credible determination through response and recovery (e.g., a scenario where the utility and local partners have reason to suspect the water has been contaminated based on a validated trigger which leads to the decision-making process for the follow-up investigation).

One-On-One Meetings

One-on-one meetings have the advantage of building direct contact and relationships with partners. They can be used to verify notification plans, roles and responsibilities and response capabilities should a water contamination incident occur. Questions to be addressed should include:

- How do partners want to be reached during a contamination incident?
- Who is the point-of-contact or person in charge?
- What information do they need regarding the incident?
- Do they have a standard beeper/cell phone number which is passed to the next on-call representative, or does each person have a dedicated beeper/cell?
- Where will they meet during response?
- What are their responsibilities and/or authorities?

Partner Workshops

Engaging partners through coordinated workshops is an effective means to develop a CMP that is truly integrated with response partner actions. These workshops should consist of a utility facilitator guiding the group through a draft of the CMP and identifying roles and responsibilities at each major action. In this way, the actions and responsibilities for each partner are confirmed and clarified. This open workshop environment helps to verify assumptions between one agency and the utility as well as assumptions that external agencies may have about each other.

> **DUAL USE**
>
> The WS pilot utility held multiple partner meetings in the development of its CMP. These meetings and workshops had the added benefit of allowing partners to clarify their roles with other partners. Not only was the utility able to gather its information and contact numbers, but partners were also able to confirm their roles and responsibilities, resources and contact information amongst each other, thus updating their own plans.

At the end of the workshop, all of the responses should be collected and analyzed to identify the actions in the CMP that are to be expanded or corrected, as well as issues and gaps that need to be resolved (e.g., communications, equipment, procedures, jurisdictions). Two major categories of issues usually surface from the planning workshops include resources (e.g., equipment, personnel) and training.

The outcome of these partner meetings should be a near complete draft of the CMP. Keep in mind that the CMP may never be "final," as it may be open to revision based on changing relationships, agency reorganization, etc. Additionally, as the implementation of the contamination warning system progresses, some changes may be warranted.

Once the roles and responsibilities of partners have been established and integrated into the CMP, the next step should involve training. The utility should involve partners in all CMP-related training events. In addition, the utility should take steps to become a member of the various groups, including LEPCs, and engage in the training exercises that are sponsored by the partners (refer to Section 6.0 for information on Training). Involving the utility in exercise efforts at the local, county, State, and even Federal level should enhance response efforts for both the utility and response partners.

Considerations for Agreements with Local Partners

The use of memoranda of understanding, memoranda of agreement, mutual aid and assistance agreements, and other agreements are becoming common in most jurisdictions. These documents often contain language that is mutually agreed upon by the parties to the agreements and generally define collaborative efforts that involve action items, equipment resources, or regional governance.

When engaging local, county, State and Federal partners in implementation activities, the utility should address the subject of these types of agreements early in the process. Addressing formal agreements early in the implementation process is extremely important, as they may commit partner agencies to specific roles and actions. Without them, implementation can be stalled by inter-agency disagreements or misunderstandings, or an agency may be left responsible for costs they believed would be covered by another.

The utility should first identify its own protocols for establishing formal agreements with external agencies, organizations, and partners. This includes identifying who holds the authority to enter the utility into these types agreements (who signs the document), any procedural details, (e.g., minimum or maximum review periods, paperwork routing procedures), restrictions on the types of agencies/groups the utility may enter into agreements with (public and private), or limits of commitment (monetary or other). The utility should also obtain a clear understanding of the same types of information from the agencies it intends to engage. Subjects of the agreements extend beyond simply who pays for equipment; commitments should be made to provide personnel both for the implementation and operation of the contamination warning system; allocation of resources; etc. If funding is from an external source, all applicable standards and regulations for establishing formal agreements should be followed.

IMPORTANT TIP

The water sector is actively developing mutual aid and assistance agreements, commonly referred to as Water and Wastewater Agency Response Networks (WARNs), which provide a single mutual aid and assistance agreement for both public and private drinking water and wastewater utilities within a state. This agreement provides access to personnel, equipment, and resources from neighboring utilities that possess the specialized resources needed to support the response and recovery of water sector operations.

While the WARN framework is structured around utilities, it could provide the foundation to leverage the initial response partner meetings once established and mature. Refer to Appendix E for links to additional information on mutual aid and assistance networks.

Section 4.0: Communications

Communication plans are an essential component of a contamination warning system and CMP. They prepare drinking water utilities for both routine and incident-specific communications with customers, response partner agencies (e.g., local, State and Federal government offices), the media, and the public at large. The overall communication strategy includes developing plans, defining roles, and identifying resources and equipment. Utilities can elect to develop communication plans as an integrated component of the CMP, or as a standalone plan.

Information management is also a critical component of a sound communication plan and is used to control the flow of information during response to a threat or incident. This section will assist the utility in developing their general and risk communication plans, as well as crafting an information management strategy.

4.1 General Communications

General communications involves plans for both internal and external response partner communications. Internal utility communications include employees as well as those persons involved in the determination of and response to an incident. External communications involve coordination with outside agencies and populations directly involved in or having the possibility of being affected by an incident. Throughout the CMP, particular attention should be paid to these types of communication plans in order to provide timely and effective communication to CMP participants in the case of a contamination incident.

Internal Utility Communications

Internal communications should address what, when, and how a message will be provided to utility employees who are directly and indirectly involved in an incident. Informing utility employees of a contamination threat/incident increases awareness and better prepares them to provide informational and logistical support. Direct communication also prevents the spread of negative rumors and adds to the cohesiveness of response teams.

The internal communication plan should outline the personnel responsible for activating the plan, the order in which notification occurs, and the members of the appropriate response teams (as outlined in the ICS structure). In addition, the plan should provide information on the specific communication method(s) that should be used (e.g., telephone, radio, email). If possible, the internal communication plan for the CMP should leverage existing internal communication plans to identify gaps and opportunities for improvement.

During a crisis or serious incident, organizations may consider using supervisors in a cascaded communications process, whereby supervisors are responsible for communicating information to their personnel. This ensures that information is delivered to employees through a credible source. Direct supervisory communication also allows managers to answer employee questions and address their concerns.

The effectiveness of internal communications – especially during a crisis – also depends on the rapid communication of events and directions between the management team making response decisions and the response personnel implementing the decisions. Rapid communication methods normally consist of telephones, cell phones, emails, loudspeaker systems (including intercoms and closed-circuit television monitors), written bulletins or newsletters, and hand-held radios. All of these communication channels have inherent positives and negatives, and a good communication plan should incorporate a combination of methods so that the various groups of personnel can exchange required information on a timely basis. When identifying the means of communication, consider the following parameters:

- Does the communication method reach all consequence management participants?
- Is the method reliable?
- Is the method fast enough to support timely decisions and actions?
- Is the method likely to be compromised by contamination incident conditions?
- Is there a back-up or redundant system?
- Will the method preserve facility security under threat conditions?

External Response Partner Communications

Communication and coordination with external response agencies should be addressed throughout the CMP. External communications involves agencies and groups that may be direct partners in responding to a contamination threat/incident. This includes groups that can be affected by the incident itself, either through contamination or through mitigation efforts. In addition, other agencies not directly involved in the initial response to a contamination incident may need to be alerted so that they can coordinate their support or resources accordingly.

DUAL USE

A communication method that may be useful when providing the public with information is a reverse phone information system. Examples of this include auto-dialer systems or a reverse voice recording system based on client records. This type of equipment could be used to deliver direct and concise phone messages from the utility out to affected populations.

The overall need and added value of a reverse phone system would need to be evaluated by each utility and would depend on the type of phone system and database used, along with budgetary restrictions.

The external communication plan should address when and how to contact response partners during credible, confirmed and recovery stages of a contamination incident. The external communication plan should also leverage any existing communication plans to identify gaps and opportunities for improvement.

The utility should include the following steps when developing their external communication plan:

1. Compile a list of external response partners (Refer to Section 3.3).
2. Determine contact information for each agency on the list and create a database containing the information. This database should include primary and two alternate contacts, telephone/cell phone numbers, email addresses, emergency or off-hours contact information (on-call lists, etc.).
3. Prepare/update the external communication procedures and establish:
   - Who will initiate external communication (e.g., Utility Director/IC);
   - Who will prepare communication/notification (e.g., PIO);
   - Who will make the actual notification;
   - Who will update and maintain the external communications database; and
   - Decision points within the CMP which will trigger external communications.
4. Conduct periodic drills of the external communication plan to verify operability.

Once a draft of the plan has been developed, the utility should meet with the agencies to verify assumptions made in the steps listed above. The objective should be to confirm and coordinate external roles and ensure that the draft CMP matches operational response plans of these other response agencies.

In accordance with the NIMS, the external communication plan should stress interoperable communication processes and architectures to allow the utility and incident command to communicate directly with outside agency first responders, EOC(s), and the incident command post. Beyond physical communication equipment, the utility and response partners should also establish shared emergency response channels or frequencies for immediate use during a water contamination incident. Communication equipment includes standard two-way radios and other communication devices, such as 800 MHz radios. Equipment resources should be evaluated during development of the plan and verified for compatibility with outside partners.

4.2 Risk Communications

Drinking water crisis incidents will involve communications with employees, government agencies, the public, the media, and others about potential risks to health, infrastructure, and the environment. The purpose of a risk communication plan is to guide the utility and its partners on when and how to make notifications, how to define the message, how to work with the media and how to develop a delivery system for the message. The goal of risk communication is to enhance knowledge and understanding of an incident, build trust and credibility, encourage constructive dialogue, and provide guidance on appropriate protective behavior and actions following a crisis incident. Useful tools that should be included in the plan are existing PN regulations and guidelines, diagrams and trees, and sample message maps.

IMPORTANT CONCEPT

Message mapping is a process by which the utility can prepare clear and concise answers (message maps) to these questions, along with supporting information, ahead of time, and practice effective message delivery before a crisis occurs. Further information on message mapping can be found in EPA's Effective Risk and Crisis Communication during Water Security Emergencies Report: http://www.epa.gov/nhsrc/pubs/reportCrisisCom040207.pdf.

Risk communication plans allow for a proactive, quick, and effective response during an emergency since many of the necessary communication decisions and activities will have already been decided upon. If carefully designed, a risk communication plan can save precious time when an emergency occurs and enable leaders and spokespersons to focus on particulars of the emergency at hand and the quality, accuracy, and speed of their responses.[5] This section will assist the utility in developing its risk communication plan as part of the CMP.

Roles

The first step in developing a risk communication plan is to identify the utility personnel responsible for communicating with the public during a contamination incident. During a crisis, the communication function can be broken down into the six distinct roles as described in **Table 4-1**. Ideally, there should be one person assigned to each role, although one person can handle additional roles depending on the extent of the emergency and the size of the utility. While other staff may be involved, the utility PIO is ultimately responsible for all communication efforts. Each utility should create and define roles based on its own organizational structure and capabilities.

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[5] *Source: Adapted from Hyer RN, Covello VT. Effective Media Communication during Public Health Emergencies: A WHO Handbook, WHO/CDS/2005.31, World Health Organization, Geneva, 2005 (www.who.int/csr/resources/publications/WHO_CDS_2005_31/en/)*

Table 4-1. Recommended Crisis Communication Roles

Title	Communication Responsibilities
Public Information Officer (PIO)	• Activates the risk communication plan after receiving authorization from the IC and directs the work related to the release of information. • Provide information to the public and other key internal and external audiences through such activities as developing and distributing printed and electronic notices, reports and informational materials; organizing and conducting special events (internal and external); and maintaining content on a Web site. • Develops and maintains relationships and supports two-way communication with public and private stakeholders, community groups and with the news media. • May develop speeches and presentations for utility executives and craft responses to constituent inquiries received via letter, email or telephone call.
PIO Support Personnel	
Content and Message Coordinator	Develops mechanisms to receive information rapidly from the EOC regarding public health emergencies and works with available subject matter experts to create situation-specific fact sheets (e.g., "Q&A" fact sheets) and updates.
Media Coordinator	Assesses media needs and organizes mechanisms to fulfill those needs.
Direct Public Outreach Coordinator	Activates a telephone information line, crisis Web site and develops public service announcements.
Partner/Stakeholder Coordinator	Establishes communication protocols based on prearranged agreements with identified partners and stakeholders.
Media Tracker	Monitors internal and external communications, identifies misinformation, provides feedback on the quality of communication, takes action to correct false information, tracks media information releases, monitors news outlets and Web sites, and dispels rumors.

Public Information Actions

The next step in developing a risk communication plan is to outline the public information actions that correspond with the various response phases of a contamination incident. Note that public information actions may occur early in the threat process, even before consequence management actions are initiated. Thus, specific communication roles and activities that may be conducted by the PIO and other staff during an incident should be developed for all response phases (e.g., possible, credible, confirmed).

Public information actions may include coordinating press briefings, developing communication plans, preparing and disseminating notifications, and arranging public meetings. An example of actions linked to specific contamination warning system phases can be found in Appendix C. Refer to this example when outlining the public information actions for each response phase of a contamination warning system.

Public Notification Requirements and Guidelines

When developing the risk communication plan, the utility should ensure that its plan is consistent with the regulatory requirements for public notification (see 40 CFR 141, Subpart Q). When a utility determines that a contamination threat is credible, the utility must consult with its primacy agency to determine if public notification is required. Under federal regulations, public notice is required for "situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the primacy agency either in its regulations or on a case-by-case basis". The utility must initiate consultation with the primacy agency to determine public notification requirements as soon as practical, but not later than 24 hours after learning of the situation. These situations require a Tier 1 public notice. See 40 CFR 141, Subpart Q for information on the form, manner, and frequency of a Tier 1 public notice. Also refer to Appendix E for information on EPA's "Public Notification Handbook," which contains additional guidance regarding PN and the requirements of the notification rule.

Tools and Resources for Working with the Media

One of the most important functions of the PIO is communicating with the media either directly or in helping to prepare for press interactions by water utility officials. This is especially critical for risk communications. Refer to Appendix E for a list of tools and resources for working with the media.

4.3 Information Management

Information management is the process of collecting, documenting, and managing the large amount of information that may be used during the threat/incident determination process to support decisions about various response actions, including communication. This includes collecting and documenting all aspects of an incident so that vital information does not get lost. Developing an effective information management strategy helps to promote and maintain overall awareness and understanding of an incident within and across jurisdictions and thus contributes to sound communication principles. Documenting incident information may also help to effectively manage liability issues, cost recovery, and meeting certain regulatory requirements that may arise as a result of a contamination incident.

When developing an information management strategy, the utility should consider including pre-incident information (e.g., baseline data), a chronological log of events, written record of all decisions and chain of custody documentation for all laboratory samples. A useful tool for capturing this information is the ICS Form 201, the Incident Briefing (Page 104 of the NIMS document: http://www.fema.gov/pdf/emergency/nims/nims_doc_full.pdf). The form is intended to be used by the IC to document actions and situational information required for transfer of command. This, in turn, assists the IC in documenting information quickly while staff is limited and the incident is dynamic. Keep in mind that this form can either be modified or the utility can create their own incident log in order to meet their specific needs. Refer to Appendix E for additional information management tools.

Section 5.0: Training and Exercises

Success in implementing the concepts, guidance and procedures contained in a utility-specific CMP comes from execution. The ability to effectively execute a CMP comes from training personnel responsible for its execution. The training and exercise process allows utility staff to face tasks and situations normally outside of their daily operations to enable them to meet the challenges associated with an actual contamination incident. In addition, effective training and exercise programs are useful for integrating response procedures with those of external partners.

In the end, training and exercises allow the utility to learn from its mistakes, thereby recognizing potential opportunities for change and enhancements in the plans and procedures already in place. This section provides guidance on how to identify and conduct the appropriate training for the CMP.

5.1 How to Implement the CMP through Training

To ensure an effective consequence management program, training should be conducted to familiarize utility staff and response partners with the CMP and their corresponding roles. Now that roles and responsibilities have been more clearly defined in the CMP, training is critical to get the staff and partners "up to speed." Training should include information concerning how the CMP is organized (e.g., credible, confirmed, remediation and recovery), the corresponding steps associated with each response, and identifying roles and responsibilities. Additionally, training activities associated with specific CMP activities (e.g., field sampling, site characterization) may need to be conducted.

Training events should also stress integration of utility personnel with external partners to establish a consistent, shared understanding of response roles and capabilities. The coordination roles of both parties during an incident should be clearly understood, including the processes and applicability of working together under an ICS.

Training Program

The personnel responsible for developing the CMP should coordinate the training exercises. There are many resources that can be used to assist with training development, including Federal, State, local, and even private sector entities which prescribe training programs designed to establish and maintain operational competency for a wide variety of initiatives. The training strategy recommended for utility CMPs is a suite of core courses in the ICS, augmented by a progression of exercises which are described by the Department of Homeland Security's Homeland Security Exercise and Evaluation Program (HSEEP).

HSEEP describes "Discussion-Based" exercises, which include tabletops, seminars, and workshops to introduce and teach new concepts, followed by "Operations-Based" exercises including drills, functional exercises and full-scale exercises to test and evaluate program effectiveness.

It may be challenging for most utilities to implement an entire HSEEP-based program, but by integrating efforts with local partners, it may be achievable. A modified training program based on the HSEEP strategy has been successfully implemented as part of the WS initiative consequence management pilot program. This program started with "Discussion-Based" exercises, including a needs assessment workshop, followed by an advanced tabletop (walk-through of the CMP with a contamination threat scenario) for utility managers and supervisors. This was followed by specific functional exercises, including Site Characterization Plan training, with utility and response partner agencies under several what-if contamination scenarios. The final training program consisted of an "Operations-Based" full-scale exercise of the CMP, with mobilization of both utility and support agency assets in a contamination incident scenario.

Utilities and response partner agencies should institute an ongoing program of internal drills to maintain competency in their respective procedural roles, and should also schedule periodic integrated exercises to assess program continuity. It is recommended that operations-based exercises be conducted every two years and after changes to the CMP or significant changes in personnel. This assumes that there is a regular program of drills of critical activities in place (e.g., trigger verification, site characterization). Discussion-based exercises can be conducted annually based on routine updates to the CMP.

5.2 Training Courses and Materials

Consequence Management Plan Training

As previously stated, discussion-based training courses for the CMP should include information as to how the CMP is organized (e.g., credible, confirmed, remediation and recovery), the corresponding steps associated with each response, and identifying roles and responsibilities. **Table 5-1** provides an example of training exercises that were conducted for the WS initiative pilot utility. They can be used and modified to train utility staff and external response partners.

Table 5-1. Example Consequence Management Plan Training Exercises

CMP Training Exercises		
Training Events	**Description**	**Audience**
Utility Management Training	The goal is to provide background and overview of the CMP to utility upper management. In turn, they will provide the necessary information and training to their respective department staff.	Utility upper-management
Site Characterization Plan Training	This training will serve to prepare participants in the use of the CMP site characterization plan. The goal is to prepare participants for field application of the plan material and processes during real-world events with improved understanding of operations and integration with other teams. The training effort will increase the capability of utility site characterization teams and improve the level of preparedness in response to a potential water contamination incident.	Target personnel actively involved in site characterization deployment (response teams, who deployed them)
CMP Training - Functional Exercise	The purpose of this exercise is to assess utility and stakeholder (local support organizations) familiarity with the CMP through a series of scenarios/tabletops. The exercises will target critical decisions made by key personnel after receiving a validated trigger (from Concept of Operations). Key personnel would include the IC, ICS Section Chiefs (leads), PIO and Agency representatives. Specific roles for each of these individuals will be covered through the exercise at various stages of a contamination incident (Possible through Confirmed and Remediation & Recovery). This training will help prepare utility staff and their response partner agencies for the utility-wide contamination warning system operations based full-scale exercise.	Utility division heads, supervisors, & representatives from outside agencies

Incident Command System Training

It is recommended that a core curriculum of ICS training be completed by utility and support agency personnel. FEMA's Emergency Management Institute offers a suite of four ICS courses in its independent study program:

- **IS-100: Introduction to Incident Command System for Public Works Personnel**: This course is designed for Federal disaster workers, public works, and law enforcement and public health personnel. The course describes the history, features, principles of ICS, and the relationship of ICS to the NIMS.

- **IS-200 ICS for Single Resources and Initial Action Incidents**: This course enables supervisory personnel to operate efficiently within an ICS, and explains roles and responsibilities, and ICS protocols?
- **IS-700 National Incident Management Systems (NIMS), an Introduction**: Explains the principles and structure of the NIMS, discusses ICS as a response model for NIMS and the applicability of NIMS in wider-scope, multi-jurisdictional incidents?
- **IS-800 A National Response Framework (NRF), an Introduction**: Describes how the Federal government will work with State, local and tribal entities in responding to national emergencies?

It is recommended that management and supervisors complete all four courses, and that field personnel complete at least the first two. Refer to Appendix E for information on these courses and additional training resources.

Exercise Development and Scenarios

Once the plan has been drafted and staff are trained and prepared, the overall CMP, including procedures and capabilities, should be evaluated to identify opportunities for corrections and adjustments. This is done through the use of “Operations-Based” exercises.

Exercises can be used to test and evaluate the utility and stakeholder implementation of the functions and activities associated with the CMP. They provide an opportunity for utility and response partners to practice their assignments, including hypothetical trigger scenarios of the contamination warning system components and follow-through exercises. By conducting exercises, the utility can identify and correct any deficiencies or weaknesses in the CMP before a real incident occurs.

Scenarios developed for use in training exercises should only be broad enough in scope to test the desired portion of the overall CMP. An exercise to train utility personnel on the CMP should contain incident threat triggers that go beyond normal operations (e.g., multiple monitoring alarms being triggered, numerous consumer complaints), but are still manageable by the utility. If the objective is to test utility and support agency integration, the exercise should contain elements that would trigger support agency involvement.

Refer to Appendix E for additional exercise resources, including FEMA courses on exercise design.

IMPORTANT TIP

The WS pilot utility conducted a full-scale exercise for utility staff and response partners. The focus was on implementing and analyzing the credibility determination and response components of the contamination warning system.

The exercise involved presenting a scripted hypothetical contamination incident to the utility, and then evaluating actual response actions versus those actions outlined in the CMP. Both the utility and response partners were actively involved in field responses and used existing communication equipment (e.g., 800 MHz radios). After completion of the exercise, a detailed discussion (“Hot-wash”) of events took place in order to analyze performance and capabilities. Lessons learned were then documented and used to make changes and updates to their plans based on weaknesses identified.

5.3 Revision of the CMP Based on Exercises or Actual Incidents

A comprehensive training program does much more than just test the knowledge and competency of the participants; it reveals areas for improvement in the content and structure of the plan. It is therefore extremely important that all exercise planning includes provisions for capturing results. Mechanisms to document training actions may include evaluator or observer forms filled out during the exercise, meticulous notes taken during the exercise, post-exercise debriefs or “Hot-washes” and formal after-action reports prepared after exercise completion. The key is to assure that management and field personnel are both made aware of the results, in a no-fault atmosphere, and that the personnel responsible for maintaining the CMP oversee the incorporation of exercise results into plan improvements.

In a like manner, actual incidents also generate information that should be assimilated into the CMP on a continuing basis. Whether from false system monitoring alarms, accidental spills, or intentional contamination of the system, actual incidents which are not “normal” operations result in “Lessons-Learned” that should be captured, evaluated, and scrutinized for possible inclusion in the CMP. Incident forms developed as part of the *Response Protocol Toolbox: Response Guidelines* can assist with collection of this data. A link to this document can be found in Appendix E.

Section 6.0: Implementation, Maintenance, and Updates

Once the CMP has been completed, there should be a predetermined plan of action for implementation and maintenance. Implementation should involve the integration and sustainability of the plan within the utility and surrounding community. Maintenance should involve scheduling reviews and updates of the plan on a regular basis. Failure to formally implement or maintain the CMP will ultimately limit its effectiveness. This section provides guidance on how utilities can best implement and maintain their plans.

6.1 Plan Implementation

There are several steps typically involved with implementing a completed CMP, including *communication, assessment,* and *preparation.* Communication involves familiarizing utility staff and response partners with the CMP and their respective roles and responsibilities. Assessment involves determining utility capabilities to manage consequences from a contamination incident. Preparation involves training in the use of the plan and corresponding operational components. Each of these steps should be addressed to ensure the success of the CMP and its sustainability.

IMPORTANT TIP

The CMP may contain sensitive information, so utilities should take the necessary steps to ensure its security (e.g., secure Intranet/Internet site, employee training). Sensitive information should be placed in appendices, or in sections that are not readily available to unauthorized personnel. The CMP, however, should be easily accessible to authorized personnel and should be easily identifiable during a major event. Steps taken to limit access by unauthorized persons should consider local and State information disclosure requirements. Alternatively, you can opt to make the CMP general in nature and not include specific information about system vulnerabilities.

A secure copy of the CMP should be maintained in an off-premises location in the event that your primary copy cannot be accessed. In addition, all copies of the CMP should be numbered for tracking purposes.

Communication

The first step in implementing a CMP should be to ensure that the major features of the plan are communicated to all participating personnel (utility staff and response partner agencies). Communication generally involves the following sequence of activities:

- Information officers from the utility and response partner agencies should prepare and distribute an information package to all personnel having a role in the CMP. The package should describe the plan and its objectives.
- The utility and response partner agencies should conduct "all-hands" meetings with their staff to walk through the major features of the plan and discuss their organization's role in implementing it. Personnel should be invited to submit comments and suggestions regarding the plan.

Assessment

Once utility staff and response partner agencies are familiar with the plan, the utility should assess and identify the organizational components needed to implement the various functions defined in the CMP. This approach should include identifying the current capabilities and resources on hand, comparing these capabilities and resources to what is needed, and identifying corresponding improvements. The assessment should focus on identifying and developing the utility's specific capabilities to manage and respond to a contamination incident, including organization, staff skills, tools and equipment (e.g., sampling equipment, personal protection equipment, field screening equipment, communications equipment, additional site characterization equipment), related technology systems, and emergency plans/experience.

Preparation

Finally, once the major operational components of the plan have been assessed and identified, the utility should prepare staff and response partner agencies for carrying out the functions of the CMP. This involves implementing the integrated training and exercise program as discussed in Section 5.0. This program should consist of a sequence of functional training and full-scale exercises to train personnel and evaluate the effectiveness of the CMP. This should include the interaction between the utility and its response partner agencies as well as the combined implementation of an ICS. After each of these scheduled training events, the results should be incorporated into adjustments to the CMP and its procedures.

6.2 Plan Maintenance and Updates

Once the CMP has been prepared (to the extent possible), the plan should be properly maintained over time. The key to keeping a CMP relevant is to treat it as a living and evolving guidance document. To accomplish this, the utility should establish some maintenance guidelines. These guidelines should specify the actions needed for routine and non-routine updates to the CMP, the circumstances under which the updates will occur and the organizations responsible for the updates.

Ideally, a standing maintenance committee should be assembled comprised of utility management, field personnel, and support agency representatives. The Utility Director or designee should act as the committee chairperson. This committee would serve to coordinate the maintenance of the plan and allow for input from the various departments and operations. However, this type of support may not always be available, so it is important to ensure that the responsibility for plan maintenance is assigned to the appropriate utility staff.

> **IMPORTANT TIP**
>
> Not only is it critical to maintain the CMP, but it is also important to maintain communications equipment and inter-operability. Communication equipment should be kept current, maintained, and in good working order. Utility personnel should have equipment that allows them to communicate between the field, operations center and local partners.
>
> The utility should also maintain other redundant communications abilities, such as email, land phone lines, short range walkie-talkies, cell phones, etc

Routine and Non-Routine Updates

The CMP Maintenance Committee, or individual assigned to its maintenance, should review and evaluate the operability of the plan on a periodic basis. It is recommended that the CMP be reviewed *on an annual basis and after each scheduled training/exercise activity*. This is important since operational changes within the utility and response partner agencies occur on frequent basis.

The plan should also be reviewed for any potential changes and operability following non-routine incidents:

- After any personnel change that may alter management, field team, or ICS composition;
- After any significant changes to sampling, analytical, or equipment procedures;
- After any significant changes to the water treatment or distribution system;
- After any significant changes to the monitoring system components, concept of operations, or procedures; and
- After any off-normal occurrence that triggered the activation of the CMP.

Any modifications to the plan should be evaluated to assess whether those changes and updates affect coordination with response partner agencies. Response partner agencies should be advised of any changes or revisions to the plan that might affect coordination assumptions between the two organizations. Changes to processes and procedures should also be evaluated to determine how they might affect other internal operations, plans and procedures.

It is recommended that the CMP Maintenance Committee, or individuals assigned to its maintenance, make all indicated changes to the plan, coordinate the review and approval of signatory agencies, and produce and distribute hard copies of the plan to those persons involved in operations and implementation of the plan. One useful method is to have a secure Intranet/Internet Web site to host electronic versions of the plan, as well as other emergency-related information.

Copies of the plan should be tracked and accounted for regularly. Copies of the plan should be numbered, as it is likely to be considered sensitive information. A central list should keep track of which divisions and other agencies have copies, where they store their copy, the person that is responsible for keeping it at that location, and the last date that it was updated or issued a number.

Finally, it is recommended that the CMP be dated and re-certified as operable by plan signatories after each update activity upon the recommendation of the CMP Maintenance Committee or the individual that is in charge of the plan.

Appendix A: Glossary

Anomaly. Deviation from an established base-state. For example, a water quality anomaly should be a deviation from typical water quality patterns observed over an extended period (i.e., a base-state).

Operational Strategy. A process for routine operation of a drinking water contamination warning system, which establishes specific roles and responsibilities, process and information flows, and procedural activities. This includes the process for validation of a contamination warning system trigger and determining whether or not contamination is possible.

Confirmed. In the context of the confirmed determination process, water contamination should be characterized as confirmed when the analysis of water quality or public health surveillance has provided definitive or nearly definitive evidence of the presence of a specific contaminant or class of contaminant.

Confirmed Determination. Confirmed determination describes the stage of an event where there is definitive, or nearly definitive information, demonstrating that a water contamination event has occurred. Confirmation transitions from the investigation of a threat (credible) to incident (confirmed) based on analytical confirmation of the presence of a contaminant or substantial reason to believe that an event is underway.

Consequence Management Plan (CMP). Provides a decision-making framework that governs when, how, what, and who will be involved in making decisions in response to a possible contamination incident in order to minimize the response timeline and implement operational or public health response actions appropriately.

Contamination Warning System. Active deployment and use of monitoring technologies/strategies and enhanced surveillance activities to collect, integrate, analyze, and communicate information to provide a timely warning of potential water contamination incidents and initiate response actions to minimize public health impacts.

Credible. In the context of the credibility determination process, water contamination should be characterized as credible if information collected during the investigation of possible contamination corroborates information from the validated contamination warning system trigger.

Credibility Determination. Contamination warning system triggers should be investigated to determine whether or not they are indicative of possible contamination. Credibility determination is the subsequent investigation to determine whether or not additional information, including data from other monitoring and surveillance components, corroborates the information from the validated trigger. If the additional information corroborates the trigger, contamination should be considered credible.

Event Detection System (EDS). A system designed specifically to detect anomalies from the various monitoring and surveillance components of a contamination warning system. An EDS may take a variety of forms, ranging from a complex set of computer algorithms to a simple set of heuristics that are manually implemented. In essence, an EDS is a data mining tool that supports the efficient analysis of large amounts of monitoring and surveillance data to pick out possible anomalies while at the same time minimizing false alarms.

Field Results. Field results include information collected from site characterization process including the site hazard assessment, field safety screening, and rapid field tests. This does not include the results of the laboratory analysis conducted on samples collected at the end of the site characterization process.

Monitoring and Surveillance. Element of a contamination warning system that provides a standardized set of information streams used in the detection of potential contamination incidents.

Possible. In the context of the contamination warning system concept of operations, water contamination should be characterized as possible if the cause of a trigger cannot be identified and/or determined to be benign.

Remediation and Recovery. Remediation and recovery is the stage of an event after a confirmed determination has occurred and operational responses have been undertaken. This stage involves the implementation of characterization, remediation, and return to service with the goal of restoring the drinking water resource and returning to operational service.

Risk Communication. Risk communication addresses the communication of issues and information, both internally and externally to an organization, concerning the impact and outcome of an event including public information releases.

Site Characterization. The process of collecting information from an investigation site to support the evaluation of a drinking water contamination threat.

Threat Warning. An unusual occurrence, observation or discovery that indicates a potential contamination incident and initiates actions to address this concern.

Trigger. Information from a monitoring and surveillance component indicating an anomalous or unusual condition within the system, which generally warrants further investigation to determine if it is benign or a possible contamination threat. The nature of a trigger can vary by component and may take the form of an alarm, alert, threshold excursion, or warning. Event detection algorithms should be the tool by which triggers should be identified for most monitoring and surveillance components.

Trigger Validation. The process of investigating potential causes of a contamination warning system trigger to either rule out contamination or determine that contamination is possible.

Appendix B: CMP Decision Tree Templates

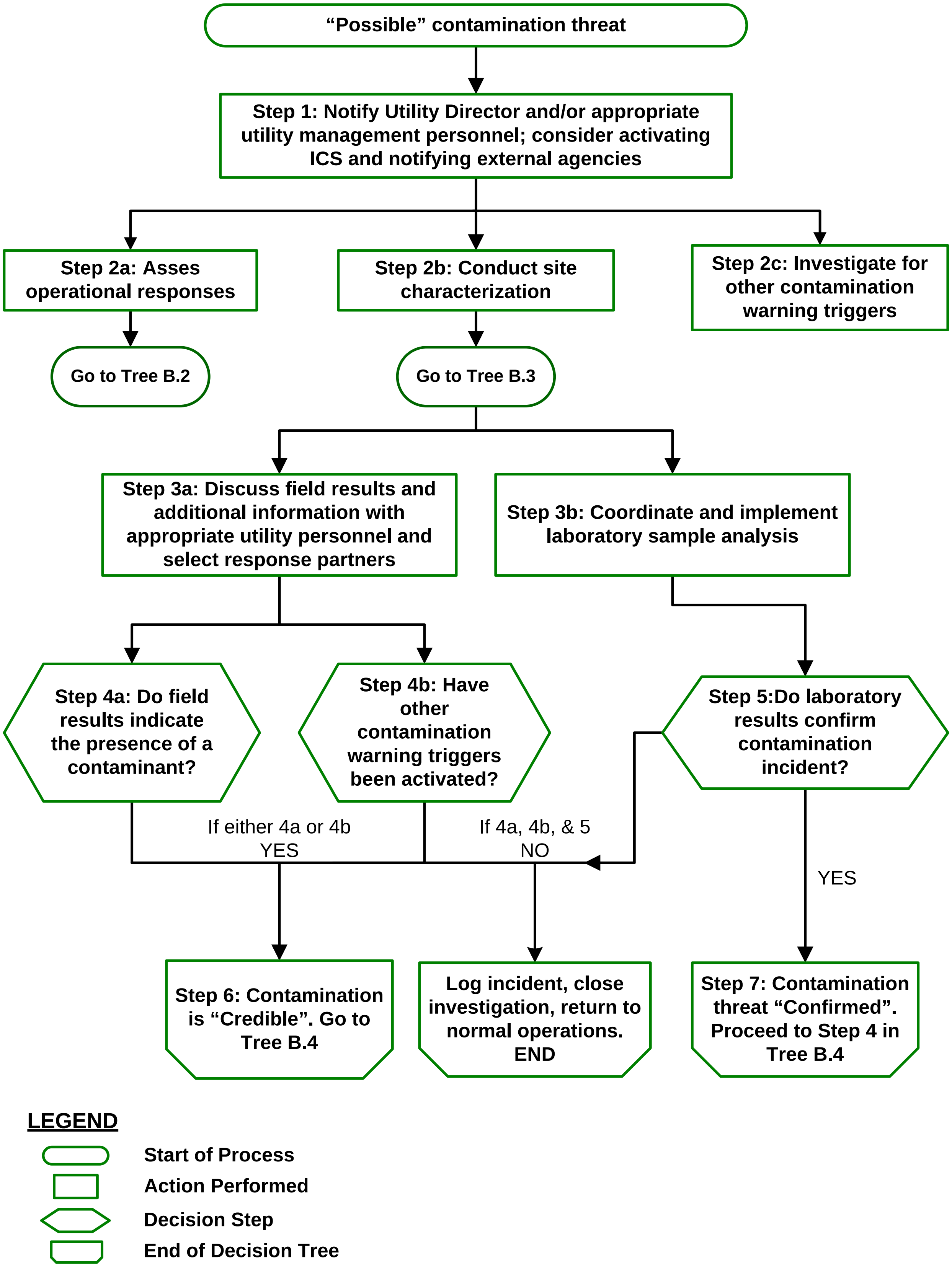
CMP Decision Tree Templates

Decision trees are invaluable in the design phase of consequence management planning as well as during response. During design, decision trees aid in defining the comprehensive consequence management process from phase to phase as well as allowing for visual verification of the steps and information. They are especially useful in demonstrating and confirming the process and coordination points with external agencies and partners. During an incident when time is a critical factor and events may seem chaotic, the decision trees may also aid the utility in navigating response actions.

The decision trees and corresponding action items included in this appendix are provided as examples and are intended to be used as a starting point when developing the credible, confirmed, and remediation and recovery stages of a utility-specific CMP. ***Each utility should modify the trees, response actions, and personnel listed in this appendix to meet its own specific needs.***

The decision trees flow in sequential order from credible to confirmed, and are outlined in a step-wise format. For each of the steps listed in the decision trees, there are corresponding recommended action items that outline the utility's response during that stage of an incident. A decision tree to guide remediation and recovery efforts is also included.

B.1 Credible Determination Decision Tree Template



Step 1: Notify Utility Director and/or appropriate utility management personnel; consider activating ICS and notifying external agencies.

- Employee leading initial possible determination field investigation notifies the Utility Director when field results indicate water contamination threat is possible.
- Appropriate utility manager (e.g., Utility Director) determines if ICS should be activated.
- Appropriate utility manager acts as the IC until the investigation closed or until a UC is instituted. *Note: Regardless of whether or not a UC is established, the utility itself will still retain an individual as their IC (unless relieved by a higher authority).*
- Appropriate utility personnel (e.g., utility IC, ICS Operations Section, or designated utility personnel in charge of field response activities) compile all available information regarding the incident, including forms, field notes, etc. IC maintains an ongoing log of events and documents all events associated with threat/incident.
- Utility IC determines which utility response teams are needed and requests their assistance (if ICS is activated).
- Appropriate utility personnel (e.g., utility IC) notify local public health department if the threat has possible health-related impacts.
- Appropriate utility personnel (e.g., utility IC) notify appropriate response partner agencies and provide updates to the agencies depending on the situation.
- Appropriate utility personnel (e.g., PIO) release statement to employees (as appropriate).

Step 2a: Assess operational responses.

- Response teams (e.g., strike team, task force) under the command of the appropriate utility personnel (e.g., IC or ICS Operations Section) assess potential operational responses.
- Go to Tree B.2, Operational Response Decision Tree for Credible Determination.

Step 2b: Conduct site characterization.

- Go to Tree B.3, Site Characterization Decision Tree; then proceed to Steps 3a and 3b of this decision tree.

Step 2c: Investigate for other contamination warning triggers.

- Appropriate utility personnel (e.g., IC or ICS Operations Section) collect additional information to be analyzed in conjunction with site characterization and any laboratory results to help determine if threat is credible. Information could include:
    - Results of site characterization.
    - Information derived from other threat warnings (e.g., security breaches, phone threats, unusual consumer complaints).
- Appropriate utility personnel (e.g., ICS Planning Section) initiate parallel investigation for other contamination warning triggers.
- Proceed to Step 3a of this decision tree.

Step 3a: Discuss field results and additional information with appropriate utility personnel and select response partners.

- Appropriate utility personnel (e.g., ICS Planning Section) and response team members discuss field results from site characterization and additional information with the utility IC. Field results include information collected from the site hazard assessment, field safety screening, and rapid field tests.

- Appropriate utility personnel (e.g., IC or designee) prepares brief summary of incident information to aid in determining if the incident is credible.
- Proceed to Steps 4a and 4b of this decision tree.

Step 3b: Coordinate and implement laboratory sample analysis.

- Appropriate utility personnel (e.g., ICS Planning Section) contact the drinking water primacy agency and local health departments to aid in sampling and analysis strategy. Consult lead law enforcement agency as samples could be considered criminal evidence.
- Appropriate utility personnel (e.g., ICS Planning Section) determine level of sampling required, based on site characterization results.
- Appropriate utility personnel (e.g., ICS Planning Section) identify additional sampling locations as needed.
- Notify internal and external laboratories of sampling plan. Laboratories should also be notified prior to conducting site characterization activities.
- Appropriate utility personnel (e.g., ICS Planning Section) implement sampling.
- Response and sampling teams should be equipped with the necessary Personal Protective Equipment (PPE) and sampling equipment. Some sites may have systems that automatically take sample upon water quality alarm and may also have capability to remotely trigger manual sample collection.
- Proceed to Step 5 of this decision tree.

Step 4a: Do field results indicate the presence of a contaminant?

- Appropriate utility personnel (e.g., ICS Planning Section) compare water quality results from site characterization rapid field tests to baseline or "normal" levels.
- Appropriate utility personnel (e.g., ICS Planning Section) consider other evidence or signs of contamination (e.g., security breaches) from site characterization.
- If YES, proceed to Step 6 of this decision tree.
- If NO, proceed to Step 4b of this decision tree.

Step 4b: Have other contamination warning triggers been activated?

- Appropriate utility personnel (e.g., IC and ICS personnel) and response partner agencies review information gathered during Step 2c of this decision tree.
- If YES, proceed to Step 6 of this decision tree.
- If NO for Steps 4a, 4b, and 5; Log incident, close investigation, and return to normal operations. In addition, review response process and make modifications to the CMP, as necessary.

Step 5: Do laboratory results confirm contamination incident?

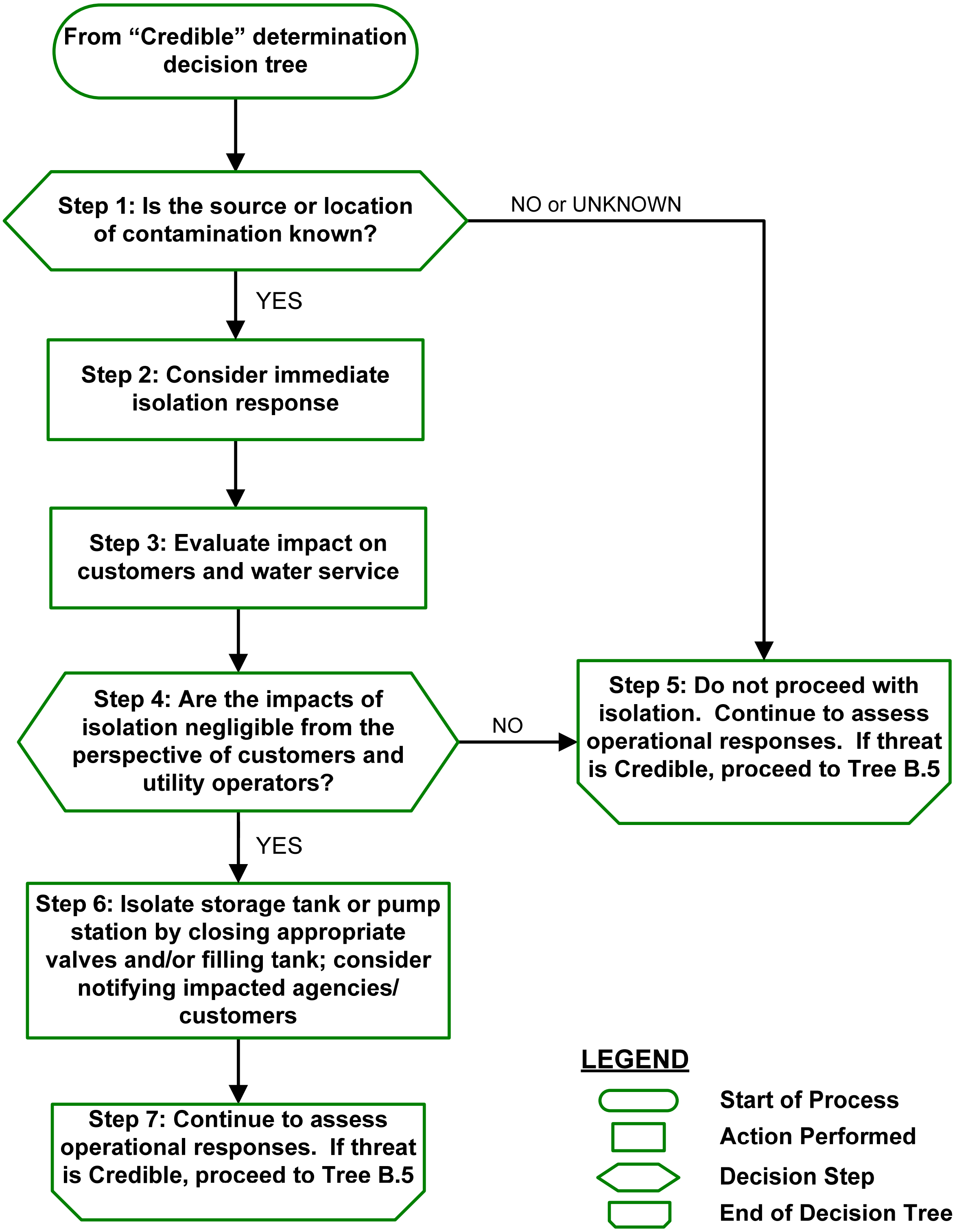
- Results from outside laboratories may take 12 hours or more. Utility IC has discretion to proceed with investigation with or without laboratory results based on "preponderance of evidence".
- If NO for Steps 4a, 4b, and 5; Log incident, close investigation, and return to normal operations. In addition, review response process and make modifications to the CMP, as necessary.

- If YES, proceed to Step 7 of this decision tree.

Step 6: Contamination threat is Credible. Proceed to Decision Tree B.4, Confirmed Determination Decision Tree.

Step 7: Contamination threat Confirmed. Proceed to Step 4 in Tree B.4, Confirmed Determination Decision Tree.

B.2 Operational Response Decision Tree Template for Credible Determination



Step 1: Is the source or location of contamination known?

- If YES, go to Step 2 of this decision tree.
- If NO or UNKNOWN, go to Step 5 of this decision tree.

Step 2: Consider immediate isolation response.

- Immediate isolation of a storage tank or pump station can significantly decrease the spread of the contaminant.
- The feasibility of isolation should depend on the following:
    - Is the source of contamination known and located at a storage tank, pump station, or other discrete and highly controllable area?
    - Is isolation low risk and low impact (e.g., little or no depressurization anticipated)?
    - Can isolation be undertaken quickly (e.g., automated or highly proximate valves are available); do suspect facilities (e.g. storage tanks or pump stations) have working valves required for isolation?
    - Would isolation require customer alerts (such as for loss of service) or formal public notification?

Step 3: Evaluate impact on customers and water service.

- Appropriate utility personnel (e.g., supply, engineering, or distribution) estimate the relative impact isolation may have on customers and utility operators (e.g., minimal number of customers affected, pressure reduction compared to minimum pressure requirements, potential period of impact). Consider impacts of implementing isolation plan on critical services such as fire flow, industry, hospitals, schools, or wholesale customers. SOPs should be prepared regarding facility isolation and impacts on customers.
- Proceed to Step 4 of this decision tree.

Step 4: Are the impacts of isolation negligible from the perspective of customers and utility operators?

- Appropriate utility personnel (e.g., utility IC) determine if impact of isolation on customers would be detrimental. Consider number of customers affected, pressure reduction and potential period of impact. Impacts of isolating certain areas of the system can be determined prior to an incident. *Note: Water quality results from site characterization may take 12 hours or more, especially for biological contaminants. Utility IC has discretion to proceed with isolation plans before the resolution of investigation.*
- If NO, proceed to Step 5 of this decision tree.
- If YES, then proceed to Step 6 of this decision tree.

Step 5: Do not proceed with isolation. Continue to assess operational responses. If threat is Credible, proceed to Tree B.5.

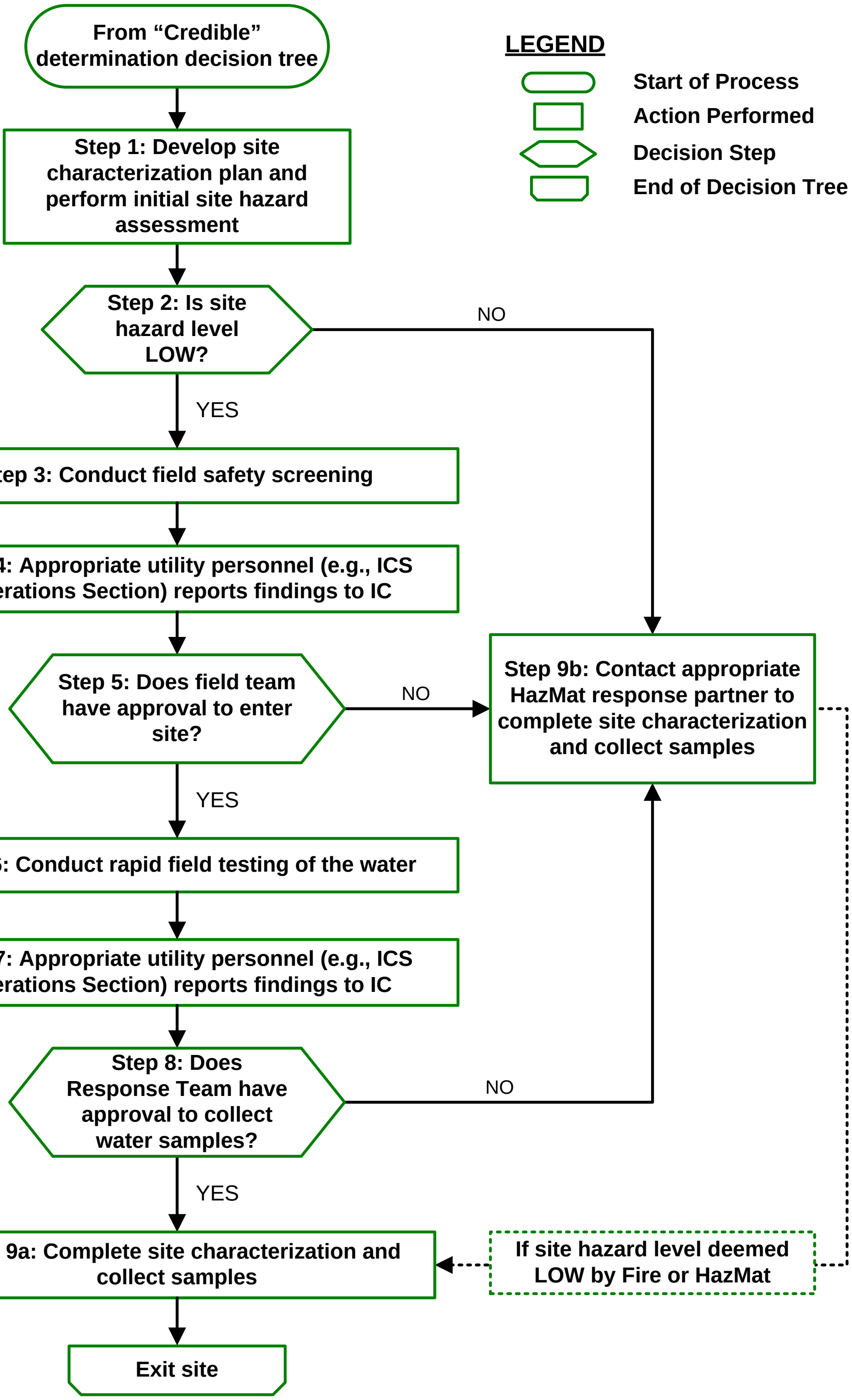
Step 6: Isolate storage tank or pump station by closing appropriate valves and/or filling tank; consider notifying impacted agencies/customers.

- Some facilities have valves required for isolation. Some storage tanks can be temporarily isolated by filling the tank and by closing the appropriate valves.

- Although isolation of a water storage tank or pump station may decrease system pressure, the risk of a credible or confirmed incident is likely greater than the risks associated with reducing system pressures. *Note: Isolation may require notification to the surrounding community and utility customers. Also, the utility will need to consider the impacts of isolation on fire suppression capabilities which should be addressed and coordinated with the local fire department in the affected area.*
- Appropriate utility personnel (e.g., utility IC or PIO) notify the appropriate response partner agencies or customers of potential impacts of operational changes (as necessary).
- Appropriate utility personnel (e.g., utility IC or PIO) notify the drinking water primacy agency of isolation plan (as necessary).
- Appropriate utility personnel (e.g., ICS Operations Section) proceed with isolation of storage tank or pump station. Supply division staff can change hydraulics of system by turning pumps on or off remotely or locally.
- Appropriate utility personnel (e.g., ICS Operations Section) direct staff (e.g., Utility Distribution Division) to close appropriate valves to tanks, pump stations, or transmission lines.
- Proceed to Step 7 of this decision tree.

Step 7: Continue to assess operational responses. If threat is Credible, proceed to Tree B.5.

B.3 Site Characterization Decision Tree Template



Step 1: Develop site characterization plan, and perform initial site hazard assessment.[6]

- Appropriate utility personnel (e.g., utility IC or ICS Operations Section) develop customized site characterization plan in conjunction with the utility IC, response team, other utility ICS staff, and appropriate outside agencies (e.g., local law enforcement, drinking water primacy agency).
- Steps involved in the development of the plan may include:
    1. Performing initial evaluation of information about the threat.
    2. Identifying one or more investigation sites and assessing potential site hazards, including hazardous materials, secondary devices (e.g., improvised explosive devices, armed intruder).
    3. Developing a sampling approach.
    4. Assembling site characterization team that includes utility ICS staff and, as appropriate, response partner agencies including HazMat personnel and investigative law enforcement personnel.
- Initial threat evaluation and site hazard assessment includes a review of available information from the warning triggers and details about suspected contamination site (e.g., assessing potential site hazards, including hazardous materials, secondary devices). Appropriate utility personnel (e.g., utility IC or ICS Operations Section) and response team reviews alarms and security videos (if available) and pertinent on-line water quality monitoring or grab samples data.
- If suspected contamination site identified, it should be classified as the primary investigation site. Additional investigation sites may be required if contamination has spread to other parts of distribution system. If isolation is not possible or it cannot be assured that suspect water has been contained, then the appropriate utility personnel (e.g., ICS Planning or Operations Sections) should further evaluate and identify additional sampling locations.
- Some triggers (e.g., written threat, notice from public health), may not be associated with a specific location. If suspected contamination site cannot be identified, number of sampling locations and frequency of sampling could be increased to help identify potential sites. A formal site characterization would not need to be conducted for these sites until information becomes available.
- Appropriate utility personnel (e.g., utility IC) takes proactive measures to gather information from the field teams.
- Utility IC contacts the appropriate utility personnel (e.g., utility operations staff) before implementing site characterization procedures (e.g., for site entry approval, assessing hazards, and sampling approval). Communications proceed using appropriate methods.
- Appropriate utility personnel (e.g., utility IC or Liaison Officer) contacts appropriate laboratories that may be involved in analysis of samples collected from site.
- Proceed to Step 2 of this decision tree.

Step 2: Is site hazard level LOW?

- Based on available threat information from the site hazard assessment, the appropriate utility personnel (e.g., utility IC or ICS Operations Section) determine whether site hazard level is HIGH. Two hazard categories are considered in the context of site characterization:

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[6] *Refer to the U.S. EPA Response Protocol Toolbox, Module 3, Site Characterization and Sampling Guide (EPA-817-D-03-003) for further information when developing this decision tree.*

  - LOW Hazard – No obvious signs of radiological, chemical, or biological contaminants present at the site and water is harmful only if consumed. Sampling generally not dangerous if splash protection is used. Utility staff will most likely sample.
  - HIGH Hazard – Radiological, Chemical, Biological
    - Radiological – Presence of radiological isotopes or emitters tentatively identified at the site or in the water (e.g., through the use of a field radiation detector).
    - Chemical – Presence of highly toxic chemicals (e.g., chemical weapons or biotoxins), aerosols, or volatile toxic industrial chemicals tentatively identified at the site or in the water, with a potential risk of exposure through dermal or inhalation routes.
    - Biological – Presence of pathogens tentatively identified at the site, with a potential risk of exposure through dermal or inhalation routes.
- Conditions where utility may require assistance from fire department or HazMat unit include:
  - Equipment limitations.
  - Utility suspects tampering (e.g., presence of unknown empty containers or evidence of a security breach).
  - Combination of monitor alarms, security breach, consumer complaints or public health calls.
  - Legitimate concern that a biohazard might exist, even for diluted samples.
- Appropriate utility personnel (e.g., utility IC or Liaison Officer) contacts the local health department concerning related health issues.
- Appropriate utility personnel (e.g., utility IC or Liaison Officer) contacts law enforcement (if not already involved).
- If YES, proceed to Step 3 of this decision tree.
- If NO, proceed to Step 9b of this decision tree.

Step 3: Conduct field safety screening.

- If the site hazard level is LOW, utility response team conducting the site characterization updates the appropriate utility staff selected by the utility IC. Only utility staff with the appropriate level of training [e.g., Occupational Safety and Health Administration (OSHA)] should be allowed on the site.
- If the site hazard level is anything but LOW, utility response team conducting site characterization should consist of trained HazMat personnel. Local fire departments should also be contacted for HazMat assistance. The responding fire department will assess what HazMat resources are needed. *Note: this may differ depending on locale*.
- During the approach to the site, establish site zones and conduct field safety screening. Consult with local health department and local fire department. The appropriate utility personnel (e.g., utility IC or ICS Operations Section) are responsible for managing each of these tasks and reporting the findings to the utility IC.
- When approaching site, utility response team performs field safety screening and inspects the site for potential hazards from the site perimeter. Required field safety screening techniques include:
  - Looking for signs of obvious contaminants in the air or on surfaces in or around the facility (approach, view from upwind of site).

- Looking for discarded containers, PPE, and equipment that could have been used to contaminate the water.
- Using portable field instruments to measure or detect radiation (e.g., Geiger counter).
- Observation of sick or dying animals and dead or discolored vegetation.
- Noting presence of unusual odors (move away from odors, upwind if possible).
- Looking for signs of intrusion, such as cut gate locks, tampered door locks, broken lights, or unauthorized vehicles/persons on premises.

- Utility response team members investigating the site should stay in constant communication with the appropriate utility personnel (e.g., utility IC or ICS Operations Section). Response team members not investigating the site should remain outside site perimeter in the staging area.
- If hazardous conditions exist (hazard level is HIGH), team members should return to their vehicles at a safe distance from the site until help arrives. Response team members shall not retreat beyond the site perimeter until they have been properly decontaminated, since personnel may inadvertently spread a contaminant.
- Proceed to Step 4 of this decision tree.

Step 4: Appropriate utility personnel (e.g., ICS Operations Section) report findings to IC.

- Appropriate utility personnel (e.g., ICS Operations Section) report findings for field safety screening and initial observation of site conditions to the utility IC.
- Proceed to Step 5 of this decision tree.

Step 5: Does field team have approval to enter site?

- Appropriate utility personnel (e.g., utility IC), in consultation with local public health and local fire department, determines if site is safe for utility staff to enter and conduct further investigations.
- If NO, proceed to Step 9b of this decision tree.
- If YES, proceed to Step 6 of this decision tree.

Step 6: Conduct rapid field testing of the water.

- Utility response team continues to monitor site conditions described in Step 3.
- If hazardous conditions exist (hazard level is HIGH), team members should return to their vehicles at a safe distance upwind from the site until additional help arrives. Response team members shall not retreat beyond the site perimeter until they have been properly decontaminated, since personnel may inadvertently spread a contaminant. Appropriate utility personnel (e.g., utility IC or ICS Operations Section) immediately report the findings to the utility IC. Contact outside agencies such as local public health and fire departments for assistance with the investigation.
- If the hazard level LOW, the utility response team conducts rapid field testing. The three objectives of rapid field testing of the water are to:
    1. Provide additional information to assess the credibility of the threat.
    2. Tentatively identify contaminants that would need to be confirmed by laboratory testing.
    3. Determine if hazards tentatively identified in the water require special precautions during sampling.

- Water quality tests include pH, chlorine residual, and other field tests, including toxicity screening as requested by the utility IC.
- Report results of rapid field testing to local the health department and the drinking water primacy agency.
- Proceed to Step 7 of this decision tree.

Step 7: Appropriate utility personnel (e.g., ICS Operations Section) report findings to IC.

- Appropriate utility personnel (e.g., ICS Operations Section) report findings to the utility IC. IC decides if safe for the team to collect water samples.
- Proceed to Step 8 of this decision tree.

Step 8: Does Response Team have approval to collect water samples?

- Proceed to Step 9b of this decision tree if the appropriate utility personnel (e.g., utility IC or ICS Operations Section) conclude the site is NOT safe for utility staff to collect water samples.
- Proceed to Step 9a of this decision tree if the appropriate utility personnel (e.g., utility IC, ICS Operations Section, or HazMat Unit Leader (if previously contacted to conduct the site characterization) concludes the site is safe for utility staff to collect water samples.
- Utility staff should collect water samples only if site hazard level is classified as LOW.

Step 9a: Complete site characterization and collect samples.

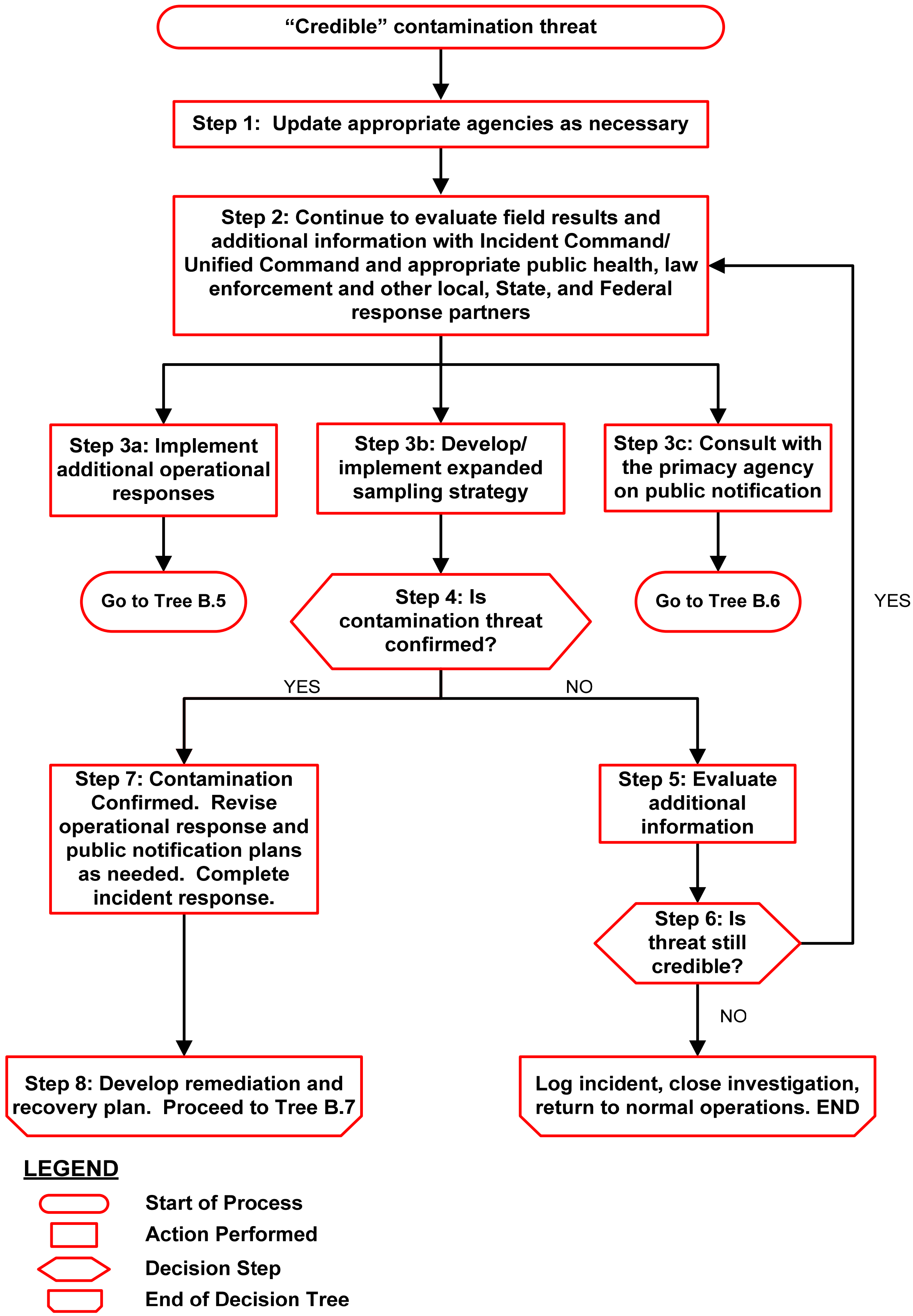
- Utility ICS staff conducts site characterization and collects water samples under the direction of the utility IC. This includes sampling the contaminated water - wherever it might be - and looking upstream for sites where the contamination might have been introduced - particularly if there is a chance that it could still be actively being introduced to the distribution system.
- Utility response team collects water samples for laboratory analysis. Where possible, sample taps or hose bibs should be used. Submersible sampling pumps may be required to collect water samples from storage tanks or underground reservoirs. Only appropriate decontaminated pumps and appurtenances shall be used to prevent compromising the samples.
- Upon completing site characterization, utility field leader documents site investigation following established procedures.

Step 9b: Contact appropriate HazMat response partner to complete site characterization and collect samples.

- Appropriate utility personnel (e.g., utility IC or Liaison Officer) contacts the local fire department (by calling 911) to request assistance from the local HazMat unit.
- Provide fire dispatcher with information regarding reason for call (e.g., chemical spill, unusual odor, or other unusual characteristics) observed during the site investigation.
- Upon HazMat arrival, utility response team informs HazMat Commander of the type of sampling required and provides the appropriate sampling equipment (bottles and labels, preservatives, pumps, etc.).
- Responding fire unit assesses what HazMat resources are needed (e.g., PPE).
- HazMat may assume field incident command.
- HazMat unit completes site characterization and collects water samples under the direction of the appropriate utility personnel (e.g., utility IC or ICS Operations Section).

- HazMat unit may consider the site hazard level LOW after completion of site characterization. Return to Step 9a if utility is allowed to collect water samples by HazMat Unit Leader.
- Upon completing site characterization, the appropriate utility personnel (e.g., utility IC or ICS Operations Section) complete a Site Characterization Report Form (Refer to the USEPA RPTB, Module 3).

B.4 Confirmed Determination Decision Tree Template



Step 1: Update appropriate agencies as necessary.

- Update response partners and agencies. Example:
    - Appropriate utility personnel (e.g., utility IC) notifies appropriate utility manager (e.g., City Manager), who determines if activation of EOC is necessary. Utility ICS is modified as needed to coordinate with the EOC.
    - Appropriate utility personnel (e.g., utility IC) updates relevant agencies with information regarding contaminant/contaminant class and area affected (if known), and enlists their assistance as follows (insert appropriate response partners):
        - Local health department may conduct local public health surveillance.
        - The drinking water primacy agency may provide assistance with developing the sampling and analysis strategy, interpreting laboratory results, summarizing regulatory requirements, and must be consulted regarding public notification.
        - State department of health may provide epidemiological assessments, confirm lab results, and provide a radioactive material control team.
        - Wastewater treatment plant may provide laboratory assistance and monitor the wastewater to serve as another contamination warning trigger.
    - Appropriate utility personnel (e.g., utility IC or designee) notifies all critical customers affected [insert appropriate utility critical customers such as hospitals, nursing homes, etc.].
    - UC may manage the incident, and utility ICS staff provides support.
    - Appropriate utility personnel (e.g., Utility Security Manager or designee) should report the credible threat determination on Water Information Sharing and Analysis Center (WaterISAC) and Homeland Security Information Network.
    - Through the EOC, notification of State EMA may be requested with information on location, type of emergency, threat immediacy, immediate needs, and future logistics issues.
    - Local law enforcement may respond for any site security or criminal investigation needs.

Step 2: Continue to evaluate field results and additional information with IC/UC and appropriate public health, law enforcement, and other local, State, and Federal response partners.

- Field results from site characterization and additional information should be discussed and evaluated with IC/UC, and appropriate public health, law enforcement, and other local, State, and Federal response partners.
- Appropriate utility personnel (e.g., utility IC or designee) prepares a brief summary of the field results and other pertinent information about the incident to aid in determining if the incident is confirmed.
- Proceed to Steps 3a, 3b, and 3c of this decision tree.

Step 3a: Implement additional operational responses.

- Response teams implement operational responses developed previously in order to isolate the contaminated area or mitigate the consequences of contamination.
- Go to Tree B.5, Operational Response Decision Tree for Confirmed Determination; then proceed to Step 4 of this decision tree.

Step 3b: Develop/implement expanded sampling strategy.

- Appropriate utility personnel (e.g., ICS Planning Section) contact the drinking water primacy agency and local health departments to aid expanded sampling and analysis strategy.
- Appropriate utility personnel (e.g., ICS Planning Section) determine level of sampling required, based on continued evaluation of field results and additional information.
- Appropriate utility personnel (e.g., ICS Planning Section) identify additional sampling locations as needed.
- Notify internal and external laboratories of sampling plan.
- Appropriate utility personnel (e.g., ICS Planning Section) implement sampling.
- Response and sampling teams should be equipped with the necessary PPE and sampling equipment. Some sites may have systems that automatically take sample upon receiving water quality alarm and may also have capability to remotely trigger manual sample collection.

Step 3c: Consult with the primacy agency on public notification.

- Appropriate utility personnel (e.g., utility IC and PIO) consult with the primacy agency to determine if public notification is required. This may include issuing "boil water," "do not drink," or "do not use" messages in order to minimize the potential for exposure.
- Utility should participate in a JIC activated by the city or county. Local health department, drinking water primacy agency, fire, police, other State and Federal agencies may also be involved depending on the nature of the incident.
- Go to Tree B.6, Public Notification Decision Tree; then proceed to Step 4 of this decision tree.

Step 4: Is contamination threat confirmed?

- Positive laboratory analysis results should be considered when confirming the contamination threat. Refer to the utility's laboratory notification protocols.
- If confirmation of an incident through laboratory analysis is not feasible, additional information sources may be considered in attempting to confirm the incident based on a "preponderance of evidence." Information that might support confirmation includes:
    - Results from laboratory analysis of samples collected during the initial or continuing site characterization activities.
    - Results and observations of continued site characterization activities.
    - Information from public health officials, area hospitals, or call centers.
    - Information about specific contaminants.
    - Targeted information from external sources based on the collective knowledge of the threat.
- IC/UC may rely on utility's water treatment division as a technical resource when confirming contamination, but IC/UC has the ultimate authority.
- If YES, proceed to Step 7 of this decision tree.
- If NO, proceed to Step 5 of this decision tree.

Step 5: Evaluate additional information.

- If laboratory results do not confirm a contamination incident, the threat may still be credible. This should be determined through analysis of existing and additional information relevant to the threat.
- Utility IC (in conjunction with IC/UC, and other local, State, and Federal response partners) should review contamination threat warning information from other CWS components, results from site characterization, contaminant characteristics (e.g., Water Contaminant Information), and other information sources listed in Step 4 of this decision tree.
- Proceed to Step 6 of this decision tree.

Step 6: Is threat still credible?

- If YES, return to Step 1 of this decision tree and revise the investigation.
- If NO, log the incident, close the investigation, and return to normal operations.

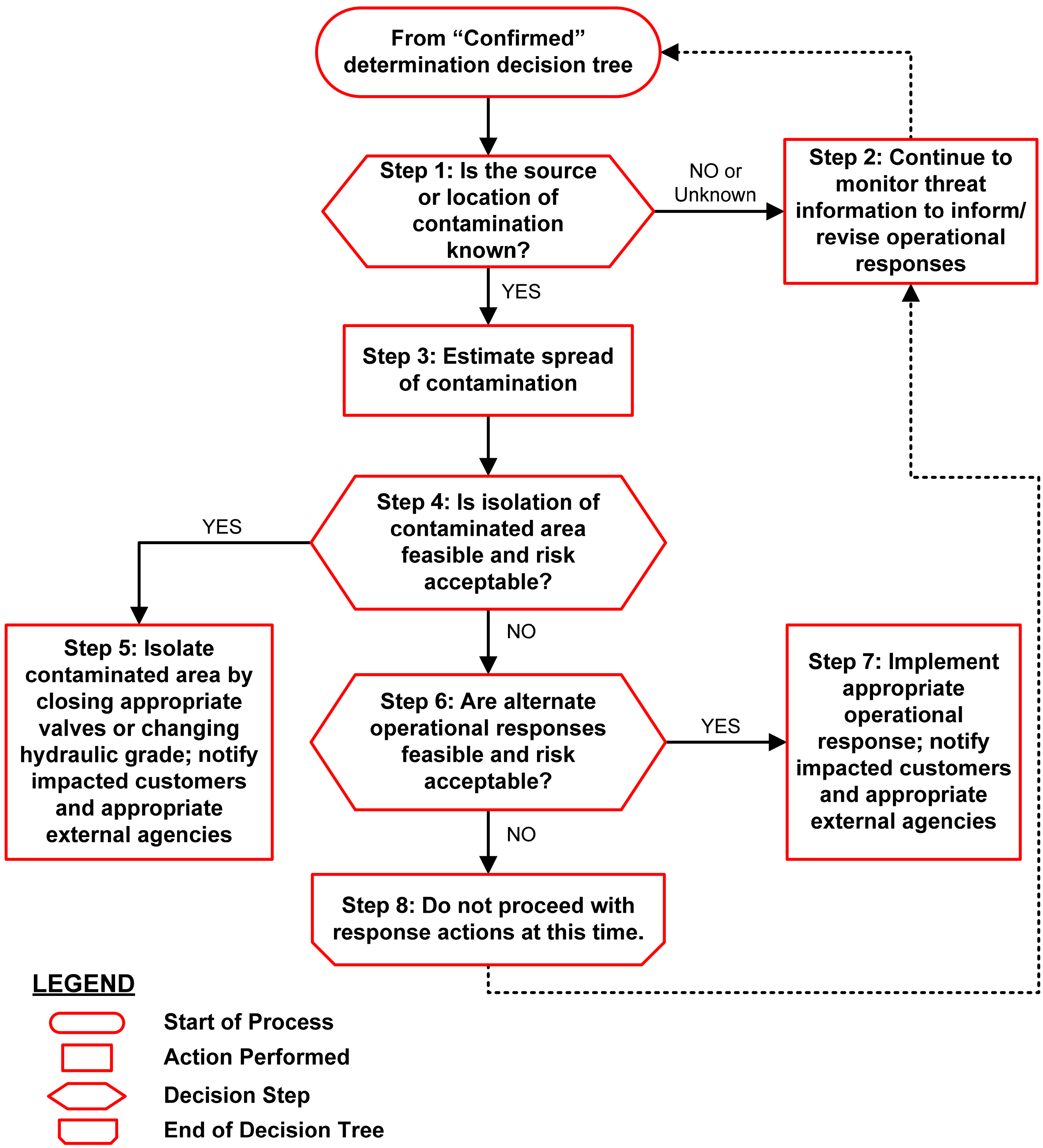
Step 7: Contamination Confirmed. Revise operational response and PN plans as needed. Complete incident response.

- Public health and operational response procedures already implemented should be reassessed and revised (if necessary). This may include revisions to containment strategies or PNs.
- Appropriate utility personnel (e.g., utility IC or designee) notify all response partners of a confirmed contamination incident and inquires as to their potential role in remediation and recovery activities.
- Appropriate utility personnel (e.g., utility IC or PIO) then notify affected residential customers and critical customers.
- Go to the Operational Response (B.5) and Public Notification (B.6) decision trees (if necessary); then complete incident response and transition to remediation and recovery.
- Proceed to Step 8 of this decision tree.

Step 8: Develop remediation and recovery plan.[7] Proceed to Tree B.7, Remediation and Recovery Decision Tree.

[7] *Refer to the U.S. EPA Response Protocol Toolbox, Module 6, Remediation and Recovery Guide (EPA-817-D-03) for further information when developing this decision tree.*

B.5 Operational Response Decision Tree Template for Confirmed Determination



Step 1: Is the source or location of contamination known?

- If YES, go to Step 3 of this decision tree.
- If NO or UNKNOWN, go to Step 2 of this decision tree.

Step 2: Continue to monitor threat information to inform/revise operational responses.

- Continue to monitor contamination warning system components and consequence management activities for additional information concerning contaminant type and location to inform/revise operational responses.

Step 3: Estimate spread of contamination.

- Appropriate utility personnel (e.g., ICS Planning Section) estimate spread of contamination using information from the contamination warning system components, distribution system models and/or utility personnel with knowledge of system.
- Proceed to Step 4 of this decision tree.

Step 4: Is isolation of contaminated area feasible and risk acceptable?

- Based on the results determined in Step 3, appropriate utility personnel (e.g., ICS Operations or Planning Section) determine whether suspected area of contamination can be isolated.
- Appropriate utility personnel (e.g., utility IC) determine potential impact of isolation on customers. Consider number of customers affected, pressure reduction and potential period of impact. Impacts of isolating certain areas of the system can be determined prior to an incident.
- Key feasibility considerations may include:
    - Is enough information available concerning the contamination source and spread to undertake a targeted isolation?
    - Is the system configured well relative to isolation need (e.g., valve placement, grid structure)?
    - Can utility staff resources meet the isolation response requirements (e.g., multiple valves in dispersed locations) within the credible and confirmed determination timelines?
    - Is the sequencing of valve closure (particularly in a "grid" framework) too complex as system hydraulics will change in response to flow curtailment?
- Key impact considerations may include:
    - Will isolation pose a system depressurization risk that may increase the risk of contamination inflow through pipe walls?
    - Will isolation exacerbate the contamination problem (e.g., increase concentrations, raising customer contact and infrastructure damage risks)?
    - Will isolation have substantial public health-related impacts, such as hygiene concerns associated with lack of water for sanitation, large customer water needs, etc?
    - What are possible impacts in maintaining public confidence outside of the isolated zone?
    - Will any hydraulic changes resulting from isolation affect the on-going threat investigation?
- If YES, go to Step 5 of this decision tree.
- If NO, go to Step 6 of this decision tree.

Step 5: Isolate contaminated area by closing appropriate valves or changing hydraulic grade; notify impacted customers and appropriate external agencies.

- Appropriate utility personnel (e.g., ICS Operations Section) proceed with the isolation plan. Utility staff may be able to change hydraulics of system by turning pumps on or off remotely or locally.
- Appropriate utility personnel (e.g., ICS Operations Section) direct staff to close appropriate valves to tanks, pump stations, or transmission mains.
- Appropriate utility personnel (e.g., utility IC or PIO) notify the appropriate agencies or customers of operational changes based on the suspected impact of the operational changes on water pressure or supply.
- Note that the isolated (and potentially contaminated) water may still be accessible by customers. Therefore, thorough and effective customer notification is critical to minimize the customer contamination contact risk in place.
- Provide alternate water supply to residential customers as needed. Contact appropriate response partner agencies.

Step 6: Are alternate operational responses feasible and risk acceptable?

- Flushing of distribution system mains is another operational response option, although the utility should not view or carry out such an action as "routine."
- Key considerations for flushing during a credible contamination incident may include:
  - The type and concentration of the potential contaminant may be unknown at this time; worker safety/protection measures should be taken and possible impacts to the environment due to discharged water should be considered?
  - Is enough information available concerning the contamination source and spread to undertake targeted flushing operations?
  - Is the system configured well relative to isolation need (e.g., valve placement, grid structure)?
  - Can utility staff resources meet the flushing response requirements (e.g., multiple flushing points in dispersed locations) within the credible and confirmed determination timelines?
  - Has the primacy agency been consulted for any planned discharges to a wastewater collection system or surface waters?
- Conditions under which a utility may consider undertaking a flush operational response include:
  - Isolation is infeasible;
  - The utility has obtained the needed regulatory clearances;
  - Customer notification is anticipated to have limited effectiveness (e.g., contamination spread involves the notification of many, widespread users); and
  - The weight of evidence suggests contamination is compatible with a flush response (e.g., the contaminant type and concentration are sufficiently well known and deemed low risk in a release context or, in the absence of this specificity, there are strong indications that a release from the system will have, on balance, tolerable environmental, general public health, and sewer system impacts).
- Appropriate utility personnel (e.g., utility IC) determine if impact of alternate operational procedures on customers and environment would be detrimental before implementing.

- If YES, go to Step 7 of this decision tree.
- If NO, go to Step 8 of this decision tree

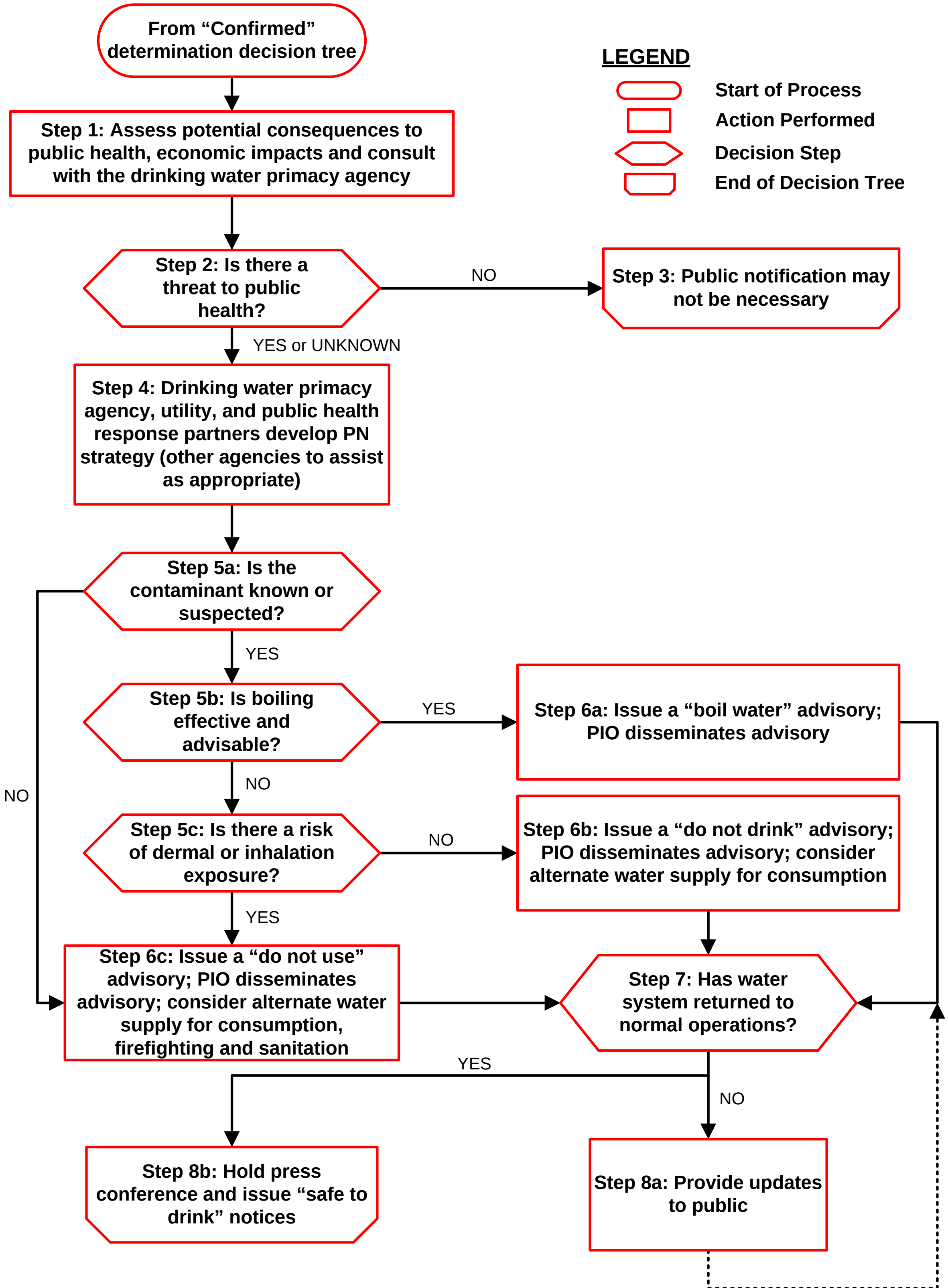
Step 7: Implement appropriate operational response; notify impacted customers and appropriate external agencies.

- Appropriate utility personnel (e.g., ICS Operations Section) proceed with the appropriate operational response.
- Appropriate utility personnel (e.g., ICS Operations Section) direct staff to appropriate flushing locations (e.g., hydrants).
- Appropriate utility personnel (e.g., utility IC or PIO) notify the appropriate agencies or customers of operational changes based on the suspected impact of the operational changes on water pressure or supply.
- Note that the isolated (and potentially contaminated) water may still be accessible by customers. Therefore, thorough and effective customer notification is critical to minimize the customer contamination contact risk in place.
- Provide alternate water supply to residential customers as needed. Contact appropriate response partner agencies.

Step 8: Do not proceed with response actions at this time.

- Contamination source, spread, or type remains insufficiently known to support operational response actions at this time.
- Proceed to Step 2 of this decision tree.

B.6 Public Notification Decision Tree Template



Step 1: Assess potential consequences to public health, economic impacts and consult with the drinking water primacy agency.

- Appropriate utility personnel (e.g., utility IC, PIO, and other utility staff) work with the drinking water primacy agency and other response partners (e.g., public health agencies) to assess available information on the public health consequences.
- Consider the properties of the contaminant, as appropriate, including acute/chronic health effects, taste/odor/color, aerosolization, toxicity values (e.g., LD_{50}), hydrolysis, reactivity, solubility, susceptibility to disinfection, etc. Refer to EPA's Water Contamination Information Tool (WCIT), EPA's List of Drinking Water Contaminants and Maximum Contaminant Levels, WaterISAC, etc.
- Consider health effects that may have been observed in the community. Contact appropriate response partners to obtain information (e.g., public health agencies, hospitals).
- Appropriate utility personnel (e.g., ICS Operations Section) estimate the spread of contamination considering operational responses that have been performed. This may have been performed as part of the Operational Response Decision Tree (B.5).
- The use of a distribution system model can provide information to identify the area of the distribution system that would be subject to water use restrictions and PN.
- Proceed to Step 2 of this decision tree.

Step 2: Is there a threat to public health?

- The drinking water primacy agency, with input from the utility and response partners (e.g., public health agencies) determines whether the incident poses a significant potential for serious adverse effects on human health as a result of short-term exposure based on the available information.
- If YES, or UNKNOWN, proceed to Step 4 of this decision tree.
- If NO, proceed to Step 3 of this decision tree.

Step 3: Public notification may not be necessary.

- If there is no threat to public health, PN may not be necessary.
- PN may be appropriate if operational responses (conducted as part of Operational Response Decision Tree B.5) have affected consumers or if non-threatening or aesthetic water quality issues are present. In this instance, follow utility SOPs for PN.

Step 4: Drinking water primacy agency, utility, and public health response partners develop PN strategy (other agencies to assist as appropriate).

- The drinking water primacy agency, with input from the utility and appropriate response partners (e.g., public health agencies), develops the PN strategy in compliance with the Federal and State PN regulations.
- PN strategy should be modified based on the area affected. If the area is small, delivering information pamphlets door-to-door and calling customers may be the most effective notification method. If the area is large, then sending the message through media resources (e.g., television, radio) may be the most appropriate method. *Note: PN strategy should be in compliance with the Federal and State PN regulations.*
- Whenever the media is notified or becomes aware of an incident, the City Manager's office (e.g., utility manager) should be advised.

- Proceed to Steps 5a – c of this decision tree to assist in determining the appropriate PN advisory level (e.g., “boil water,” “do not drink,” or “do not use”) and identifying alternate water supplies, if needed.

Step 5a: Is the contaminant known or suspected?

- If the contaminant or class of contaminant is identified or suspected, proceed to Step 5b of this decision tree.
- If the type of contaminant is unknown, consider adopting a conservative approach and issue a “do not use” notice. Proceed to Step 6c of this decision tree to issue a “do not use” advisory.

Step 5b: Is boiling effective and advisable?

- The drinking water primacy agency, with input from the utility and appropriate response partners (e.g., public health agencies), determines if boiling of water is effective and advisable.
- A “boil water” advisory typically is issued when biological contaminants are present. Issuance of a “boil water” advisory may be preferred if boiling will easily destroy the contaminant without creating additional hazards through aerosolization.
- If boiling water is deemed effective and will not produce additional public health concerns, proceed to Step 6a of this decision tree to issue a “boil water” advisory.
- If boiling water is deemed ineffective or unsafe, then proceed to Step 5c of this decision tree.

Step 5c: Is there a risk of dermal or inhalation exposure?

- The drinking water primacy agency, with input from the utility and appropriate response partners (e.g., public health agencies), determines if the risk of dermal or inhalation exposure exists.
- If the contaminant does not pose a risk through inhalation or dermal exposure pathways, issuance of a “do not drink” advisory may be appropriate. A “do not drink” advisory should restrict all use of water if ingestion is possible (i.e., the water should not be consumed or used in food preparation). Proceed to Step 6b of this decision tree to issue a “do not drink” advisory.
- If there is a risk to public health through inhalation or dermal exposure, or if the risk of exposure by these pathways is unknown, then a “do not use” notice should be considered. Proceed to Step 6c of this decision tree to issue a “do not use” advisory.

Step 6a: Issue a “boil water[8]” advisory; PIO disseminates advisory.

- Notify city manager (e.g., utility manager) and PIO of decision to issue a “boil water” advisory.
- With input from ICS Planning Section, public health agencies, drinking water primacy agency, and PIO, modify existing templates for issuing a “boil water” advisory.
- Keep the public updated of any changes to the advisory throughout the investigation.

Step 6b: Issue a “do not drink” advisory; PIO disseminates advisory; consider alternate water supply for consumption.

- Notify city manager (e.g., utility manager) and PIO of decision to issue a “do not drink” advisory.

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[8] *Refer to the U.S. EPA Response Protocol Toolbox, Module 5, Public Health Response Guide (EPA-817-D-03-003) for example notifications for “boil water”, “do not drink”, “do not use”.*

- With input from the ICS Planning Section, public health agencies, drinking water primacy agency, and PIO, modify existing templates for issuing a “do not drink” advisory.
- Suspect water can still be used for purposes that do not involve ingestion (e.g., flushing toilets), and it should be necessary to provide an alternate drinking water supply only for consumption and related activities such as food preparation.
- Appropriate utility personnel (e.g., utility IC and ICS Operations Section chief (as appropriate)) should identify alternate water supplies for both short- and long-term consumption. Contact the appropriate alternate water supply agencies, as appropriate.
- Keep the public updated of any changes to the advisory throughout the investigation.

Step 6c: Issue a “do not use” advisory; PIO disseminates advisory; consider alternate water supply for consumption, firefighting, and sanitation.

- If there is a risk to public health through inhalation or dermal exposure, or if the risk of exposure by these pathways is unknown, then a “do not use” notice should be considered.
- Notify city manager (e.g., utility manager) and PIO of decision to issue a “do not use” advisory.
- With the input of the ICS Planning Section, public health agencies, drinking water primacy agency, city PIO, and local fire department, modify existing templates for issuing a “do not use” advisory.
- Appropriate utility personnel (e.g., utility IC and ICS Operations Section chief (as appropriate)) should identify alternate water supplies for short- and long-term consumption, firefighting, and sanitation. Contact the appropriate alternate water supply agencies.
- Keep the public updated of any changes to the advisory throughout the investigation.

Step 7: Has water system returned to normal operations?

- If YES, proceed to Step 8b of this decision tree.
- If NO, proceed to Step 8a of this decision tree.

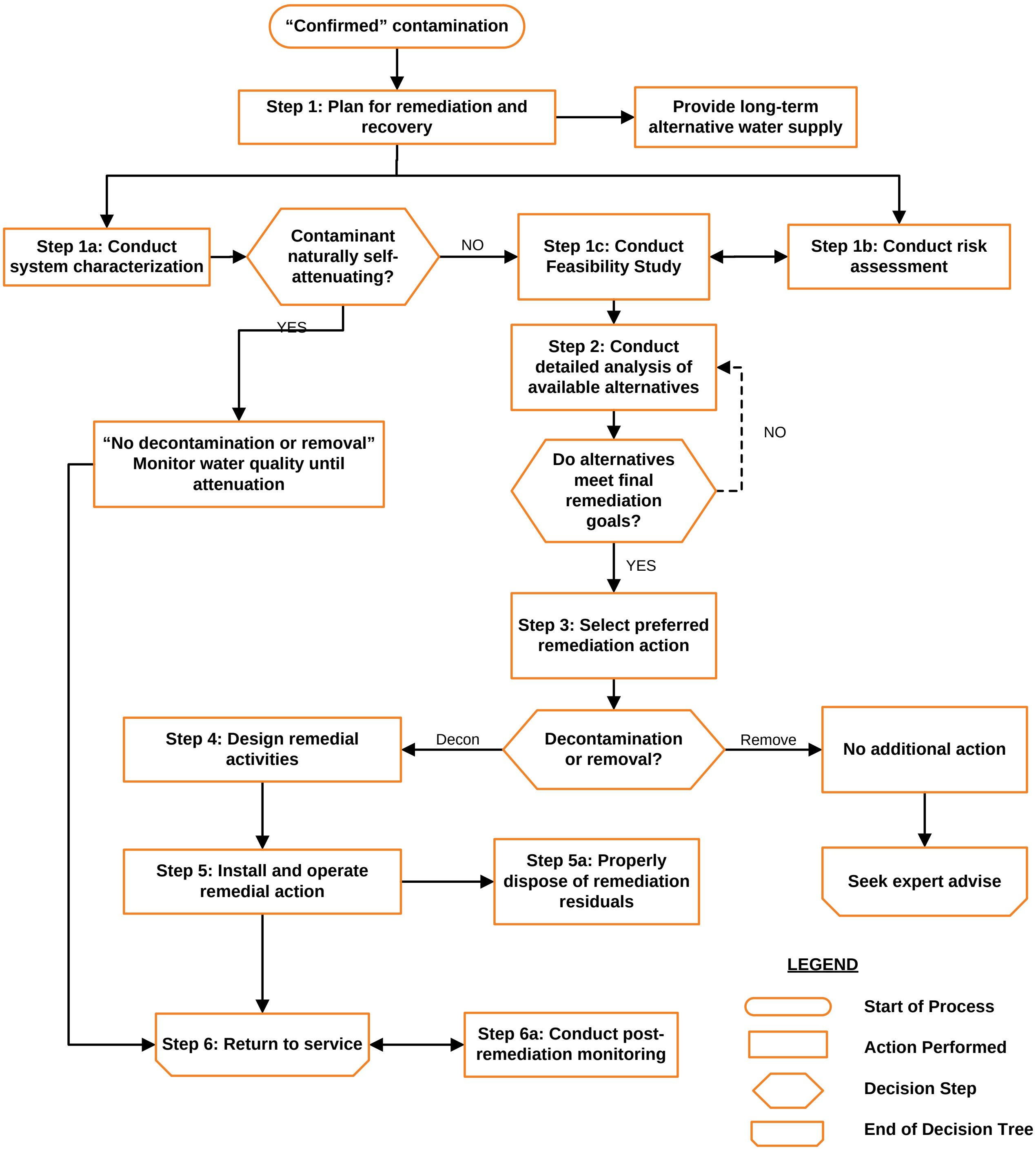
Step 8a: Provide updates to public.

- With input from the ICS Planning Section, public health agencies, drinking water primacy agency, and city PIO, provide periodic updates to the public until a “safe to drink” notice has been issued (Step 8b of this decision tree).

Step 8b: Hold press conference and issue “safe to drink” notices.

- Notify City Manager (e.g., utility manager) and city PIO of decision to issue “safe to drink” notices.
- With input from the ICS Planning Section, public health agencies, drinking water primacy agency, and city PIO, modify existing templates for issuing a “safe to drink” notices.

B.7 Remediation and Recovery Decision Tree Template



Step 1: Plan for remediation and recovery[9].

- Appropriate utility personnel (e.g., ICS Planning Chief), in consultation with the utility IC, should convene a meeting with response partners to engage in a systematic planning process for remediation and recovery. The systematic planning process ensures that the information collected is sufficient to:
  - Address public health response.
  - Conduct risk assessment.
  - Make decisions related to system characterization, remedy selection, remedy implementation and post-remedial monitoring.
  - Provide information to address a public information campaign to assure public water is safe to use again.
- The following key decisions and outputs should result from the systematic planning process:
  - Goals and Objectives: Appropriate utility personnel (e.g., ICS Planning Chief), in consultation with the local health department and other planning partners, should determine the goals to return the system to service as quickly as possible or a framework for "what is an acceptably cleansed water system." The goals should be specified in Qualitative terms (i.e., restoration of fire-protection and basic sanitation) and Quantitative terms (i.e., concentration-based remediation goals for the water, system components, and affected environmental media).
  - Roles and Responsibilities: Based on the nature and extent of the contamination, appropriate utility personnel (e.g., ICS Planning Chief), in consultation with the utility Operations, Logistics, and Admin/Finance Section Chiefs, should identify utility and response partners' roles and responsibilities for the remediation and recovery phase.
  - Funding: Appropriate utility personnel (e.g., ICS Admin/Finance Chiefs), in conjunction with the Utility Director and appropriate response partners and agencies, should plan for how to fund remediation and recovery efforts.
  - Schedules and Milestones: Appropriate utility personnel (e.g., ICS Planning Section) should prioritize remediation and recovery efforts and establish schedules and milestones to achieve goals.
  - Development of a Conceptual Site Model: Appropriate utility personnel (e.g., ICS Planning Chief) should direct the development of a conceptual site model based on use of existing information. The conceptual site model provides a concise summary of information about the nature and extent of contamination, and the fate and transport of contaminants in the water system. An inter-agency team, including the utility, drinking water primacy agency, public health departments, site remediation specialists, and technical assistance providers [e.g., National Decontamination Team and National Homeland Security Research Center (U.S. EPA)] should provide assistance in developing the conceptual site model.
  - Laboratory and Data Collection Needs: Appropriate utility personnel (e.g., ICS Planning Section) should make the decisions related to identification of analytical laboratories, types of data needed, sampling locations, and quality control procedures.

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[9] *Refer to the U.S. EPA Response Protocol Toolbox, Module 6, Remediation and Recovery Guide (EPA-817-D-03) for further information when developing this decision tree to plan for Remediation and Recovery.*

- Long-Term Alternate Water: Appropriate utility personnel (e.g., ICS Planning Section), with input from the drinking water primacy agency, public health officials, and the appropriate State and Federal officials, should make decisions related to providing long-term water (greater than a few days) to the customers (if necessary).

Step 1a: Conduct system characterization.

- Appropriate utility personnel (e.g., ICS Planning Chief) should direct system characterization efforts and activities. System characterization should be used to identify the nature, extent, and fate of particular contaminants in the utility water system and its components to support the selection of appropriate remediation actions. If the contamination is contained through immediate operational response and is confined to a well-defined area, then extensive system characterization may not be necessary. In this case, a reevaluation of the initial site characterization (see Site Characterization Decision Tree) data and the information obtained through the conceptual site model (developed under Step 1 of this decision tree) may provide sufficient information to guide remediation and recovery efforts.
- System characterization activities should include the following:
  - Evaluate information gathered during initial site characterization to determine whether additional characterization activities are necessary.
  - Develop system characterization planning documents (e.g., System Characterization Work Plan, Sampling and Analysis Plan, updating the Health and Safety Plan).
  - Conduct and continue with sampling and analysis.
  - Evaluate sample analysis results to characterize the system and determine the nature, extent, and fate of contamination; and to evaluate potential remedial alternatives.
  - Define the extent of the remedial action.
  - Document all results in the final System Characterization/Feasibility Study report.
- Appropriate utility personnel (e.g., ICS Operations Chief) should arrange for support activities while coordinating with the Planning, Logistics, and Administration/Finance Chiefs to:
  - Ensure access to all areas to be investigated.
  - Procure equipment and supplies in a timely manner.
  - Coordinate with analytical laboratories.
  - Procure on-site facilities for office and laboratory space, decontamination equipment, sample storage, and utilities.
  - Provide for storage and disposal of contaminated material (Step 5a of this decision tree).
- Appropriate utility personnel (e.g., ICS Operations Section Chief) should implement system characterization as prescribed by the Planning Chief and approved by the IC in planning documents to define the nature, extent, and fate of contaminants in the water system by conducting sampling and analysis and evaluation of results.
- Appropriate utility personnel (e.g., ICS Planning Section) should determine whether data are sufficient to evaluate potential remedial alternatives (Step 1c of this decision tree).
- Determine whether human health and environmental risks are reduced through attenuation and/or degradation of the contaminant in the water system within a reasonable period of time and where an alternate water supply is available during this period. This determination will be based on the framework for "what is an acceptably cleansed water system" (Step 1 of this decision tree).

  - If contaminant is naturally self-attenuating, then "no decontamination or removal is required"; proceed to monitor water quality until after attenuation, return to service and conducting post remediation monitoring (Steps 6 and 6a of this decision tree).
  - If contaminant is not naturally self-attenuating, proceed to Step 1c of this decision tree to conduct a Feasibility Study with Risk Assessment (Step 1b of this decision tree).
- Appropriate utility personnel (e.g., ICS Planning, Logistics, Administration/Finance Chiefs) should document all results of system characterization in the final System Characterization / Feasibility Study report (concurrent with Step 1c of this decision tree).

Step 1b: Conduct risk assessment.

- Appropriate utility personnel (e.g., ICS Planning Section), in consultation with public health departments, should direct appropriate utility staff to conduct risk management activities following System Characterization (Step 1a of this decision tree) to:
  - Evaluate risk reduction resulting from immediate operational response actions.
  - Help establish preliminary remediation goals and final remediation goals.
  - Assess potential risk reductions from implementation of a long-term remedy (if necessary).
  - Inform further system characterization and field investigations (Step 1a of this decision tree).
  - Evaluate the protectiveness of the candidate remediation technologies and remediation alternatives.
- To conduct risk assessment, consider using Superfund risk assessment guidance[10], when appropriate. For very large-scale remediation projects, consider using EPA resources – such as regional On-Scene Coordinators, Remedial Project Managers, the National Decontamination Team, and the National Homeland Security Research Center – and other national partners, such as the Centers for Disease Control and Prevention (CDC).
- Considering the framework for determining an acceptably cleansed system identified in Step 1 of this decision tree, establish long-term, media-specific target concentrations (based on acceptable risk levels to human health and the environment) or preliminary remediation goals to use in screening and selecting remedial alternatives.
  - For a known contaminant with an existing action level, such as a Maximum Contaminant Level (MCL)[11] or Effluent Limitation Guideline for treated water, the existing regulatory level can be used as the preliminary remediation goals.
  - If an action level does not exist, human health risk-based preliminary remediation goals can be established by performing risk calculations used by the Superfund risk assessment guidance.
- Evaluate the protectiveness of the candidate remediation technologies and remediation alternatives identified in the Feasibility Study (Step 1c of this decision tree).
- Determine the final remediation goals after the completion of the system characterization, Feasibility Study, and the identification of the remedial action objectives under Step 1c of this decision tree.

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[10] *U.S. EPA Superfund Risk Assessment http://www.epa.gov/oswer/riskassessment/risk_superfund.htm.*

[11] *For more information on Drinking Water MCLs and associated health advisories go to: http://www.epa.gov/waterscience/criteria/drinking/*

  - In the absence of established drinking water standards such as an MCL and non-zero MCL goals, use criteria modeled after EPA's risk and remediation goals in the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR 300.430(e) to establish Final Remediation Goals.
- Appropriate utility personnel (e.g., ICS Planning Chief) should report risk assessment outcomes to the IC and PIO.

Step 1c: Conduct Feasibility Study, if needed.

- If determined to be necessary, the utility IC should conduct the Feasibility Study concurrently with the system characterization. The goal of the Feasibility Study is to develop, screen, and evaluate remedial action alternatives. If remedial alternatives for the contaminant of concern are known and well-defined, then combine Feasibility Study and detailed analysis of available alternatives (Step 2 of this decision tree).
- The Feasibility Study should be conducted to:
  - Identify remedial action objectives based on feasibility criteria.
  - Determine treatment technologies that are capable of reaching remediation objectives and are reasonably available.
  - Develop and screen remedial alternatives and conduct treatability studies (if necessary).
  - Prepare a list of remedial alternatives to be evaluated in greater detail under Step 2 of this decision tree.
- Remedial Action Objectives should be established considering the contaminant, media of interest (i.e. water, system components, storage tanks, distribution lines, filters, pumps, etc.), Preliminary Remediation Goals, and degree of remediation necessary based on system-specific factors (e.g., need to treat water for consumption or treat to dispose/discharge and volume of water).
- For the majority of remediation projects, EPA resources including regional On-Scene Coordinators, Remedial Project Managers, National Decontamination Team, and National Homeland Security Research Center, will provide technical support to conduct the Feasibility Study.
- Once the Feasibility Study is complete, prepare the System Characterization/Feasibility Study Report and proceed to Step 2 of this decision tree.

Step 2: Conduct detailed analysis of available alternatives.

- Appropriate utility personnel (e.g., utility IC or ICS Planning Section) should be responsible for the detailed analysis of remediation alternatives (selected under Step 1c of this decision tree) by building on previous evaluations conducted during the development and screening of alternatives. The analysis should be coordinated with other appropriate utility staff (e.g., engineering, security, distribution, commercial, supply, treatment, technical specialists). If IC cannot facilitate (e.g., if utility does not have the expertise), this may become the responsibility of the local EMA.
- Compliance with Federal regulations for alternative treatments should be determined by the drinking water primacy agency.
- The detailed analysis process should follow the steps below:
  - Select alternatives for the treatment of contaminated water using available resources (e.g., EPA's WCIT and RPTB Module 6).
  - Identify vendors of water treatment equipment and supplies.

- Select alternatives for the rehabilitation/remediation of the affected system components including infrastructure and hardware used to store, treat, and distribute water in the water system, distribution system components, household plumbing, wastewater piping, and sewer systems.
- Select alternatives for affected environmental media and use available resources as necessary.

- Consider seeking expert advice from the EPA National Decontamination Team and the National Homeland Security Research Center if an established decontamination method is not available.
- Present the relevant information needed for decision makers to select remedy to satisfy the remedial action objectives under Step 1c of this decision tree. Categorize each remedy alternative as:
  - Containment technologies.
  - Extraction or removal technologies.
  - Treatment technologies.
  - Institutional controls (e.g., use restrictions, access control, and notices).
  - Combination of remedies.
  - No decontamination or removal alternative for contaminated water if water treatment or natural attenuation (for non-persistence in water) may be the most appropriate alternative.
  - No additional action alternative for system components if removal or replacement may be necessary.
- Determine whether the selected alternatives meet the Final Remediation Goals:
  - Proceed to Step 3 of this decision tree if selected alternatives meet the Final Remediation Goals.
  - If selected alternatives do not meet the Final Remediation Goals, conduct detailed analysis of available alternatives following further screening of remedial alternatives under Step 1c of this decision tree.

Step 3: Select preferred remedial action.

- Appropriate utility personnel (e.g., ICS Planning), with input from other utility divisions (e.g., engineering, security, distribution, commercial, supply, treatment), should be responsible for selecting the preferred remedial action and making the recommendation to the utility IC. The selected remedy should satisfy the Remedial Action Objectives.
- The selection of the preferred remedial action should include the following steps:
  - Evaluate potential remedial response alternatives developed under Step 1c and Step 2 of this decision tree based on overall protection of human health and the environment, compliance with applicable regulations, and long-term effectiveness and permanence.
  - Analyze and select the preferred remedial activities by selecting alternatives for treatment of contaminated water, rehabilitation/remediation of the affected system components, including infrastructure and hardware, and rehabilitation of affected environmental media.
  - Determine whether selected alternatives meet the Final Remediation Goals.
  - Present relevant information needed for decision makers to select a remedy that satisfies the remedial action objectives.

  - Conduct a comparative analysis to evaluate the performance of each alternative relative to one another.
  - Prepare Remedy Selection Study Report, documenting all results of these analyses.
  - Utility IC should make the final decision in conjunction with the drinking water primacy agency and other response partners.
- If activated, the EOC/ UC should be informed of the decisions.
- Determine whether decontamination or removal is necessary.
  - Select the "no additional action" alternative and proceed to seek expert advice if removal or replacement of system components is necessary.
  - Proceed to Step 4 of this decision tree to design remedial activities if decontamination is necessary.

Step 4: Design remedial activities.

- The utility IC should form a design team consisting of utility staff (e.g., engineering, supply, distribution and treatment).
- Appropriate utility personnel (e.g., ICS Planning and ICS Operations Section) should prepare a Remedial Action Work Plan. This involves:
  - Developing a Site Data Collection Plan (if necessary) to support remedial design efforts (refer to Step 1a of this decision tree).
  - Developing a remedial design to create technical plans for the selected remedy. The remedial design will contain documents, specifications, and drawings that provide details of steps to be taken during remedial action for treatment and containment of the system.
  - Identifying the remedial design documentation by building and preparation of the remedial system and verification that the contamination has been sufficiently reduced or eliminated.
- The utility should obtain State plan approval from the drinking water primacy agency or other required regulatory agencies. The drinking water primacy agency or other regulatory agency may set minimum criteria for remedial design approval.
- Proceed to Step 5 of this decision tree.

Step 5: Install and operate remedial action.

- Appropriate utility personnel (e.g., ICS Operations Section) should execute the Remedial Action Work Plan according to the remedial design. Prepare for long-term monitoring and maintenance if contaminated water needs to be treated during the same period that the system components are rehabilitated or natural attenuation processes are used to reduce contaminant concentrations.
- Document all remediation action activities in a Remedial Action Report(s), and verify whether remedial action objectives have been met.
- Appropriate utility personnel (e.g., ICS Planning Section) should review the water quality information to verify that the remedial action objectives have been met and that the contaminant concentrations have been reduced to acceptable levels (using methods specified by public health departments, drinking water primacy agency).
- IC should report results to the EOC if implemented.

- If remedial action objectives have not been met, go back to Steps 2 through 5 of this decision tree and complete the sequence.
- If remedial action objectives have been met, properly dispose of remediation residuals (Step 5a if necessary), return the system to service (Step 6 of this decision tree) and conduct post-remediation monitoring (Step 6a of this decision tree).

Step 5a: Properly dispose of remediation residuals.

- The drinking water primacy agency, with additional guidance from EPA, should assist in the management, classification, and disposal of remedial waste according to applicable regulations. Remedial waste could include contaminated water, decontamination fluids, water treatment residuals such as biosolids, contaminated equipment (home water filters, ice makers, water heaters, and garden hoses), and PPE.
- The utility, as IC for remediation and recovery of the facility, should be responsible for coordinating the disposal.

Step 6: Return to service.

- Once the utility IC, public health departments, and drinking water primacy agency determine that all remedial action objectives have been met and initial post-remediation monitoring is satisfactory, return the system to service. Continue post-remediation monitoring of the system (Step 6a of this decision tree) after the water system is returned to service. The utility, public health departments, and the drinking water primacy agency should assume responsibility for continued monitoring of the system for the contaminants of concern to provide long-term assurance that the system can maintain normal operation.
- The utility, public health department, and the drinking water primacy agency should inform the local EMA of ongoing monitoring.
- Once the system has been returned to service, the utility should document the lessons learned from the remediation and recovery process.

Step 6a: Conduct post-remediation monitoring and operation.

- Appropriate utility personnel (e.g., ICS Planning), in consultation with the public health department, should create a post-remediation monitoring plan to ensure continued compliance with the remediation objectives. The monitoring activities include:
  - Monitoring for the contaminants of concern.
  - Periodic inspection and maintenance of treatment equipment remaining on site.
  - Periodic inspection and maintenance of the water distribution system components.
  - Maintenance of security measures or institutional controls.
  - Public communication of monitoring activities and results.
- The monitoring plan should include sampling locations, frequencies, parameters, and durations. Sampling and monitoring should occur at various locations to help provide an analysis of contamination levels over time for various points in the water system.
- Appropriate utility personnel (e.g., ICS Operations) should conduct the sampling and monitoring and will report the results to the Planning Section. ICS Planning Section (or appropriate utility personnel) should review the results and report to IC, if the ICS has been implemented, who should report to the EOC. The public health department and the drinking water primacy agency should also review the results.

- If unacceptable water quality information is obtained, the appropriate utility personnel (e.g., ICS Planning Section), in consultation with other planning partners, should decide whether to go back and complete a sequence of remedial steps.

Appendix C: Public Information Action Plan

The guidance below was developed and adapted from a tool kit prepared by the California Department of Health Services[12] and provides an example of how public information activities might be planned during each CMP response phase of a contamination incident. ***Each utility should modify these public information actions to meet its own specific needs.***

Credible Determination

1. Verify the Situation
    a. Get the facts from your water system personnel
    b. Obtain information from additional sources such as local public health, law enforcement and fire departments, hospitals, or others
    c. Ascertain information sources and determine threat credibility
    d. Review and critically judge all information
        i. Determine whether the information is consistent with other sources in other markets
        ii. Determine whether the characterization of the incident is plausible
        iii. Clarify information through subject matter experts
        iv. Attempt to verify the magnitude of the incident and human impact

2. Prepare Information and Obtain Approvals
    a. Determine special populations
    b. Prepare key messages and initial media statement
    c. Develop incident questions and answers
    d. Finalize advisories ("boil water," "do not drink," etc.)
    e. Draft and obtain approval on initial news release
        i. Provide only information that has been approved by the appropriate agencies—do not speculate
        ii. State the facts about the incident
        iii. Describe the data collection and investigation process
        iv. Describe what the water system is doing about the crisis
        v. Explain what the public should be doing
        vi. Describe how to obtain more information about the situation
    f. Confirm media contact list

3. Prepare to Notify Employees, Partner Agency PIOs, Public, and Media
    a. PIO consults with Utility Director/IC on timing of release of information to employees, partner agencies. (Employees are the first to be notified.)
    b. Develop/distribute scripts for all call takers and talking points for spokesperson
    c. Develop questions and answers

4. Identify Staffing and Resource Needs
    a. Assemble the crisis communications team
    b. Secure an appropriate space, equipment and supplies for the duration of the incident
    c. Ensure crisis information is being communicated to staff members

5. Continue Assessments/Activate Crisis Communication Plan

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[12] *Adapted from: "Crisis Emergency Risk Communication Tool Kit, California Dept. of Health Services, March 2006.*

   a. Continue to gather and check the facts
   b. Activate the crisis communication team
   c. Verify information provided by partners and stakeholders
   d. Monitor what is being said about the incident for accuracy

6. Organize Assignments
   a. Determine the current priorities
   b. Identify subject matter experts and spokespersons
   c. Decide whether communication should operate 10, 12, 20, or 24 hours a day
   d. Decide whether communication should operate 5, 6, or 7 days a week

Confirmed Determination

(Note: Steps 7–12 could occur earlier during an incident and may not necessarily occur in the order listed.)

7. Notify mayor, city manager, city PIO, utility employees, and call takers
   a. Release initial information to utility employees and call takers

8. Release Initial Information to the Media, Public, and Partners through Arranged Channels
   a. Distribute news release to media contacts and public officials (for city and other jurisdictions, depending on affected areas/populations)
   b. Ensure spokesperson(s) are standing by for potential media inquiries
   c. Distribute media materials to partner/stakeholder organizations. Establish regular briefing schedule and protocols with partners/stakeholders
   d. Establish regular briefing schedule and protocols for working with the media

9. Decide if PN may be required and begin coordination. Consider the following:
   a. Is there pressure or inquiry from outside groups/entities?
      i. Media
      ii. Law enforcement
      iii. Political entities (e.g., Mayor)
      iv. Citizens/customers
   b. Large population or sensitive groups at risk?
   c. Potential for major economic loss?
   d. How soon will new or updated information arrive?

Incident Confirmed

10. Begin Coordination of PN *(Note: This step could occur earlier.)*
    a. Finalize pre-prepared advisories (e.g., Do Not Use, Do Not Drink, Alternative Water Supply); work with other agencies (e.g., local health departments) to modify existing notification templates
    b. Notify city manager and city PIO of decision to issue an advisory
    c. Keep public updated on any changes or terminations of the advisory throughout the course of the investigation

11. Update Media/Hold News Conference
    a. Send follow-up release with additional incident information and details of any scheduled news conferences/media briefings
    b. Create additional materials, such as media advisory for news conference and media briefings, as necessary
    c. News Conference:
       i. Plan agenda, messages, speakers

        ii. Rehearse
        iii. Notify media of scheduled news conference
        iv. Conduct news conference
        v. Distribute press kit
        vi. Gather information addressing unanswered journalist questions
        vii. Notify media when next update will occur

12. Disseminate Additional Information
    a. Send additional information to media, as available

Remediation and Recovery Phase

13. Obtain Information on Alternate Water Supply
    a. Coordinate with EOC, county, and State environmental management or protection agency
    b. Relay information to the public

14. Ongoing Communication with the Public
    a. Report results of sampling and analysis to the public
    b. Report any risks, risk reduction measures during decontamination and recovery phases
    c. Provide the public with information on the contamination incident, the nature of the contaminant, and ongoing rehabilitation of the water system

End of Incident and Return to Non-Emergency Operations

15. Provide Final Notice to Public
    a. Lift all restrictions and close the incident

16. Obtain Feedback and Conduct Crisis Communications Evaluation
    a. Compile and analyze communications and media coverage
    b. Share results within utility
    c. Determine need for changes to the crisis and emergency crisis communications plan
    d. Revise crisis plan policies and procedures based on lessons learned
    e. Institutionalize changes with appropriate training

17. Conduct Public Education
    a. After incident:
        i. Determine public perceptions and information needs related to the incident
        ii. Update the community on the incident status through town hall meetings, flyers, or other outreach activities
        iii. For communications and messages for traumatized individuals, the PIO will defer to local health or mental health officials/professionals to execute any communications

Appendix D: Roles and Responsibilities

This appendix provides a description of recommended roles and responsibilities for the CMP, including a discussion of the ICS as it relates to a drinking water utility and local, State, regional, and Federal partners.

Utility ICS and Local, State, and Federal Roles

Incident Command at the Water Utility

If a threat or incident is discovered first by water utility personnel, the utility should assume command and establish their ICS. Under the National Incident Management System (NIMS)[13], the 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.

Figure D-1 provides an overview of an ICS structure for a drinking water utility. It is important to note that the ICS structure is flexible and can be modified or enhanced to meet the utility's needs. Also, the utility ICS may evolve during credible and confirmed determination, and all sections may not be activated at once. As credible determination transitions to confirmed determination, resources within the ICS will grow exponentially. At the same time, incident command may transition to higher levels of supervision and management.

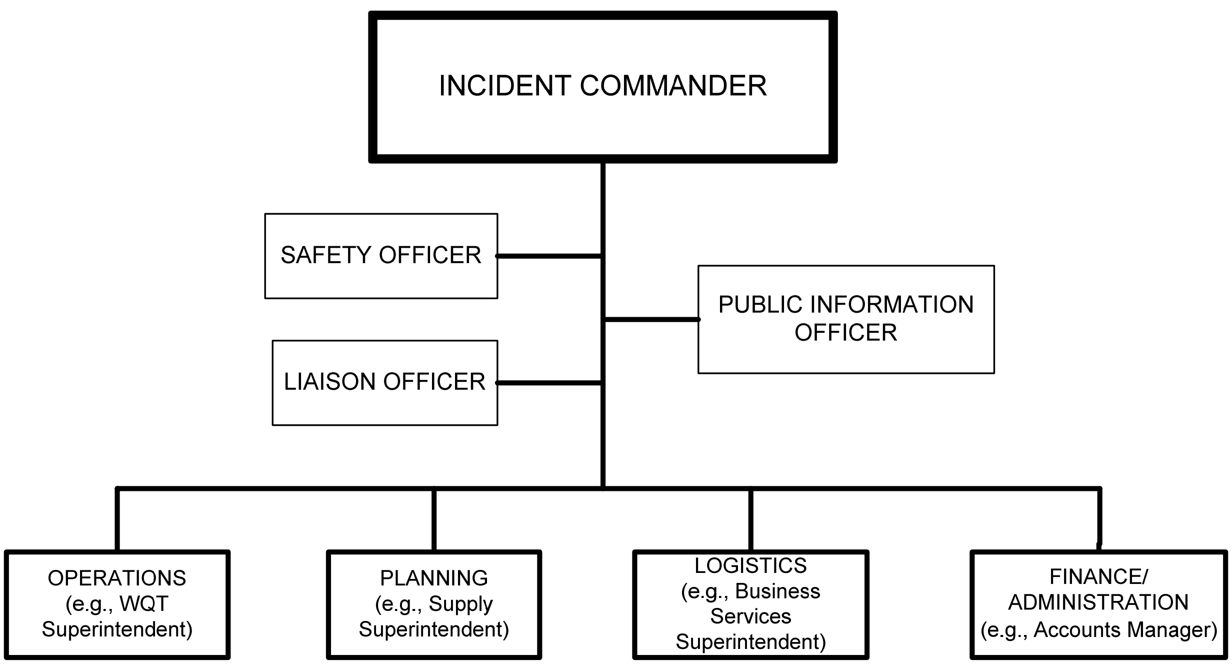

Figure D-1. Overview of ICS Organization Structure

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[13] *Refer to the FEMA National Incident Management System (NIMS) for further information on the Incident Command System and Federal, State, and Local roles: www.fema.gov/emergency/nims/index.shtm.*

Unified Command and Local, State, and Federal Roles

As an incident escalates (e.g., credible, confirmed, remediation and recovery) and additional responders arrive in response to utility notifications, a UC may be established under ICS. Under UC, local, State, and Federal agencies may work together through the designated members of the UC to manage an incident. UC may be used when incidents cross jurisdictional boundaries or cross the limits of individual agency functional responsibility. The UC organization should consist of the ICs from the various jurisdictions or agencies operating together to form a single command structure. An effective UC:

- Enables all responsible agencies to manage an incident together by establishing a common set of incident objectives and strategies.
- Allows ICs to make joint decisions by establishing a single command structure.
- Maintains unity of command. Each employee only reports to one supervisor.

The primary differences between a single command structure and a UC structure are that:

- In a single command structure, the IC is solely responsible (within the confines of his or her authority) for establishing incident management objectives and strategies. The IC is directly responsible for ensuring that all functional area activities are directed toward accomplishment of the strategy.
- In a UC structure, the individuals designated by their jurisdictional authorities (or by departments within a single jurisdiction) must jointly determine objectives, strategies, plans, and priorities and work together to execute integrated incident operations and maximize the use of assigned resources.

For example, in **Figure D-2**, the role of IC has been replaced with a UC consisting of local, State and Federal agencies. Note that this type of UC would be established for complex incidents where the State and Federal government agencies have jurisdiction.

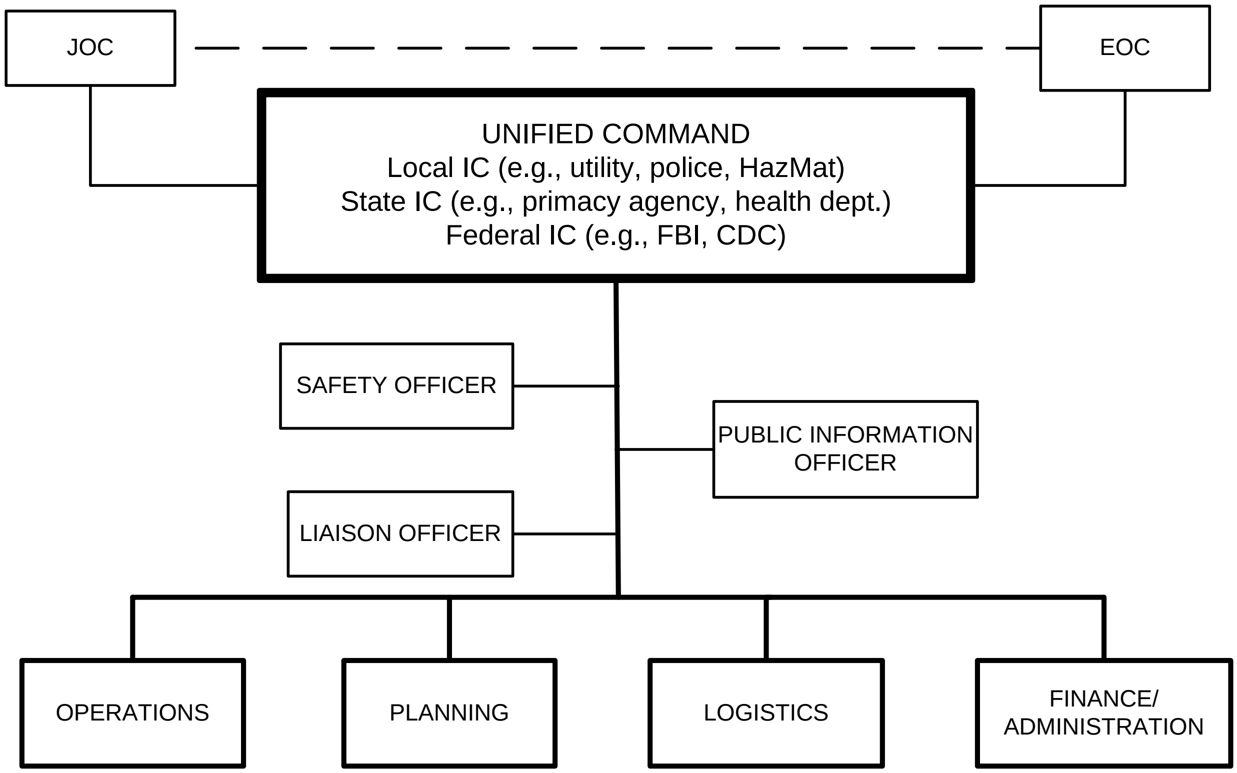

Figure D-2. Unified Command for Multi-agency/Multi-jurisdiction Incident

In addition, Figure D-2 serves to graphically show how an Emergency Operations Center (EOC) and a Joint Operations Center (JOC) may be integrated into the IC/UC structure. An EOC is a pre-designated facility established at the agency, local, county, regional, and State level 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 IC or UC by arranging for needed resources. A JOC is essentially a federal equivalent to the local EOC. Established by the FBI, a JOC would be activated during a bioterrorist or weapons of mass destruction events. FBI agents would join the incident command structure at the local level in order to feed information back to the JOC.

Regardless of whether or not a UC is established, the utility itself should still retain an individual as their IC (unless relieved by a higher authority). Regardless of the organization responsible for incident command, the utility should serve as a technical advisor to the IC or UC for issues related to the operation of the water system and ensuring water quality.

Local, State, Regional, and Federal CMP Partners

Tables D-1 through **D-4** contain information on local, State, regional and Federal response partners that may play a role under a UC. It is important to note that each utility's local and State policies and procedures may require different actions than those described in the examples given below. This characteristic illustrates why it is important to talk with and include local first responders, the local emergency planning committee, and public health and primacy agencies in utility emergency response planning efforts.

Table D-1. CMP Roles and Responsibilities for Local Partners

Local Partner Organizations	CMP Roles and Responsibilities
Local health department	Provide support including consultation and public notification. Serve as conduit to State and Federal health departments and agencies. May have some degree of analytical capability to support sampling and analysis.
Local law enforcement	Provide support through credibility determination and response. May also serve as conduit to state and national law enforcement and intelligence agencies. In addition, clarification and understanding of the police roles in securing a site under investigation should be made so that the utility will have access to take necessary samples needed to determine the type and extent of contamination.
Local civil government (e.g., elected officials, chamber of commerce)	Should be engaged early in the planning for implementation. Also, should an incident occur, the elected officials of different jurisdictions should be appropriately informed of the state of the situation so that they can effectively communicate with their constituencies.
Local emergency planning committees (LEPCs) and emergency management agencies (EMAs)	Primarily support consequence management activities as a conduit to other response partner agencies at the State and Federal level. Can support provision of alternate water supplies, coordination, disaster declaration, and transition to NRF implementation. These groups are made up of industry experts, local emergency planners–including county law enforcement and fire representatives, and other subject matter experts.
Local fire and HazMat	Local fire department and HazMat play a critical role in consequence management, including site characterization activities to support credibility determination. Coordination with the local or volunteer fire units is necessary if water service in a specific response area should be shut down. The fire department can notify affected neighborhoods and can distribute alternate water supplies.
Local wastewater utility	May provide analytical support for routine sampling and analysis. Should be consulted in the development and implementation of CMPs due to the potential impact of contamination on wastewater operations. Also important for remediation and recovery because residuals or contaminated water could end up in the collection system.
Citizen Corps	FEMA-sponsored Community Emergency Response Team training groups can be especially useful during the first hours of a disaster. They can be used as a first line of defense until the main response team is operational. They can be used to alert local citizens of the contamination incident, help guide traffic, assist with triaging medical casualties, and provide manpower for most activities necessary to assist in the response.
Corporate industries	May provide assistance and resources during an incident. This can include equipment and food resources (e.g., water, ice).
Neighboring utilities	May provide support in the event of a contamination incident through mutual aid and assistance. Assists with provision of alternate water supplies, remediation, and recovery activities.
Local railroad representatives	Can inform local utilities of common shipments which, if derailed, could impact water management resources. Railroads often have chemical spill experts and HazMat teams that can assist.
Nuclear plant representatives	These industries are required to have extensive response plans. Coordination with these partners is essential in preparing for these types of incidents. Nuclear mitigation and response plans will indicate which water utilities are within a probable impact area.
Poison Control Centers	Provide emergency poison management information to the utility, residents and their health care providers.

Local Partner Organizations	CMP Roles and Responsibilities
Red Cross	May support emergency response crews/firefighters by providing food and drink. May also provide temporary assistance to those families which are displaced as a result of the disaster/incident. Assistance includes vouchers for lodging, food, and clothing, or provision of a community shelter if local resources are not available. They also have mental health service representatives that can assist first responders and displaced families.
Hospitals and clinics	Hospitals and clinics may have specific information concerning the source of a potential contamination outbreak and whether it is water-related.
Tribal officials	Tribal officials whose reservation may be served by the water utility follow their own governmental rules. Access to tribal sites will require permission from the designated tribal representative(s).
Media	Local media organizations may serve as a valuable resource in communicating messages to the public in the event a contamination incident occurs.

Table D-2. CMP Roles and Responsibilities for State Partner Organizations

State Partner Organizations	CMP Roles and Responsibilities
Drinking water and wastewater primacy agencies	Primacy agencies can be public health agencies as well as separate State or local environmental agencies, such as State or regional water quality boards. If contamination does occur, there may be regulatory ramifications related to use of contaminated water, public notification, environmental concerns for discharged water, quality of alternative supplies, and other issues. Additionally, the primacy agency, along with EPA, should be consulted on any potential remediation and recovery plan.
Environmental and public health laboratories	Provide analytical support during consequence management to assist in credibility determination as well as response and remediation efforts. State public health laboratories provide access to CDC's Laboratory Response Network.
State government	May have a role in establishing formal agreements with State partners or coordinating funding resources. Should be informed and engaged once contamination has been confirmed to assist in coordination of resources and communication.
State emergency responders	Provide support if a contamination incident is confirmed. Should be engaged in consequence management planning to ensure efficient transition in the event a contamination incident escalates. State Emergency Response Commissions (SERCs) can be identified by contacting Emergency Planning and Community Right-to-Know Act (EPCRA) hotline at 800-535-0202. LEPCs report up to the SERCs.
State emergency management and homeland security agencies	Provide support if a contamination incident is confirmed. Should be engaged in consequence management planning to ensure efficient transition in the event a contamination incident escalates.
State law enforcement	Provide support if a contamination incident is confirmed. Should be engaged in consequence management planning to ensure efficient transition in the event a contamination incident escalates.
State Department of Health	Can assist in tracking data to determine if there is a public health incident. They can also provide preparedness actions by alerting health care providers of potential contamination incidents and appropriate treatment methods.
State environmental representative	The State environmental representative is sometimes located in the public health department and sometimes located within the engineering department. Can assist in providing guidance on engineering devices which could be used in cleanup as well as monitoring wells/devices which can be used to determine the extent of contamination.
Local National Guard units	Could provide assistance in cordoning off quarantined or contaminated areas and may be a key player in alternate water supply acquisition and distribution.

Table D-3. CMP Roles and Responsibilities for Regional Partner Organizations

Regional Partner Organizations	CMP Roles and Responsibilities
Regional Response Teams (RRTs)	There are 13 RRTs that are spread out over the U.S. RRTs are made up of representatives from Federal agencies which make up the National Response Team (NRT). RRTs work with local and State officials along with an On-Scene Coordinator (OSC). RRTs have responsibilities for response, planning, training, and coordination associated with chemical releases or oil spills. When resources are limited, RRTs can request assistance from Federal or State entities to provide sufficient resources when responding to an incident.
EPA On-Scene Coordinator (OSC)	Usually from EPA Superfund, provides direction, guidance and support during response activities.
EPA Regional offices and/or laboratories	May assist in coordination of federal resources (including EPA response resources), provide technical assistance, and provide analytical surge capacity during phases of consequence management.
Homeland security representatives and workgroups	These representatives are essential and should be included in CMP procedures. By establishing two-way communication and coordination with these groups, they might be able to support the determination of, and response to an intentional event.

Table D-4. CMP Roles and Responsibilities for Federal Partner Organizations

Federal and National Partner Organizations	CMP Roles and Responsibilities
Agency for Toxic Substance and Disease Registry (ATSDR)	Responds to incidents where toxic and hazardous substances were released which might impact public health. They can be activated by calling the CDC Director's EOC at 770-488-7100 and asking for the on-call ATSDR Emergency Response representative.
Centers for Disease Control and Prevention (CDC)	Provide oversight to the Laboratory Response Network, a network of public health laboratories with the ability to analyze for select agents based on established analytical protocols. Ensure member laboratories have appropriate training, equipment, reagents, and resources. Provide technical consultation during credibility determination and other phases of consequence management.
EPA Criminal Investigation Division (CID)	Provide support if a contamination incident is confirmed. Should be engaged in consequence management planning to ensure efficient transition in the event a contamination incident escalates.
EPA Environmental Response Team (ERT)	Provide support if a contamination incident is confirmed. Should be engaged in consequence management planning to ensure efficient transition in the event a contamination incident escalates. EPA ERT can provide assistance and technical guidance during response and can assist in evaluating threats to human health. The team can also assist in providing technical bulletins, fact sheets, SOPs, and analytical method development/evaluation.
EPA National Decontamination Team (NDT)	Along with EPA National Response Team and the OSC, the National Decontamination Team provides support and guidance in remediation and recovery activities.
Federal Bureau of Investigation (FBI)	May assist in site characterization and/or CMP development. Establishing a relationship with local FBI agents early in the implementation process is critical due to the need to establish and understand roles and responsibilities in the event contamination occurs.
Federal Emergency Management Agency (FEMA)	Can assist with provision of resources during a man-made or natural disaster.
National Response Center (NRC)	NRC is the 24/7 response center which is manned by the U.S. Coast Guard. It is where releases or spills should be reported. The main NRC hotline is 800-424-8802. NRC can notify other agencies of the incident and can assist with technical support in response to the situation. Although NRC is not a true partner to be involved in the CMP process, it is a valuable resource.

Appendix E: References and Tools

The following is a list of references and Internet links that may be useful in preparing a CMP.

Response Plan Guidance Documents, Publications, and On-line Tools

- **Agency for Toxic Substances and Disease Registry (ATSDR)**: ATSDR provides useful information for substances not found in the EPA WCIT. http://www.atsdr.cdc.gov/
- **American Water Works Association (AWWA)**: EPA training developed through partnership with AWWA covers security issues, including assessing vulnerabilities, emergency response plans and risk communication. AWWA information can be accessed at the AWWA Web site, http://www.awwa.org.
    - Specific AWWA resources can be found at: http://www.awwa.org/Resources/Content.cfm?ItemNumber=29824&navItemNumber=29837
    - Additional information on mutual aid and assistance networks in the water sector can be found at: http://www.nationalwarn.org
- **U.S. Army Corps of Engineers (USACE)**: USACE has typically been assigned by FEMA to provide commodities such as bottled water and packaged ice (in the aftermath of disasters) to State and local governments for distribution to victims. The distribution of these items to the public is a local responsibility in coordination with the State, and is a labor-intensive operation. For information on distribution methods go to: http://www.usace.army.mil/publications/eng-regs/er500-1-1/entire.pdf
- **The Association of State Drinking Water Administrators (ASDWA)**: ASDWA has information on water security planning, training, and links to state programs and other information sources. Go to the security link at http://www.asdwa.org.
- **U.S. Department of Labor Occupational Safety & Health Administration (OSHA)**: Information concerning developing Health and Safety Plans (HASPs) can be found on the OSHA website. Go to: http://www.osha.gov/dep/etools/ehasp/index.html for an electronic expert system jointly developed by EPA and OSHA.
- **U.S. Environmental Protection Agency (EPA)**: EPA has numerous resources available in addition to this guidance. The following are key sources:
    - Compendium of Environmental Testing Laboratories: A network of laboratories which provides emergency responders with an efficient mechanism to obtain essential laboratory capability and capacity information during emergency situations (registration required): https://cfint.rtpnc.epa.gov/cetl/lblogin.cfm?action=None&CFID=368552&CFTOKEN=679004652&jsessionid=ba3028ce85e96511236cTR
    - Drinking Water Health Advisories: For more information on Drinking Water MCLs and associated health advisories go to: http://www.epa.gov/waterscience/criteria/drinking/
    - Large Water System Emergency Response Plan Outline: Guidance to assist community water systems in complying with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, available at: http://www.epa.gov/safewater/watersecurity/pubs/erp-long-outline.pdf

- Emergency Response Plan Guidance for Small and Medium Community Water Systems: Document published by EPA for use by community water systems serving a population between 3,301 and 99,999 as they develop or revise emergency response plans. The document should be of considerable value to key authorities with critical roles during emergency response or remediation actions resulting from a drinking water contamination threat or incident. This document is available at: http://www.epa.gov/safewater/watersecurity/pubs/small_medium_ERP_guidance040704.pdf
- Response Protocol Toolbox (RPTB): Planning for and Responding to Drinking Water Contamination Threats and Incidents: The RPTB is composed of six interrelated modules that focus on different aspects of planning a response to contamination threats and incidents:
  - Overview (EPA-817-D-03-007), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_overview.pdf
  - Water Utility Planning Guide - Module 1 (EPA-817-D-03-001), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module1.pdf
  - Contamination Threat Management Guide - Module 2 (EPA-817-D-03-002), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module2.pdf
  - Site Characterization and Sampling Guide - Module 3 (EPA-817-D-03-003), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module3.pdf
  - Analytical Guide - Module 4 (EPA-817-D-03-004), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module4.pdf
  - Public Health Response Guide - Module 5 (EPA-817-D-03-005), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module5.pdf
  - Remediation and Recovery Guide - Module 6 (EPA-817-D-03-006), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module6.pdf
- Response Protocol Toolbox – Response Guidelines: An action oriented document to assist drinking water utilities, laboratories, emergency responders, state drinking water programs, technical assistance providers, and public health and law enforcement officials during the management of an ongoing contamination threat or incident. This document can be found at: http://www.epa.gov/safewater/watersecurity/pubs/rptb_response_guidelines.pdf
- Water Contaminant Information Tool (WCIT): A secure, on-line database that provides information on chemical, biological, and radiological contaminants of concern for water security. Also can be used as a resource for contaminant-specific detailed information on the effectiveness of treatment methods for drinking water and wastewater. This can be found at: http://www.epa.gov/wcit

Risk Communication Resources

- **California Department of Health Services and the Centers for Disease Control and Prevention (CDC)**:

- Crisis and Emergency Risk Communication Toolkit: Provides water systems the essential resource materials to assist in effectively managing and communicating during an emergency or crisis. This can be found at: http://www.dhs.ca.gov/ps/ddwem/Homeland/PDFs/CERCtoolkit.pdf

- **U.S. Environmental Protection Agency (EPA)**: EPA has numerous resources available on PN and risk communication. The following are key sources:
  - Code of Federal Regulations for the Public Notification Rule (July 1, 2007 Edition): 40 CFR Part 141, Subpart Q (141.201-141.211). This can be found at: http://www.access.gpo.gov/nara/cfr/waisidx_07/40cfr141_07.html
  - Revised Public Notification Handbook: This guide was developed for community water systems and non-transient non-community water systems. It provides instructions and includes templates that can be used for various types of public notices (EPA 816-R-07-003, March 2007). This can be found at: http://www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotification_pnhandbook.pdf
  - Public Notification Handbook for Transient Non-community Water Systems: This guide was developed for transient non-community water systems. It provides instructions and includes templates that can be used for various types of public notices (EPA 816-R-07-004, March 2007). This can be found at: http://www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotification_pnhandbook_tncws.pdf
  - PNiWriter: EPA released this web-based program to help public water systems comply with the public notification requirements of the Safe Drinking Water Act. The PNiWriter provides a fast, user-friendly format for creating public notices that meet all Federal requirements. After users log in they will see a series of questions about the violation or situation requiring public notice. After answering questions and filling in blanks they will be able to print or download the public notice, an instruction sheet, and public notice certification. The program is free and can be accessed at http://www.pniwriter.org. Users may also access the program from the EPA web site at: http://www.epa.gov/safewater/publicnotification/compliancehelp.html
  - EPA Effective Risk and Crisis Communication during Water Security Emergencies Report (EPA/600/R-07/027): This document includes sample messages for the following scenarios: biological contamination, physical attack, receipt of a credible threat, power loss, pesticide contamination, and chemical warfare agent contamination. The document can be found at: http://www.epa.gov/NHSRC/pubs/600r07027.pdf
  - For another overview of message mapping, refer to EPA Research Highlights on Risk Management Research (http://www.epa.gov/nrmrl/news/news012006.html). This link includes information on a new EPA workbook that is under development: “Risk Communication in Action: Tools of Message Mapping.”
  - Response Protocol Toolbox (RPTB): Planning for and Responding to Drinking Water Contamination Threats and Incidents. Public Health Response Guide - Module 5 (EPA-817-D-03-005), available at: http://www.epa.gov/safewater/watersecurity/pubs/guide_response_module5.pdf

- **World Health Organization**:
  - Effective Media Communication during Public Health Emergencies: A WHO Handbook: This handbook describes a seven-step process to assist public health officials and others

to communicate effectively through the media during emergencies. This can be found at: www.who.int/csr/resources/publications/WHO_CDS_2005_31/en/

Information Management Resources

- **U.S. Department of Justice (DOJ)**: Crisis Information Management Software (CIMS) may be useful, especially when interfaced with a central data repository and/or electronic data management system. A description and comparison of several commercial CIMS packages has been prepared by the DOJ, http://www.ncjrs.org/pdffiles1/nij/197065.pdf
- **U.S. Environmental Protection Agency (EPA)**: A Field Operations and Records Management System (FORMS), originally developed for EPA's Contract Laboratory Program, may help manage records relevant to sample documentation, analysis, and tracking during evaluation of water threats. Can be accessed at: http://www.epa.gov/superfund/programs/clp/f2lite.htm

Training Resources

- **Federal Emergency Management Agency (FEMA)**:
  - FEMA offers support and guidance in preparedness and planning. In addition, the FEMA Emergency Management Training Institute offers on-line training for the NIMS/ICS courses described in Section 5.0 of this document. This can be found at: http://www.fema.gov/emergency/nims/nims_training.shtm
  - FEMA Exercise Design Training:
    - IS 120: An Orientation to Community Disaster Exercises- http://training.fema.gov/EMIWeb/IS/is120.asp
    - IS 139: Exercise Design - http://training.fema.gov/EMIWeb/IS/is139.asp
- **U.S. Environmental Protection Agency (EPA)**:
  - Emergency Response Tabletop CD-ROM Exercise for Drinking Water and Wastewater Systems: The CD-based tool 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 its emergency response team (e.g., health officials, laboratories, fire, police, emergency medical services, and local, State, and Federal officials). Users can adapt the materials for their own needs. The exercises also allow water suppliers to test their Emergency Response Plans before an actual incident occurs. This can be found at: http://www.epa.gov/safewater/watersecurity/tools/trainingcd/.
  - **U.S. Department of Homeland Security (DHS)**: Extensive details for the development of all types of exercises can be found at the Department of Homeland Security Web site, https://hseep.dhs.gov/.