Contaminant Risk Management Communication Strategy and Tools

PDF Report to Accompany Guide #4001

Subject Area: Management and Customer Relations

Contaminant Risk Management Communication Strategy and Tools

WATER RESEARCH FOUNDATION℠

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The Water Research Foundation (formerly Awwa Research Foundation or AwwaRF) is a member-supported, international, 501(c)3 nonprofit organization that sponsors research to enable water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers.

The Foundation's mission is to advance the science of water to improve the quality of life. To achieve this mission, the Foundation sponsors studies on all aspects of drinking water, including resources, treatment, distribution, and health effects. Funding for research is provided primarily by subscription payments from close to 1,000 water utilities, consulting firms, and manufacturers in North America and abroad. Additional funding comes from collaborative partnerships with other national and international organizations and the U.S. federal government, allowing for resources to be leveraged, expertise to be shared, and broad-based knowledge to be developed and disseminated.

From its headquarters in Denver, Colorado, the Foundation's staff directs and supports the efforts of more than 800 volunteers who serve on the board of trustees and various committees. These volunteers represent many facets of the water industry, and contribute their expertise to select and monitor research studies that benefit the entire drinking water community.

The results of research are disseminated through a number of channels, including reports, the Web site, Webcasts, conferences, and periodicals.

For its subscribers, the Foundation serves as a cooperative program in which water suppliers unite to pool their resources. By applying Foundation research findings, these water suppliers can save substantial costs and stay on the leading edge of drinking water science and technology. Since its inception, the Foundation has supplied the water community with more than $460 million in applied research value.

More information about the Foundation and how to become a subscriber is available on the Web at **www.WaterResearchFoundation.org**.

Contaminant Risk Management Communication Strategy and Tools

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DISCLAIMER

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FOREWORD

The Water Research Foundation (Foundation) is a nonprofit corporation that is dedicated to the implementation of a research effort to help utilities respond to regulatory requirements and traditional high-priority concerns of the industry. The research agenda is developed through a process of consultation with subscribers and drinking water professionals. Under the umbrella of a Strategic Research Plan, the Research Advisory Council prioritizes the suggested projects based upon current and future needs, applicability, and past work; the recommendations are forwarded to the Board of Trustees for final selection. The Foundation also sponsors research projects through the unsolicited proposal process; the Collaborative Research, Research Applications, and Tailored Collaboration programs; and various joint research efforts with organizations such as the U.S. Environmental Protection Agency, the U.S. Bureau of Reclamation, and the Association of California Water Agencies.

This publication is a result of one of these sponsored studies, and it is hoped that its findings will be applied in communities throughout the world. The following report serves not only as a means of communicating the results of the water industry's centralized research program but also as a tool to enlist the further support of the nonmember utilities and individuals.

Projects are managed closely from their inception to the final report by the Foundation's staff and large cadre of volunteers who willingly contribute their time and expertise. The Foundation serves a planning and management function and awards contracts to other institutions such as water utilities, universities, and engineering firms. The funding for this research effort comes primarily from the Subscription Program, through which water utilities subscribe to the research program and make an annual payment proportionate to the volume of water they deliver and consultants and manufacturers subscribe based on their annual billings. The program offers a cost-effective and fair method for funding research in the public interest.

A broad spectrum of water supply issues is addressed by the Foundation's research agenda: resources, treatment and operations, distribution and storage, water quality and analysis, toxicology, economics, and management. The ultimate purpose of the coordinated effort is to assist water suppliers to provide the highest possible quality of water economically and reliably. The true benefits are realized when the results are implemented at the utility level. The Foundation's trustees are pleased to offer this publication as a contribution toward that end.

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Project Advisory Committee:

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India Williams (retired)
Kenan Ozekin (interim)
Shonnie Cline
Susan Turnquist (interim)

EXECUTIVE SUMMARY

OBJECTIVES

The purpose of Project 4001 is to help water utility executives answer this question: "If faced with a water contamination issue, how will I respond?" The stated objectives are:

1. Develop a <u>coordinated risk communication strategy</u> that will guide the industry and individual utilities in developing more consistent and effective contaminant messages that will allow utilities to respond in a credible, expeditious, and effective manner.
2. Provide a resource to utilities that can be immediately used to improve public and local health agency outreach in the form of a <u>set of risk communication tools</u> around 12 priority contaminants of potential concern to water utilities nationwide.
3. <u>Strengthen the working relationship between participating local water utilities and public health entities</u> through project tasks and activities that can help the industry deepen its public health roots and increase the potential for future partnership activities.

METHODS

From a long list of substances and microorganisms that are regulated or potential drinking water contaminants, the following 12 were selected for research by the Project Advisory Committee (PAC), subject matter experts, and partner utilities because they represent different contaminant types, different health risks, perceived risks, pose specific health concerns to sensitive populations, are considered contaminants of emerging concern, and represent different water sources and treatment methods.

Contaminants selected for review were:

- Algal toxins (as a class)
- Atrazine
- *Bacillus anthracis* (representing a class of deliberate contaminants)
- *Cryptosporidium*
- Disinfection byproducts (with NDMA and THMs as examples)
- *Eschericia coli*
- Endocrine disruptors (as a class)
- Lead
- Methyl tertiary butyl ether (MTBE)
- Perchlorate
- Pharmaceuticals (as a class)

The next discovery task, an in-depth literature review, focused on currently available materials on 12 contaminants or contaminant classes. The review also concentrated on risk communication practices in the drinking water industry and other allied fields. The research included interviews with drinking water utility personnel and public health professionals to identify potential partnership opportunities, create new communication tools useful to utilities and public health, and build a general risk communication strategy. Research on the selected contaminants continued throughout the study period. New resources are included in the list of references.

Part of the project called for establishing a relationship with the National Association of County and City Health Officials (NACCHO) to formulate partnership opportunities between public health and the drinking water industry. A workshop with the NACCHO Environmental Health Committee provided insight on how public health professionals view the drinking water industry as a whole and perceptions of individual utilities. Committee members identified successful working relationships as well as challenges they face in teaming with water utilities.

RESULTS

Water Research Foundation Project 4001 *Contaminant Risk Management Communication Strategy and Tools* had an original project schedule of eighteen months. A three-month extension was granted. The original proposed schedule was affected by a number of factors: Project kickoff was held one month later than projected in the original project schedule; an initial literature review was conducted prior to the selection of the 12 contaminants; and the PAC requested review of sample tools prior to the development of all the tools. In addition, the research team worked with four different project managers in 18 months. Nonetheless, the project has been completed within the amended schedule approved by management.

The main outcomes of Project 4001 are tested approaches that drinking water utilities can use to talk about and educate the public on contamination and the possible risk to public health. The final project deliverable, a non-standard report called *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants* and an accompanying CD-ROM, provides drinking water utilities with research-based strategies and tested tools to help them communicate with their customers, elected officials, community, and the media about drinking water contamination. It covers both the risks and reality of such an incident.

Key findings from discovery tasks were:

- Currently available fact sheets and communication materials fail to target important segments of the population. Although children under five, the elderly, pregnant women, and immunocompromised persons have the greatest health risk from exposure to the prioritized contaminants, fact sheets did not address specific risks for these populations.
- Most materials are only available in English, creating a communication barrier for non-English speaking populations. Public health professionals need utilities to provide materials translated into languages prevalent in the community.
- While hundreds of fact sheets about the priority contaminants are available, few are comprehensive. Most water utility fact sheets offer basic information about the contaminants, are more technical than practical, and refer those who want to know more to other sources, such as a utility’s consumer confidence report.
- Fact sheets often contain scientific jargon that might prove too complicated for the public to understand.
- Customer service representatives are typically not made available to answer questions pertaining to the specific contaminants.

- Most of the communication materials come from national and state public health agencies, rather than from the water industry and local utilities.
- Available information indicated that the health effects of several of the priority contaminants are unknown at this time.
- Limited documentation is available about successful communication strategies involving the selected priority contaminants.
- Although the water industry has many examples of communication strategies and tools, there were no step-by-step processes for distribution and implementation of the tools or risk communication processes for water contamination events.
- Review of overall risk communication procedures developed by AWWA, Water Research Foundation, and other related industries revealed that they agree on several essential steps to develop a successful emergency risk communication process strategy, including:
  - Build and maintain relationships with the stakeholders and other agencies within the community;
  - Prepare and organize prior to an emergency situation;
  - Identify staff roles and responsibilities that will be operational during a crisis;
  - Locate vulnerable populations within the community and address their specific communication needs prior to an emergency situation;
  - Create communication templates that can be easily transferred among multiple scenarios;
  - Develop alternative plans for message dissemination in case traditional methods are unavailable; and
  - Work closely with the media during an emergency situation.

The risk communication guidelines and tools developed for this project were beta tested by the research team among partner utilities, public health professionals near the partner utility communities, pregnant women, parents of young children, individuals who are limited English proficient (LEP), elderly or immunocompromised, and the media. The findings from these tests indicated:

- Water utility representatives and public health/medical practitioners found the materials met their needs and were useful to them.
- Fact sheets and public notifications offered helpful information but need to have more colorful, bolder graphic elements to attract attention.
- Fact sheets, public notices, and media releases need fewer words and simpler language.
- Medical practitioners and other clinical healthcare providers receive information about drinking water contamination from public health resources rather than directly from utilities.
- Seemingly familiar terms, such as “tap water,” are unclear to certain groups of people.
- Water utilities should include their logo on all materials so the public can easily identify whom the materials are from.
- Fact sheets and public notices should include more information on water use.
- LEP populations need materials to be translated.

- News releases need to be in bulleted format for radio and television outlets.
- News releases need to be shorter and offer information related to dangers, actions to take, and where to find more information.
- Having the guidelines and tools in one document was helpful to water utility professionals.
- The guidelines and tools were complementary to utility emergency response planning.
- Public health professionals judged the tools suitable for their use.

The report, *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants*, is a coordinated, step-by-step risk communication strategy that addresses routine, emerging, and crisis situations. These guidelines include tools for 12 priority contaminants that can be used immediately to improve outreach to customers, media, and the local public health community. The guidelines and tools put drinking water into an overall risk context and identify potential mitigation measures consumers can take to protect themselves and those who count on them.

The guidelines and tools use 12 key contaminants or contaminant classes as content but build implementation activities that can be customized to best serve a water utility's needs regardless of size, geographic location, disinfection system, or customer groups who could be affected by contaminants. The guidelines and tools will be useful to any drinking water utility, but particularly to those that do not have dedicated professional communication staff.

In addition, the project team established a working relationship with NACCHO to develop health risk communication elements in the tools. The scope and budget of this project limited the potential for comprehensive partnership building, but the NACCHO Environmental Health Committee members identified long-term partnership opportunities around such issues as emergency response preparedness and the impact of pharmaceutical disposal on drinking water.

CHAPTER 1: INTRODUCTION AND BACKGROUND

OVERVIEW

Drinking water utility executives and managers face a complex array of challenges to maintain safe and sufficient supplies of drinking water to serve the daily needs of their communities. They are the most fundamental guardians of public health. Yet, many utilities struggle with how best to let their communities – their customers, elected officials, media, and the general public – know about issues that can affect the public's health, such as the safety, taste, appearance, and delivery of drinking water. The greatest challenge of all is being able to answer the question: "Is my water safe to drink?"

The nuances of answering that basic question require a great deal of thought and careful consideration of both the technically correct information *and* the environment in which the answer will be received. Unfortunately for many water utilities, the answers to basic questions belie the underlying complexity and tradeoffs of water treatment. Water utilities take years to optimize their treatment processes to stay within regulatory compliance and to provide reliable water supplies. The industry's increasing ability to detect infinitesimally smaller and smaller concentrations of chemicals in finished water supplies can challenge the public's perception of what makes drinking water safe. Add to this the complexity that utilities may produce water safe for most of its customers but still pose a risk for certain populations, and the result is that utility managers have a difficult and frustrating context for talking about risk.

Drinking water utility customers are demanding more, better, and timelier water quality information. The upside of this trend is that better informed customers generally have fewer complaints and are more willing to support a utility's programs, operations, and even rate increases (Tatham et al. 2004). The downside of the trend is that many water utilities – particularly mid-size and small ones – are significantly ill equipped to provide consistent and effective communication to their customers. Without a proactive communication strategy in place, drinking water utilities can be left unprepared, vulnerable to loss of reputation and public support and with few workable options to manage the information given to the public about contamination of the community's water supplies before, during, and after an incident. Customers and other stakeholders, including the media, will no longer accept reactive responses to contamination incidents – whether they are real events or perceived risks.

To counter inaccurate perceptions and the news media's reporting, drinking water utilities must become more proactive in providing accurate information to the public about water quality and the aquatic environment.

OBJECTIVES

1. Develop a <u>coordinated risk communication strategy</u> that will guide the industry and individual utilities in developing more consistent and effective contaminant messages that will allow utilities to respond in a credible, expeditious, and effective manner.
2. Provide a resource to utilities that can be immediately used to improve public and local health agency outreach in the form of a <u>set of risk communication tools</u> around 12 priority contaminants of potential concern to water utilities nationwide.

3. Strengthen the working relationship between participating local water utilities and public health entities through project tasks and activities that can help the industry deepen its public health roots and increase the potential for future partnership activities.

The following 12 contaminants or contaminant classes were selected for research by the Project Advisory Committee (PAC) and partner utilities because they met the criteria spelled out in Project 4001 request for proposal (RFP) and other specific criteria developed by the PAC, such as representing different types of risks and specific health concerns.

- Algal toxins (as a class)
- Atrazine
- *B. anthracis* (representing class of deliberate contaminants)
- *Cryptosporidium*
- Disinfection byproducts (with NDMA and THMs as examples)
- *E. coli*
- Endocrine disruptors (as a class)
- Lead
- Methyl tertiary butyl ether (MTBE)
- Perchlorate
- Pharmaceuticals (as a class)

The outcome of the research is the *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants,* a coordinated, step-by-step risk communication strategy that addresses routine, emerging, and crisis situations. These guidelines on risk and crisis communication, in addition to the accompanying CD-ROM, include tools for 12 priority contaminants that can be used immediately to improve outreach to customers, media, and the local public health community. The guidelines and tools put drinking water into an overall risk context and identify potential mitigation measures consumers can take to protect themselves and those who count on them.

The project scope also called for establishing a relationship with a nationally recognized public health organization to develop health risk communication elements in the tools and to formulate partnership opportunities between public health and the drinking water industry. The project team established a working relationship with NACCHO. The scope and budget of this project limited the potential for comprehensive partnership building, but the NACCHO Environmental Health Committee members identified long-term partnership opportunities around issues such as emergency response preparedness and the impact of pharmaceutical disposal on drinking water.

Throughout the development of the guidelines and tools, the research team gathered input from water utility executives and communication managers; public health professionals at local, state, and national levels; and target audiences about the content and format that would be most useful. The team incorporated these recommendations into the draft *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants.*

CHAPTER 2: REVIEW OF CURRENT DRINKING WATER CONTAMINATION INFORMATION

OVERVIEW

The Water Research Foundation Project 4001 kickoff meeting Feb. 9-10, 2007, in Kansas City, Mo., started the technical review of the selected priority contaminants included in the study. At this meeting the project team, Project Director India Williams, and PAC members Jeanne Bailey, Sue Pennison, and June Weintraub reviewed the project objectives and began the process of selecting 10 to 15 priority contaminants for further study. The PAC members established a set of criteria to be used in selecting the priority contaminants for further study. The project team with the input from the PAC conducted a broad literature review of drinking water contaminants and developed a comprehensive list of potential contaminants that met these criteria. From this list, 12 priority contaminants were selected.

The next discovery task was a narrower literature review focused on 12 contaminants or classes of contaminants selected by the PAC, Water Research Foundation staff, and partner utilities. The review also concentrated on risk communication practices in the drinking water industry and other allied fields.

The research process included analysis of information about effective risk communication tools as well as facts and data about contaminants, their threat to human health, and techniques for protecting health and removing the contaminant from the drinking water supply. Examples of exemplary risk communication practices and types of information and data the PAC described as useful in a fact sheet or other outreach efforts were helpful in developing risk communication tools. The in-depth review of currently available literature revealed an abundance of materials on the 12 contaminants. Few, however, met all the criteria prescribed by the PAC:

- Written in plain language
- Contains a pronunciation guide
- Describes contaminants
- Explains how contaminants are used
- Defines where the contaminants come from
- Describes how the contaminants are removed from the drinking water
- Has definite, clear action steps
- Describes effects on human health
- Contains resources for water utility communicators, media, and other interested persons to learn more

LITERATURE REVIEW

Methodology

The Water Research Foundation 4001 (RFP) established criteria to be followed in selecting 10 to 15 priority contaminants for the project. The list will address a combination of health risk (acute, chronic, or sub-chronic, and sensitive population) and contaminant types (inorganic, organic, emerging, and weapons of mass destruction). The contaminant (sensitive subpopulation or health risk) list will include: lead (children), disinfection byproducts (DBPs - cancer and reproductive/development), endocrine disruptors, and select deliberate contaminants. The contaminant list should also consider other contaminants of emerging concern such as those on the Contaminant Candidate List #1 or Unregulated Contaminant Monitoring Rule (UCMR) #2, e.g., perchlorate. The list must address traditional (surface and groundwater) and consider non-traditional (seawater desalination or reclaimed) sources.

The PAC discussed specific criteria that should be used to determine whether a contaminant should be chosen for the priority list. These criteria include:

1. Is it a contaminant that people know and fear, e.g., arsenic?
2. What are the effects on human health at different doses?
3. What are the risks to sensitive populations, e.g., very young or very old?
4. Is it adequately addressed elsewhere (USEPA, Centers for Disease Control and Prevention [CDC], AWWA) in a form that is user friendly or does it need to be put into a new, consistent format?
5. Could it possibly be used in a terror attack?
6. Can current treatment processes remove it?
7. What is the source of the contamination – surface or groundwater?

The PAC also requested additional factors to be used in selecting contaminants for the priority listing, including:

1. What percent of the population is affected?
2. What amount of coverage is in the press?
3. How common is the contaminant?
4. How inordinately feared (versus the actual risk) is the contaminant? Research needs to determine how to evaluate fear versus risk.
5. Are they contaminants of emerging concern, meaning that they do not yet have standards and/or are not tested for or treated in the water supply?

Finally, it was determined that general classes of contaminants should be considered rather than a single contaminant, such as classes of compounds that make up trihalomethanes.

Contaminant Selection

Subject matter experts on the research team took the list of potential contaminants and classes of contaminants identified at the kickoff meeting and added additional contaminants based on professional experience and broad literature review. Other members of the research team relied primarily on available CDC and public information available from the USEPA to determine potential deliberate contaminants. The USEPA Contaminant Candidate and UCMR lists were also reviewed for potential priority contaminants. The list was supplemented with suggestions from Water Research Foundation Project 4001 Water Utility Partners, who were asked to identify contaminants they would consider national and local priorities for study. Finally, the list was further supplemented based on recent media coverage of contaminant incidents in the United States.

The research team compiled a list, including some classes of contaminants, in a single spreadsheet format. Based on the research team's technical literature search and existing technical knowledge, the contaminants were assessed as to their relationship to the PAC guidance, RFP criteria, whether they were identified in the Media Survey, or whether they were considered a priority by the Water Utility Partners. The research team characterized whether a particular contaminant or class of contaminants strongly or weakly met the PAC and RFP criteria, including standard status, type of potential adverse health effects (acute, chronic, and sub-chronic), and type of water source primarily impacted (groundwater, surface water, or both).

The spreadsheet that lists all the potential contaminants for prioritization for project research is attached as Appendix D.

Spreadsheet Instructions

The potential contaminants are listed in the rows grouped by the type of contaminant, such as DPBs, deliberates, gasoline additive, inorganic chemicals, etc. At the end of the listing are compounds from the contaminant candidate list (CCL) and UCMR that are not listed elsewhere. The columns represent the PAC and RFP criteria, media interest, Water Utility Partner recommendations, and research team recommendations for inclusion on the list of priority contaminants for further study. The recommendations are those of the subject matter experts on the team (CH2M HILL staff) and meet all of the PAC and RFP criteria with the exception of a non-traditional water source. The spreadsheet did not weight the contaminants, but rather it served as a tool for reaching a consensus on which contaminants were the best candidates for this study. The columns include:

Column A – Contaminant – Name of contaminant or class of contaminants.

Column B – RFP – Each contaminant specifically cited in the RFP is indicated with the word "Given."

Column C – PAC Criteria: Known – Contaminants that should be readily known and recognized are indicated by a double xx, while those somewhat known are indicated with a single x. Contaminants not well known are blank.

Column D – PAC Criteria: Feared – Contaminants that would be likely to create significant fear are indicated by a double xx, while those somewhat less frightening are indicated with a single x. Contaminants not known to cause public fear are blank. Unknowns would also be blank.

Column E – Health Effects at Low Dosages – This column attempts to assess whether the contaminant is known to pose adverse health risks at the low dosages potentially found in drinking water. Contaminants with strong evidence of such risks are indicated by a double xx and those with lesser certainty are indicated with a single x. Contaminants without known risks or for which such information isn't readily available are blank.

Columns F and G – Sub-Populations: Children/Others – In these columns an x indicates whether a contaminant poses a special risk to either children or other sensitive sub-populations, e.g., the elderly or immunocompromised.

Column H – Addressed Elsewhere – An x in this column indicates that there are likely communication messages either already in place or being developed for the contaminant elsewhere, e.g., CDC advisories on.

Column I – Standard Exists – Indicates whether there is an existing Federal Primary or Secondary Maximum Contaminant Level (MCL), Federal Action Level, Federal Treatment Technique requirement, or State MCLs or guidance.

Column J – Terror Concern – An x indicates that the contaminant has been included in either a CDC or USEPA list of contaminants that could potentially be used in a deliberate attack on a water system.

Column K – Treatable – An x indicates that the contaminant is readily handled by technology regularly used by drinking water systems.

Column L – Source – The type of source water generally impacted by the contaminant is indicated; S for Surface waters, GW for groundwater, and NT for non-traditional sources.

Column M – % Population affected – An xx indicates contaminant has the potential to impact large populations (generally common surface water contaminants); an x indicates contaminant could impact numerous systems and fairly large populations; and a blank indicates the impact of the contaminant is generally limited.

Column N – Media Coverage – An x indicates that the contaminant was listed in Media Survey.

Column O – Common – An x indicates that the contaminant is fairly common in the environment or drinking water – this indicator is similar to Column M, population affected.

Column P – Emerging – An x indicates that the contaminant is emerging in the water industry as a contaminant of concern, e.g., perchlorate.

Column Q – Acute – An xx indicates that the contaminant is known to cause acute health effects.

Column R – Chronic – An xx indicates that the contaminant is known to cause chronic health effects, e.g., cancer.

Column S – Sub-Chronic – An xx indicates that the contaminant is known to cause sub-chronic health effects, e.g., adverse reproductive outcomes.

Column T – Water Utility Suggestion – Indicates how many of the four (4) Water Utility Partners suggested a particular contaminant or class of contaminants for consideration.

Column U – Rec'd – An xx indicates that the subject matter experts on the research team recommended a particular contaminant or class of contaminants for inclusion in the 10 to 15 priority contaminants. The subject matter expert's recommendations cover all of the PAC and RFP criteria, except for the non-traditional source.

Final Selection

Based on the recommendations from the Partner Water Utilities and the research team and an in-depth, technical discussion during a conference call April 24, 2007, with the PAC and the Water Research Foundation Project 4001 project team, the following contaminants and contaminant classes were selected as the "priority" contaminants for this study.

- Algal toxins (as a class)
- Atrazine
- *B. anthracis* (representing a class of deliberate contaminants)
- *Cryptosporidium*
- Disinfection byproducts (with NDMA and THMs as examples)
- *E. coli*
- Endocrine disruptors (as a class; overlap with pharmaceuticals)
- Lead
- Methyl tertiary butyl ether (MTBE)
- Perchlorate
- Pharmaceuticals (as a class; overlap with endocrine disruptors)

Literature Review on Priority Contaminants

The research team conducted an in-depth review of currently available literature on the 12 priority contaminants or contaminant classes identified for research by the Project Advisory Committee (PAC) and partner utilities. The team researched and analyzed materials from periodicals, trade journals, academic research, media articles, scientific journals, Internet sites, and government publications related to the specific 12 contaminants and contaminant classes. The findings were compiled in a literature review report and attached to Water Research Foundation Project 4001's Second Periodic Report, dated August 2007 (attached here as Appendix A). The research team continued to monitor available literature throughout the study period. New resources have been added to the reference list that accompanies this report.

Literature Review Findings

Many things are already known about the 12 priority contaminants and many resources are available to drinking water, public health, emergency management, and other professionals to define a contaminant, its health consequences, and its removal process. The research team has identified the following as significant findings:

- There are commonly identified core components that must be included in a public notification of water contamination (e.g., Tier 1: Public water systems must provide notice within 24 hours in a form and manner reasonably calculated to reach all persons serviced via radio, television, hand delivery, posting, or other state specified methods.)
- Currently available fact sheets on water contaminants often contain scientific jargon that might prove too complicated for the public to understand.
- Available fact sheets and communication materials fail to target important segments of the population. Although children under five, the elderly, pregnant women, and immunocompromised persons have the greatest health risk from exposure to the prioritized contaminants, no fact sheets address specific risks to these groups. Most materials were only available in English, which creates a communication barrier for non-English speaking populations.
- While there are hundreds of fact sheets available about the priority contaminants, few are comprehensive. Most water utility fact sheets offer only basic information about the contaminants, are not comprehendible for low-literacy populations, and refer those who want to know more to other sources, such as a utility's consumer confidence report.
- Much of the communication material comes from national and state public health agencies, rather than from the water industry and local utilities.
- Available information indicated that the health effects of several of the priority contaminants are unknown at this time.

INTERVIEWS

Methodology

A database of 29 potential interview candidates was compiled based on recommendations from members of the project team, public health, and drinking water experts. Of the 14 interviewees, six were from the water industry. They completed the survey by telephone and e-mail. The purpose of the interviews was to capture anecdotal and undocumented expert information important to the basic research. Figure 2.1 illustrates the tiered approach to the research effort.

Sources emphasized the placement of risk communication within the overall context of risk management and the application of risk messages to decisions by the public. The project's partner utilities include:

- City of Durham Department of Water Management, Durham, N.C.
- City of Portland, Oregon, Bureau of Water Works, Portland, Ore.

- Philadelphia Water Department and Water Revenue Bureau, Philadelphia, Pa.
- Water District No. 1 of Johnson County, Lenexa, Kan.
- The Water Works and Sewer Board of the City of Anniston, Anniston, Ala.

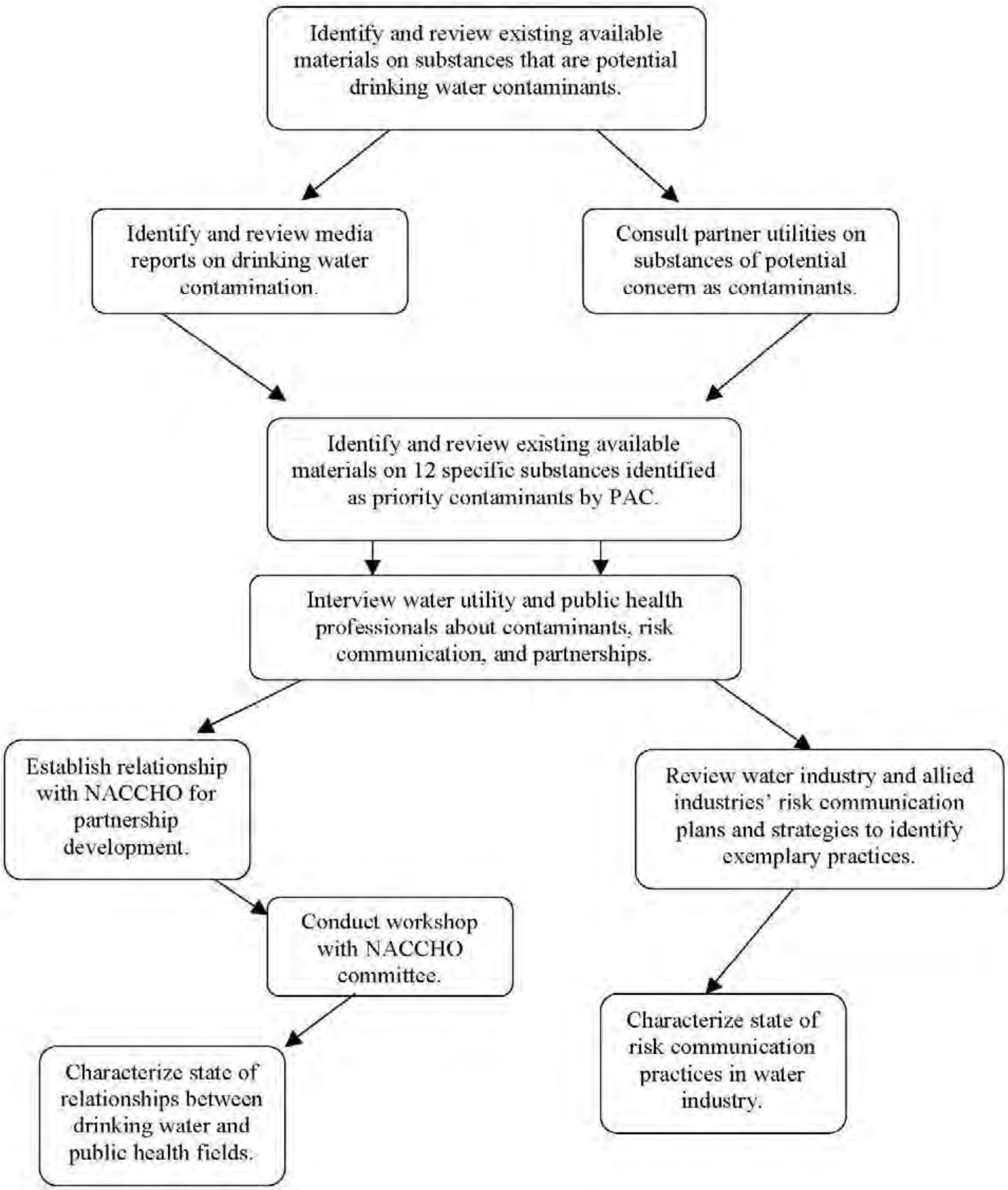

Figure 2.1 Tiered Research Approach

Interview Findings

Water Utility Interviews

Part 1 - Risk communication strategies and tools. The research team selected six interviewees from the water industry to complete the survey by telephone and e-mail. Interviewees were given a list of the 12 priority contaminants and asked to rate their familiarity – very familiar, generally familiar, heard of them, and not at all – on each contaminant (See Figure 2.2). Most respondents were very familiar or generally familiar with all of the contaminants listed. Interviewees reported being most familiar with lead, MTBE, *Cryptosporidium*, and THMs. Most were generally familiar with NDMAs and anthrax. Atrazine and endocrine disruptors were very familiar to only one utility. Perchlorate was the only contaminant that was completely unfamiliar to at least one utility representative.

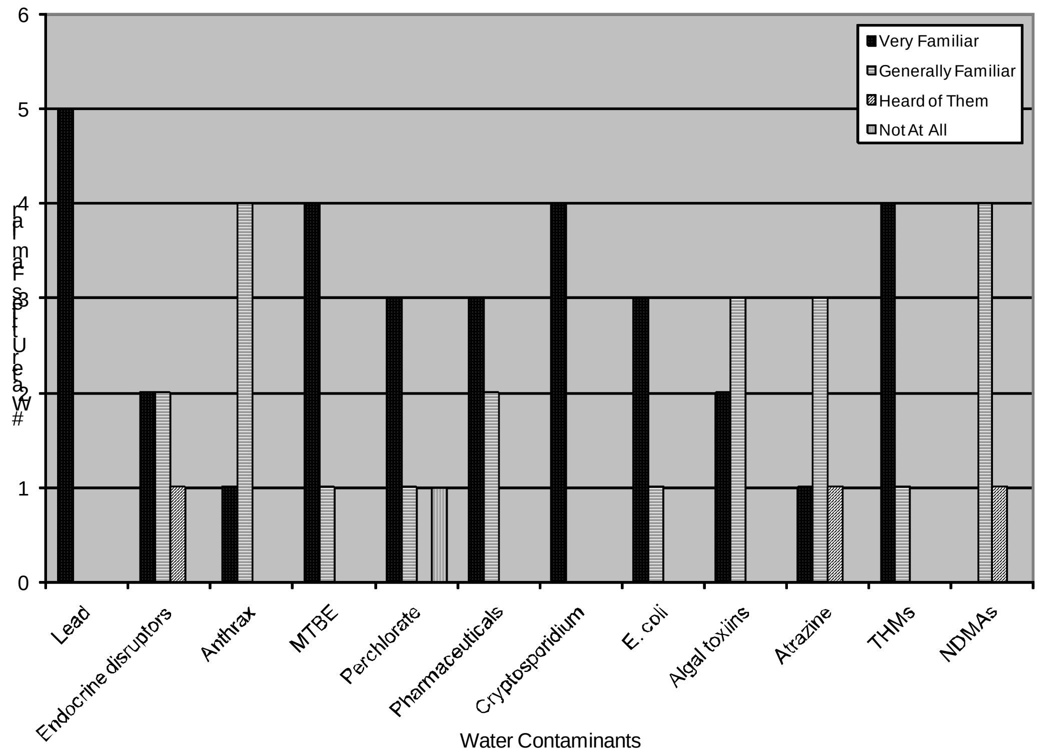

Figure 2.2 Water Industry Contaminant Familiarity

Five of the six utilities interviewed had experienced a contamination event including contaminants such as lead, *Cryptosporidium*, and THMs. Lead was the most predominant, with three of six of the utilities reporting issues with lead in their water. Each utility representative reported having a risk or crisis communication plan, which is used to prepare and respond to a number of different crisis events. These plans include the tools and channels or methods to notify the public (that could be tailored to meet the specific needs warranted by the emergency) of a potential risk or in responding to a crisis. These tools and tactics included:

Print

- Bill stuffers
- Boil water notifications
- Consumer Confidence Reports (CCRs)
- Door hangers

Promotional items

- Magnets

Events

- Community workshops/presentations
- Press conferences

Media

- Media advisories
- Media kits (could include press release, fact sheet, disk with photos, notification/backgrounder)
- Press releases
- Public service announcements (PSAs)

Internet

- Web site/Internet communication

Advertising

- Bus signage
- Newspaper advertisements
- Theater slides

Message Delivery

- Door-to-door delivery
- Direct mail, especially to high-risk populations
- General listserv notifications and other specialized contact lists for nursing care, social service agencies, and churches working with minority/non-English speaking populations
- Protus-fax for desktop service

Water utilities use water quality reports or CCRs as the main form of communication with their customers. Interviewees said CCRs were effective and that customers like and read them. In fact, four of the six water industry representatives interviewed said their primary tool for communicating to customers about each of the project-identified contaminants was the CCR.

For contaminants such as perchlorate and algal toxins, interviewees said they did not have tools for communicating to customers and had limited resources for communicating about anthrax, atrazine, endocrine disruptors, MTBE, and NDMA. The only contaminants about which interviewees communicated regularly were lead, *Cryptosporidium,* and THMs.

Interviewees generally preferred materials that address at-risk populations and are accessible, comprehensive, concise, creatively formatted, flexible, graphically appealing, multi-lingual, readable, and well-written. Issues with materials varied from the level of importance of information to include in a given communication document to including information that is too technical and long. Interviewees said they lacked the staff and funding to keep information updated the way they felt it needed to be due to the constant release of new information.

Materials could be made more useful if they included pre-approved templates and messages that could be customized and ready to use prior to an emergency. Interviewees said many of the materials were too technical and hard for anyone outside the water industry to understand. These would be more useful if they included more basic language written for target audiences, including vulnerable populations, doctors' offices, and the general health sector.

Water utility representatives had a number of ideas for ways to improve current communication practices, but they reported feeling constrained by multiple barriers including:

- Budget restrictions related to printed materials and translation costs
- Challenges of putting risk in perspective
- Lack of resources to focus on an event that may (or may not) happen in the future
- No dedicated communication staff
- Question the credibility of available information/unsure what to believe
- Slow approval process
- Small staff
- Time/resources to sort through the abundance of information available
- Too many decision-making bodies

The water utility representatives recommended tools that could be useful in the water industry. One suggestion was to create posters depicting proper disposal practices for medicines that could be mounted in doctors' offices or pharmacies. Some interviewees reported that an improved relationship with public health could contribute to the development of materials that would be easy to understand and would work in multiple scenarios. All interviewees agreed that materials and messages created and approved for both the water and health industries would be a great asset.

Water utilities must work with a broad range of people including customers, government officials, hospitals, public health agencies, and more. Interviewees were asked to list those groups whom they consider to be their target audience.

Target audiences given included:

- Children six and under, and their parents
- Consumers
- Doctors who prescribe medicine and doctors/pharmacists who direct disposal of medication
- General public
- Healthcare provider community

- Media
- People with limited English proficiency
- Policy-makers
- Pregnant women
- Rate payers
- Subcategories of the public who may be sensitive to contaminants

Because of the barriers listed above, most interviewees reported having difficulty creating materials to target individual audiences. However, some had created materials or developed strategies for message dissemination that could reach people with limited English proficiency, parents of young children, elderly people, and people whose health would be at risk from a contaminant. To reach those with limited English proficiency, one interviewee reported using software that helped determine the education level or ease of the language used in a particular piece. Other tools or strategies listed included Spanish translation, using the required language for the CCR, following a 100-word-or-less guideline, producing materials in multiple languages, and using large print and Braille. As a means to develop materials specifically targeted to those whose health would be at risk from a contaminant, an interviewee described the use of an advisory board tasked to review materials for vulnerable populations. Other strategies that interviewees cited for reaching parents of young children and people who are elderly were mailings to service providers and community groups (pediatricians, hospices, Meals on Wheels, OBGYNs, schools) that have regular interaction with these populations.

In terms of emergency response planning protocol, interviewees were asked to specify an organization outside the utility that would be notified with crisis messages first. Answers were extremely broad. Four out of six would contact the county level health department or state health officials. Other contacts included state water departments, county elected officials, media, hospitals, USEPA, and law enforcement.

Web sites were a popular method used by water utilities for distributing important messages to multiple audiences. All of the interviewees reported using their utility's Web site to distribute information such as reporting documents (CCR and triennial reports), media materials (press releases), public education materials (brochures, flyers, fact sheets), and risk and crisis communication documents (drought, contaminant, boil water instructions).

Most communication through Web sites, media, print materials, and other methods was considered one-way communication – the utility communicating messages to the public or other audiences. All six of the water industry representatives interviewed reported having two-way communication channels in place. Telephone hotlines and customer service departments are the main tools and strategies used to interact with the public. All interviewees reported having some sort of dedicated telephone line and customer service department to work with customers. Other two-way communication channels reported by water utilities were special telephone hotlines with trained customer service representatives, 24-hour customer service lines and departments, and interactive Web-based message boards that utility personnel monitor. (Message boards, also known as discussion boards, can function as electronic public forums for e-mail, Internet chat forums, and document sharing. If a utility posts a discussion board, personnel must be assigned to respond to comments and discuss issues with the public.)

Part 2 – Communication and relationship building with public health. Public health representatives seemed to be aware of the public health impact of drinking water and contamination. However, some interview responses showed limited interactions with the local drinking water utility or the drinking water industry.

Four water utility interviewees reported having a strong relationship with public health, while two reported their relationship as casual with occasional contact. Those reporting a strong relationship participated in regularly scheduled meetings and emergency planning activities with representatives from their local and state health departments. One interviewee recommended that with more money and extra staff, water utilities could have more options to pursue and maintain such relationships.

Interviewees reported common reasons for having contact with public health to be:

- Coordinating public education efforts on lead and other contaminants
- Co-funding opportunities on materials and programs
- Attending regularly scheduled meetings
- Problem-solving
- Providing advice on water issues that affect public health
- Communicating about widespread environmental issues

Four of the six water utility representatives interviewed worked with public health contacts to communicate technical information to the public about the contaminant and the public health risks. Interviewees reported regular coordination with public health, but shared material only some of the time due to lack of consistent agreement on the language that was understandable, credible, and useful. Other barriers to working with public health included:

- Gaps in communication
- Separate governing bodies
- Lack of public health focus on water issues
- No documented process/structure for communication
- Need for mutual respect between industries (water and public health professionals)
- Resources (staff, money, time)

Frequent contact was a common requirement to achieving success in developing and maintaining a relationship between water utilities and public health agencies. Four of six water utility representatives who reported meeting regularly with public health tended to be larger utilities who had a structured communication plan or process in place. Previous research (Mobley et al. 2006) showed that many utilities had little to no dedicated communication staff, which made time and funding a sizeable barrier to creating an effective relationship with public health.

Health Services Interviews

Interviews with public health professionals and others in the health field revealed important information about effective communication practices surrounding water contaminants and those that needed revision. Lead, *Cryptosporidium*, and *E. coli* were the most familiar contaminants to interviewees and those for which interviewees were most likely to have communication practices in place. Interviewees were least likely to have communication materials for endocrine disruptors and NDMA.

Two interviewees transmitted their messages through community-based organizations capable of reaching a wide variety of people, including many different ethnic groups. Most of those interviewed said their communication materials were already, or could quickly and easily be, translated into other languages to serve non-English speaking populations. A majority of interviewees said that though they may post information on their organizations' Web sites, it was not the most effective way to reach their entire population. Therefore, they did not use it as the primary way of communicating with the public in an emergency situation.

Other issues addressed in the interviews were the relationships and communication between interviewees and their counterparts in their local drinking water utility. All interviewees had at least some contact with their water utility; however, most of this contact occurred after a problem arose. A representative from the Midwest was the only interviewee to report barriers in communication with utilities. This interviewee found communicating with smaller, rural utilities to be much more difficult than with those of more substantial size. This representative said work was under way to get water utilities involved in the Kansas Public Health Information Exchange (PHIX), a members-only Web site that notifies health officials and practitioners through a mass e-mail when health issues occur, such as the West Nile Virus (eHealth Initiative 2006).

A representative from a large metropolitan public health department reported regular contact with counterparts at the water utilities. Together they have developed a phone tree that includes home and cell phone numbers of public health utility counterparts to use during a water emergency.

Interviewees agreed it was important to have open lines of communication with their water counterparts to ensure public safety. They need to be able to receive accurate information about water emergencies as soon as it is available from the water utilities. This includes what the contaminant is, how widespread it is, the potential risks to the community, how soon it will be resolved, and other information to determine if a boil water order should be issued. All agreed that phone calls and face-to-face communication were the best ways to transmit this information.

PARTNERSHIP WITH NACCHO

The research team organized and facilitated a workshop with NACCHO's Environmental Health Committee on November 1, 2007, in Washington. The Environmental Health Committee provides oversight on environmental public health issues – drinking water among them – and has agreed to serve as a public health partner in this research effort.

Findings from this workshop related to drinking water and working with utilities included:

- Information given to the public and media about water contamination should come from public health, not from water utilities. Utilities can provide the technical information and public health should issue the advisory.
- There is a difference in cultures. Public health requires maximum disclosure and minimum delay in the timing of disclosure.
- The two industries don't speak the same language. An environmental director is seen as enforcement and prevention. Water engineers are nuts and bolts people who are interested in how to deliver water.

- Knowing the source of the information is critical to public health's confidence in the material. Public health prefers CDC material because it is science-based, published, and peer-reviewed.
- Water is not informed about the public health issues. Water utilities don't have a public health focus. They see public health as enforcement only. Sometimes public health sees itself as only a regulatory agency.
- Misunderstanding about public health/environmental health as a purely regulatory function. Yet, if something affects health, then it is public health's business to fix it.
- Anytime there is a boil water order, public health has to get involved in enforcement in food service and public accommodations.
- Potential exists for conflicting and confusing messages.
- Often, the two sectors don't speak to each other because there is no issue to talk about.
- Water industry people who are out in the field and are required to talk on camera need media training.
- Water utilities sometimes have multiple health directors to deal with.
- When dealing with private water providers, the relationship is different and public health needs to work through/with state officials.
- After Hurricane Isabella (2003) left one community without water, public health professionals there became trained in National Incident Management System (NIMS) after it was establish in 2005. NIMS is a comprehensive, national approach to incident management that allows governments at all levels to prepare for, prevent, respond to, recover from, and mitigate the effects of incidents regardless of cause, size, location, or complexity (Federal Emergency Management Agency [FEMA] 2008).

As the potential for comprehensive partnership building is limited by this project's scope and budget, a portion of the workshop included the identification of long-term partnership potential. All participants agreed that working on an initiative together and allowing a partnership to emerge from the work was more desirable than activities or meetings spent "planning" toward partnership. Committee members proposed two topic areas for which the water and public health industries should begin to develop a proactive and collaborative approach to addressing. The two topic areas were pharmaceutical byproducts as a water contaminant risk and emergency preparedness.

CHAPTER 3: REVIEW OF CURRENT DRINKING WATER RISK COMMUNICATION PRACTICES

INTRODUCTION

The social science of risk and crisis communication is an emerging area of interest for many industries and critical infrastructures, including drinking water. As a result of 9/11, the field of risk and crisis communication has grown rapidly, yet the amount of literature around drinking water utility risk communication is limited.

Water utilities often have some planning element of risk assessment and management in place, but research for a previous project revealed that only 14% of water utility managers surveyed had a formal communication plan that was integrated with other operational plans; more than half of the water utilities in North America operated without a formal communication plan; those with a communication plan admitted that they did not have a template or format to follow when developing it; and more than half of the water utility managers interviewed did not have a full-time staff position dedicated to communication.

For mid-size and small water systems, the lack of any communication plan or staff translates into no coordinated, strategic communication plan to give customers credible, timely information so they can make good decisions (Mobley et al. 2006).

Risk communication can play a key role in preventing or mitigating adverse human health effects related to water contaminant exposure (Agency for Toxic Substances and Disease Registry [ATSDR] 1994). Risk communication is an interactive, two-way process, which means that water utilities must engage stakeholders in their risk communication planning process to gain insight and information about identifying, locating, and reaching individuals, groups, and institutions. Across the board, risk communication experts advise preparing a well thought-out and organized risk communication plan. For drinking water utilities, the process for regulated contaminants includes:

- Educating staff on USEPA and state regulations regarding format and content of each type of notice based on the contaminant and its threat to human health
- Knowing the specific regulations on formatting and wording for these notices
- Identifying the communication methods approved by the USEPA and other methods that will reach vulnerable, special populations
- Identifying the drinking water utility spokesperson who is authorized and prepared to speak on behalf of the organization
- Training other employees on interacting with the media

Risk communication around contaminants of emerging concern is less clear-cut. The science is still developing and the uncertainty around doses and duration of exposure is disconcerting to consumers and the general public. Utilities are challenged to be accurate with what is known about a contaminant yet comfortable with uncertainty about health risks and the accompanying public anxiety. Utilities can expect diverse and contradictory input from consumers and other stakeholders when they are engaged in discussions about contaminants of emerging concern.

LITERATURE REVIEW

The team reviewed utility customer communication research and examples of risk communication strategies from the larger body of knowledge about general risk communication. In addition, the team interviewed drinking water utility partners about existing risk communication processes, how they worked, what could make them more effective, and their working relationships with local public health agencies.

Research delved into multiple sources including AWWA, Water Research Foundation, USEPA, CDC, U.S. Geological Survey (USGS), state, county, and municipal public health departments, medical and scientific journals, and general interest media. The review also included identifying, in literature and interviews, promising practices of risk communication in the energy industry, the military, public health, and transportation. The research team reviewed the growing body of literature about philosophies and techniques in the practice of risk and crisis communication. This study and analysis yielded exemplary risk communication strategies, processes, and tools that can serve as models and templates for project deliverables.

Key Findings included:

1. The field of risk and crisis communication has grown rapidly since 9/11, yet the amount of literature around drinking water risk communication practices is limited. Water utilities are challenged to communicate with consumers, media, and the general public about the risk of drinking water contamination. This is particularly true for contaminants of emerging concern because the science is still evolving.
2. Many of the challenges around risk communication for water utilities exist because decisions about how to respond to risk are grounded in value systems as well as in objective or scientific fact. Water utilities express themselves in terms of scientific and mathematical models. Consumers, on the other hand, think about the credibility of the messenger and their personal anecdotal experiences and information, such as “my cousin said…”.
3. How people weigh risks and benefits and then decide to act in the face of a commonly experienced risk can vary widely. Based on the things they value or find important, people are willing to make trade-offs among risk, safety, and certainty. As a result, communicating about risk must take into account far more than science or technical information. It must account for the credibility of the source, the accuracy of the message, and the legitimacy of the process by which the message content was delivered and perceived by the recipient.
4. Table 3.1 illustrates conditions that affect how people think about risk and how they determine when risks are tolerable. These are often expressed as polarities.

Table 3.1 How People View Risks (Reynolds 2002)

Acceptable	Unacceptable
Voluntary	Involuntary
Personal control	Controlled by others
Familiar	Exotic
Natural	Man-made
Reversible	Permanent
Quantitative	Anecdotal
Endemic (spread over time at a predictable rate)	Epidemic (grouped by time and location)
Fairly distributed	Unfairly distributed (perceived as targeted)
Generated by a trusted institution	Generated by a mistrusted institution
Adults	Children
Benefit understood	Questionable benefit

For a variety of reasons, people often confuse the probability in the scientific or technical sense with causality. A common example is the public's confusion with a meteorological prediction for a 100-year flood. People believe such a flood would happen only every 100 years, rather than the intended 1% probability that such a flood would happen in any given year.

Other findings include:

- Statements about water safety and purity are important to all customers in all regions (Tatham et al. 2004).
- Risk communication is an exchange of information and opinion among the utility, customers, and other stakeholders (including the media, wastewater, and public health agencies) about the "the likelihood of an adverse event and its negative impact" (U.S. Department of Homeland Security [USDHS] 2007).
- Crisis communication is an element of risk communication. It relays the risks and benefits of different actions to agencies, consumers, and other stakeholders during an emergency or disaster.
- Preparation and partnerships are critical to the success or failure of every risk communication strategy.
- Every risk communication plan requires decision-making points that must be carefully considered by professionals and stakeholders.
- Water utilities and their communities must agree to have thoughtful, productive discussions about the most current scientific information, about their different values and perspectives, and how to move forward together in the face of uncertainty. These risk communication discussions lay the foundation for effective emergency risk and crisis communication.
- The field of risk and crisis communication has grown rapidly since 9/11, yet the amount of literature around drinking water risk communication processes, particularly for utilities without a communication plan or dedicated staff, is limited. Water utilities are challenged to communicate with consumers, media, and the general public about the risk of drinking water contamination. This is particularly true for contaminants of emerging concern because the science is still evolving. The USEPA's Office of Research and Development Homeland Security Center recently developed a report, *Effective Risk and Crisis Communication during Water Security Emergencies*. This is

a resource that provides a step-by-step process for message mapping, a pre-event strategy to help water utility managers and executives anticipate and prepare to answer questions from the media and public (Covello et al. 2007). In addition, Awwa Research Foundation Projects 2766 and 2955 provide guidance and tools on communication planning and how to develop a strategic communication plan (Mobley 2005, Mobley 2006).

- When communicating about risk, a utility has legal and regulatory responsibilities; serves as an expert on its own operations and technology; and is also a communicator with a stake in the outcome and therefore may be perceived as biased.
- Review of risk communication procedures developed by AWWA, the Water Research Foundation, and other related industries revealed that they agree on several essential steps to develop a successful emergency communication strategy, including:
  - Build and maintain relationships with the stakeholders and other agencies within the community;
  - Prepare and organize prior to an emergency situation;
  - Identify staff roles and responsibilities that will be operational during a crisis;
  - Locate vulnerable populations within the community and address their specific communication needs in advance of emergencies;
  - Create communication templates that can be easily transferred among multiple scenarios;
  - Develop alternative plans for message dissemination in case traditional methods are unavailable; and
  - Work closely with the media during an emergency situation.

The CDC analyzed strategies and tactics used during the pre-event, response, and post-event stages of Hurricane Katrina to address a range of emergency communication exigencies. Members of the organization identified three difficult challenges for communication specialists: rapid dissemination of health messages; adaptation of health messages for diverse audiences, locations, and circumstances; and phasing of key risk messages during the response phase. This study suggests that emergency communicators need to be prepared in advance with materials and plans, but at the same time be able to adapt procedures, channels, and messages to the dynamic nature of a crisis (Vanderford et. al 2007).

In general, every risk communication strategy has essential elements regarding public participation and advanced preparation. These are well expressed in the USEPA's Seven Cardinal Rules of Risk Communication:

1. Accept and involve the public as a legitimate partner.
2. Plan carefully and evaluate your efforts.
3. Listen to the public's specific concerns.
4. Be honest, frank, and open.
5. Coordinate and collaborate with other credible sources.
6. Meet the needs of the media.
7. Speak clearly and with compassion (Covello and Allan 1988).

CHAPTER 4: DEVELOPMENT OF RISK COMMUNICATION STRATEGY GUIDELINES AND TOOLS

OVERVIEW

Based on the information obtained from the literature search, as well as input from the partner water utilities, interviews of public health officials, and PAC members, the research team recommended the creation of fact sheets, public notification templates, and media release templates for the 12 priority contaminants. To test the format and substance of the tools, the research team drafted materials from THMs and perchlorate first for review by the PAC. In addition, the PAC received an outline or checklist of risk communication guidelines.

Subsequently, draft tools were developed at two levels: materials that can be prepared and approved in advance of a crisis to help manage a risk; and those that will be needed to manage a crisis or emergency around drinking water contamination. Draft tools – press release, fact sheet, and public notification – for all priority contaminants were submitted to the PAC and were revised based on feedback.

Subject matter experts rigorously examined the draft tools for scientific and technical accuracy and applicability to the drinking water industry and public health. Recommended changes in content and format were incorporated.

Finally, the research team conducted beta tests of the draft tools with a cross section of end users, partner utilities, public health agencies, and healthcare subject matter experts. Testing of the draft tools served as a "reality check" with potential end users of the information. The tests also measured the relevancy of the tool content to drinking water utilities and public health agencies.

The literature review, interviews, and NACCHO workshop led to the development of *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants,* a handbook for drinking water utilities that includes sets of communication tools and templates that can be manually copied or downloaded electronically from a CD-ROM. These were initially outlined as a checklist, submitted to the PAC for review, and then were expanded into the draft guidelines.

METHODOLOGY

Based on the literature review, interviews and PAC input, the research team developed sample risk communication tools for perchlorate and THM. The subject matter experts reviewed the draft fact sheets, public notifications, and media release templates for technical accuracy, formatting, public comprehension and acceptance, regulatory consistency and accuracy, and water supplier applicability. The research team reviewed existing federal, state, and water supplier materials to ensure the accuracy of the messages. The subject matter experts also relied on their own long and varied experience in dealing with water suppliers, regulators, and the public around these contaminants in drinking water. The research team included experts in water treatment, water systems management, public communications, regulatory requirements, and public health protection.

The subject matter experts provided specific comments and suggestions for revising the perchlorate and THM tools. Revised versions of the tools were included in Water Research

Foundation Project 4001 Fourth Periodic Report for confirmation that these tools met PAC expectations as well as for further input on the content.

Based on PAC comments, the research team developed draft tools for the remaining contaminants. Subject matter experts reviewed all draft tools in the same manner as the THM and perchlorate materials and recommended revisions on format, public viability, and technical accuracy, in particular on the contaminant traits, health effects, and water treatment options and capabilities.

Participating subject matter experts working as members of the research team included Elisa Speranza, president of CH2M HILL; Michael E. Burke, P.E., Joe Nattress, P.E., Linda MacPherson, and Jed Campbell from CH2M HILL. Resumes for these key staff are attached in Appendix E to demonstrate their appropriateness as subject matter experts.

Beta Testing

To provide a "reality check," the research team conducted beta tests with potential end users of the information in the tools and the risk communication guidelines. As part of this process, the research team developed generalized audience profiles for Partner Water Utilities that can be applied productively to a variety of communication needs, both routine and risk. The audience profiles looked at characteristics such as mainstream residential and business ratepayers, apartment dwellers, limited English proficient (LEP) customers, and income levels (Appendix F).

The project team conducted four focus groups and 14 interviews with LEP populations, pregnant women, parents of young children, those who are immunocompromised, public health and medical professionals, members of the media, and water utility representatives. These stakeholders were selected because they experience special communication challenges, are likely to be more susceptible to the effects of contaminants in the water, or are responsible for dispensing critical information to the public and vulnerable populations. For beta testing purposes, these groups, were referred to as:

- End users (LEP populations, pregnant women, parents of young children, immunocompromised, media);
- Public health and medical professionals; and
- Water industry representatives.

End Users

The research team convened four focus groups with a total of 30 end users who reviewed fact sheets on anthrax, *Cryptosporidium,* endocrine disruptors, lead, pharmaceuticals, and THMs. Specific attention was given to the credibility of the information and whether the material could easily be understood, promote a specific action, and ensure target audiences could be informed successfully. Some respondents participated in telephone and face-to-face interviews. End users included in beta testing were pregnant women, parents of young children, LEP populations, those who are immunocompromised, and the media. Members of the media were asked to review fact sheets as well as news releases that would be sent to them during a contamination event.

Public Health and Healthcare Professionals

The research team conducted interviews with public health professionals that were also instrumental during the literature review period of this project. Their input was recorded early in the project regarding their expectations on the usability of the tools.

A representative sample of medical professionals were included in the beta testing of draft contaminant communication tools, including the director of clinical services for a state association for the medically underserved, a director of a large suburban hospital cardiac rehabilitation department that serves elderly and other at-risk patients, an infection control manager for a large urban hospital system, and the manager of patient safety/regulatory compliance who helps prepare one of the largest nonprofit healthcare organizations in the United States for the Joint Commission accreditation process. They were selected because they have one-on-one contact with patients who might be more susceptible to drinking water contaminants, and were responsible for providing information to them about issues that could affect their health. After reviewing fact sheets for six contaminants, the medical professionals discussed the actions they might take in distributing the messages to their patients, the credibility of the documents, how easily understood the messages were, and if the fact sheets answered questions that people would be likely to ask.

Water Industry Representatives

Since water utilities would play a primary role in the dissemination of key messages in the event of a water contamination incident, the partner utilities also took part in the beta testing process. Each partner utility received a packet containing a press release, public notice, and fact sheet for each of the contaminants listed above. They also received a draft copy of *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants.* Individuals at these organizations were given one week to review the materials. After review, interviews were conducted to evaluate and gather data based on their thoughts and feedback.

KEY FINDINGS

End Users

In general, end users who reviewed the materials said the concepts presented were easy to understand. Specifically, they thought the descriptions of the contaminants and the sources of the contaminants were clearly explained and informative. Reviewers complimented the level of detail presented in the tools and said that citing the resources on the fact sheets added to the credibility of the information.

With regard to structure and appearance of the tools, reviewers found the colors particularly appealing and appreciated the inclusion of pronunciations for the contaminant names. End users also appreciated that important information was called out in boxes and/or bold font. It was requested that a logo for the issuing water utility be placed somewhere on the materials.

Many end users said the tools were too text-heavy and suggested reducing the amount of text to make them easier to read. Others thought some words were difficult to comprehend. Areas that caused confusion were the phrases “tap water” and “soft water,” and whether to seek medical attention. Users also experienced some confusion about why the information presented was being released if the contaminant was not an immediate health threat. More information was requested about how the contaminants would affect at-risk populations and pets. End users also suggested materials needed to be produced in different languages, such as Spanish.

There were concerns about the titles on the public notifications. Some end users said titles should be revised to draw the reader in and be put in a larger font size. Some suggested more complex graphic elements to draw the attention of customers.

Three members of the media – one radio broadcaster, one newspaper reporter, and one public relations practitioner – reviewed the materials and commented mainly on the presentation of the information. Media members said the text might be too long to be practical for use by radio and television and suggested that a bulleted format could be more suitable. They also recommended attaching an identifier or logo to more easily identify the sender or contact. They said text boxes and bold text made important information easy to find, and media members suggested using those tactics more often.

Water Industry Representatives

Tool Content

In the discovery phase of this project, water industry representatives were asked what characteristics they valued in model communication materials. Those responses were taken into consideration when developing the tools. During the beta testing, the same utility representatives were asked to gauge whether the materials corresponded with their thoughts on valued communication materials. All of the utility representatives agreed that the materials were actionable, useful, well written, adequately described contaminants, and adequately described the current treatment processes. Four of the five representatives somewhat agreed that the tools might be acceptable to public health. Four of the five representatives answered that the tools sufficiently answered the five Ws – who, what, when, where, and why. None of them disagreed or somewhat disagreed with any of the characteristics. The feedback was positive. One water utility representative said, “These tools are useful to utilities, we need to have them for these contaminants,” said one water utility representative. Figure 4.1 shows water utility representatives’ responses to the tools’ characteristics.

Water utility representatives agreed unanimously that the language in the fact sheets and notifications was a balance of technical or scientific accuracy and ease of comprehension. While most of them said the materials would be easy for their customers to understand, they recommended the research team alter the language slightly in order to register at a lower grade level – fifth grade or middle school. They suggested, “Ninth grade is good, but maybe fifth grade is better.”

Resources cited on the fact sheets enhanced the credibility of the information, according to the utility representatives. However, they weren’t sure that the general public would feel the same way, due to the public’s lack of trust in government agencies. It was recommended to add other sources that are not connected to federal agencies. Suggestions included non-governmental resources, even if they were not related to the water industry, and local health groups.

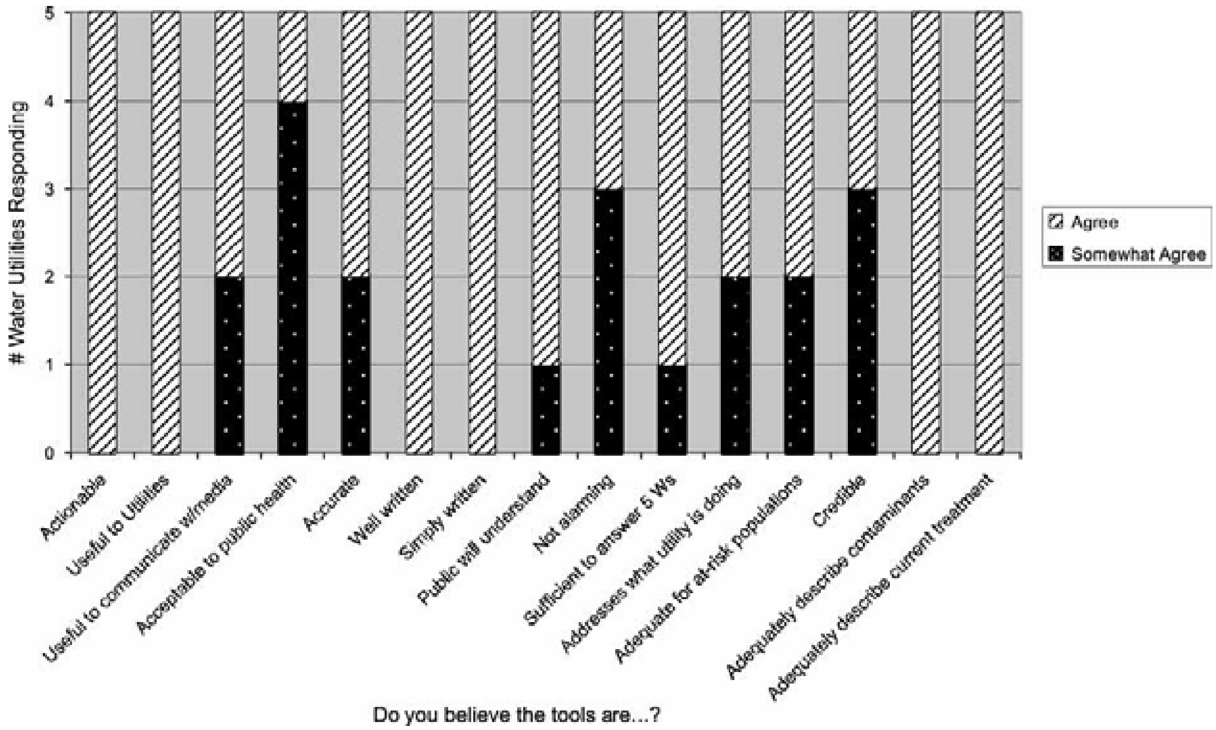

Figure 4.1 Tool Characteristices – Water Utility Representatives

Increased trust in the materials would cause the utility representatives to use the materials when communicating with the media, general public, and public health entities. Representatives said that trust is a big issue in their industry. The public values interest in its welfare, and that can sometimes outweigh factual support. Representatives said the CDC was a good resource to include on the tools because, as one representative stated, "CDC is not often tied to the federal government. It is seen more as an agency that cares about public health."

Water utility representatives were asked to rate characteristics of the tools' format. The project team determined which characteristics were highly regarded in communication tools. All agreed the tools were accessible, customizable for different audiences, easy to keep current, portable, and adaptable to many different kinds of contaminants. Table 4.1 shows responses from water utility representatives about tool format characteristics.

Tool Format

Table 4.1 Tool Format Characteristics

Characteristi c	Agree	Somewhat Agree	Somewhat Disagree	Disagree
Accessible	5	0	0	0
Customizable	5	0	0	0
Customizable for audiences	5	0	0	0
Easy to keep current	5	0	0	0
Portable	5	0	0	0
Adaptable to contaminants	5	0	0	0

Tool Use

None of the water utility representatives said the tools would be, "just one more thing to deal with." They agreed the tools were needed and could be customized to fit their needs, especially in working with public health personnel. Water utility representatives had comments such as:

- "We have a hit-or-miss relationship with the local public health department. This is a good jumping-off point for a better relationship."
- "These tools will be faster, especially if we receive a heads up from AWWA. It's a good starting point."
- "Fits well with emergency planning for a back up plan, as opposed to being just one more manual."
- "Good starting point."

Water utility representatives were asked to name the typical communication methods they use to convey messages during an emergency. The most widely used (by all five utilities) methods were mainstream media, the local public health department, and the utilities' Web site. Another method used by four of the water utilities was hanging printed messages on door handles – door hangers. Some utilities recommended using personalized e-mail blasts, Internet blogs, Reverse 911, or elected officials to distribute a message quickly to a large number of people.

Few representatives said they would use printed messages, including fliers and bill inserts to distribute an emergency message quickly. Figure 4.2 shows all communication methods used by the water utility representatives during emergency situations.

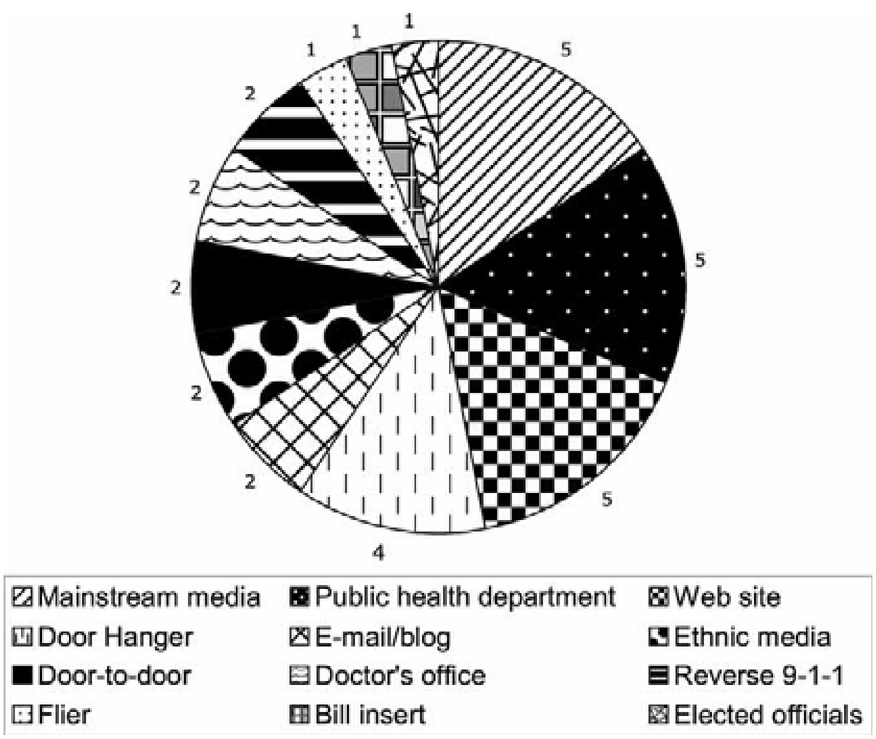

Figure 4.2 Typical Communication Methods in an Emergency

Electronic messaging and face-to-face communication or distribution methods seemed to be favored by water utilities because of the malleability in format – messages can be changed rapidly and therefore conveyed to the public more quickly.

In a non-emergency, the most used methods – used by all 5 utility representatives interviewed – were bill inserts, fliers, mainstream media, and the utilities' Web site. Some representatives suggested alternative methods, such as purchasing advertising space or submitting editorial content in a local newspaper or neighborhood newsletter. Figure 4.3 shows all communication methods used by the water utility representatives during non-emergency situations.

Overall, water utility representatives commented that the tools were a good compilation of information. They said it was, "Great to have everything in one place." Utility representatives also said the tools were a good starting place for utilities to begin forming emergency plans, which includes relationship building with public health entities.

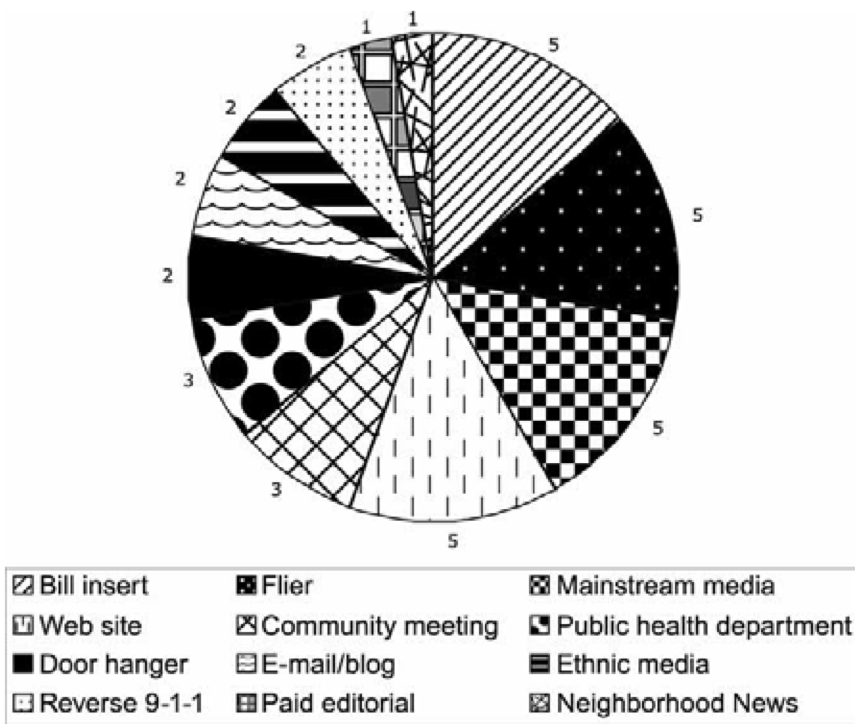

Figure 4.3 Typical Communication Methods in a <u>Non-Emergency</u>

Public Health Professionals

Tool Content

In interviews with public health professionals during the discovery phase, the interviewees were asked to name characteristics they valued in model communication materials. The same public health professionals were asked to respond to the determined characteristics and whether or not they felt the materials reflected the characteristics. Both public health representatives agreed the materials were simply written in a way the public could understand, the messages would not be alarming, the messages address what the utility is doing in response to the contamination, the tools are credible, and the tools accurately describe the contaminants. One agreed and the other somewhat agreed that the tools were actionable, acceptable to public health, accurate, well written, sufficiently answer the 5 Ws – who, what, when, where, why – and adequately describe the current treatment processes. One of the public health professionals somewhat disagreed that the tools would be adequate for at-risk populations and said, "Some issues are of different significance depending on areas of the country. Geography yields different risks and potentially different population demographics. It is hard to say these tools will be adequate for all of them in every situation." Public health professionals said the tools strike a good balance between technical or scientific accuracy and ease of comprehension. However, one said the average reading level of ninth grade was just right for their customers while the other professional with a higher rate of inner-city customers said the reading level was too high and suggested a fifth grade reading level might be more understandable for a greater number of populations.

The professionals were also split on whether or not the resources cited on the fact sheets help make the information more credible. One said they did, while the other, looking at it more from a citizen's perspective, said the general public would not care about cited resources.

Tool Format

Both public health professionals were complimentary of the format of the tools, stating the information was presented in logical order they would not change anything about the structure, order, or appearance. Specific comments included:

- "It's all well done."
- "The Q&A is quite good. The colors are good."

Tool Use

When asked if they would use the tools, one of the public health professionals said the tools would be used if the research team confirmed that a medical person had reviewed the language.

In an emergency, the public health professionals stated the best way to reach them with communication messages would be through a media release. They would then pass messages along to other health professionals through their own, already established networks, including a subscriber PHIX system, with alerts sent to subscribers according to their own choice of medium, and through fax. Both professionals said they would alert the public through local mainstream and ethnic news media outlets.

In a non-emergency, the public health professionals would prefer to receive messages through bill inserts, the utility's CCR, or postings on the Web site.

Medical Professionals

Generally, the medical professionals said the fact sheets were good tools, concise, well written, factual, and comprehensive. Specific comments included:

- The fact sheets encapsulated all the information needed to understand the health risks to patients, preventive actions to take, and where to find more information.
- Fact sheets would be useful in emergency rooms.

- Utilities should share drinking water contaminant information with local infection control groups, such as local chapters of the Association for Professionals in Infection Control and Epidemiology (APIC), and with hospital safety officers.

Changes that medical professionals recommended included:

- Reduce the reading level. It was too high for many patients (low income, elderly, low education levels).
- Reduce the amount of information, as it was too much for the common reader. For example, the reader might not need to know about parts per billion (ppb).
- Parts per billion defined as an expression of time is inaccurate. It would be more accurate to express ppb as a concentration or dilution, such as drops per gallons or trillion gallons or some measure people are familiar with.
- More elaborate, colorful graphics, such as pictures, would help to discern the different fact sheets for different contaminants. For example, print each fact sheet in a different color.
- Utilities should provide healthcare professionals with information about the likelihood that a substance would be a problem. For example, how likely is a person to be exposed to anthrax, lead, or endocrine disruptors?
- One respondent wanted to know if the risk was related to location.
- Materials such as these would come from the hospital's contacts with the local public health agency and not directly from the water department.

OUTCOMES

Based upon key findings in the feedback from the beta testing, the project team made revisions to the draft *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants*. Those revisions included:

- Reducing the language comprehension level as low as possible without losing technical and scientific accuracy;
- Editing fact sheets, public notifications, and media releases to reduce the amount of text, again only where technical and scientific accuracy were not compromised;
- Replacing or explaining terms that confused end users, such as "tap water;"
- Adding space on the materials for insertion of a utility's logo; and
- Creating a media advisory template and example for use with broadcast media.

The project team consulted with Water Research Foundation staff to determine the final format for the tools. The project team recommended that the format for the guidelines and tools be in a non-standard report format, specifically a spiral-bound notebook with replicable templates of the tools. The tools were placed on a CD-ROM attached to the back of the guide for electronic download and reproduction. The tools were designed in both Microsoft Word and portable document format (PDF) for ease in downloading from the disk by different types of computers and programs.

The guidelines and tools were based on communication industry standards to help a water utility develop a broad approach that can be applied to all drinking water contamination events.

CHAPTER 5: APPLICABILITY OF RESEARCH TO THE DRINKING WATER INDUSTRY

"It is fundamentally necessary to change our thinking – to think of disaster as not special."

– Dr. Lee Clarke, specialist in Disaster Studies, Rutgers University, and advisory to the Department of Homeland Security (Mobley 2003)

Research for this project shows that disasters are not special, or even unexpected events. They occur daily in communities throughout North America and, as a result, are a reality that calls every vital infrastructure – including drinking water – to prepare for the worst. Before and after 9/11 and the anthrax attacks that followed, drinking water utilities have recorded scores of incidents around water contamination from accidents, vandalism, hoaxes, and plots to outright attacks (Welter 2003). This Water Research Foundation project provides the drinking water industry with clear, easily understood, actionable information and direction for contaminant risk and crisis communication and the potential connection to public health partners that the industry will need to be credible leaders in reaching the public and motivating appropriate response.

RISK COMMUNICATION STRATEGY GUIDELINES AND TOOLS

A water utility's best response to contaminant risk is readiness, and utilities are increasingly ready to treat a variety of naturally occurring, manufactured, or terrorist contaminants. Just as identified and contaminants of emerging concern represent an ongoing treatment issue, contaminants also represent a public relations issue. In that arena, utilities are much less in control. Few utilities have risk and crisis communication strategies and implementation plans in place and have tested, exercised, and updated them to represent real preparedness. In fact, according to a 2005 survey of water utility managers (Awwa Research Foundation Project 2955), 69% of those surveyed had no formal communication plan at all (Mobley et al. 2006).

Because a water utility must be prepared to address so many different types of potential contaminants (e.g., those regulated, those on the contaminant candidate list, contaminants of emerging concern, people from disinfection byproducts); so many different individual health factors (e.g., elderly, immunocompromised individuals, cancer patients, children, pregnant women); so many different audiences (e.g., media, government officials, rate payers, people who are disabled, those who don't understand English); and so many different types of water sources, treatments, geographical factors, and utility sizes, a one-size-fits-all approach to communicating risk information around even 12 contaminants would be impossible. Moreover, many water utilities will not have the resources to invest in extensive education and dialogue efforts to meet the needs of several demographic groups. The only way to protect against the risk and possible crises in contaminant communication is to put in place a risk and crisis communication *process* built around a sample of contaminants, with potential application to others that may emerge. The process developed for this project has value industry-wide because it uses key contaminants as content, but also builds strategies and implementation activities that can be customized where needed to serve a water utility's needs.

The project team focused on the development of an overall risk communication process strategy and specific contaminant risk communication tools that can meet the needs of the many utilities operating with little or no communication support. Those with more sophisticated staffing and planning will find the process strategy and tools to be a useful checklist and guide to exercising and monitoring their plans. The guidelines and tools also fit well with a water utility's emergency planning by providing easy-to-use, step-by-step activities for backup personnel to follow when the manager or communication staff are unavailable. These foundational risk and crisis communication guidelines with core materials addressing 12 contaminants or contaminant classes are the kind of "preparedness kit" any utility could use.

How the Tools Can Be Used

This "kit" contains research- and experience-based strategies, activities (tools), and answers to some essential questions for any utility and encourages a platform for customizing a risk and crisis communication plan for its specific needs. The guidelines create a framework for water utility management to determine the following:

- How to make risk/crisis communication a basic value in their service approach
- How the need for urgent communication fits into their overall planning
- How to prepare internally for risk-related and crisis situations
- How to build working relationships with consumers through risk communication activities
- How to identify audiences and how contaminant risk relates to each
- How to educate and manage the media on contaminant issues
- The body of knowledge and set of instructions that must be in place internally around contaminants
- How pervasive readiness can be achieved
- Which community partners are needed to be timely, effective, and credible in reaching all the utility's stakeholders

Building Collaborations

A further – and essential – value of this project to the water utility industry is the initial interface and potential partnerships with public health. Interviews with local and national level public health professionals indicated limited interaction with the drinking water industry or the local drinking water utility.

The team conducted a workshop with the NACCHO Environmental Health Committee to address partnerships between water utilities and public health, including barriers, relationships, lessons learned during drinking water contamination events, communication approaches and activities, and public health's expectation of its partnerships with water utilities. As the potential for comprehensive partnership building is limited by this project's scope and budget, a portion of the workshop included the identification of long-term partnership potential. All participants agreed that working on an initiative together and allowing a partnership to emerge from the work was more desirable than activities or meetings spent "planning" toward partnership. Committee members proposed two topic areas for which the drinking water industry and the public health sector should begin to develop a proactive and collaborative approach to addressing. The two topic areas were pharmaceutical byproducts as a drinking water contaminant risk and emergency preparedness.

Partnership with public health can provide utilities with a pre-existing means of getting the word out to help members of communities prepare and protect themselves during a drinking water crisis. Other industries are currently pursuing similar partnerships and seeing successful results.

Additional efforts that could assist water utilities in applying the research results and products might include technology transfer conferences with an emphasis on risk communication strategies around drinking water contamination.

CHAPTER 6: SIGNIFICANT FINDINGS

LESSONS LEARNED RELEVANT TO DRINKING WATER UTILITIES

- The guidelines and tools provide drinking water utilities with well thought out planning to help prepare for the risk of a contamination event.
- Risk communication must address acceptable exposure levels to chemicals and microorganisms.
- Communication of statistical probability, and thus risk, requires forethought to create comparisons that allow the public to comprehend both the risk of the substance itself and the various courses of action available.
- Drinking water quality reports and CCRs are a major communication tool for dispersing widespread messages.
- Printed materials are not an adequate risk communication strategy on their own, since risk communication is an interactive process. Materials must be part of a global communication strategy in an organization.
- Many agencies rely more and more on their Web site to communicate with their customers and stakeholders; however, people who are economically disadvantaged and many elderly people do not have access to e-mail or the Internet, either by choice or affordability. A 2007 study found that 31 million households in the United States did not have Internet access. Of these, 6.8 million said they could not afford a computer or the cost of Internet service (Reuters 2007). Further, some emergencies render the Internet unavailable.
- Many remote rural areas may not have reliable access to electronic communications.
- Water utilities use the following resources to help communicate with customers and the general public: Water Quality Complaint Investigator's Field Guide and the Public Notification Handbook (Lauer 2004 and EPA 2007c).
- Effective utility managers are proactive and oriented to be involved with other disciplines.
- Drinking water utilities need to be at the table for community emergency/disaster management planning.
- The fact sheets tools would be useful to emergency rooms and hospital public safety staff.

LESSONS LEARNED FROM PUBLIC HEALTH RESEARCH

- The community benefits from strong working relationships between public health and the water utility.
- A majority of contact between public health and their local water utilities occurs after problems arise.
- Utilities and public health agencies need to plan to issue joint informational materials rather than issuing their own.
- Materials must be able to withstand medical and scientific scrutiny.
- Most people want health information from their healthcare providers.
- Drinking water standards are set to "healthy" adults. This creates an information gap for clinicians in understanding risk to sensitive populations.

- Boil water orders or other directions must be geographically defined, e.g., Zip codes and/or cross streets, because many people do not know their water supplier by name.
- Public health personnel want to be notified as soon as a drinking water contamination is suspected. This is especially true for those who must assemble experts to assist with confirmation of an exposure.
- Public health takes the approach of, "I'll tell you what I know – even if the information is not complete." They perceive water utilities as taking the approach, "I'll tell you when I know for sure."
- Without a relationship with drinking water utilities, public health professionals will not be able to answer questions from consumers.
- In a model partnership, water utility and public health staff will plan together and support each other's grant-seeking efforts. For example, in Louisville, Ky., where the water company is owned by the city, public health and water professionals meet bi-monthly, alternating hosting. They set an agenda and discuss topics such as grants, communicable diseases, school drinking water testing, and state regulations. As another example, in Massachusetts water utilities and public health work together on pre-recorded key messages that can be disseminated by phone or e-mail.
- When a contamination is suspected, water utility personnel must notify public health.
- Utilities should be willing to handle resolution of a contamination incident and allow local or state public health officials to handle public communication. (This is a lesson learned from an actual drinking water contamination event.)
- To engage drinking utilities around public health issues, public health practitioners need to show utilities, "What's in it for me?" (WIIFM).

CHAPTER 7: RECOMMENDATIONS

OBJECTIVE 1

Develop a coordinated risk communication strategy to guide the industry and individual utilities to develop more consistent and effective contaminant messages. This will allow the utilities to respond in a credible, expeditious manner.

Outcome

Drinking water utility executives and communicators confirmed that the tools and strategy guidelines developed for this Project 4001 met their needs, and that they would want and use the materials. They agreed the tools and strategies were actionable, adaptable, accurate, accessible, simply written, credible, easy to use, and accurate for various populations, contaminants, and treatments.

OBJECTIVE 2

Provide a resource to utilities that can be immediately used to improve public and local health agency outreach by developing a set of risk communication tools around 10 to 15 priority contaminants of potential concern to water utilities nationwide.

Outcome

The *Risk Communication Strategy and Tools: Guidelines for Communicating about Drinking Water Contaminants* is a readily accessible resource for water utilities to use in reaching general and special audiences. The tools are available in formats that can be copied or easily downloaded and can be adapted to various contaminants, different audiences, and various treatment processes. Drinking water representatives agreed the tools were a good starting point for building relationships with the public health agencies.

OBJECTIVE 3

Strengthen the working relationship between participating local water utilities and public health entities through project tasks and activities that can help the industry deepen its public health roots and increase the potential for future partnership activities.

Outcome

The project team established the foundation for a working relationship with a national public health organization, NACCHO. The drinking water industry can work with NACCHO to develop a model for drinking water and public health partnership around such issues as emergency response preparedness and pharmaceuticals in drinking water supplies. In addition, the guidelines and tools give drinking water utilities information they can give to public health agencies about how to recognize and manage public health issues surrounding drinking water contamination. Both drinking water and public health representatives who participated in this project reported increased awareness of the different perspectives between the two fields, the roles each plays in managing the risk of drinking water contamination, and opportunities that can benefit their communities by working together.

FUTURE RESEARCH

1. The drinking water industry can work with NACCHO to develop a model for drinking water and public health partnership around such issues as emergency preparedness and pharmaceuticals in drinking water supplies. This will build on the groundwork initiated in the research for this report. A national research project involving both Water Research Foundation and NACCHO would foster the critical link between drinking water utilities and public health professionals.
2. Water Research Foundation or AWWA might consider a feasibility study on the need to provide, at a reasonable cost, language translation assistance for small to mid-sized drinking water utilities. The demographics of the United States are changing dramatically with sharp increases in populations who have limited or no English language speaking or reading skills. For example, the U.S. Census Bureau estimates that the Hispanic population will contribute to 39% of the population growth from 2000 to 2010 and, by the years 2030 to 2050, Hispanics will account for 60% of the total U.S. population (Day 2007). Many utilities do not know how to access language translation services to accurately communicate the specialized terms about drinking water contaminants (or other public impact issues, such as water conservation), nor do they have the funds or other resources to provide such translation.
3. Intentional contamination of drinking water supplies is the highest water security priority for the USEPA and the water industry. Because contamination of drinking water is possible, the threat of contamination is probable, and the risk is high, water utilities of all sizes must be encouraged to participate in joint planning with federal, state, and local agencies involved in drinking water emergency response (Texas Engineering Extension Service 2004).

APPENDIX A: LITERATURE REVIEW SUMMARY REPORT

EXECUTIVE SUMMARY

Overview

This report of literature review findings represents the basis for a project to assist water utilities with their communication practices around drinking water contamination. The goals of the project are to:

1. Develop a coordinated risk communication process strategy that will guide the industry and individual utilities in developing more consistent and effective contaminant messages to allow utilities to respond in a credible, expeditious, and effective manner
2. Provide a resource to utilities that can be immediately used to improve public and local health agency outreach by developing a set of risk communication tools around 10 to 15 priority contaminants of potential concern to water utilities nationwide
3. Strengthen the working relationship between participating local water utilities and public health entities through project tasks and activities that can help the industry deepen its public health roots and increase the potential for future partnership activities

Though drinking water treatment technologies successfully remove many chemicals and substances from drinking water supplies, drinking water utilities are just beginning to address how to communicate with stakeholders inside and outside their operations about contaminants that threaten their product and their customers. This is particularly true of contaminants that have been tagged as “emerging concerns” and those that are a direct result of the drinking water treatment process itself. Water Research Foundation Project 4001 partners, City of Durham Department of Water Management; City of Portland, Oregon Bureau of Water Works; Philadelphia Water Department and Water Revenue Bureau; Water District Number 1 of Johnson County; The Water Works and Sewer Board of the City of Anniston; Project Advisory Committee; and initial project research findings assisted the research team to prioritize the following contaminants for in-depth project research:

- Algal toxins (as a class)
- Atrazine
- *B. anthracis* (representing a class of deliberate contaminants)
- *Cryptosporidium*
- Disinfection byproducts (with NDMA and THMs as examples)
- *E. coli*
- Endocrine disruptors (as a class)
- Lead
- MTBE
- Perchlorate
- Pharmaceuticals (as a class)

Communication with the public is crucial to the success of many industries, and it is becoming increasingly more important in the drinking water industry during a time when the public is concerned about drinking water contamination, both intentional and unintentional. Little research exists on the health effects of some contaminants of emerging concern, and the lack of accurate, scientific information makes communication to the public about these contaminants particularly challenging for the drinking water industry.

For this project, the following definition by the USGS guided the research: "Emerging contaminants can be broadly defined as any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment, but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects. In some cases, release of emerging chemical or microbial contaminants to the environment has likely occurred for a long time, but may not have been recognized until new detection methods were developed. In other cases, synthesis of new chemicals or changes in use or disposal of existing chemicals can create new sources of emerging contaminants" (USGS 2008).

The purpose of the literature review was to investigate and document risk communication practices in the public health sector as well as credible and effective tools already being used to communicate risks of the identified contaminants. The research team conducted a qualitative examination of fact sheets, brochures, Web sites, and reports surrounding the priority contaminants produced by organizations including the U.S. Environmental Protection Agency (USEPA); Centers for Disease Control and Prevention (CDC); American Water Works Association (AWWA); state, county, and municipal public health agencies; and public and private water utilities. The research team also conducted an analysis of risk communication practices in the water industry and other related industries, specifically health, energy, military, and transportation.

Key Findings

- Available fact sheets and communication materials fail to target important segments of the population. Although children under five, the elderly, pregnant women, and immunocompromised persons have the greatest health risk from exposure to the prioritized contaminants, no fact sheets addressed specific risks to these groups. Most materials were only available in English, which created a communication barrier for non-English speaking portions of the population.
- While there are hundreds of fact sheets available on the priority contaminants, few are comprehensive. Most water utility fact sheets offer basic information about the contaminants, are more technical than practical, and refer those who want to know more to other sources, such as a utility's consumer confidence report.
- Customer service representatives are not made available to answer questions pertaining to the specific contaminants.
- Most of the communications materials come from national and state public health agencies, rather than the drinking water industry and local utilities.
- Fact sheets often contained scientific jargon that might prove too complicated for the public to understand.
- Limited documentation is available about successful communication strategies involving the priority contaminants.

- Although communication strategies and tools were found in the drinking water industry, there were no step-by-step processes for distribution and implementation of the tools or risk communication processes for drinking water contamination events.
- Available information indicated that the health effects of several of the priority contaminants are unknown at this time.
- Review of risk communication procedures developed by AWWA and Water Research Foundation and other related industries revealed that they agree on several essential steps to develop a successful emergency communication process strategy, including:
  - Build and maintain relationships with the stakeholders and other agencies within the community;
  - Prepare and organize prior to an emergency situation;
  - Identify staff roles and responsibilities that will be operational during a crisis;
  - Locate vulnerable populations within the community and address their specific communication needs;
  - Create communication templates that can be easily transferred between multiple scenarios;
  - Develop alternative plans for message dissemination in case traditional methods are unavailable; and
  - Work closely with the media during an emergency situation.

PRIORITY CONTAMINANTS

Algal Toxins

Background

Algal blooms, scientifically known as cyanobacteria, are microscopic bacteria that occur naturally in ponds, streams, and lakes. Ordinarily the bacteria are undetectable, but in warm, sunny environments they multiply and form visible colonies. Algal blooms can occur any time in the right conditions, usually late summer or early fall, and can grow to be several inches thick. Varying in appearance and consistency, blooms are often blue, green, brown, or red in color. They have a very distinct odor, often described as smelling like freshly mowed grass.

Algal blooms become a big concern when they invade fresh water sources, such as drinking water reservoirs. Detectable signs of algal blooms in drinking water include musty smells and tastes. These signs should be reported to the local water utility if detected (CDC 2007a).

Potential Risk

Most forms of algae, including some forms of blue-green algae, pose no threat to humans and animals, however certain strains generate toxins. These toxins are some of the most powerful natural poisons in existence, and there are no known antidotes. People and animals can become gravely ill and even die from exposure to harmful blue-green algal toxins.

Symptoms of harmful blue-green algal bloom exposure include rash, hives, blisters, watery eyes, runny nose, sore throat, gastroenteritis, nervous system problems, nausea, diarrhea, vomiting, and kidney and liver failure (Health Canada 2005). Little information is available about risks associated with long-term exposure to harmful blue-green algal toxins, however, some researchers believe it can lead to an increased risk of liver cancer (New York State Department of Health 2005).

To control taste and odor, most water utilities go to great lengths to keep blue-green algae from growing in their surface water supplies. There are no drinking water standards for blue-green algae, but algal toxins are on the USEPA's Drinking Water Contaminant Candidate List, which is used to set priorities for research that would determine the need for regulation. In order to prevent exposure to toxic algae, water from untreated surface sources should not be used for cooking or drinking. Drinking water that is discolored or has a musty odor should be reported. Algae can be removed from drinking water through filtrations and activated carbon, and potassium permanganate will remove any lingering odor or taste (North Carolina Public Health 2006).

Example of Communication Practice

Many residents of California's Humboldt and Mendocino counties walk their pets along South Fork Eel River, occasionally letting them take a swim on hot, sunny days. Concerns began to rise as several dogs died after swimming in the river. Between 2001 and 2005, nine dogs died from the toxic effects of blue-green algae.

Once officials determined blue-green algae to be the cause of the animals' sudden deaths, the local and state health and human services departments were quick to respond. They issued press releases to media outlets throughout the area warning about the risk of exposure to blue-green algae. They suggested guidelines for water use, including not allowing pets to swim or drink river water infested with algae; avoiding ingesting, swimming in, or handling water with algae present; and keeping children away from algae, as they are more susceptible to its effects (Humboldt County Health & Human Services Department 2008).

The USEPA and the California State Water Resources Control Board (which regulates recreational water) conducted an information workshop on blue-green algae in 2005 to give the public an opportunity to learn more about a blue-green algae bloom in the Klamath Basin, to hear from experts on cyanobacteria, and to learn more about blue-green algae issues in California. In addition, the California State Water Resources Control Board Web site includes recent guidance on blue-green algae and a link to the California Department of Public Health, which regulates drinking water.

The Water Board Web site now offers an opportunity for the public to subscribe to a blue-green algae e-mail list to receive updates on the topic (California State Water Resources Control Board 2005).

Promising Practices

- *Blue Green Algae: A Guide* – The Cooperative Research Centre for Water Quality and Treatment
- *Blue Green Algae Fact Sheet* – Oklahoma Department of Environmental Quality
- *Facts About Cyanobacteria and Cyanobacterial Harmful Algal Blooms* – Centers for Disease Control and Prevention

Anthrax

Background

Anthrax is a spore-forming bacterium scientifically named *Bacillus anthracis*. Known as a highly lethal infectious disease to humans and hoofed animals, anthrax is exceptionally durable lasting in soil for decades. The bacteria can also resist long periods of drought, UV light, gamma radiation, bleach, and exposure to extreme heat or cold. The fact that it is colorless, odorless, and has a lengthy incubation period in the body makes it difficult to detect (Anthrax Vaccine Immunization Program [AVIP] 2007). Furthermore, there is no official screening that will indicate a human infection (CDC 2006c). Anthrax is diagnosed by isolating *B. anthracis* from the blood, skin, lesions, or respiratory secretion or by measuring specific antibodies in the blood (CDC 2002). Anthrax can also withstand standard disinfection methods for drinking water (WaterWebster 2006).

The largest human outbreak of anthrax occurred in 1979 in the USSR when a military facility accidentally released aerosolized anthrax into the air. The spores spread with the wind and infected 77 people. In 2001, only months after 9/11, anthrax in the form of a white powder was sent through the mail to several states. Five people died out of 22 people who were exposed (AVIP 2007). Since then, several organizations, including the CDC, Food and Drug Administration (FDA), and AVIP have been working to raise awareness and educate the public about this deadly bacteria and possible forms of prevention and treatment, including the anthrax vaccine.

Potential Risk

The CDC has categorized anthrax as a Class A, or high priority, agent that poses a risk to national security. It poses the greatest possible threat for a bad effect on public health; may spread across a large area or need public awareness, and requires planning to protect the public’s health. Anthrax can be used as a biological weapon, as in 2001 when anthrax in the form of a white powder was sent through the mail. Exposure to anthrax can be deadly if not treated (CDC 2008c).

There are three primary methods of exposure: cutaneous (skin contact), gastrointestinal (ingestion), and pulmonary (inhalation). Common treatment for all forms of anthrax is a 60-day antibiotic regimen. Common antibiotics include penicillin, erythromycin, tetracycline, and chloramphenicol (San Francisco Public Utilities Commission 2006). A quick diagnosis and treatment process aid recovery. A patient’s age, sex, medical history, and allergies will determine which antibiotic is prescribed. The risk of spreading anthrax from person-to-person is rare, but standard hygiene should be observed if an individual is around someone who is contaminated.

Example of Communication Practice

Although intentional anthrax contamination of drinking water supplies in the U.S. has not been reported, federal officials perceive the risk to be great (CDC 2008a). Therefore, effectively communicating the risks to the public is important. While reporting on the 2001 anthrax outbreak showed some successful communication, it also highlighted flaws that need to be addressed.

In a U.S. General Accounting Office (USGAO) report to Congress, communication between public health agencies and first responders, including law enforcement, emergency management, and hazardous materials units was considered effective during the anthrax outbreaks, largely because communication procedures were in place before the events occurred. These agencies used regularly scheduled conference calls to keep information flowing between them. Conference calls were also used to raise concerns and ask questions of each other to ensure the best possible response.

Though the communication at local and state health departments using fax machines, landline telephones, and the Internet was successful, many employees reported there was no backup system in the event of a power outage. In addition, public health workers reported they did not have cellular phones or laptop computers that would allow them to continue work if their buildings had to be evacuated.

Due to the fatality rate of anthrax exposure, doctors were extremely concerned about missing a diagnosis and wanted information from the public health departments about symptoms and treatments. Relationships between the two groups did not exist before the outbreak, and, as a result, communication was often ineffective. Health departments reported difficulty in reaching physicians. Some agencies faxed information to hospitals and doctors, which was effective in reaching many people, but did not allow for two-way communication. Other agencies attempted to use e-mail, but many physicians did not have e-mail or Web access in their offices. Many agencies tried to disseminate information by telephone but realized during the outbreak that many of the phone rosters were out-of-date. Health departments were unable to determine one method that would reach all physicians in a timely manner.

Public health officials realized that the media was a crucial link between themselves and the public during the outbreak. They conducted regular press conferences, made officials available for media interviews, and produced informational materials to keep the media abreast of the situation. Most public health representatives reported that media outlets were successful in publicizing information, such as hotlines, symptoms of exposure, and where to seek treatment. However, the media also caused unnecessary panic. In one case, the media reported that nasal swabbing was the test for anthrax. As a result many people sought unwarranted testing, tying up physicians and laboratories that could have helped elsewhere (USGAO 2003).

Some steps have been taken to remedy the problems that occurred, including identifying steps to take during a waterborne outbreak of the bacteria.

Promising Practices

- *Anthrax Fact Sheet and Common Questions* – Public Health Department of Seattle and King County
- *Anthrax: What You Need To Know* – Centers for Disease Control and Prevention
- *Fact Sheet on Anthrax* – New York State Department of Health
- *Response Protocol Toolbox*: Planning for and Responding to Drinking Water Contamination Threats and Incidents – U.S. Environmental Protection Agency

Atrazine

Background

Atrazine is the most widely used herbicide in the world. It was banned from the European Union in 2004, but U.S. scientific research shows that the chemical is safe for agricultural use on crops, including corn, sorghum, sugarcane, turf grass sod, asparagus, and pineapple. In the 1960s, farmers, specifically those in the Midwest, began using atrazine to control broadleaf and grassy weeds. Many farmers choose to use atrazine on their crops because of its rather low cost at $5 per acre. In fact, over 80% of corn crops in the Midwest are routinely sprayed with atrazine (Purdue University Extension 2006). In 1990, the U.S. Environmental Protection Agency (USEPA) classified atrazine as a Restricted Use Pesticide (RUP) because of potential adverse health effects. This classification restricted the frequency of application for agricultural and industrial uses. It also limited the sale and use of atrazine to certified applicators who must maintain a strict record-keeping process, including the product used, location, timeframe, and application approval number (Beyond Pesticides 2003).

The USEPA's Office of Pesticide Programs initiated an intensive monitoring program to look for atrazine residues in about 150 community water systems, located primarily in the Midwest, that appear to be the most vulnerable to atrazine contamination. (For updated information about the Peticide Program's Monitoring in Community Water Systems, go to http://www.epa.gov/pesticides/reregistration/atrazine/atrazine_update.htm#cws). Results from 2003-2007 are posted on the Regulations.gov site (http://www.regulations.gov/search/Regs/home.html). Other updated information about atrazine can be found at the USEPA Web site (http://www.epa.gov/peticides/registration/atrazine) (USEPA 2009a).

Because atrazine application coincides with spring rains, runoff into drinking water sources has become a major concern. Once atrazine enters a water source it is slow to break down, allowing it to remain in the environment for long periods of time (Purdue University Extension 2006). The USEPA reports atrazine is the second-most commonly used pesticide in the United States. In an effort to reduce instances of atrazine in drinking water, in 1993 the USEPA banned non-agricultural uses completely and required buffer zones around surface water near application sites. The USEPA also set a maximum contaminant level (MCL) of 3 parts per billion (ppb) for atrazine and other chlorinated triazine pesticides.

Potential Risk

In October 2009, the USEPA launched a comprehensive evaluation of atrazine to determine its effects on humans. The evaluation will help the USEPA determine if the current risk assessment of the pesticide needs to be revised and whether new restrictions are necessary to better protect public health. In 2006, the USEPA completed an updated risk assessment that led the agency to conclude, "There is a reasonable certainty that no harm will result to the general U.S. population, infants, children, or other major identifiable subgroups of consumers from aggregate exposure (from food, drinking water, and non-occupational sources) to cumulative residues of atrazine…" (USEPA 2006f).

Although the Cancer Assessment Review Committee (CARC) classified atrazine as unlikely to be a human carcinogen, studies have shown other adverse health effects. Acute exposure to levels of atrazine above the MCL can cause skin and eye irritation; fatigue; nausea; congestion of the heart, lungs, and kidneys; low blood pressure; muscle spasms; weight loss; and degeneration of the adrenal glands. Studies of long-term exposure to high levels of atrazine show harmful side effects, including skin allergies, cardiovascular damage, retinal and muscle degeneration, damage to the nervous system, and mammary tumors (USEPA 2006d).

Researchers have conducted numerous studies on the effects of atrazine in animals. One particular study tested the effects of a daily oral dosage of atrazine for six months. Animals exhibited symptoms such as respiratory distress, paralyzed limbs, stunted growth, and structural and chemical changes in various organs, including the brain, heart, and endocrine organs. Dogs in another study showed increased heart and liver weight, lowered blood cell counts, and tremors after daily doses of atrazine. While some scientists believe these side effects can be translated into possible human side effects, others believe that biological differences between humans and the types of animals used make these outcomes unlikely (Beyond Pesticides 2003).

Example of Communication Practice

Specific communication practices regarding atrazine vary from official government sources, such as fact sheets and frequently asked questions developed by the USEPA (USEPA 2008d) and the Agency for Toxic Substances and Disease Registry (ATSDR 2003); to domestic and international advocacy and special interest groups that have issued public statements regarding the environmental and human health risks from atrazine use. These have appeared in print and electronic media, including videos on YouTube. While most of the groups have a bias against atrazine use, their materials offer insight into possible customer questions and media interest. Because atrazine is considered a water contaminant of ongoing concern, particularly for groundwater sources, water utilities need to be familiar with these matters and be prepared to address them.

Promising Practices

- *ToxFAQs™ for Atrazine* – Agency for Toxic Substances and Disease Registry
- *ChemicalWATCH Fact Sheet: Atrazine* – Beyond Pesticides
- *Consumer Factsheet on: Atrazine* – U.S. Environmental Protection Agency
- *Atrazine Science Reevaluation: Potential Health Impacts* – USEPA 2009a*

*(*Note: Literature about atrazine was originally collected in 2007 and updated in 2010.)*

Cryptosporidium

Background

Cryptosporidium is a parasite that lives in the intestines of humans and animals. It is commonly found in lakes and rivers, usually when the water is contaminated with sewage and animal waste (USEPA, 1999). The parasite is protected by an outer shell called an oocyst. In the intestinal tract, the parasite can cause infection. The oocysts are passed through the stool of infected people and animals. When ingested, the oocysts can infect others (CDC 2004a).

Cryptosporidium can be found in drinking water sources that are contaminated with human or animal feces. The hard outer shell that allows the oocysts to survive in the environment for extended periods of time also makes them resistant to standard chlorine treatment processes. Consumption of only a few oocysts can cause infection in humans. To prevent illness people should avoid drinking from untreated streams, lakes, and rivers. Outbreaks have also occurred at water parks. Those concerned about the safety of their drinking water should boil it for one minute to inactivate any oocysts present (New York City Department of Health and Mental Hygiene 2006).

Potential Risk

Cryptosporidiosis is the illness caused by the parasite. Originally, *Cryptosporidium* was thought to be a disease that only infected animals. However, the first *Cryptosporidiosis* case was discovered in a human in 1976, and instances of the illness began to rise in the early 1980s (AIDS Treatment Data Network 2006).

All surface water systems (or ground water under the direct influence of surface water, e.g., Karst aquifer) are subject to contamination in their source water by *Cryptosporidium* or other parasites, such as *Giardia Lamblia.* These drinking water utilities are required to provide a basic level of treatment, typically filtration and disinfection to remove and treat disease-causing organisms. Although not required to monitor routinely for *Cryptosporidium* or any other pathogen, most surface water sytems are required to monitor for *Cryptosporidium* during a 12-24 month period to establish the level of *Cryptosporidium* in their source water. Source water *Cryptosporidium* levels are used to establilsh the required level of treatment to the system. A few utilities monitor for *Cryptosporidium* in their source water on a routine basis, e.g., New York City, but this is the exception rather than the rule. *Cryptosporidium* in raw water sources does not in itself indicate a risk to customers of drinking water utilities. The risk occurs when a treatment process breaks down and creates the potential for the parasite to enter the finished drinking water supply. However, *Cryptosporidium* is very resistant to disinfection, and even a well-operated water treatment system cannot ensure that drinking water will be completely free of this parasite. People who are immunocompromised are likely to have more severe and longer-lasting symptoms than healthy individuals. The EPA and CDC have issued guidance for severely immunocompromised persons. Boiling water is the most effective way to kill *Cryptosporidium*. In place of boiling, *Cryptosporidium* can be removed form drinking water by using a point-of-use filter devise approved under the NSF International Standard 53 for Cyst Removal. The EPA and CDC guidance also provides cautionary advice and helpful suggestions on the choice of bottled water. (http://www.epa.gov/safewater/consumer/pdf/crypto.pdf)

Symptoms of *Cryptosporidium* infection usually appear two to ten days after exposure and can include watery diarrhea, abdominal cramping, nausea, vomiting, loss of appetite, fever, headache, weight loss, and dehydration. Symptoms typically last one to two weeks. Some people who are infected have no symptoms, while others have severe symptoms. Symptoms can come in cycles where one may feel better for a few days and then feel worse again. Young children, pregnant women, and immunocompromised persons are prone to severe and lengthy symptoms (CDC 2004a).

Diagnosis can only be made through laboratory analysis of fecal sample or intestinal biopsy. Most laboratories do not regularly screen for *Cryptosporidium*. Physicians must request this test (Public Health Department of Seattle and King County 2003). The U.S. Food and Drug Administration approved nitazoxanide (NTZ) for the treatment of *Cryptosporidiosis* infection in people with healthy immune systems, but as of 2006, no drugs have proven consistently effective in getting rid of the infection among immunocompromised individuals (AIDS Treatment Data Network 2006).

Example of Communication Practice

The largest waterborne disease outbreak in United States history occurred during the spring of 1993 when one of two water treatment facilities in Milwaukee, Wis., became contaminated with *Cryptosporidium*. The Howard Avenue Purification Plant on the city's south side was shut down after illness in the community was found to be associated with individuals who consumed drinking water from this plant. As a result, more than 400,000 people became ill with stomach cramps, diarrhea, dehydration, and fever over the course of two weeks. Between 50 and 100 deaths, primarily elderly and immunocompromised people, were reportedly linked to the outbreak.

Milwaukee Water Works (MWW) obtains its water from Lake Michigan. Plant records showed an increase in the turbidity of treated drinking water from the south plant from March 21 through April 5. The Milwaukee Health Department (MHD) received reports from a doctor citing numerous *Cryptosporidiosis* cases in his office. On April 7, Wisconsin state health laboratories identified *Cryptosporidium* oocyts in human stool samples. That same day, the mayor issued a boil water order to more the more than 800,000 customers served by MWW (Water Quality and Health Council 1995).

Though cases of *Cryptosporidiosis* drastically declined following the boil water order, this outbreak revealed a lack of coordinated communication between many entities. MWW and MHD did not have agreed-upon channels for communicating with one another nor with health care providers in the Milwaukee area. At that time, few people thought an illness on this scale would be waterborne and emergency or crisis communication was a relatively new field. There was no official protocol in Milwaukee for emergency communications, pre-determined communication channels, or clear messages to send to the public.

Since 1993, the City of Milwaukee has taken great measures to ensure another outbreak like this would not happen again. Representatives from the MHD, State of Wisconsin Department of Natural Resources, State of Wisconsin Division of Public Health, Milwaukee Metropolitan Sewage District, and MWW formed the Water Quality Technical Workgroup, which has become a national model. Together these entities are working to ensure Milwaukee residents have safe and potable drinking water at all times. To date, the group has developed response protocols for specific contaminants, set benchmarks for finished drinking water quality, conducted studies of watersheds in the area, and responded to treatment plant events that may pose public health concerns. The workgroup has started work to have water utility response protocols included in the community-wide emergency operations plan.

Promising Practices

- *Cryptosporidiosis* – New York City Department of Health and Mental Hygiene
- *Cryptosporidium* – Minnesota Department of Health
- Cryptosporidium *Infection* – Centers for Disease Control and Prevention
- *Guidance for People with Severely Weakened Immune Systems* – U.S. Environmental Protection Agency and Centers for Disease Control and Prevention

Disinfection Byproducts (DBPs) – With THMs and NDMA as Examples

Background

Drinking water disinfection has been a major advancement in both the health and drinking water industries. For centuries, drinking water was untreated, resulting in many deaths from such waterborne diseases as typhoid and cholera. "Disinfection was a major factor in reducing these epidemics" (USEPA 1998). At the same time, the process of disinfecting water has produced new concerns. This study looked at byproducts formed by different water treatment methods (chlorine and chloramines disinfection) and focused on trihalomethanes (THMs) and Nitrosodimethylamine (NDMA), as examples.

Since the mid-1970s when DBPs became a known concern, water utilities have been reviewing operations to find alternative ways to treat drinking water. In 1998, the Stage 1 Disinfectants and Disinfection Byproducts Rule was the first strategy required by Congress as part of the 1996 Amendments to the Safe Drinking Water Act. Recently, the Stage 2 DBPR and Long Term 2 Enhanced Surface Water Treatment Rule (LT2) were developed developed to strengthen protection against contaminants, such as *Cryptosporidium,* while reducing potential health risks of DBPs (USEPA 2009a and Minnesota Department of Health 2005a). The goal of the Stage 2 DBP Rule is to reduce potential cancer, reproductive, and developmental health risks from disinfection byproducts. The rule applies to community and non-community water systems that deliver water treated with a primary or residual disinfectant. Systems will begin first year of compliance monitoring between 2012 and 2016 (USEPA 2005a).

As a result of the wide use of chlorine in the United States, scientists discovered that disinfectants react with natural materials in water to create byproducts (USEPA 2005a). Chlorine combines with the raw organic material found in water and forms THMs and haloacetic acids (HAAs), which with long-term exposure to levels above 80 ppb can increase the risk of cancer. Many utilities have switched to chloramines for disinfection to reduce the levels of THMs and HAAs in their drinking water; however, chloramine disinfection also produces byproducts, such as NDMA, a contaminant of emerging concern.

NDMA is an unintended byproduct of using chloramines for disinfection of wastewater and drinking water at treatment plants (USEPA 2008e). It was discovered in 1998 in groundwater near Northern California (Rancho Cordova). Only a year later it was discovered in southern California in close proximity to a rocket engine testing facility at concentrations of up to 40,000 parts per trillion (ppt). NDMA is an organic chemical that mixes in water and is unlikely to biodegrade in the soil. At room temperature the chemical is an odorless liquid with yellow coloration. Sunlight has been shown to reduce NDMA levels in the atmosphere (ATSDR 1999).

There are several routes of exposure to NDMA, including consuming certain foods and beverages, inhaling air contaminated with certain products (e.g., rocket fuel, cigarette smoke, or pesticides), or by using some cosmetics, toiletries, and cleansers. Testing indicated the presence of NDMA in some drinking water sources as a chlorine/chloramines disinfection byproduct. However, a study published in *The Journal of Water and Health* showed that consumption of drinking water likely accounted for a small percentage of NDMA exposure (Fristachi and Rice 2007).

NDMA is listed as a priority pollutant by the USEPA and is on the Department of Defense Emerging Contaminant Watch List, but no federal standards have been established for drinking water (USEPA 2008e). However, an action level of 10 ng/L was set in 2002 by the state of California after discovering NDMA was a byproduct of disinfecting drinking water (San Francisco Public Utilities Commission 2007).

Potential Risk

Laboratory tests show low-level exposure to disinfection byproducts can produce spontaneous abortions and stillbirths. Studies conducted on animals showed increased instances of cancer (USGS 2007). However, normal levels of chlorine in drinking water leaving water treatments plants is set at or below four parts per million (ppm) – a safe level for ingestion, according to the USEPA (2000).

Children are the most at risk to the effects of DBPs because they consume more water per unit of body weight than adults. Pregnant women and people who are elderly or who have suppressed immune systems are also at increased risk.

Water customers can help protect themselves against the effects of these DBPs by reading consumer confidence reports released by their water utilities (Vora 2002).

NDMA has an USEPA Integrated Risk Information System (IRIS) classification of B2 because it is an anticipated human carcinogen. While there is no human data, lab testing on animals has proven that NDMA causes liver damage and tumors to appear in the liver, kidneys, and lungs. Based on animal test results, acute effects in humans are believed to be liver damage and low platelet counts with additional symptoms such as nausea, vomiting, headaches, and depression (USEPA 2007a).

At this time there are blood and urine tests to sample test for exposure to NDMA, but the test must be done soon after exposure and only few labs have the special equipment needed.

Example of Communication Practice

The Latham Water District serves 76,000 residential customers as well as many commercial and industrial users in Colonie, a village in upstate New York. During the third quarter sampling period in 2004, THMs exceeded the MCL of 80 ppb set in the Disinfection/Disinfection Byproducts Rule as administered by the New York State Health Department. The Latham Water District mailed a public notice to customers to advise them of the violation and provide information about THMs.

The notice included the following information:

- When the samples were collected (Sept. 1, 2004).
- Where they were collected (four sites within the town and village).
- The level of exceeded (80 ppb).
- The Running Annual Average THM level (84.3 ppb).
- The causes of THMs (naturally occurring organic material, such as decomposing tree leaves, algae, or other aquatic plants).
- Factors that affect levels of THMs (organic material in the raw water, pH, temperature, time, and chlorine residual).

- The cause of the Latham violation (engineer believed summer's above average rainfall contributed to the problem by decreasing water demands on the distribution system).
- Required Health Effects Language mandated by the EPA.
- Information about the safety of the water (health danger not yet determined; customers did not have to avoid using the water; boiling water not necessary; but further precautions could be taken, such as boiling water, or using bottled water or filters).
- Details about the four tasks the water district was undertaking to come into compliance.
- When the district was expected to be in compliance (December 2004).
- Phone numbers and Web links for customers with questions or seeking additional information.

The water district issued a press release Dec. 28, 2004, to announce that samples collected during the fourth quarter showed the district was below the MCL for THMs.

Promising Practices

- *Drinking Water Disinfection and Disinfection Byproducts* – Minnesota Department of Health, Division of Environmental Health
- *Fact Sheet: Stage 2 Disinfectants and Disinfection Byproducts Rule* – U.S. Environmental Protection Agency
- *Studies on Disinfection Byproducts and Drinking Water* – U.S. Geological Survey
- *Emerging Contaminant—N-Nitroso-dimethylamine (NDMA)* – U.S. Environmental Protection Agency

Escherichia coli

Background

There are hundreds of strains of the bacterium known as *Escherichia coli*. Most strains are harmless and co-exist in large numbers with other bacteria in the gut of humans and other animals. However, some *E. coli* strains, such as *E. coli* O157:H7 can cause severe illness. The first recorded case of illness from *E. coli* O157:H7 occurred in 1982 after a person ate contaminated hamburger meat. Since that time, other sources of contamination have been identified, including sewage-contaminated drinking water (CDC 2006a). *E. coli* 0517:H7 has frequently been identified in feces of cows and deer.

E. coli contamination is most likely after heavy rainfall, snowmelt, or when other forms of precipitation wash the bacteria into rivers and lakes used for drinking water (USEPA 2006a). *E. coli* is passed from person to person and from animals to people through loose stools containing the bacteria as many as two weeks after the illness has resolved.. People can become infected with *E. coli* 0517:H7 by drinking ground water that has not been disinfected. Water utilities that have surface water sources disinfect with chlorine, ultra-violet light and ozone.

The USEPA requires monitoring for the presence of *E. coli* under the Total Coliform Rule, but does not regulate any specific strain of *E. coli*. The presence of *E. coli* is an indication that the water has fecal contamination and that it could be contaminated with disease- causing organisms that are shed in human and animal waste, e.g., *Cryptosporidium, Hepatitis* A, *Campylobacter* and pathogenic strains of *E. coli*. *E. coli* 0157 can easily be killed by standard drinking water disinfection. (USEPA 2009a)

Potential Risk

Reactions to *E. coli* bacteria vary widely from person to person. Some have no visible symptoms. Others experience moderate symptoms such as bloody diarrhea, mild fever, and abdominal cramping. These symptoms typically appear two to four days after ingesting the bacteria and subside in 5 to 10 days (State of Connecticut Department of Public Health 2005). In some cases, a more serious illness known as hemolytic uremic syndrome (HUS) occurs. Young children, the elderly, and immunocompromised persons are most likely to experience this condition, which causes renal failure, anemia, and blindness. Hospitalization is usually required to mitigate these symptoms (Public Health of Seattle & King County 2006).

Although most people recover from their illnesses without medication, it is important for people who experience sudden bloody diarrhea to be tested in order to prevent further outbreaks. *E. coli* can be found through examination of a stool sample, but approximately one-third of labs still do not test for the bacteria. Physicians must ensure they specifically request testing if they believe *E. coli* to be present.

Upon diagnosis, infected people should avoid using antibiotics and anti-diarrheal agents. These medications have not shown an improvement in symptoms resulting from *E. coli*. Some instances show they actually increase the risk for kidney complications. Infected people should only use such medications under the supervision of a physician (CDC 2006a).

To reduce the chances of contracting *E. coli*, people should thoroughly wash their hands after changing a child's diaper, using the toilet, and before handling food. Drinking water should always be filtered before consumption. Anyone infected with a diarrheal illness should refrain from swimming in pools or lakes and from preparing food for others (New Jersey Department of Health and Senior Services 2007).

Example of Communication Practice

Walkerton was simply a small, rural town in Ontario, Canada, until a water crisis put them in the national spotlight. In 2000, the town of 5,000 was devastated by an *E. coli* outbreak in the municipal drinking water supply that left 2,300 people ill and seven people dead. The incident, the worst in Canadian history, revealed corruption and deceit in the Public Utilities Commission (PUC). It is a classic example of how failed communication can lead to tragedy (Water Quality and Health 2005b).

On May 12, heavy downpours swept cattle manure into the town's water well, contaminating it with *E. coli*. Three days later the PUC collected routine samples from the well. Reports of *E. coli* symptoms ranging from bloody diarrhea and vomiting to cramps and fever began to come in from physicians' offices around town. When laboratory results from the PUC's testing returned indicating *E. coli* contamination, the commission president failed to report them.

Reports of *E. coli* illnesses continued to stream in from throughout Walkerton. The Medical Health Office (MHO) placed repeated calls to the PUC to verify the safety of the drinking water and were continually reassured. On May 22, the MHO began conducting its own testing of the drinking water supply and issued a boil water order as an extra precaution. Two days later, MHO tests verified the presence of *E. coli* in the town's well.

After the outbreak was contained, a house-by-house disinfection process began. Each of the 2,500 customer locations in Walkerton had its pipes scrubbed clean with chlorinated water. Water was declared safe to drink on November 16, but the boil water order was not lifted until December 5.

The Ontario Provincial Police launched an investigation after a handful of residents filed a class-action lawsuit, citing negligence by the PUC. A settlement was reached in March of 2001 that provided each person affected by the outbreak at least $2,000 (CTV.ca 2004).

Justice Dennis O'Connor also launched a public inquiry into the Walkerton case. Testimony from several current and former officials revealed the corrupt nature of the PUC. O'Connor delivered a final verdict declaring the incident could have been prevented. He blamed the tragedy on the commission president's actions, along with budget cuts and the Environment Ministry's ineffectiveness. The president pleaded guilty to common nuisance and was sentenced to two years in prison for his role in the Walkerton case (CBC News Online 2004).

As a result of the Walkerton tragedy, new drinking water standards and communication practices were put into place all over Ontario to ensure the safety of the public. The misfortune also prompted other utilities in Canada and throughout the world to evaluate their public drinking water sources to prevent another incident such as Walkerton's.

Promising Practices

- *Coliform Bacteria and Drinking Water* – Washington State Department of Health
- E. coli *in Drinking Water: Information the Public Should Know* – State of Connecticut Department of Public Health
- E. coli *O157:H7 Fact Sheet* – Oregon Health Services

Endocrine Disruptors

Background

An endocrine disrupting chemical (EDC) is a natural or man-made chemical that interferes with the normal production and activity of the endocrine system – the body's main communication network. Glands, such as ovaries, testes, pituitary, and thyroid, produce hormones that are secreted into the blood and carried like messengers throughout the body to coordinate with other tissues in order to maintain and control energy levels, reproduction, and growth and development in the human body. Endocrine disruptors mimic the naturally occurring hormones (i.e., estrogen and androgen), potentially causing over-stimulation or blocking the hormone from carrying out its normal functions (National Institute of Environmental Health Sciences [NIEHS] 2006).

EDCs in the environment raise concerns due to the harmful impacts observed in wildlife. Reproduction, growth, and development of certain fish and other wildlife have been disturbed by contamination of their habitat (USEPA 1997a). For example, fish in the Great Lakes exposed to polychlorinated biphenyls (PCBs) and other man-made chemicals are exhibiting reproductive issues and swelling of the thyroid gland.

Examples of EDCs can include diethylstilbesterol (DES), dioxin, PCBs, dichlor-diphenyl-trichloroethane (DDT) and other pesticides, and Bisphenol A (BPA). BPA is a man-made chemical used in the manufacturing of polycarbonate plastics used for food and beverage containers. The man-made chemical has been known to leach out of the plastic products when heated. These chemicals can be found in cosmetics, shampoos, shaving lotions, skin creams, dishwashing liquids, pesticides, flame retardants, plastics, and anti-bacterial soaps (Underwood 2007).

Exposure to endocrine disruptors occurs through contact with pesticides or other chemicals or through ingestion of contaminated drinking water, food, or air (Natural Resources Defense Council [NRDC] 1998).

Potential Risk

According to the USEPA, evidence suggests that environmental exposure to some man-made chemicals may result in disruption of the endocrine systems in human and wildlife populations (USEPA 2006e). Although several classes of these chemicals are covered by USEPA mandates to protect public health and the environment, many scientific uncertainties remain. The International Programme on Chemical Safety (IPCS) conducted a global assessment of the state-of-the-science of endocrine disruptors in 2002, which suggest EDCs in humans may be causing:

- Reductions in male fertility
- Abnormalities in male reproductive organs
- Female reproductive diseases
- Earlier puberty
- Declines in the number of males born
- Adverse neurological development, neuroendocrine function, and behavior (Damstra et al. 2002).

The USEPA Office of Research and Development identified endocrine disruption as one of its top six research priorities and is addressing some of the uncertainties. The National Science and Technology Council Committee on Environment and Natural Resources has established a working group on endocrine disruptors that is chaired by the USEPA and includes members from several federal agencies dealing with health and environment.

"Several Federal agencies are currently engaged in a wide range of research activities relating to endocrine disruptors that include studies of exposure and effects, as well as the mechanisms of endocrine disrupting chemicals. Researchers are developing methods and models to detect, understand, and predict endocrine-related impacts in wildlife and humans. Suspected endocrine disruptors are also being evaluated for their linkage to cancer, reproductive, neurological, and immunological effects and to determine exposures in wildlife and human populations. Federal research on wildlife is measuring potential endocrine disruption in the field and developing indicators of exposure and effect in wildlife species, at individual and population levels. Human exposure research is being conducted, including occupational exposure" (USEPA 2006e).

In an effort to reduce exposure to EDCs, the USEPA has initiated a program to screen and test chemicals for potential effects. A draft list of the initial pesticide ingredients and inerts was released in June 2007 (USEPA 2007e).

Example of Communication Practice

USEPA's Pesticide Environmental Stewardship Program (PESP) was featured during the Green Festival™, a project of Global Exchange and Co-op America held in Washington, D.C. in November 2008. The Green Festival™ included a Town Hall Meeting: *Smart Choices Today – A Healthy Chesapeake Bay Tomorrow*. The Town Hall Meeting, attended by more than 100 members of the public, created a dialogue between local government officials and citizens about the choices and actions that both can take to safeguard and improve the health of the Chesapeake Bay watershed. During this event, PESP recognized one of its newest partners, the D.C. Office of the Clean City, for its efforts to increase public awareness of the condition of the Chesapeake Bay and to change behaviors that harm the Bay. The citation specifically recognized the city's work in the area of rodent control employing reduced-risk pest management strategies (USEPA 2008b).

Media Reports

A *Newsweek* article (Underwood 2007) encouraged consumers to educate themselves on the effects of EDCs and to take action steps to reduce the amount found in drinking water resources. To reduce exposure to EDCs in drinking water, the article suggested:

- Look for phthalate-free deodorants or body lotions.
- Stop using antibacterial soaps.
- Learn the proper way to dispose of over-the-counter and prescription drugs.
- Use contaminant removal devices, such as charcoal filters, tabletop water distillers, and purification units.

(This information was taken from a *Newsweek* article rather than an official government source.)

Promising Practices

- *NRDC: Endocrine Disruptors FAQ* – Natural Resources Defense Council
- *USEPA Special Report on Endocrine Disruption* – U.S. Environmental Protection Agency
- *Endocrine Disruptors* – National Institute of Environmental Health Sciences

Lead

Background

Lead is a toxic metal that was frequently used in household plumbing in houses built before 1985, the year the USEPA began imposing restrictions on lead plumbing. Before this time, lead was the predominant material used in faucets, interior water pipes, and pipes connecting houses to the main water line (USEPA 2006b).

Lead rarely exists in source water, but rather it enters water after it leaves treatment facilities through a process called corrosion. As water travels through a home's pipes, a chemical reaction causes tiny particles of lead to erode from the pipes and contaminate the water. Various factors contribute to the process of corrosion, such as temperature and acidity. For example, hot, acidic water corrodes metal faster than cold water that is low in acidity. The amount of time water remains in pipes also has an influence on corrosion. Water that remains still in a home's pipes for an extended period of time causes more corrosion than water that is constantly moving (Portland Water Bureau 2006).

The USEPA estimates that approximately 10 to 20% of lead exposure comes from drinking water (American Water Works Association 2007). Infants who consume mostly formula mixed with tap water can receive 40 to 60% of their lead exposure from drinking water. (USEPA 2006c)

In 1991, the USEPA published a regulation to control lead and copper in drinking water. The USEPA set the Maximum Contaminant Level Goal (MCLG) for lead at zero due to health concerns identified below. The USEPA also set an action level of 15 ppb, believing this was the lowest level to which water systems could reasonably be required to control this contaminant if it occurred in water at their customers home taps. (USEPA 2006c, Daniels and Mesner 2005)

> *The LCR has four basic requirements: (1) require water suppliers to optimize their treatment system to control corrosion in customer's plumbing; (2) determine tap water levels of lead and copper for customers who have lead service lines or lead-based solder in their plumbing system; (3) rule out the source water as a source of significant lead levels; and, (4) if lead action levels are exceeded, require the suppliers to educate their customers about lead and suggest actions they can take to reduce their exposure to lead through public notices and public education programs. If a water system, after installing and optimizing corrosion control treatment, continues to fail to meet the lead action level, it must begin replacing the lead service lines under its ownership*. (USEPA 2006g)

The public education process includes messages disseminated through a combination of communication channels, including newspapers, radio, and television. Certain community water systems can use language and delivery methods appropriate for their systems. (USEPA 2006g) Utilities are also required to distribute an annual report disclosing lead levels to their customers (American Water Works Association 2007).

Potential Risk

According to the USEPA consumer fact sheet (available at http://www.epa.gov/safewater/lcrmr/fs_consumer.html), short- and long-term effects of lead consumption include a variety of adverse health effects. When people are exposed to lead at levels above the action level for relatively short periods of time, effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing, and learning abilities of children, and slight increases in the blood pressure of some adults. (USEPA 2006c)

Lead has known toxic effects on the human body. Exposure to lead can result in premature birth, low birth weight, blood anemia, and delayed physical and mental development. Lead also causes chronic health problems in adults. Lead can build up in the body over time and damage the brain, red blood cells, and kidneys (Lansing Board of Water and Light 2007). Other known health effects include damage to the nervous and reproductive systems, high blood pressure, sperm reduction, and miscarried pregnancies. At this time there is no conclusive evidence to suggest that lead exposure causes cancer in humans. However, rats and mice exposed to lead in numerous studies have developed kidney tumors. This evidence resulted in the USEPA declaration of lead as a likely human carcinogen (ATSDR 2005).

Unlike with microbial water contaminants, the act of boiling concentrates lead rather than removing it. To prevent consumption of lead, water that has been standing in pipes for six hours or more should be run until it is cold. Cold water should then be heated for drinking, cooking, and making infant formula. Extra precautions can include replacing faucets with lead-free versions, cleaning particles from faucet aerators, and purchasing a filter certified by NSF International to remove lead (USEPA 2005b). Lead is not absorbed through the skin; water containing lead can be used for showering or bathing (South Carolina Department of Health and Environmental Control 2001).

Example of Communication Practice

In the spring of 2007, the Racine Water Utility, which serves about 32,000 residential and business customers, released data showing it failed tests to meet the state standard of 90% of samples with 15 ppb or fewer of lead.

The Racine Water Utility issued a Tier II Public Notice about exceeding the action level as part of its public awareness or reporting program. The notice was mailed to all customers and posted in city hall and the Post Office. The utility implemented a Public Education Program to better inform the water customers of both the effects of lead in the drinking water and ways to reduce exposure to lead.

In compliance with the Wisconsin Department of Natural Resources' regulations, the Racine Water Utility sent out brochures to its customers in March 2007. The brochures offered an explanation about the failed tests, warnings about the dangers of lead, and lead removal strategies (Block 2007). Racine continues to warn its citizens about the dangers of lead through the distribution of brochures to homes and by making information available on its Web site.

Promising Practices

- *Drinking Water Facts: Lead* – Utah State University Extension
- *Is There Lead in my Drinking Water?* – U.S. Environmental Protection Agency
- *The Facts About Lead in Drinking Water* – South Carolina Department of Health and Environmental Control
- *Lead and Copper Minor Revisions: Fact Sheet December 1999* – U.S. Environmental Protection Agency
- *Consumer Fact Sheet on Lead in Drinking Water* – U.S. Environmental Protection Agency

MTBE

Background

Methyl tertiary butyl ether (MTBE) is a colorless liquid often used as a gasoline additive. Beginning in the 1970s, MTBE was used as a replacement for lead in gasoline to increase its octane. In 1992, MTBE became more widely used in many metropolitan areas as an oxygenate for fuel to meet requirements of the USEPA's Oxygenated Fuel Program. MTBE is the favored oxygenate because of its low cost, ease of manufacturing, and blending capabilities with gasoline (Gullick and LeChevallier 2000).

Reports indicate use of oxygenated fuel has improved air quality in many areas, but, as a result, MTBE contamination of drinking water has occurred through several different sources, including leaking storage tanks, spills, and boat engines. MTBE seeps quickly into groundwater and remains there for a long time before breaking down. The taste and odor threshold for MTBE is very low; meaning only a small amount of the gasoline additive present in a water source can be grounds for declaring it unusable. Several wells, including ones in South Lake Tahoe and Santa Monica, Calif., have been closed indefinitely because of MTBE contamination (USEPA 2006b).

Potential Risk

Little research has been conducted on the health effects of consuming MTBE in drinking water. Consumption of MTBE presents a few symptoms, such as nausea, dizziness, shortness of breath, and diarrhea. Possible long-term health effects include gastrointestinal complications and liver and kidney damage. Laboratory rats exposed to MTBE through inhalation and oil applied to their skin developed cancer and nervous system damage. However, this evidence is not sufficient to conclusively determine whether consumption of MTBE-contaminated drinking water causes cancer (U.S. Army Center for Health Promotion and Preventive Medicine 2007).

Water utilities have technologies, such as air stripping, granular activated carbon (GAC), and advanced oxidation, to remove MTBE from water supplies. Home filters can be used for extra precautions but should be approved by NSF for MTBE removal (USEPA 2007b).

Example of Communication Practice

The city of Santa Monica, Calif. has cutting-edge environmental policies. In 1994, the city approved the "Sustainable Cities" program to reduce environmental impacts. Among the city's efforts was an initiative to reduce dependence on outside water sources. The plan worked for a short time, which increased Santa Monica's water production from 31% to 70%.

On October 15, 1995, officials discovered concentrations of MTBE fifty times higher than state regulations in seven of the city's drinking water wells. This discovery forced the city to close the wells that produced 80% of the city's drinking water. Investigators determined that leaking gasoline storage tanks near the wells caused the contamination.

Reports later revealed that oil companies, including Chevron and Exxon-Mobil, knew about rotting storage tanks as early as 1992. They failed to communicate this information to city officials until several of the wells were severely corroded. The city pursued legal action and settled six years after the contamination discovery. The companies involved agreed to perform a complete clean up of the involved wells.

Though the oil companies agreed to pay for repairs, their failure to relay information in a timely manner left many of the wells beyond repair. Because of the contaminated areas, Santa Monica will have to import more than two billion gallons of water from outside sources by 2015. This will cost the city approximately $24.5 million. In addition to the financial resources it will take, importing water will lead to depletion of natural resources from the already strained Colorado River (Jahagirdar 2003).

The oil companies' communication practices could have resulted in a public health disaster. This is still a possibility because long-term effects of MTBE exposure have yet to be determined. Communication between industries and public utilities must improve to prevent further environmental and health risks.

Promising Practices

- *Information on Toxic Chemicals: Methyl Tertiary Butyl Ether (MTBE)* – Wisconsin Department of Health and Family Services
- *What You Need to Know About MTBE in Drinking Water* – Connecticut Department of Public Health
- *MTBE (methyl-t-butyl ether) in Drinking Water* – U.S. Environmental Protection Agency

Perchlorate

Background

Existing in solid and liquid forms, perchlorate is a chemical oxidizer typically found in rocket fuel, fireworks, explosives, gunpowder, temporary adhesives, batteries, and other products (USEPA 2007a). At high temperatures perchlorate is extremely reactive, but in normal temperatures it can be slow moving and travels easily through water (ATSDR 2006). It is immobile in dry soil where it remains in the environment for decades without breaking down (Department of Toxic Substances Control 2006).

Military forces in countries throughout the world use 90% of perchlorate that is produced. Many countries consider the amounts they make confidential, which makes it difficult to track human exposure (Massachusetts Military Reservation 2007). Small amounts of perchlorate (considered not enough to be harmful) are generated during the disinfection process. While the most prevalent source of perchlorate has been attributed to products of rocket propellants, fireworks, and other explosives, perchlorate can also occur naturally in the environment. For example, Chile possesses caliche ores rich in sodium nitrate ($NaNO_3$), which are also a natural source of perchlorate (USEPA 2008F). Although there are many theories to explain the natural formation of perchlorate, it appears that conditions required for nitrate formation are similar to those required for perchlorate. Furthermore, naturally occurring perchlorate is likely to form in environments with arid climates and strong evaporitic conditions (Orris et al. 2003).

The main source of exposure to perchlorate is consumption of contaminated drinking water and food. There is no known risk associated with skin absorption. In December 2008, the USEPA issued an interim drinking water health advisory level (15 µg/l) based on the recommendations of the National Research Council (NRC) of the National Academies as reported in "Health Implications of Perchlorate Ingestion" (National Research Council 2005). The NRC recommended and EPA adopted a Reference Dose (RfD) of 0.7 µg/kg/day" (USEPA 2008f). It is considered a contaminant of emerging concern.

Other sources of perchlorate exposure are cow's milk, breast milk, certain tobacco products, intake of contaminated soil by young children, and inhalation of dust generated during the manufacturing of the chemical.

Potential Risk

Individuals with thyroid problems, pregnant women, and infants are at the highest risk for complications due to perchlorate exposure. The most serious side effect of exposure is disruption of the thyroid gland, which, in turn, affects the nervous system and the metabolism. Other effects include skin rash, vomiting, and nausea.

To prevent harmful side effects of perchlorate exposure, products containing perchlorate should always be stored as directed. People should avoid consuming water near contaminated areas, keep children from consuming contaminated soil, and practice proper hand washing techniques.

The most efficient way to test for perchlorate exposure is through a urine specimen. However, it must be done quickly because the chemical leaves the body approximately eight to 12 hours after entering (ATSDR 2006).

Example of Communication Practice

The Rancho Cordova community in Northern California is situated near the confluence of the American and Sacramento rivers, and people living there have been identified as victims of one of the oldest groundwater contamination controversies in the state.

A leading maker of solid and liquid propellants since 1951, Aerojet Corporation had violated a number of environmental and safety codes by dumping waste chemicals, including perchlorate, into unlined pits.

According to USEPA records, the disposed perchlorate migrated into local drinking water sources. In 1997, officials found perchlorate in several drinking water wells, which contaminated 55% of the city's water supply. Many community members came forward to complain of diseases linked to perchlorate exposure ranging from malignant tumors to abnormal hormone function. The economy was also at risk. Eleven drinking water wells capable of producing 7,260 gallons a minute, enough to supply over 25,000 families for a year, were closed due to contamination, which left the community at risk of not having enough drinking water to meet its future needs.

Public information is vital to protecting the health of the Rancho Cordova community and protecting the area's water supplies for the future. Experts have suggested that the California Department of Public Health Services make "all information about potential drinking water sources readily available to the public" by posting it on the Internet in an easily understandable format (Jahagirdar 2003).

Promising Practices

- *Perchlorate* – Massachusetts Military Reservation: Impact Groundwater Study Program
- *Perchlorate Fact Sheet* – The Air Force Resource for Environmental Risk Evaluation and Communication
- *Perchlorate Fact Sheet for Public Water Suppliers* – Massachusetts Department of Environmental Protection

Pharmaceuticals

Background

Large quantities of prescription drugs, such as birth control pills, antidepressants, painkillers, tranquillizers, antibiotics, chemotherapy agents, and anti-seizure medicine, are routinely being introduced to the nation's water supply, which is causing concern about public health and safety. Many people are flushing unused or outdated pharmaceuticals down a toilet, washing them down a drain, or dumping them in the trash. The main concern is that certain prescriptions "can kill helpful bacteria in the septic system and pass largely untouched through sewage treatment plants. Once in the landfill, drugs can trickle into the groundwater" (Leonnig 2008).

Preliminary water-quality collections began in Europe in the early 1990s when a cholesterol-lowering drug, clofibric acid, was discovered in groundwater (Reynolds 2003). This sparked further research in the U.S. during 1999 and 2000, which was the first nationwide inspection to prove the occurrence of pharmaceuticals, hormones, and other organic wastewater contaminants (OWCs). The Toxic Substances Hydrology Program of the USGS collected and analyzed 129 streams in 30 states (Buxton and Kolpin 2002). Pharmaceutical contaminants were found in 80% of the 139 streams tested (Water Quality and Health 2005a). "Pharmaceuticals have since been found in treated sewage flows, surface waters, soil, and tap water, though at very low levels (parts per trillion, [ppt])" (Reynolds 2003). Currently, concentrations of pharmaceuticals in drinking water are not controlled in the U.S. (Snyder et al. 2005).

Potential Risk

Considered contaminants of emerging concern, pharmaceuticals drew national attention in March 2008 following a series of investigative reports by the Associated Press (AP) into the presence of pharmaceuticals and personal care products in drinking water of 24 cities in the United States. Utilities are able to detect small amounts of these chemicals, but science has not yet determined if the presence of these pharmaceuticals (and at what amount) harm human health (Donn et al. 2008). Scientists believe that if any living things suffered adverse effects from these drugs, it would be fish and other creatures living in the rivers or streams. "Research has shown a high number of fish with high levels of estrogen and antidepressants in their system, with many showing signs of significant neurological and physiological disorders." There is also evidence that pharmaceuticals may be a factor in the "feminization of male fish" (Water Quality and Health 2005a). "Other studies have shown antidepressants to trigger premature spawning in shellfish, while drugs designed to treat heart ailments block the ability of fish to repair damaged fins." This is directly related to the fact that many pharmaceuticals are considered to be EDCs, meaning they interfere with the endocrine system (glands that produce hormones). Furthermore, "antibiotics and estrogen are only two of many pharmaceuticals suspected of persisting in the environment, either due to their inability to naturally biodegrade or continued prevalence as a result of continuous release." In the future, this could lead to long-term ecosystem problems as more aquatic life becomes exposed (Reynolds 2003).

Adverse effects in humans are unknown. Currently, concentrations are too low to have an effect on people; however, long-term risk remains an issue. Conventional drinking and wastewater treatment plants cannot completely remove many EDCs because they are resistant to normal methods of purification (Snyder et al. 2003).

Furthermore, there are a few laboratories capable of chemical trace analysis and the cost is extremely high (Snyder et al. 2005). Some pharmaceutical experts are concerned that disease-causing bacteria could become immune to treatment and that drug-resistant diseases could develop. Arid regions are more susceptible to drug-contaminated water flow because they are more likely to have streams that rely almost entirely on larger bodies of water for flow, especially during dry months. Furthermore, large numbers of retirees, who tend to be high prescriptions users, often move to dryer climates, therefore causing higher occurrences of pharmaceuticals in the water supply (Arizona Water Resource 2000).

Example of Communication Practice

In March 2008, the AP reported on its investigation into pharmaceuticals in drinking water supplies of 24 major metropolitan areas. While the presence of pharmaceuticals was not "news," the AP presented new information about specific community's water supplies. This set off a series of other reports focusing on local drinking water supplies. For example, the *Washington Post* reported that the Capital area's water contained trace amounts of six commonly used drugs that cannot be filtered out by most wastewater treatment systems (Leonnig 2008).

In 2007 when the AP first interviewed America Water Works Association about pharmaceuticals in the water, AWWA issued a public affairs advisory to utility members and provided talking points, consumer handouts, and other resources. The week before the story ran, AWWA:

- Issued two more advisories,
- Recommended that utilities contact their local media outlets before the story broke, and
- Phoned each utility known to be named in the story as testing positive for pharmaceuticals (Kail 2008).

These communication practices enabled some member utilities to prepare to answer questions about pharmaceuticals in their drinking water. Several utilities provided test results to the AP and their local papers and/or posted them on their Web sites. Many other, often smaller utilities were reluctant to comment or reveal tests results on whether or not they had tested for pharmaceutical chemicals. One Midwest water treatment plant supervisor refused to answer AP questions, cited post-9/11 issues and added, "We're not putting out more information that we have to put out. How about that?" (Donn et al. 2008).

The AP report and AWWA Public Affairs Office response both point to the need for drinking water utility personnel at all levels and public officials in their communities to be prepared every day for media and public inquiries about the safety and quality of treated drinking water with accurate, clearly understood communication that will inform without causing alarm.

Promising Practices

- *Evaluating Pharmaceutical Wastes* – Minnesota Pollution Control Agency
- *Pharmaceuticals and Endocrine Disruptors in Rivers and On Tap* – Robert W. Masters, National Ground Water Association (NGWA)
- *Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams* – United States Geological Survey

RISK COMMUNICATION

Background

For this document, a crisis is defined as any event that (a) significantly disrupts a water utility's ability to conduct normal business and that (b) generates media coverage and public scrutiny sufficient enough to threaten its ability to achieve its mission of providing clean, safe drinking water.

A crisis event that has or should have been recognized by water utility management and that could generate negative media coverage and public scrutiny if it becomes widely known is described as a lingering crisis rather than an immediate crisis, which is unexpected. One of the first steps in managing a crisis of any type is to conduct a risk assessment. Water utilities generally have some form of risk assessment and management as a standard business practice.

The social science of risk and crisis communication is an emerging area of interest for many industries and critical infrastructures. Risk communication can play a key role in preventing or mitigating adverse human health effects related to drinking water contaminant exposure. Water utility management and communication staff must understand the needs of their communities and be able to communicate about technical issues of drinking water contaminant risk and needs of the community (ATSDR 1994). Risk communication is an interactive process, which means that water utilities will need to engage all stakeholders in their risk communication process strategy to gain insight and information about the individuals, groups, and institutions.

Across the board, risk communication experts advise preparing a well thought out and organized risk communication plan. For drinking water utilities the process includes:

- Educating staff on USEPA and state regulations regarding format and content of each type of notice based on the contaminant and its threat to human health
- Knowing the specific regulations on formatting and wording for these notices
- Identifying the communication methods approved by the USEPA and other methods that will reach vulnerable, special populations
- Identifying the drinking water utility spokesperson who is authorized and prepared to speak on behalf of the organization
- Training other employees on interacting with the media

Example of Communication Practice

The CDC's analysis of its strategies and tactics used during the pre-event, response, and post-event stages of Hurricane Katrina to address a range of emergency communication exigencies identified three difficult challenges for communication specialists: rapid dissemination of health messages; adaptation of health messages for diverse audiences, locations, and circumstances; and phasing of key risk messages during the response phase. It suggests being able to adapt messages on the fly and emphasized the importance of localizing communication efforts by using local staff as liaisons with state and federal communication personnel who were then able to adapt messages and formats to respond quickly to diverse communication needs. For example, the staff created door hangers for door-to-door delivery of poison and prevention materials; created stickers for children in evacuation centers to remind them about hand hygiene; and created one-line messages for high-frequency radio broadcasts. The Web site was reformatted, translated, and recombined with other messages that were easy to read and included pictograms. After the event, an analysis of performance found three major needs: to improve low-technology information delivery; to develop a system for faster adaptation; and to rethink the phasing of message dissemination.

This study suggests that emergency communicators need to be prepared in advance with materials and plans, but at the same time be able to adapt procedures, channels, and messages to the dynamic nature of a crisis. This report identified several important pre-event communication activities:

- Development of messages
- Review of messages
- Adaptation of messages to reflect literacy level and cultural context of diverse audiences
- Dissemination of messages in advance to local media and state public health information officers (Vanderford et al. 2007)

INDUSTRY RESEARCH

Water Industry Research

Overview

The nation's drinking water supply has improved dramatically since passage of the Clean Water Act in the 1970s. Many toxic substances and pathogens are now effectively minimized through treatment techniques. However, low levels of certain man-made chemicals, such as pesticides, gasoline hydrocarbons, personal care and household products, disinfection byproducts, and manufacturing additives, remain in public water supplies after treatment. These are unregulated and are not required to be monitored or removed (Delzer and Hamilton 2007). Current treatment processes, however, do not always detect the growing number of contaminants (Underwood 2007).

Since water has been identified as one of America's most critical infrastructures, strategic crisis and risk communication in the drinking water and wastewater industries has become an essential management practice for protecting the health of customers and local communities. Not only are drinking water supplies at risk of contamination through man-made or natural disasters, but public health is also threatened by leaking fuel storage tanks, pipelines, refueling spills, automobile accidents, man-made chemicals (such as pharmaceuticals or perchlorates accidentally or purposely being released into the water supply), and flooding. Drinking water utilities must be prepared to communicate the risks, facts about the specific contaminant, and action steps for consumers to take to protect their health and the health of people for whom they are responsible. (USEPA 2004c).

Promising Practices in Risk Communication

After the anthrax attacks of 9/11, drinking water utilities worried they could be potential targets for similar threats. The industry recognized that a collected assembly of information on attacks involving water utilities did not exist. In an effort to share ideas and experiences and encourage collaborations among those in the industry, the USEPA hosted a symposium in San

Francisco, Calif., about communicating risks to drinking and wastewater systems. The goal was to inform key water security stakeholder groups about effective risk communication strategies, tools, and plans. Attending were state and local drinking water and wastewater agencies, local emergency response organizations, elected officials, and the media.

Many case studies were presented at the symposium. They generally followed similar steps toward developing an overall successful risk/crisis communication practice.

Terri Stratton, risk communication co-lead for the California Department of Health Services (DHS), recommended that drinking water utilities know their communities by performing a community assessment at the beginning of the process (Stratton 2004). This type of assessment means identifying and communicating with the many different players, including stakeholders, media outlets, and potential partners.

As part of the process of identifying stakeholders, James McDaniel, Los Angeles Department of Water and Power (LADWP) deputy assistant manager, suggested building connections through other organizations and networks, such as caregivers for the immunocompromised, schools, hospitals, senior centers, restaurants, large commercial water users, and those who distribute low-flow toilets within the community (McDaniel 2004). He said the media was another important member of the stakeholder group because the media, including ethnic media, has the ability to reach the public at-large and several other "subpopulations" that may need special information in alternative formats. Media directories can be accessed in most communities. (Additional research will be required to find outlets that reach populations with barriers to traditional communication.) Additionally, part of identifying stakeholders is identifying organizations and agencies that could be potential partners of a drinking water utility in communication and outreach efforts. The LADWP provided a list of potential partners, including:

- U. S. Environmental Protection Agency
- State and local health departments
- Water ISAC (Information Sharing and Analysis Center)
- Rapid response providers (neighboring utilities and wholesalers)
- Local law enforcement
- First responders (county sheriff, county health, state offices of emergency services [OES], and state departments of justice)
- Referral services with other utilities to share information (USEPA 2004b)

A short list of partners provided by the California DHS included a public information officer from a water utility, emergency services, health department with networks and outreach to special populations, and a city representative (Stratton 2004). Initiating and maintaining relationships with all identified partners might be an unattainable goal for small utilities with few staff and a tight budget, but creating a short list of high-priority partners is achievable.

Another key step in the risk communication process identified at the symposium was building relationships or making collaborations. In his report on the "Psychology of Risk Perception," David Ropiek warned that trust was a prime ingredient in relationship building and all communication must be open, honest, timely, and accurate (Ropiek 2004). As part of its relationship building, the Washington State Department of Health worked with partners and collaborators to establish goals and objectives plus roles and responsibilities. They also suggested that partners be asked to participate in message development and the creation of tools by providing feedback during the draft phase (Clifford 2004). Another outreach approach would be to convene an advisory committee or informal group interested in regular interaction on policies and procedures as well as material review and development.

Message and tool development should be designed with many different populations in mind to ensure that the message will be received and acted on by those who receive it. The California DHS showed how to provide transparency in the planning process by sending out periodic press releases and public information materials to keep consumers updated on current procedures and next steps (Stratton 2004). Another effective process for message development was "message mapping." Message mapping was described as a seven-step tool for overcoming communication barriers. The steps are:

4. Gather a list of stakeholders in your risk communications plans/message map development.
5. Identify potential stakeholder questions/concerns, and divide into the following three categories:
    a. Overarching questions
    b. Informational questions
    c. Challenging questions
6. Analyze questions to identify common sets of concerns, and construct a matrix with stakeholders on one axis and concerns on the other.
7. Develop key messages in response to each stakeholder questions and concern.
8. Develop supporting facts for each question and concern.
9. Test and practice messages.
10. Deliver maps through appropriate information channels (Covello et al. 2007).

In response to the fires in Southern California in 2003, the California DHS followed a specific application of crisis and risk communication actions, including involving risk communicators early, issuing public health messages with **clear** guidance on what to do, using press releases to disperse information on early actions taken, targeting messages to many populations, and sending press releases to already identified partners (Stratton 2004).

LADWP, California's largest retail water supplier serving 3.8 million in the Los Angeles area, presented an approach to message delivery. The utility has had to respond to a number of incidents including high chlorine due to a chlorine injector misfeed, earthquakes, and incidents of noncompliance. To reach customers during these events, the utility personnel used signage and road barriers, contracted language translators, used mapping tools for hard copy and electronic delivery of maps that identified pressure zones and geographic boundaries for notification and return to service messages and standard templates for "Boil Water," "Do Not Use," and "Return to Service" (McDaniel 2004).

To notify or alert those in potential danger during an emergency situation, the Cincinnati, Ohio, Fire Department used such notification techniques as outdoor warning sirens, television emergency alert systems, telephone trees, blast faxes, and e-mail, National Oceanic and Atmospheric Administration (NOAA) weather radio (can be used for non-weather-related emergencies), and the Disaster Radio Network to notify hospitals of sick and injured (Dadosky 2004).

Once message content has been conceptualized and developed and partners have been identified, presenters said it was important to test those messages and established relationships to identify gaps in planning and better understand roles and relationships. The Washington State Department of Health conducted workshops and tabletop exercises with state and local health department officers as well as water utility personnel to explore cross-jurisdictional coordination and communication issues (Clifford 2004).

A crisis communication plan is never complete. New issues continually emerge, relationships change and evolve. Testing and information-sharing reveal gaps or breakdowns in planning and plans need to be adjusted to fit current and future circumstances. The California DHS advocated for a transparent planning process by inviting public and stakeholder input in all aspects of the process. Relationships with the public, stakeholders, partners, and others should continue to be maintained as long as the potential for risk exists (Stratton 2004).

Energy Industry Research

Overview

As a public utility, the drinking water industry can adapt exemplary communication methods employed by other public utilities during an emergency situation. Energy utilities are a critical infrastructure, as are drinking water utilities, and disruption of service can impact the public in much the same was as a contamination event. “An energy emergency is an actual or potential loss of energy supply that significantly impacts the state. An energy emergency can be caused by natural disasters (such as earthquake, fire, or flood) or geopolitical events (such as war, terrorism, civil disturbance, or embargo)” (California Energy Commission 2006). Communication methods are also especially important when sending messages to the public about their role in energy conservation and safety.

Promising Practices in Risk Communication

Among the exemplary practices identified in the research literature about energy industry risk communication were:

- Identify and utilize as many resources as possible to relay important messages to target audiences.
- Identify and build relationships with stakeholders who can offer support in a crisis.
- Form mutual aid agreements between cooperative and municipal utilities and their Investor Owned Utilities (IOUs). Mutual agreements can supply additional trained manpower, vehicles, and a range of equipment to assist in restoring power sooner if an outage were to occur (North Carolina State Energy Office 2003).
- Form partnerships with fire, police, public health, and other emergency personnel to aid in a more efficient emergency response plan.

The California Energy Commission utilized the following stages for disaster planning:

- Readiness
- Verification
- Pre-emergency
- Emergency

During an emergency an established chain of command should take effect in order to pass appropriate messages down an information pipeline. The role of the Public Information Officer (PIO) has special importance in this pipeline. In the state of California, the PIOs coordinated media conferences, media releases, and Web updates. They also guaranteed that any messages released were coordinated with the appropriate state agencies. Because messages needed to be sent at the proper time and to the correct place, the PIO had an important responsibility in the verification, pre-emergency, and emergency stages of a crisis (California Energy Commission 2006).

"Energy companies and governments have long wrestled with the task of providing accurate and sufficient information without causing panic. Most citizens are well prepared for short-term outages and, although annoyed, understand the issues. Over the years, energy companies and governments have learned the value of being forthright when discussing energy interruptions and shortages. Lack of candor can turn public opinion against energy providers and government and is unlikely to elicit cooperation during restoration. A useful part of preparing for an energy emergency is regular staff training on media relations. This includes gathering data under pressure, completing analyses rapidly, and conveying complex information effectively" (North Carolina State Energy Office 2003). Serving a large population makes message-mapping a standard component in the communication process. Every message must be tailored to the target population, and particularly to vulnerable, special populations.

These subgroups of special populations within every community include people who are:

- Geographically isolated
- Economically disadvantaged
- Individuals with special medical conditions that place them at risk when a utility emergency takes place

The highest priority for restoring power is in areas with the largest number of people. Individuals in remote areas are the lowest priority. When an energy emergency creates a shortage of supply and high demand, economically disadvantaged populations might not be able to afford energy for their homes. Furthermore, individuals relying on power-supplied medical equipment are particularly at risk if no power is available for an extended period of time.

Good examples of exemplary communication practices in the energy industry are limited. The Kansas City Kansas Board of Public Utilities and Portland General Electric both have 24-hour/seven-day-a-week telephone hotlines that would be double-staffed during emergency situations. Both have good resources on their Web site for utility consumers. The Portland Web site contains information to use during an outage, including an emergency checklist, step-by-step instructions for how to report and handle a power outage at a home or business, instructions for storing and cooking food throughout an outage, and tips for life support patients or patients with critical medical equipment that requires electricity (Portland General Electric 2007). The Kansas City Board of Public Utilities' Web site also offers emergency assistance numbers; safety tips; 24-hour emergency numbers for weekdays, weekends, and holidays; and instructions for individuals and their families who might require electric powered medical equipment (Kansas City Board of Public Utilities 2005).

Although these two sources presented some communication tools, they failed to address contingency plans for power outages when television, Internet, and possibly radio would be unavailable. They did not have communication plans for members of the populations without either a computer or Internet access. According to a 2007 survey done by Park Associates, 29% of U.S. households, or 31 million, did not have Internet access and did not intend to subscribe in the next year because of cost or perceived lack of value to daily life (Reuters 2007). Another 2005 study indicated that most Web sites were not designed for people with low literacy who have "radically different" online behavior than high literacy users (Nielsen 2005).

Health Sector Research

Overview

The health sector is an important ally to the water industry in communicating to the public about the effects of water contaminants on human health. Promising practices from the health sector can provide a good base of knowledge for putting together a risk communication strategy that can serve as a reference document in preparing for any emergency.

Promising Practices in Risk Communication

During an emergency, the public generally turns to the media and trusted sources, such as government officials and organizational or community leaders, for information and reassurance. These information sources should be prepared with a crisis communication process strategy that offers guidance on message development, clear guidelines for verifying information and approving messages, staff roles and working with partner agencies, community stakeholders and media.

Messaging. A good crisis communication plan gives guidance in preparing, approving, and disseminating messages to the public. A variety of messages could be prepared in advance of an emergency, which can save time and make the process flow faster to give the public resources for information and instructions when they need it most – at the onset of the emergency. Materials that can be pre-packaged include:

- Fact sheets
- Press releases
- Pamphlets and brochures
- Maps
- Fliers with diagrams and illustrations

These pre-packaged materials can be tailored to different contaminants and emergency scenarios with appropriate information about personal protective measures for individuals and groups. They can also include local emergency telephone numbers and maps to local emergency treatment facilities.

Audience. Messages should be tailored to specific audiences with specific consideration given to those with special needs, including individuals who are:

- Geographically and culturally isolated
- Without access or experiencing barriers to traditional communications
- Limited in literacy skills
- Visitors or tourists
- Non-English speakers
- Disabled or physically or cognitively impaired
- Very young or very old

To get messages to the general public and those listed as special populations, research must be carried out to determine the best tactics, tools, and vehicles for dissemination. The research needs to identify the audience's trusted sources, different languages spoken, cultural practices and belief systems, and physical and mental characteristics and limitations. This can be accomplished by searching the U.S. Census and by conducting interviews and focus groups with local organizations that have daily access to different population subgroups.

Next, for effective message delivery it is important to know where the populations are located. Those in remote rural areas will have different barriers to communication or different ways to receive messages than people living in an urban setting.

To reach the audience in the identified locations, community- and faith-based organizations can provide a direct link to the populations they serve. For instance, research shows that African Americans, Hispanics, and Native Americans distrust mainstream media messages and typically get information from a local newsletter or other medium geared toward them by a local community- or faith-based group. Without that bit of knowledge, a crisis communication plan can miss substantial audiences with its messages (CDC 2007b).

Staffing. A crisis communication plan should address staff positions and functions, shift management, and staff surge capacity as well as identify staff roles and responsibilities during an emergency. Staff roles to be defined include spokesperson, lead and assistant public information officers, liaisons to other agencies and executive decision-making and/or oversight.

Working with the media. Following the damaging earthquakes on the island of Oahu in October 2006, the governor of Hawaii formed a Comprehensive Communications Review Committee tasked with the responsibility of developing recommendations on how to more efficiently and effectively communicate with the public based on the response efforts during the earthquake. To prepare for future emergencies, the committee suggested establishing a Joint Information Center (media center) to give reporters a work area with telephone lines, Internet access, and a venue for receiving timely information from officials. The committee also commented on the importance of constantly relaying communication – approximately every 30 minutes – to the public through the media. To increase efficiency in getting those messages to members of the media, the committee wanted to assign a public affairs officer as a liaison dedicated to handling media requests for information or interviews, coordinating briefings, releasing information to the media and the public as well as correcting misinformation.

During the earthquakes, communication was a key issue. High volumes of calls following the earthquakes jammed telecommunications systems, which made communication between responders, officials, and the media difficult. The committee is exploring the possibility of cell phone text messaging emergency messages or communicating through electronic message signs along the freeway (Hawaii Reporter 2007).

Working with other agencies. A crisis occurs without consideration for state or county lines, so it is inevitable that agencies will have to work together for the greater good of communities. A crisis communications process strategy should identify contact information for state and local departments or agencies, roles for the different response agencies and the officials involved, and procedures for communication.

The CDC suggests public health agencies establish working relationships with organizations such as:

- Emergency Management Agencies (EMAs)
- Emergency Medical Services (EMS)
- Medical/health/behavioral care providers
- Fire, law enforcement, and other federal, state, local and tribal response organizations
- Local Emergency Planning Committees (LEPCs)
- State, regional, and tribal public health response coordinators
- Neighboring health jurisdictions
- Humanitarian/volunteer organizations
- Private businesses
- Academic institutions
- Other pertinent agencies/organizations (CDC)

Military Research

Overview

The defense of the nation has been identified as one of 17 critical infrastructure and key resource sectors in the United States. Water is also one of these key sectors (USDHS 2008b). As a result of the high risk associated with military actions, the armed forces must be prepared to communicate with the public during an emergency situation. But only recently have military installations started to realize the importance of communicating with their stakeholders. In the past, the military has generally communicated on a need-to-know basis, has not always been open with the public, and has been unwilling to admit errors in judgment. Building trust and developing effective communication with the public are two areas that the military establishment (as well as drinking water utilities) must address (Flannery and Fulton 2001).

Promising Practices in Risk Communication

One of the most important steps to improving communication during a military crisis is pre-emergency preparedness. The military must operate under the assumption that a crisis will inevitably happen and, therefore, plan and strategize in advance of an emergency situation. Having plans in place before a crisis occurs will help to minimize panic within the organization during the crisis (Harris et al. 2002).

While plans are beneficial, they are only truly effective when relationships are developed before the crisis happens. It is important for military organizations to locate and get to know their stakeholders in advance. This includes identifying those who are most vulnerable in particular situations, learning about their concerns, and locating public opinion leaders within the various stakeholder groups (Browde et al. 2004). Research shows that people are more receptive to those that they know or with whom they are familiar. When an emergency situation arises, the public will be more likely to respond to and cooperate with trusted sources (Kentucky Cabinet for Health and Family Services 2006). By generating relationships prior to an emergency, military organizations are able to build trust and credibility between themselves and the public.

Military communication personnel must not contribute to the natural human tendency to panic during a crisis. One of the best ways to accomplish this is to avoid complicated or scientific language when explaining the situation. When the people cannot comprehend the messages, their level of understanding goes down substantially and incorrect information begins to circulate. By using simpler language, military officials can reduce the amount of misinformation that reaches the public (Browde et al. 2004). When inaccuracies do arise, military personnel should take immediate action to provide the correct information.

Another factor in military crisis communication is the channel through which a message will be carried. There are a variety of options, and there are ups and downs for each. Some channels carry more authority and credibility, while others reach a wider audience. For instance, public or town hall meetings might carry more authority, but mass media, such as newspapers and television, reach a broader audience. Military installations must take these into consideration when distributing their messages to ensure it reaches all members of the public that are affected (Navy Environmental Health Center 2002). Some situations may pose larger problems in the decision-making process if there are segments of the population that are particularly hard to reach, such as non-English speaking populations that may not use traditional media. Everyone within the affected area must receive the facts about a situation and steps to take to ensure their safety.

Transportation Industry Research

Overview

The transit industry plays a vital role in emergency preparedness and risk management at the federal, state, and local levels. Its importance is based on multi-functional roles and responsibilities in a crisis situation.

Employee training, public awareness, and emergency preparedness are the three primary goals of the Federal Transit Authority (FTA 2006). These goals are a common reoccurrence throughout many of the approaches to emergency preparedness. The emphasis placed on communication is high. During a crisis situation, public awareness is essential to avoid additional hazards that can occur. In an effort to disseminate messages, promising practices must be used to reach as many populations as possible and reduce a higher probability of risk.

Promising Practices in Risk Communication

By building relationships with local support organizations, two-way dialogue becomes easier in an emergency. Moreover, adequately understanding the processes for creating a preparedness plan is essential to recognizing the stages at which different messages are sent. “It is impossible to optimize the overall system if its components are considered in isolation” (Hendershot 1999).

The Federal Emergency Management Agency (FEMA) created the Comprehensive Emergency Management (CEM), which includes steps to address and organize activities before, during, and after a crisis situation. Steps in the CEM are mitigations, preparedness, response, and recovery. These steps, while varying slightly, are fundamental in several different crisis plans across the transit industry.

Measures taken to reduce risk and minimize possible risks and hazards are the primary function of the *mitigations* process. Also known as “scoping,” this day-to-day function can be maintained by reviewing current vehicle and facility design, evaluating accessibility for elderly or riders with disabilities, training employees on safety procedures and policies, and promoting safe operating conditions. This stage is appropriate for educating passengers on safe ride practices and personal security.

Preparedness is the foundation for any crisis situation. Prior to an emergency a risk assessment should be conducted. This is an assessment of situations that are most likely to occur in the geographic area. Each potential hazard should have corresponding services needed. Furthermore, testing the current plan with training exercises and case study scenarios is a great way to evaluate existing practices. Establishing partnerships and communication between other participating organizations is a great resource for forging communication channels with different populations, coordinating procedures, and training programs. However, an established chain of command should be in place to define the roles of each supporting agency's staff members.

Response occurs when a crisis arises or when warning signs point to an imminent crisis situation. Depending on the crisis, responders may have little or no time to initiate preparedness procedures. Guidelines established in the preparedness phase should govern the constant monitoring and frequent communication required to maintain organization, efficiency, and effectiveness. A trained public relations specialist should be on hand to help get appropriate information out to the public and the media.

After the crisis has occurred, the *recovery* stage involves assisting the community with repairing any damage and returning operations to normal. More messages will need to be disseminated when operating functions are safe and have returned to normal. A debriefing should take place and further plan assessment needs to be conducted to evaluate its effectiveness and review any improvements that would make for a more efficient process in the future (Higgins et al. 1999).

During an emergency, transit agencies may need to alter or adapt the services they provide to the public. For example, in a weather emergency normal bus routes may be shut down due to flooding. Therefore, agencies must be prepared to keep the public up-to-date and notified on evacuation information, changes in bus routes, pick-up and drop-off points, and timing of operations. Thus, employer training on proper procedures and policies is also important. FTA employee communication occurs by two-way radio through a dispatch center while the public is informed with an up-to-date 24-hour hotline that is TTY friendly (Transit Cooperative Research Program 2006).

However, the research presented a lack of information on alternative methods of communication outside of the telephone. If telephone and power lines were knocked down in a severe weather emergency, there would need to be back-up methods for sending and receiving messages. Although the industry outlines when it is appropriate to send these messages, it does not discuss how they plan on sending these messages.

Reaching special populations is another reason specialized communication is essential for minimizing risk. The most frequently defined special populations are very old or young, have limited-English proficiency, have low literacy levels, are geographically isolated, are physically or intellectually disabled, are blind or have limited vision, and are deaf and hard of hearing. Adequately reaching all these audiences requires an appropriate use of resources.

Transit agencies team up with other supporting organizations, such as public health agencies, evacuation shelters, faith-based organizations, assisted living centers, and human services organizations, because they are helpful partners for coordinating and establishing non-traditional message channels. "Research shows that people are more likely to rely on messages from trusted sources rather than outside informants, such as the government or mainstream media" (Kentucky Cabinet for Health and Family Services 2006). Prior to and following a disaster, these organizations can forward preparedness materials to these special populations. Furthermore, emergency resources made available to the public should include materials in large print, in different languages, in Braille, and with pictures or pictograms. Any media messages disseminated during an emergency should be produced in multiple languages and in closed captioning. Other tools for locating and identifying special populations can be census data and through registries of public users who identify themselves as needing specialized assistance (FTA 2006).

APPENDIX B: PARTNER UTILITY AND PUBLIC HEALTH INTERVIEW TOOLS

INTERVIEW QUESTIONS: DRINKING WATER UTILITIES

Date:	
Name of public drinking water utility:	
Name and title of person interviewed:	
Phone number:	

Introduction

Hello. My name is _________________. I'm with Jane Mobley Associates, a communication firm and principal investigator on a study for the Awwa Research Foundation (AwwaRF). The study is called "Contaminant Risk Management Communication Strategy and Tools." You were recommended as someone who could speak about communication around drinking water contamination events. Your input will help our research team develop a consistent risk communication strategy and tools on the subject of contaminants for use by local utilities.

I have a brief survey. Is this a convenient time for you to participate?
If yes, proceed to next paragraph. If no, ask when would be a good time for you to call back.
Call back time and date:

If they decline to participate, ask if there is someone else they might recommend.
Recommendation:

Thank them for their time.

Survey

One purpose of this interview is to learn what you, as a drinking water utility official, have or need to have readily available to communicate with public health agencies, the media, vulnerable populations, and the general public in the event of water contamination that threatens public health. Another purpose is to better understand the relationship between your utility and the public health agency in your area.

I'm going to read you a list of 12 priority contaminants identified after an in-depth review of literature and consultation with public health and drinking water experts.

- Lead
- Endocrine disruptors
- Anthrax (deliberate contaminants)
- MTBE (gasoline additive)
- Perchlorate
- Pharmaceuticals
- *Cryptosporidium*
- *E. coli*
- Algal toxins
- Atrazine
- THMs (DBP as a class formed by use of chlorine)
- NDMAs (DBP as a class formed by use of chloramines)

Part I – Risk Communication Strategies and Tools

1. How familiar are you with each of these 12 contaminants and their effects on public health?

    a. Very familiar
    b. Generally familiar
    c. Heard of them
    d. Not at all familiar

2. Has your drinking water utility experienced a contamination event? If so, please identify: (*If not, move on to question 3.)*

    a. The contaminant?
    b. The risks to the public?
    c. The cause of the problem?
    d. The channels or methods used to notify the public?
    e. How was your public health agency involved?

3. If you've never had an event, please tell me briefly how your utility has prepared for the possibility of a drinking water contamination incident?

    a. Do you have a risk or crisis communication plan? Yes or No *(Circle one)*
    b. Outside the utility, who would be notified first?
    c. What materials have you prepared to give to the public?
    d. What channels or methods do you plan to use to notify the public?

4. What type of materials do you currently use to communicate with your customers about each of the following water contaminants?

   - Algal toxins
   - Anthrax (deliberate contaminants)
   - Atrazine
   - *Cryptosporidium*
   - *E. coli*
   - Lead
   - Endocrine disruptors
   - MTBE (gasoline additive)
   - Perchlorate
   - Pharmaceutical
   - THMs (DBP as a class formed by use of chlorine)
   - NDMAs (DBP as a class formed by use of chloramines)

5. Do you believe the material you've identified is effective in communicating with your customers and the media?

   a. What do you like about the materials?
   b. What don't you like?
   c. What would make them more useful?
   d. Could you please send me copies of some of your materials? What is your Web site address?

6. For contaminants of emerging concern such as endocrine disruptors and pharmaceuticals, how helpful would public education material be in increasing awareness about the proper use and disposal of personal care products, OTC drugs, and prescriptions?

   Very Somewhat Not Helpful

7. What barriers, if any, prevent you from getting the materials you need to communicate more effectively about contamination?

8. Whom do you consider your target audiences? (*Use list for prompt: Media, policy-makers, rate payers, consumers, the general public, sub-categories of the public who may be sensitive to contaminants, or vulnerable, such as non-English speakers*.)

9. How have you customized your contamination information materials and crisis strategies to reach different audiences, such as:

   - People with limited English proficiency or limited literacy skills?
   - Parents of young children?
   - People who are elderly?
   - People whose health would be at risk from a contaminant?

10. How do you use your Web site to communicate with the public?

11. Do you have two-way communication channels to receive input from the public about possible water contamination? Yes or No. (*Circle one*) If yes, please describe.

Part II – Communication and Relationship Building with Public Health

1. How would you describe the working relationship between your drinking water utility and your public health agencies?

    a. Strong partnership with regular, frequent contact
    b. Casual relationship with occasional contact
    c. Acquainted with little contact
    d. No working relationship

2. How could this relationship be strengthened?

3. What might be a common reason for you to have contact with the public health department?

4. If you needed to contact your local or state public health agency, who would you contact?

5. Have you ever worked with public health to communicate about water contamination to the public? If yes, please describe your experience.

6. In general, when do you think the local public health department should be notified about a water contamination event?

    a. When it is suspected?
    b. When the contamination is confirmed?

7. In preparation for an event, what types of information do you think public health officials need to have about likely water contaminants?

8. During a contamination event, what do you think would be the most important information a drinking water utility could give public health officials?

    - What would be the best way to distribute that information?

9. What are your barriers to working with your local public health agency?

10. Have you used materials prepared by public health about health risks from water contaminants?

    a. All the time.
    b. Some of the time.
    c. Never.
    d. If b or c, why?

That's the end of the survey. Thank you so much for participating. Your input will be extremely valuable as we develop strategies and tools for this project. Do you have any questions?

Thank you again. Goodbye.

INTERVIEW QUESTIONS: PUBLIC HEALTH PROFESSIONALS

Date:	
Name of public health agency:	
Name and title of person interviewed:	
Phone number:	

Introduction

Hello. My name is ___________________. I'm with Jane Mobley Associates, a communication firm and principal investigator on a study for the Awwa Research Foundation (AwwaRF). The study is called "Contaminant Risk Management Communication Strategy and Tools." You were recommended as a professional who could share insight on public health's role in drinking water contamination events. I am conducting brief telephone interviews with a number of public health professionals whose input will help us develop a consistent risk communication strategy and communication tools for local water utilities.

I have a brief survey. Is this a convenient time for you to participate?
If yes, proceed to next paragraph. If no, ask when would be a good time for you to call back.
Call back time and date: ____

If they decline to participate, ask if there is someone else they might recommend.
Recommendation: ____

Thank them for their time.

Survey

One purpose of this interview is to help define the relationship between drinking water utilities and public health agencies, particularly around their mutual concern for health risks from drinking water contaminants. The other purpose is to learn what types of information you, as a public health official, need from drinking water utilities to help you communicate with the media, clinicians, and the public, including vulnerable populations, in the event of a water contamination event.

I'm going to read you a list of the 12 priority contaminants identified in the study after an in-depth review of literature and consultation with a number of public health and drinking water experts.

- Lead
- Endocrine disruptors
- Anthrax (deliberate contaminants)
- MTBE (gasoline additive)
- Perchlorate
- Pharmaceuticals
- *Cryptosporidium*
- *E. coli*
- Algal toxins
- Atrazine
- THMs (DBP as a class formed by use of chlorine)
- NDMAs (DBP as a class formed by use of chloramines)

Part I – Experience with Water Contaminants

1. How familiar are you with these 12 contaminants and their effects on public health?

   a. Very familiar
   b. Generally familiar
   c. Heard of them
   d. Not at all

2. Has your agency experienced a water contamination event? If yes, please identify: *(If not, go to question 3.)*

   a. The contaminant?
   b. The risks to the public?
   c. The cause of the problem?
   d. How your public health agency was notified?
   e. The channels or methods used to notify the public?

3. If not, please tell me briefly how your public health agency would have prepared for the possibility of a drinking water contamination incident?

   a. Do you have a crisis communication plan? Yes or No *(Circle one)*
   b. Whom would you notify first?
   c. What information are you prepared to provide the public?
   d. What channels or methods do you plan to use to notify the public?
   e. How would your agency interact with drinking water officials in the case of a contamination incident?

4. If public health surveillance suspected that a drinking water contaminant might be the source of a disease outbreak, who would you contact at a water utility?

5. What type of materials do you currently use to communicate with the public about each of the following water contaminants?

    - Algal toxins
    - Anthrax (deliberate contaminants)
    - Atrazine
    - *Cryptosporidium*
    - *E. coli*
    - Lead
    - Endocrine disruptors
    - MTBE (gasoline additive)
    - Perchlorate
    - Pharmaceutical
    - THMs (DBP as a class formed by use of chlorine)
    - NDMAs (DBP as a class formed by use of chloramines)

6. Do you believe the material available to you for communication about drinking water contamination is effective in communicating with the public, health clinicians, and the media?

    a. What do you like about the materials?
    b. What don't you like?
    c. What would make them more useful?
    d. Could you please send me copies of some of your materials? What is your Web site address?

7. For contaminants of emerging concern such as endocrine disruptors and pharmaceuticals, how helpful would public educational material be in increasing awareness about the proper use and disposal of personal care products, OTC drugs, and prescriptions?

    Very   Somewhat   Not Helpful

8. Are you aware of any other tools, materials or communication strategies that might help you be more effective in reaching the media, health clinicians, and the general public in the event of water contamination?

    - People whose health would be at risk from a contaminant?

9. How do you use your Web site to communicate with the public?

10. Do you have two-way communication channels to receive input from the public about possible water contamination? Yes or No *(Circle one)* If yes, please describe.

Part II – Communication and Relationship Building with Public Health

1. How would you describe the working relationship between your local drinking water utility and your public health agency? *(Circle one)*

    a. Strong partnership with regular, frequent contact
    b. Casual relationship with occasional contact
    c. Acquainted with little contact
    d. No working relationship

2. How could this relationship be strengthened?

3. What might be a common reason for you to have contact with the drinking water utilities in your area?

4. Have you ever worked with a drinking water utility to communicate about water contamination to the public? If yes, please describe your experience.

5. In general, when do you think the local public health department should be notified about a water contamination event?

    a. When it is suspected?
    b. When the contamination is confirmed?

6. In preparation for an event, what types of information do you think public health officials need to have about likely water contaminants?

7. During a contamination event, what do you think would be the most important information the utility could give public health officials?

    - What would be the best way to distribute that information?

8. What are your barriers to working with your drinking water utilities?

9. Have you used materials prepared by the drinking water industry about health risks from water contaminants?

    a. All the time.
    b. Some of the time.
    c. Never.
    d. If b or c, why?

That's the end of the survey. Thank you so much for participating. Your input will be extremely valuable as we develop strategies and tools for this project. Do you have any questions?

Thank you again. Goodbye.

APPENDIX C: BETA TESTING DISCUSSION GUIDES

BETA TESTING DISCUSSION GUIDE – END USERS

Introduction:

"THE AWWA RESEARCH FOUNDATION, CALLED AWWARF, IS CREATING COMMUNICATION TOOLS TO PROVIDE INFORMATION TO THE PUBLIC ABOUT DRINKING WATER CONTAMINATION. YOU WOULD RECEIVE THESE MATERIALS THROUGH VARIOUS CHANNELS, INCLUDING THE TELEVISION, RADIO, NEWSPAPERS, PRINTED MATERIALS, AND HEALTH CARE PROVIDERS, SUCH AS DOCTORS' OFFICES AND PUBLIC HEALTH AGENCIES. YOU WILL BE REVIEWING FACT SHEETS DEVELOPED AROUND SPECIFIC CONTAMINANTS. I WILL THEN ASK A SERIES OF QUESTIONS RELATED TO THE INFORMATION PROVIDED IN THE TOOLS, THE APPEARANCE OF THAT INFORMATION, AND HOW THE TOOL CAN BE USED AND DISTRIBUTED. YOU CAN RESPOND TO THE QUESTIONS OPENLY AND HONESTLY SO THAT THE TOOLS CAN LATER BE CHANGED TO FIT THE NEEDS OF OUR TARGET AUDIENCE – YOU AND OTHER PEOPLE LIKE YOU!

THERE ARE NO RIGHT OR WRONG ANSWERS. EVERYONE'S OPINION IS EXTREMELY VALUABLE.

NOW, PLEASE TAKE A FEW MINUTES TO LOOK OVER THE MATERIALS. THE QUESTIONS I ASK WILL BE VERY GENERAL, BUT YOU CAN FEEL FREE TO USE SPECIFIC MATERIALS AS EXAMPLES IN YOUR RESPONSES."

Questions:

Tool Information

1. What information in the tools is easy to understand? Explain.
2. What in particular is hard to understand?
3. What do you like about the information in the tools?
4. What would you change about the information in the tools?
5. What questions, if any, do you have after reading these materials?
6. Is there more information that you would want to know? What is it?
7. Do the resources cited on the fact sheet help you believe the information in this document?

Tool Structure

1. Is the information presented in logical order?
2. What do you like about the structure, order, or appearance? (For example, should Q&A come after treating the contaminant in the water; should the resources appear on the first page and/or is Q&A a good way to present information to people?)

3. What would you change about the structure, order, or appearance?
4. Does important information stand out? (For example, do you notice words in larger type or inside a box more than other words?)

Tool Use

1. Is there a clearly stated action for you to take? (From the information in the tool, can you determine what you should do?) What is it?
2. If you received this information through television or radio, in the mail, or at your doorstep, would you:
   a. Follow any instructions on the fact sheet?
   b. Follow up with a doctor to determine effects, if any?
   c. Go online to the Internet, including the utility's Web site with questions or search for answers?
   d. Throw the information away?
   e. Worry about potential effects and be uncertain what to do?
   f. Not think at all about the information?
   g. Other ____
3. If the answer above was "throw the information away," what would make you keep it?

Tool Distribution

1. What is the best way for a water utility to give you this information – if it **is not** an emergency?
   a. Flier in the mail
   b. Bill insert
   c. Door hanger (information left on the door handle of your front door)
   d. Mainstream media – television, radio, newspaper
   e. Ethnic media – television, radio, newspaper
   f. Utility person going door-to-door, face-to-face communication
   g. Through a doctor's office, hospital or public health department
   h. Water quality report and/or Consumer Confidence Report (annual report that water utilities must distribute or make available to customers annually)
   i. Other____

2. What is the best way for a water utility to give you this information – if it **is** an emergency?
   a. Flier in the mail
   b. Door hanger (information left on the door handle of your front door)
   c. Mainstream media – television, radio, newspaper
   d. Ethnic media – television, radio, newspaper
   e. Utility person going door-to-door, face-to-face communication
   f. Through a doctor's office, hospital, or public health department
   g. Other____

Wrap up:

"THANK YOU FOR YOUR PARTICIPATION. YOUR THOUGHTS AND IDEAS WILL HELP AWWARF CREATE BETTER MESSAGES TO COMMUNICATE CRITICAL INFORMATION RELATED TO DRINKING WATER AND HEALTH TO YOU AND OTHERS THROUGHOUT THE UNITED STATES."

BETA TESTING DISCUSSION GUIDE – END USERS/MEDIA
FACE-TO-FACE OR PHONE

Introduction:

THE AWWA RESEARCH FOUNDATION, CALLED AWWARF, IS CREATING COMMUNICATION TOOLS TO PROVIDE INFORMATION TO THE PUBLIC ABOUT DRINKING WATER CONTAMINATION. YOU WOULD RECEIVE THESE MATERIALS THROUGH YOUR LOCAL PUBLIC HEALTH AGENCY AND PUBLIC WATER UTILITY AND COULD USE THEM TO HELP COMMUNICATE WITH YOUR VARIOUS AUDIENCES.

IT IS AWWARF's GOAL THAT THESE TOOLS COULD BE USED BY BOTH THE WATER AND PUBLIC HEALTH INDUSTRIES TO COMMUNICATE INFORMATION TO THE PUBLIC THROUGH THE NEWS MEDIA. IT IS IMPERATIVE THAT WE CAPTURE YOUR THOUGHTS AND IDEAS SO THAT WE CAN LATER TAILOR THE TOOLS TO BEST SERVE YOUR AUDIENCES AND COMMUNITY.

Face-to-face

YOU WILL REVIEW NEWS RELEASES AND FACT SHEETS DEVELOPED AROUND SPECIFIC CONTAMINANTS.

Phone

YOU HAVE ALREADY RECEIVED COPIES OF SOME OF THESE TOOLS FOR YOUR VIEW.

Both

I WILL ASK A SERIES OF QUESTIONS RELATED TO THE INFORMATION PROVIDED IN THE TOOLS, THE APPEARANCE OF THAT INFORMATION, AND HOW THE TOOL CAN BE USED AND DISTRIBUTED. YOU CAN RESPOND TO THE QUESTIONS OPENLY AND HONESTLY SO THAT THE TOOLS CAN LATER BE CHANGED TO FIT THE NEEDS OF OUR TARGET AUDIENCE – YOU AND OTHER PEOPLE LIKE YOU!

THERE ARE NO RIGHT OR WRONG ANSWERS. EVERYONE'S OPINION IS EXTREMELY VALUABLE.

THE QUESTIONS I ASK ABOUT THE MATERIALS WILL BE VERY GENERAL, BUT YOU CAN FEEL FREE TO USE SPECIFIC MATERIALS AS EXAMPLES IN YOUR RESPONSE.

Questions

THE FIRST SET OF QUESTIONS IS GEARED TOWARD GETTING FEEDBACK ON THE INFORMATION IN THE TOOLS. IN INTERVIEWS, SEVERAL DRINKING WATER UTILITIES DESCRIBED CHARACTERISTICS THEY WANTED IN COMMUNICATION TOOLS. MANY OF THESE CHARACTERISTICS APPLY TO NEWS RELEASES. AS I READ A CHARACTERISTIC, PLEASE RESPOND IF THE TOOLS MEET THE REQUIREMENT AS AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR DISAGREE.

Tool Information

1. Do you believe the tools [are]:

CHARACTERISTIC	AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	DISAGREE
Actionable (tell people what to do)				
Useful for the media				
Clearly written				
Simply written with plain language				
Easy for public to understand				
Sufficient to answer questions of what, where, when, why, and who is affected				
Sufficient to address what utility is doing about the situation				
Credible (Do you believe the message?)				
Adequately describe contaminants and how they are used				
Adequately describe current treatment to remove contaminant (if known)				
Provide information on where to find more details				

2. In the areas where you somewhat disagreed or disagreed, what is your concern? (Take these one at a time.)
3. Is there more information that you would want to know? What is it?
4. Do the resources cited on the fact sheet help you believe the information in this document?

WE ARE MOVING ON TO A NEW SET OF QUESTIONS. THESE ARE GEARED TOWARD GETTING FEEDBACK ON THE STRUCTURE OF THE TOOLS.

Tool Structure

1. Is the information presented in logical order?
2. What would you change about the structure, order, or appearance?

THE LAST TWO QUESTIONS ARE GEARED TOWARD GETTING YOUR FEEDBACK ON TOOL USE AND DISTRIBUTION.

Tool Use and Distribution

1. Would these tools be useful to you in reporting the risk of drinking water contamination or an actual contaminant event in your community?
    a. If not, why
2. What is the best way for a water utility to give you this information – if it **<u>is not</u>** an emergency?
    a. E-mail from the water utility
    b. Fax from the water utility
    c. Mail
    d. Telephone call
    e. Hand delivery
    f. Other____
3. What is the best way for a water utility to give you this information – if it **<u>is</u>** an emergency?
    a. E-mail from the water utility
    b. Fax from the water utility
    c. Telephone call
    d. Mail
    e. Hand delivery
    f. Other____
4. Would you describe your news outlet as:
    a. Mainstream broadcast
    b. Mainstream daily print media
    c. Mainstream weekly or biweekly
    d. Ethnic broadcast
    e. Ethnic daily print
    f. Ethnic weekly or biweekly print
    g. Electronic media (only) (not connected with a newspaper, radio or television station)

Wrap up:

"THANK YOU FOR YOUR PARTICIPATION. YOUR THOUGHTS AND IDEAS WILL HELP AWWARF CREATE BETTER MESSAGES TO COMMUNICATE CRITICAL INFORMATION RELATED TO DRINKING WATER AND HEALTH TO YOU AND OTHERS THROUGHOUT THE UNITED STATES."

BETA TESTING DISCUSSION GUIDE – TELEPHONE INTERVIEW (WATER UTILITIES)

HELLO, MY NAME IS ______________________________. I'M CONTACTING YOU ON BEHALF OF THE AWWA RESEARCH FOUNDATION. YOUR UTILITY IS A PARTNER UTILITY ON PROJECT 4001 – CONTAMINANT RISK MANAGEMENT COMMUNICATION STRATEGY AND TOOLS. WE TALKED WITH [YOU OR NAME OF PERSON] LAST FALL ABOUT THE CHARACTERISTICS YOUR UTILITY WOULD LOOK FOR IN COMMUNICATION TOOLS AROUND CONTAMINANTS. NOW WE WOULD LIKE YOUR HELP AGAIN TO DETERMINE IF THE TOOLS WE'VE CREATED MEET YOUR NEEDS.

AS YOU MAY RECALL, THE OVERALL AIM OF THIS PROJECT IS TO HELP DRINKING WATER UTILITIES EXECUTIVES AND MANAGERS ANSWER THIS QUESTION: IF FACED WITH A DRINKING WATER CONTAMINANTION ISSUE, HOW WILL I RESPOND?"

YOU SHOULD HAVE RECEIVED VIA E-MAIL A SERIES OF NEWS RELEASES; PUBLIC NOTIFICATIONS; AND FACT SHEETS DEVELOPED AROUND 12 SPECIFIC CONTAMINANTS OR CLASSES OF CONTAMINANTS. HAVE YOU HAD ENOUGH TIME TO REVIEW THOSE MATERIALS? IS THIS A GOOD TIME TO TALK ABOUT THEM?

(IF NO) COULD WE SCHEDULE ANOTHER TIME IN THE NEXT WEEK THAT YOU MAY HAVE AVAILABLE TO TALK ABOUT THE TOOLS? IT IS IMPORTANT THAT WE CAPTURE YOUR THOUGHTS AND IDEAS. THESE TOOLS ARE CREATED SPECIFICALLY TO HELP WATER UTILITIES COMMUNICATE WITH THEIR STAKEHOLDERS AND YOUR FEEDBACK WILL HELP US MAKE THEM USABLE IN THE WATER INDUSTRY.

INTERVIEW SCHEDULED FOR ____.

(IF THEY CAN TALK NOW THEN PROCEED WITH THE INTERVIEW.)

(IF YES) IS IT OKAY TO PROCEED WITH THE INTERVIEW? LET'S GET STARTED.

Tool Information

THE FIRST SET OF QUESTIONS IS GEARED TOWARD GETTING FEEDBACK ON OVERALL EFFECTIVENESS OF THE TOOLS.

IN THE INTERVIEWS, OUR PARTNER UTILITIES DESCRIBED THE CHARACTERISTICS THEY WANTED IN THE TOOLS. I WILL READ A CHARACTERISTIC AND ASK YOU TO TELL ME IF YOU BELIEVE THE TOOLS FIT THAT DESRIPTION. PLEASE RESPOND

WITH AGREE; SOMEWHAT AGREE; SOMEWHAT DISAGREE; DISAGREE. ARE YOU READY?

1. Do you believe the tools [are]:

CHARACTERISTIC	AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	DISAGREE
Actionable (tells people what to do)				
Useful to utilities				
Useful for communicating with media				
Acceptable to public health community				
Accurate				
Well written				
Simply written with plain language				
Easy for public to understand				
Not alarming				
Sufficient to answer questions of what, where, when, why, and who's affected				
Sufficient to address what utility is doing about the situation				
Adequate for at-risk populations				
Credible (will people believe the message?)				
Adequately describe contaminants and how they are used				
Adequately describe current treatment to remove contaminant (if known)				

5. In the areas where you somewhat disagreed or disagreed, what is your concern? (Take these one at a time.)
6. Do you think the language in the fact sheets and public notifications strikes a good balance between technical/scientific accuracy and ease of comprehension?
   a. If not, why not?
7. The fact sheets are written to an average reading level of ninth grade student in the eighth month of school. Do you believe this language level is too high, too low or just right for your customers?
8. Do the resources cited on the fact sheets help make the information more credible?
   a. If no, what other resources would you want cited on the communication tools to make them more credible?
   b. Would increased trust in the communications tools cause you to use the materials when communicating with the media, general public or public health agencies? Yes, why? No, why not?
   c. If no, is there something else that could be added to, or changed about, the communication tools that would cause you to be more likely to use them?

Tool Structure

WE ARE MOVING ON TO A NEW SET OF QUESTIONS. THESE ARE GEARED TOWARD GETTING FEEDBACK ON THE STRUCTURE OF THE TOOLS.

You would receive these tools from AwwaRF and use them to communicate with customers, the media and health care providers. These tools will be available in a downloadable CD and in hardcopies that can be photocopied. I will name a characteristic and ask you again to tell me if you agree, somewhat agree, somewhat disagree, or disagree.

6. Do you believe the tools [would be]:

CHARACTERISTIC	AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	DISAGREE
Accessible (formats)				
Customizable for different situations				
Customizable for different audiences				
Easy to keep current				
Portable (able to be taken into field)				
Adaptable to contaminants not on the priority list				

7. In the areas where you somewhat disagreed or disagreed, what is your concern? (Take these one at a time.)

Tool Use

THE NEXT QUESTIONS ARE GEARED TOWARD GETTING YOUR FEEDBACK ON THE USE OF THE TOOLS.

8. Would you set these tools aside and feel that they are just one more thing to deal with?
   a. If yes, what would make them useful to you?
9. Do you think the tools would be useful to you in working with a public health agency?
   a. If not, why not?
10. In an emergency, what is the typical way for your water utility to distribute this type of information?
    a. Door hanger (information left on the door handle of a front door)
    b. Mainstream media – television, newspaper, radio
    c. Ethnic media – television, newspaper, radio
    d. Utility person going door-to-door, face-to-face communication
    e. Through a doctor's office or public health department
    f. Other____
11. In a non-emergency, what is the typical way for you to distribute this type of information?
    a. Flyer, bill insert or other mailed information
    b. Door hanger (information left on the door handle of a front door)
    c. Mainstream media – television, newspaper, radio
    d. Ethnic media – television, newspaper, radio
    e. Utility person going door-to-door, face-to-face communication
    f. Through a doctor's office or public health department
    g. Meetings in the community
    h. Other____

Risk communication process strategy guide

THE LAST SET OF QUESTIONS RELATE TO THE RISK COMMUNICATION STRATEGY GUIDELINES. AGAIN I WILL READ YOU A LIST OF CHARACTERISTICS THAT PARTNER UTILITIES WANTED IN RISK COMMUNICATION STRATEGY GUIDELINES AND ASK YOU TO TELL ME IF YOU AGREE, SOMEWHAT AGREE, SOMEWHAT DISAGREE, OR DISAGREE. THERE IS ALSO A NEW RESPONSE OF NOT APPLICABLE/DON'T KNOW.

12. Do you believe the guidelines [are]

CHARACTERISTIC	AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	DISAGREE	N/A
Something you would use					
Useful to utilities with no communication plans or personnel					
Useful to water utilities with communication plans and personnel					
Identify how utilities can take leadership roles in public health and community preparedness					
Well organized					
Easy to follow					
Clearly explain the difference between risk and crisis communication strategies and activities					
Help identify different methods of communicating about risk and crisis					
Assign utility staff to specific roles that must be carried out upon identification of a contaminant risk or crisis					
Help you assess when to communicate with the public about contaminant issues					
Identify broad audience categories					
Advise water utilities on how to develop or enhance partnerships with local public health agencies					
Include information on how to find additional resources					

13. In the areas where you somewhat disagreed or disagreed, what is your concern? (Take these one at a time.)

THOSE ARE ALL THE QUESTIONS I HAVE. DO YOU HAVE ANYTHING ELSE YOU WOULD LIKE TO ADD?

THANK YOU SO MUCH FOR YOUR PARTICIPATION. YOUR THOUGHTS AND IDEAS WILL HELP AWWARF CREATE BETTER MESSAGES TO COMMUNICATE CRITICAL INFORMATION RELATED TO DRINKING WATER AND HEALTH TO YOU AND OTHERS THROUGHOUT THE UNITED STATES.

BETA TESTING DISCUSSION GUIDE – TELEPHONE INTERVIEW (PUBLIC HEALTH)

HELLO, MY NAME IS ______________________________. I'M CONTACTING YOU ON BEHALF OF THE AWWA RESEARCH FOUNDATION, CALLED AWWARF. AWWARF IS SPONSORING A PROJECT TO IMPROVE WATER UTILITIES' PUBLIC HEALTH OUTREACH AROUND WATER CONTAMINANTS. AS PART OF THAT PROJECT, AWWARF IS CREATING COMMUNICATION TOOLS TO PROVIDE INFORMATION TO THE PUBLIC ABOUT DRINKING WATER CONTAMINATION.

IT IS AWWARF'S GOAL THAT ANY COMMUNICATION TOOLS DEVELOPED COULD BE USED BY BOTH THE WATER AND PUBLIC HEALTH INDUSTRIES. IN ORDER TO MAKE THE TOOLS WORK FOR PUBLIC HEALTH, IT IS IMPERATIVE THAT WE CAPTURE YOUR THOUGHTS AND IDEAS SO THAT WE CAN LATER TAILOR THE TOOLS TO FIT THE NEEDS OF THOSE IN PUBLIC HEALTH INCLUDING LOCAL HEALTH DEPARTMENTS AND AGENCIES, HOSPITALS, AND PHYSICIANS.

YOU SHOULD HAVE RECEIVED VIA E-MAIL AND/OR MAIL A SERIES OF FACT SHEETS DEVELOPED AROUND SPECIFIC CONTAMINANTS. IS THIS A GOOD TIME TO TALK ABOUT THEM?

IF NO, INTERVIEW SCHEDULED FOR _______________________________________.

(IF THEY CAN TALK NOW THEN PROCEED WITH THE INTERVIEW.)

(IF YES) IS IT OKAY TO PROCEED WITH THE INTERVIEW? LET'S GET STARTED.

THE FIRST SET OF QUESTIONS IS GEARED TOWARD GETTING FEEDBACK ON THE INFORMATION IN THE TOOLS.

IN INTERVIEWS, OUR PARTNER UTILITIES AND PUBLIC HEALTH PROFESSIONALS DESCRIBED THE CHARACTERISTICS THEY WANTED IN THE COMMUNICATION TOOLS. I WILL READ A CHARACTERISTIC AND ASK YOU TO TELL ME IF YOU BELIEVE THE TOOLS FIT THAT DESRIPTION. PLEASE RESPOND WITH AGREE; SOMEWHAT AGREE; SOMEWHAT DISAGREE; DISAGREE. ARE YOU READY?

Tool Content

1. Do you believe the tools [are]:

CHARACTERISTIC	AGREE	SOMEWHAT AGREE	SOMEWHAT DISAGREE	DISAGREE
Actionable (tells people what to do)				
Acceptable to public health community				
Accurate				
Well written				
Simply written with plain language				
Easy for public to understand				
Not alarming				
Sufficient to answer questions of what, where, when, why, and who’s affected				
Sufficient to address what utility is doing about the situation				
Adequate for at-risk populations				
Credible (will people believe the message?)				
Adequately describe contaminants and how they are used				
Adequately describe current treatment to remove contaminant (if known)				

9. In the areas where you somewhat disagreed or disagreed, what is your concern? (Take these one at a time.)
10. Do you think the language in the fact sheets strikes a good balance between technical/scientific accuracy and ease of comprehension? If not, why not?
11. The fact sheets are written to an average reading level of ninth grade student in the eighth month of school. Do you believe this language level is too high, too low or just right for residents in your area?

12. Do the resources cited on the fact sheets help make the information more credible?
    a. If no, what other resources would you want cited on the communication tools to make them more credible?
    b. Would increased trust in the communications tools cause you to use the materials? If yes, why? If no, why not?
    c. If no, is there something else that could be added to or changed about the communication tools that would cause you to be more likely to use them?

WE ARE MOVING ON TO A NEW SET OF QUESTIONS. THESE ARE GEARED TOWARD GETTING FEEDBACK ON THE STRUCTURE OF THE TOOLS.

You would receive these tools from a Drinking Water Utility to provide information about contaminants to the public, your clients, and health care providers.

Tool Structure

1. Is the information presented in logical order?
2. What do you like about the structure, order, and appearance?
3. What would you change about the structure, order, and appearance?

THE LAST SET OF QUESTIONS IS GEARED TOWARD GETTING YOUR FEEDBACK ON THE USE OF THE TOOLS.

Tool Use

1. Would you use these fact sheets? If no, why?
2. If your clients/patients received this information from television, radio, newspapers, in the mail, or at their doorstep, what do you think they would do with it?
3. What is the best way for a water utility to give you this information – if it **is not** an emergency?
    a. E-mail
    b. Fax
    c. Mail
    d. Telephone call
    e. Hand delivery
    f. Other____
4. What is the best way for a water utility to give you this information – if it **is** an emergency?
    a. Telephone call
    b. E-mail
    c. Fax
    d. Mail
    e. Hand delivery
    f. Other____

5. In the event of a water contaminant emergency how would you inform other health professionals in your area?
    a. Telephone system
    b. Mass text messaging
    c. Web
    d. Direct fax
    e. Courier service
    f. Other: ____

13. In the event of a water contamination emergency how would you inform the public of vital health information?
    a. Web
    b. Contact the local mainstream media – television, radio, newspaper?
    c. Contact local ethnic media – television, radio, newspaper?
    d. Other____

THOSE ARE ALL THE QUESTIONS I HAVE. DO YOU HAVE ANYTHING ELSE YOU WOULD LIKE TO ADD?

THANK YOU SO MUCH FOR YOUR PARTICIPATION. YOUR THOUGHTS AND IDEAS WILL HELP AWWARF CREATE BETTER MESSAGES TO COMMUNICATE CRITICAL INFORMATION RELATED TO DRINKING WATER AND HEALTH TO YOU AND OTHERS THROUGHOUT THE UNITED STATES.

APPENDIX D: CONTAMINANT CANDIDATE SPREADSHEET

	RFP	PAC Criteria		Health Effects at Low Dosages	Sub-populations		Addressed Elsewhere	Standard Exists	Terror concern	Treatable	Source	% population affected	Media coverage	Common	Emerging	Acute	Chronic	Sub-chronic	Water Utility Suggestion	Rec'd
Contaminant		Known	Feared		Children	Others														
LEAD	Given	xx	x	xx	x		x	Action Level		x	S/GW	xx	x	x			xx	xx	2	xx
DBP's (could be included as a class)	Given	xx	x	xx	x	x	x	MCL/chron		x	S	xx	x	x			xx	xx	3	xx
THMs (chloraform) (could do as a class)	Given	xx		xx	x	x	x	MCL/chron		x	S	xx	x	x			xx	xx	3	xx
HAA	Given	xx		xx			x	MCL/chron		x	S	x					xx	x	3	
NDMA		xx	x								S				x		xx			
Bromate				x				mcl			S								1	
Endocrine Disruptors (handle as a class of contaminants)	Given		xx	x	x						S/GW	x	x		x		xx	xx		xx
note: some overlap with pharmaceuticals																				
Deliberates	Given	xx	xx	xx			x		x		S/GW		x			xx				xx
i.e.Bacillus Anthrasis		xx	xx	xx			x		x		S/GW		x			xx				xx
Botulism		xx	xx	xx			x		x		S/GW					xx				
Plague		x	xx	xx			x		x		S/GW					xx				
Smallpox		x	xx	xx			x		x		S/GW					xx				
Tularemia			xx	xx			x		x		S/GW					xx				
Viral Hemorrhagic Fevers		x	xx	xx			x		x		S/GW					xx				
Cyanide		x	xx	xx			x		x		S/GW					xx				
Sarin		x	xx	xx			x		x		S					xx				
Ricin			xx	xx			x		x		S					xx				
Phosgene			xx	xx			x		x		S					xx				
Gasoline Additives																				
MTBE		xx	x	x			x	state mcls		x	GW	xx	x	x			xx		3	xx
Ethanol		x									GW				x					
Inorganic Chemicals							x	mcl												
Chlorides		xx						sec.mcl			S/GW/NT			x						
Perclorate	Given	xx	xx	xx	x			state mcls	x		GW		x		x		xx	xx	2	xx
Nitrates		x	x	xx	x		x	mcl		x	GW	x	x	x		xx	xx		1	
Flourides		xx	x					mcl		x	GW		x	x			xx		2	
Arsenic		xx	xx	xx			x	mcl	x	x	GW	x	x	x			xx		2	
Mercury		x	xx	xx			x	mcl	x		S/GW		x			x			1	
Radon		x	x							x	GW	x		x			xx		2	
Copper		xx						mcl		x	S/GW	x	x	x			xx		2	
Aluminum		xx								x	S			x						
Pharmaceuticals (handle as a class)		x	xx								S/GW	x	x		x				3	xx
examples - antibiotics, caffeine, antidepressants, birth control, cholesterol-lowering compounds																				

Contaminant	RFP	PAC Criteria		Health Effects at Low Dosages	Sub-populations		Addressed Elsewhere	Standard Exists	Terror concern	Treatable	Source	% population affected	Media coverage	Common	Emerging	Acute	Chronic	Sub-chronic	Water Utility Suggestion	Rec'd
		Known	Feared		Children	Others														
Microbial Contaminants																				
Fecal coliform		xx	x	xx						x	S/GW	x	x			xx				
Legionella		xx	x	x		x				x	S/GW		x	x		xx			1	xx
e-coli		xx	xx	xx	x			mcl	x	x	S/GW		x			xx			1	xx
h-pylori										x	S/GW					xx				
microbacterium										x	S/GW					xx				
cryptosporidium		xx	x	xx	x	x	x	TT		x	S	xx	x	x		xx			3	
giardia		xx	x	xx	x	x	x	TT		x	S	xx		x		xx			1	
avian flu		xx	xx				x		x				x		x	xx				
Adenoviruses		x	x	xx						x	S	xx		x		xx				
Aeromonas hydrophila				xx																
Caliciviruses				x																
Coxsackieviruses		x	x	x																
Echoviruses				x																
Microsporidia (Enterocytozoon & Septata)				x																
Mycobacterium avium intracellulare (MAC)				x																
Algal toxins (as a class)		x	x	x					x		S	x	x		x	xx				x
Cyanobacteria (blue-green algae), other freshwater algae, and their toxins		x		x					x		S	x	x		x	xx				
Geosmir/taste and odor compounds		x									S	x		x					1	
Pesticides/Herbicides																			2	
Alachlor		xx		x				State Guidance		x	GW				x		xx			
Metolachlor		x		x				State Guidance		x	GW				x		xx			
Atrizine		x		x				State Guidance		x	S/GW	x	x	x	x		xx		1	x
Triazine (and degredates)				x				State Guidance		x	GW				x		xx			
Radiologicals																				
uranium		x	xx						x	S			x		x		xx	xx		
cobalt																				
tritium																				
Strontium													x							
Solvents/Organics																			1	
Trichloroethene (TCE)		x						mcl		x	GW						xx			
1,1,1, Tetrachloroethane (TCA)		x						mcl		x	GW						xx		1	
Perchloroethene (PCE)		x						mcl		x	GW						xx			
Dichloroethylene								mcl		x	GW						xx			
Vinyl Chloride		x						mcl		x	GW						xx			
Benzene		x	x					mcl	x	x	GW						xx		1	
Dioxin		x	xx					mcl	x	x	S						xx		1	
PCBs		x	xx					mcl		x	S/GW						xx		1	

	RFP	PAC Criteria		Health Effects at Low Dosages	Sub-populations		Addressed Elsewhere	Standard Exists	Terror concern	Treatable	Source	% population affected	Media coverage	Common	Emerging	Acute	Chronic	Sub-chronic	Water Utility Suggestion	Rec'd
Contaminant		**Known**	**Feared**		**Children**	**Others**														
CCL LIST Microbial Contaminant Candidates																				
Note: Listed for information, but no details																				
Three Parent Acetanilides																				
Acetochlor																				
Six Acetanilide Degradates																				
Acetochlor ethane sulfonic acid (ESA)																				
Acetochlor oxanilic acid (OA)																				
Alachlor ethane sulfonic acid(ESA)																				
Alachlor oxanilic acid (OA)																				
Metolachlor ethane sulfonic acid(ESA)																				
Metolachlor oxanilic acid (OA)																				
Six Nitrosamines																				
N-nitroso-diethylamine (NDEA)																				
N-nitroso-dimethylamine (NDMA)																				
N-nitroso-di-n-butylamine (NDBA)																				
N-nitroso-di-n-propylamine (NDPA)																				
N-nitroso-methylethylamine (NMEA)																				
N-nitroso-pyrrolidine (NPYR)																				
Assessment Monitoring List 1																				
Contaminant																				
Dimethoate																				
Terbufos sulfone																				
Five Flame Retardants																				
2,2',4,4'-tetrabromodiphenyl ether (BDE-47)																				
2,2',4,4',5-pentabromodiphenyl ether (BDE-99)																				
2,2',4,4',5,5'-hexabromobiphenyl (HBB)																				
2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153)																				
2,2',4,4',6-pentabromodiphenyl ether (BDE-100)																				

	RFP	PAC Criteria		Health Effects at Low Dosages	Sub-populations		Addressed Elsewhere	Standard Exists	Terror concern	Treatable	Source	% population affected	Media coverage	Common	Emerging	Acute	Chronic	Sub-chronic	Water Utility Suggestion	Rec'd
Contaminant		Known	Feared		Children	Others														
Three Explosives																				
1,3-dinitrobenzene																				
2,4,6-trinitrotoluene (TNT)																				
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)																				

Chemical Contaminant																				
1,1,2,2-tetrachloroethane																				
1,2,4-trimethylbenzene																				
1,1-dichloroethane																				
1,1-dichloropropene																				
1,2-diphenylhydrazine																				
1,3-dichloropropane																				
1,3-dichloropropene																				
2,4,6-trichlorophenol																				
2,2-dichloropropane																				
2,4-dichlorophenol																				
2,4-dinitrophenol																				
2,4-dinitrotoluene																				
2,6-dinitrotoluene																				
2-methyl-Phenol (o-cresol)																				
Acetochlor																				
Boron																				
Bromobenzene																				
DCPA mono-acid degradate																				
DCPA di-acid degradate																				
DDE																				
Diazinon																				
Disulfoton																				
Diuron																				
EPTC (s-ethyl-dipropylthiocarbamate)																				
Fonofos																				
p-Isopropyltoluene (p-cymene)																				
Linuron																				
Methyl bromide																				
Molinate																				
Nitrobenzene																				
Organotins																				
Prometon																				
RDX																				
Terbacil																				
Terbufos																				
Vanadium																				

APPENDIX E: SUBJECT MATTER EXPERTS' RÉSUMÉS

Elisa M. Speranza
President; CH2M HILL OMI

Education

M.P.A., Public Administration, Harvard University, 1988
B.A., Political Science, Boston College, 1982

Distinguishing Qualifications

- President of CH2M HILL OMI, a 1,600-person business group within the CH2M HILL enterprise that provides management, operations, and maintenance services to municipalities and industries
- Was CH2M HILL's global service team leader for Utility Management Solutions practice in the firm's Water Business Group
- Served as Deputy Director of the Massachusetts Water Resources Authority, serving 2.5 million customers and implementing the $4 billion Boston Harbor Project
- Recognized industry leader and resource on strategic communication, infrastructure asset management, sustainable financing, and organizational development

Relevant Experience

Elisa Speranza is President of CH2M HILL OMI, which provides a range of custom-tailored operations and maintenance solutions for clients in government and industry. Services provided by the more than 1,600 people of CH2M HILL OMI include management and operations consulting services; water and wastewater system optimization; contract O&M of water, wastewater and other utilities; and complete municipal operations, including administration, public works and community development. Prior to assuming her current role in January 2008, Elisa was CH2M HILL's global service team leader for its Utility Management Solutions practice. She has worked on both the public utility and consulting sides of the water and wastewater business for over 20 years, and is experienced with the development and implementation of strategies to help organizations manage more efficiently and foster effective communications with customers and other stakeholders. Her recent work with utilities has focused on communication, strategic planning, organizational development, rates, and asset management issues.

Over the last several years, Elisa has worked with municipal water and wastewater agencies taking a proactive approach to infrastructure asset management and sustainable financing. A co-author of the AWWA report, *Water Infrastructure at a Turning Point: The Road to Sustainable Asset Management,* she was also the project manager for the 2004 AWWA-sponsored study, *Avoiding Rate Shock: Making the Case for Water Rates.*

Prior to becoming a consultant, Elisa served as Deputy Director of the Massachusetts Water Resources Authority and Special Projects Manager for the Boston Water and Sewer Commission. A recognized leader in the North American water profession, Elisa is a past AWWA Executive Committee member and currently serves as Vice President of Water for People.

Representative Projects and Dates of Involvement

Task Leader, Public Communications, *Guide to Evaluating Disinfection in a Security-Conscious Environment*, American Water Works Association, Washington DC, 2007 to present. Development of a comprehensive guidance document to provide utility decision-makers and other stakeholders with a true picture of risks, mitigation approaches, and alternative tradeoffs that will result in better, more informed disinfection system decisions.

Project Manager, Establishment of the Western Regional Water Commission, Reno, NV, 2007. Facilitating staff working group pursuant to a new state law establishing a regional commission to coordinate water resources management for six entities in Western Nevada.

Task Leader, Social and Policy—MASDAR Development, 2007. Program Management team for implementation of the world's first zero carbon, zero waste, 100% renewable energy development for the Abu Dhabi Future Energy Company.

Project Manager—Water Infrastructure and Conservation Adjustment implementation, 2007, Connecticut Water Company, Clinton, CT. Assisting investor-owned utility in developing response to new regulation and an infrastructure assessment report.

Team Member/Advisor—Public Awareness Program; USAID – Water and Wastewater Sector Policy Reform; Cairo, Egypt; 2006-2007. Drafted comprehensive Strategic Communication Plan for Holding Company overseeing institutional development of water and wastewater utilities for the country. Working with in-country team on implementation of public awareness activities designed to communicate the value of water and importance of water conservation.

Project Manager, Management Best Practices Review, City of Phoenix Water Services Department; October 2005–2007. Organizational assessment for the water/wastewater utility encompassing a review and best practices assessment of 10 strategic areas of utility operations, management, and capital programs. Overseeing Phase 2 tasks involving strategic communications, IT, regulatory compliance, and training.

Project Advisory Committee, "Tools to Help Water Utilities Establish Customer Payment Options," Project 4004, Awwa Research Foundation, 2007 to present. Project is to develop a guidance manual to help water utilities develop convenient and flexible customer payment options, and to identify how best to communicate the availability of these options to enhance customers' regular payment of water bills.

Analyst and Co-author, *Water Infrastructure at a Turning Point: the Road to Sustainable Asset Management*; AWWA Water Utility Council; Washington, D.C.; April 2005–June 2006. Public policy report designed to help water utilities communicate with their elected and appointed decision-makers and the public about the importance of investment in water infrastructure.

Task Leader, Public Outreach Program; Comprehensive Financial Plans, City of Cleveland Divisions of Water & Water Pollution Control; 2004-June 2006. Developed and implemented public outreach program in support of a comprehensive rate study, search for additional revenue sources and potential service area expansion for the City of Cleveland utilities. Mayoral support and Council approval by a 22-1 vote.

Project Manager, Organizational Efficiency Review, Regional Water Authority, New Haven, CT; April 2004. Reviewed the Customer Relations Division's organizational structure, work processes and performance metrics to provide recommendations for optimized operations.

Project Manager; *Avoiding Rate Shock: Making the Case for Water Rates*; AWWA Water Utility Council; Washington, D.C.; June 2003-April 2004. Developed case studies and recommendations for utilities to promote sustainable local financing of water infrastructure.

Presenter, Facilitator and Co-author; *Asset Management Planning and Reporting Options For Water Utilities*; Awwa Research Foundation (AwwaRF); Denver, Colorado; October 2002 to 2005. Collaborative effort with participating utilities to compare costs and benefits of several different approaches to asset management for water infrastructure.

Team Member; Strategic Business Planning, Honolulu Board of Water Supply, Hawaii; 2002-2004. Worked with the utility's upper management to implement strategic business plan together with organizational development and communication improvements to enhance the Board's status as a "best practice" utility.

Instructor; Asset Management Workshops; Association of Metropolitan Sewerage Agencies (AMSA, now the National Association of Clean Water Agencies—NACWA); Baltimore, Atlanta, and Kansas City, Missouri; 2002. Presented a series of asset management workshops sponsored by AMSA on asset management, "*Managing Public Infrastructure Assets to Minimize Cost and Maximize Performance.*"

Project Manager; Strategic Communication Program; Water and Sewer Commission; Springfield, Massachusetts; September 2001-June 2002. Developed a strategic communication program to support the Commission's asset management and capital infrastructure financing program. Resulted in first water rate increase in over 10 years.

Task Leader; Competitiveness Evaluation and Business Process Re-engineering; U.S. Navy; Pearl Harbor Public Works Center; Honolulu, Hawaii; September 2000-August 2001. Comprehensive re-engineering program for water and wastewater utilities on the base.

Co-Author, analyst and facilitator, *Dawn of the Replacement Era* infrastructure policy report; AWWA, Water Utility Council; Washington, D.C.; May 2001. Policy analysis for the AWWA associated with the development of a "best practice" approach to infrastructure asset management.

Policy Analyst; Infrastructure Policy Analysis; U.S. Environmental Protection Agency (USEPA); Washington, D.C.; 2001. Policy analysis regarding the federal role in water/wastewater asset management and infrastructure financing.

Public Sector Experience

As Deputy Director for the Massachusetts Water Resources Authority (MWRA) from 1992 through 1995, Elisa oversaw policy development, external affairs, environmental reviews, and facilities planning efforts. Before re-joining MWRA in 1992, Elisa was a project manager for the Boston Water and Sewer Commission (BWSC), where she reviewed capital projects, monitored laws and regulations, and coordinated pollution prevention, wet weather, water accountability, and public education projects. She has also worked in the fields of affordable housing, community development, journalism, politics, and mass transit.

Professional Organizations/Affiliations
American Water Works Association (past Council Chair, Vice President, and Director-at-Large); Outstanding Service to AWWA Award and Honorary Member, 2007; Water for People (Vice President); New England Water Works Association (Past Director-at-Large); Water Environment Federation (5S Society); Massachusetts Water Works Association (Past President); McGuinness Award

Presentations and Publications

Elisa has spoken on a wide range of issues affecting water and wastewater utilities at numerous meetings of local, state, and national professional organizations. She has testified before the Massachusetts Legislature and the U.S. House of Representatives, and has been a frequent spokesperson with local, regional, and national print and electronic media. Her presentations, publications, and other professional activities include the following:

- National League of Cities, Congress of Cities, November 17, 2007, New Orleans, LA. "Water Infrastructure and the Role of Local Elected Officials."
- Cromwell, John E., Speranza, Elisa M. & Reynolds, Haydn, April 2007, "The Infrastructure 'Crisis'?" *Journal AWWA*, Vol. 99 Issue 4.
- Sundheimer, Marlene, Zone, Matt & Speranza, Elisa M., April 2007, "Beyond the Tap: City Water Service as a Catalyst for Regional Economic Development," *Journal AWWA*, Vol. 99 Issue 4.
- Cromwell, John E. & Speranza, Elisa M. January 2007, "Asset Management Too Complicated? Just Think About Your Car," *Journal AWWA*, Vol. 99 Issue 1.
- American Water Works Association, June 2006. *Water Infrastructure at a Turning Point: The Road to Sustainable Asset Management*. National webcast, panel presentation at AWWA Annual Conference & Exposition, San Antonio, TX.

- Awwa Research Foundation, 2006. *Asset Management Planning and Reporting Options For Water Utilities*. Co-author.
- New England Water Works Association, December 2005. "Saving America's Wetland: the Role of Coastal Erosion in the Hurricane Katrina Disaster," Randolph, Massachusetts.
- American Water Works Association, June 2005. "Foundations for Water Infrastructure Renewal", and "Value of Water", presentations and panel participation at Annual Conference and Exposition, San Francisco, CA.
- American Water Works Association. *Avoiding Rate Shock: Making the Case for Water Rates.* Project Manager; presenter at Annual Conference and Exposition, Orlando, FL June 2004; North American Webcast, July 2004; over a dozen presentations around the country in 2004 and 2005.
- Awwa Research Foundation, 2004. *Understanding and Enhancing the Impact of Consumer Confidence Reports.* Reviewer.
- Speranza, Elisa M. 2003. "Death of the Silent Service: Meeting Consumer Expectations." In *Drinking Water Regulation and Health.* Ed. Fred Pontius. John Wiley & Sons, Inc.
- Speranza, Elisa M., E. Rothstein, G. Wammock, and J. Spencer. 2003. *Development of a Strategic Planning Process*. American Water Works Research Foundation (AwwaRF) project #2745.
- Speranza, Elisa M.. *Water Utility and Community Response* and *Developing Credibility through Communications,* March 2003. AWWA Security Congress, Anaheim, California.
- Speranza, Elisa M. and E. Rothstein. February 2003. *Take Time for Paradise: Parallels between Baseball and Utility Management.* AWWA/WEF Joint Management Conference. Dallas, Texas.
- Speranza, Elisa M. March 2002. *Anti-Terrorism for Small Rural Water Systems.* Panelist, National Rural Water Association.
- Speranza, Elisa M. February 2002. *Reinvesting in Drinking Water Infrastructure.* Maine Water Utilities Association. Portland, Maine.
- Speranza, Elisa M. February 2002. *Aging Water Infrastructure Adds to Public Health Concerns.* American College of Preventive Medicine. San Antonio, Texas.
- Speranza, Elisa M. *Making the Water-Health Connection.* March 2002. Association of State Drinking Water Administrators. Alexandria, Virginia.
- Speranza, Elisa M. November 2001. *Making the Water-Health Connection.* Moderator, AWWA Water Quality Technology Conference. Nashville, Tennessee.
- Speranza, Elisa M., J. Cromwell, and H. Reynolds. May 2001. *Dawn of the Replacement Era: Reinvesting in Drinking Water Infrastructure.* AWWA Water Industry Technical Action Fund.
- Speranza, Elisa M. March 2001. *All Infrastructure Is Local: A Top-Down Approach to Asset Management.* National League of Cities. Washington, D.C.
- Speranza, Elisa M. February 2001. *Making the Water-Health Connection.* AWWA, Hawaii Section. Hilo, Hawaii.
- Speranza, Elisa M. November 1999. *Is the Drinking Water Safe? What You and the Public Will Need to Know.* American Public Health Association Annual Conference. Chicago, Illinois.

- Speranza, Elisa M. and P. Demit. June 1999. "Consumer Confidence Reports: An Opportunity for Public Outreach." *Journal NEWWA.*
- Speranza, Elisa M. October 1998. Project Advisory Committee. *Infrastructure Needs for the Public Water Supply Sector*. AWWA Water Industry Technical Action Fund.
- Speranza, Elisa M. November 1997. AWWA SDWA Implementation Workshop. Nashville, Tennessee.
- Speranza, Elisa M. 1997-1998. Project Advisory Committee. *Risk Checklist for Water Utilities.* AWWA Research Foundation.
- Speranza, Elisa M. June 1997. Public Confidence and Customer Satisfaction. AWWA Annual Conference and Exposition. Atlanta, Georgia.
- Speranza, Elisa M. June 1996. *SDWA Reauthorization: A Utility Perspective.* AWWA Annual Conference and Exposition. Anaheim, California.
- Speranza, Elisa M. September 1995. "Forging New Partnerships for a Sensible Approach to SDWA Compliance." *Journal of New England Water Works Association.* Vol. 109, No. 3.
- Speranza, Elisa M. and Cosgrove, E.V. February 1994. *The Massachusetts Water Resources Authority: Turning the Tide on Pollution.* White Oak International Conference on Regional Water Resources. Sponsored by the American Academy of Arts and Sciences. Jacksonville, Florida.
- Sullivan, John P. and Speranza, Elisa M. July 1992. "Proper Meter Sizing for Increased Accountability and Revenues." *Journal AWWA.*
- Represented AWWA on the National Drinking Water Advisory Council's working group to develop the Consumer Confidence Report Rule under the 1996 Safe Drinking Water Act Amendments.
- Developed Consumer Confidence Reports for several municipalities in response to federal Safe Drinking Water Act water quality “right-to-know” regulations.

Michael Burke

Education

M.S., Urban and Environmental Studies, RPI, 1977
B.S., Chemical Engineering, Lowell Technology, 1970

Professional Registrations

Professional Engineer: New York (1976); Massachusetts (1976)

Distinguishing Qualifications

- Twenty years as Director of the State of New York's drinking water program
- More than thirty years of wastewater and drinking water regulatory experience
- Development of drinking water regulations as required by the federal drinking water act and state legislature and executive body
- Development and implementation of New York's Drinking Water State Revolving Fund which has awarded more than one billion dollars in low interest loans and grants
- Past President of the Association of State Drinking Water Administrators, as well as Association's Legislative Committee Chair during 1996 Safe Drinking Water Act Amendments
- Past Chair of AWWA's Regulatory Agency Workgroup and past member Public Affairs Manufacturers and Water Utility Councils
- Member of a team that created the New York section of AWWA's Tifft Symposium, now in it's 26th year

Relevant Experience

As State Drinking Water Administrator, Mr. Burke is extremely knowledgeable in drinking water regulations, both at the state and national level. He developed and implemented compliance efforts in New York for the Surface Water Treatment Rules, Disinfection By-Products, organic chemical regulations, lead and copper rule, public notification, and radionuclide standards, among others. Mr. Burke's compliance efforts involved training, technical assistance, financial assistance, as well as direct enforcement.

James E Campbell
Public Involvement Manager

Education

B.S., Environmental Resource Management/Economics, Allegheny College, 1983
Trained mediator, PennAccord Center for Environmental Dispute Resolution

Distinguishing Qualifications

- Expertise in collaborative problem solving, public involvement, risk communication, and decision making for environmental projects

Relevant Experience

Mr. Campbell is an environmental planner specializing in collaborative problem solving, public involvement, risk communication, and decision making for environmental projects. His experience includes projects related to generating and distributing electric power, supplying and ensuring the quality of drinking water, planning for the disposal of municipal solid waste, siting facilities for handling solid waste, remediating hazardous waste sites, protecting estuaries, managing growth, and managing military base closures. Mr. Campbell is experienced in developing and implementing methods to facilitate group decision making. He has worked as an instructor in a variety of public forums (including conducting workshops and open houses, facilitating advisory committee meetings, and using structured decision making techniques) to develop public involvement skills.

Joseph M Nattress
Environmental Engineer

Education

M.S., Environmental Engineering, Drexel University, 1997
B.S., Environmental Engineering, Wilkes University, 1996

Professional Registrations

Professional Engineer: Delaware (#12425, 2002), Pennsylvania (#PE062195, 2003), New Jersey

Distinguishing Qualifications

- Experience in the planning, design, and construction of water infrastructure projects
- Experience in water and wastewater treatment processes and technologies
- Expertise in pilot testing conventional and new technologies for water treatment
- Familiar with drinking water regulatory requirements and implementation strategies

Relevant Experience

Mr. Nattress is an environmental engineer in CH2M HILL's Water Business Group in the Philadelphia, Pennsylvania office. Mr. Nattress has been involved with the planning, design and construction of numerous water treatment and distribution projects in the Northeastern and Mid-Atlantic regions of the United States. He also has experience in the areas of water quality, hydraulics, and drinking water regulations. He has unique experience in the design and operation of drinking water pilot plant facilities.

Mr. Nattress has also been involved in the planning, design, and construction services for wastewater treatment and collection systems for municipal clients in the Northeastern United States as a project manager and project engineer. This includes unique experience in the evaluation of plant capacity via the use of tools to maximize the existing infrastructure. In addition, Mr. Nattress is knowledgeable in air and odor issues in municipal wastewater treatment.

Linda Macpherson
Vice President, Reuse Principal Technologist, Senior Water Policy Planner, Public Involvement Specialist

Education

M.P.A., Portland State University, 1980
B.A., magna cum laude, University of Massachusetts-Amherst (Phi Beta Kappa), 1971

Distinguishing Qualifications

- 30 years of experience developing public awareness programs for water, wastewater, and environmental quality
- Actively involved in planning and service organizations dealing with water resources issues, including the Water Environment Federation (WEF) Public Education Chair and Communications Task Lead for the Compounds of Emerging Concern Community of Practice (CEC COP), American Water Works Association (AWWA) Reuse Video Subcommittee, WateReuse Foundation Research Advisory Committee, Association of Metropolitan Sewerage Agencies (AMSA), Association of Clean Water Agencies (ACWA), Pacific Northwest Clean Water Agencies (PNCWA), Water Environment Research Foundation (WERF), and the WateReuse Association
- Member of American Leadership Forum (Class 19 Fellow), City Club of Portland, SOLV (Board Member) and the National Association for Interpretation
- Recognized for work conceptualizing and managing the development of environmental educational exhibits, videos, interactive computer programs, and printed materials
- Extensive experience designing concepts for public education displays and visitor centers at water and wastewater reclamation facilities
- Expertise in inspiring a new vision and appreciation for water and new solutions to old problems
- Winner of the national 1999 WEF Public Education Award for work on the Pacific Northwest Pollution Control Administration Education Committee, 1992 ACWF President's Award for support of water quality stewardship initiatives, and the 1995 ACWA Special Award for long-term contributions in support of its communication and education agenda
- Successfully presents complex technical issues to the public and policy makers
- Demonstrated expertise creating consensus among parties involved in challenging issues through planning, policy analysis, and public education and involvement
- Sought-after speaker on water policy at national and international conferences
- CH2M HILL Co-Global Technology Leader for Reuse Services and member of the Sustainable Development and Public Involvement Communities of Practice

Relevant Experience

Linda Macpherson specializes in translating complex water-related issues into clear vernacular and in stimulating new ways of thinking about sustainable water management. She is a senior policy planner, public involvement specialist, and reuse technologist with CH2M HILL, where she is often called upon to develop public education campaigns and policy strategies that build consensus among parties who are grappling with challenging water, wastewater, and environmental quality issues. Linda is based in CH2M HILL's Portland, Oregon, office.

Ms. Macpherson's goal is to actively engage people in the issues to stimulate good decision making around water use and sustainable solutions. Through extensive work with environmental education and policy, she has developed a keen understanding of how to get people of all ages involved in water stewardship. Her concepts for educational facilities—including interactive exhibits and videos—have engaged the public in unique and exciting new ways and garnered numerous awards. Ms. Macpherson has worked with clients to create public support for such projects as wastewater treatment plant siting and expansion, odor control efforts, and water reuse programs. Her communications approach is to design plans to reach broad audiences; to address a wide range of learning styles by relaying information through a variety of media; tailor the message to address the unique character of local communities; and to recognize the importance of and to incorporate feedback into the process.

Ms. Macpherson is also a strategist and sought-after speaker on sustainable water resources management. She assists governments and public works agencies with finding new ways to manage complex policy issues, including water resources policy, endangered species management, water reuse, and institutional management. She also works with citizen groups and elected officials to identify and address land use, growth, and environmental issues affected by water and wastewater projects.

Before joining CH2M HILL, Ms. Macpherson managed the Environmental Education and Policy Division of the Bureau of Environmental Services for the City of Portland, Oregon. In that capacity, she provided policy analysis and regulatory review for the beginnings of the city's Clean Rivers program.

APPENDIX F: PARTNER WATER UTILITY PROFILES

WATER DISTRICT NO. 1 OF JOHNSON COUNTY, KAN. (WATERONE)

10747 Renner Blvd.
Lenexa, KS 66219
Administration: (913) 895-5500
Customer Service: (913) 895-1800
www.waterone.org

Water District No. 1 (WaterOne) is a drinking water provider for Johnson County, Kan., that serves 15 cities on a retail basis and has three sources: the Missouri River, the Kansas River, and 21 wells.

The District operates under its own seven-member governing board and is separate from JCW (Johnson County Wastewater). JCW, a sanitary sewer provider in Johnson County, is a county department that operates under the Johnson County Board of County Commissioners.

Unique to WaterOne's communication efforts is its online series of water quality "Fact Sheets" covering a variety of contaminants. (Available only in English.) A 2003 Customer Satisfaction Survey documented high consumer satisfaction with availability, taste, and safety of water, as well as problem resolution by WaterOne.

Demographic analysis of factors that could impact communication around contaminants in the communities served by WaterOne reveals:

- A general population that is well below the national average in terms of poverty rate.
- A percentage of non-English speaking residents below the national average.
- The percentage of owner-occupied households is above the national average
- The percentage of renter-occupied households is below national statistics.
- The percent of households over 65 is in line with U.S. comparison data.

ANNISTON WATER WORKS AND SEWER BOARD OF CALHOUN COUNTY, ALA.

131 West 11th Street
P.O. Box 2268
Anniston, AL 36202
Administration: (256) 236-3429
www.awwsb.org

The Anniston Water Works and Sewer Board of Calhoun County, Ala., serve not only Anniston proper, but also Fort McClennan and the Anniston Army Depot, along with other communities throughout the southern end of Calhoun County. The utility manages the region's premier water resource, the Coldwater Spring, and the area's surface water reservoirs: the Hillabee Reservoir and the Sam Hamner Reservoir. Another notable customer of the Board is the Southern Bottled Water Company. This local company takes water from Coldwater Spring for sale nationally under the label of "Watkopie Spring."

The Water Works and Sewer Board of the City of Anniston is a public corporation governed by a seven member Board of Directors. The Board is appointed by the City Commissioners of the City of Anniston.

Its primary form of customer communication is its annual CCRs.

Demographic analysis of factors that could impact communication around contaminants for the City of Anniston itself reveals:

- The percentage of individuals who fall below the poverty rate is significantly above the national average
- The number of non-English speaking residents falls far below comparable national data.
- The percent of owner-occupied households is below the national average.
- The percentage of renter-occupied households is above average.
- The percentage of people over the age of 65 residents is higher than average.

CITY OF DURHAM DEPARTMENT OF WATER MANAGEMENT

101 City Hall Plaza
Durham, NC 27701
Administration: (919) 560-4381
www.durhamnc.gov/departments/wm/

The Department of Water Management is responsible for the operation and maintenance of the City of Durham's water supply system – approximately 200,000 customers – with the utility's service area increasing by nearly 28% over the previous 10 years. Durham has two high-quality sources of water. Lake Mitchie, built in 1926, had been a reliable source for over 60 years. Rapid development in the mid 1980's led to the construction of the Little River reservoir and dam in 1988 to provide additional water.

The City of Durham has a council-manager form of government with the Council comprised of seven elected members including the Mayor. The Department of Water Management is a city-operated entity.

The Annual CCR is available online; printed copies may be requested through the City. Also available online is information regarding lead contamination entitled "Lead in Drinking Water – Should Durham Customers be Concerned?" Water customers can request a sample test kit either online or by calling the city.

Demographic analysis of factors that could impact communication around contaminants for the City of Durham reveals:

- A poverty level that is above the national average
- Non-English speaking percentages that are below comparable data.
- Consistent with the presence of a large university, owner-occupied rates are noticeably below and renter-occupied rates are noticeably above relative benchmarks.
- The number of over-65 customers also is below the national average.

PHILADELPHIA WATER DEPARTMENT AND WATER REVENUE BUREAU, PHILADELPHIA, PENN.

ARAMark Tower - 5th Floor
1101 Market Street
Philadelphia, PA 19107-2994
Administration: (215) 685-6300
www.phila.gov/water
Customer Information: (215) 686-6880
www.phila.gov/waterrev/index.html

The Philadelphia Water Department and Water Revenue Bureau serve the Greater Philadelphia region, a population of about 1.6 million people. The Water Revenue Bureau was created in 1959 specifically to handle water and sewer billing operations. Drinking water resources include the Delaware and Schuylkill Rivers with each contributing approximately one-half of the city's overall supply.

The Philadelphia Water Department is leading the development and implementation of an **Early Warning System** for the Schuylkill and lower Delaware Rivers. Its goal is to provide advance warning of potential source water contamination (chemical spills and other potential hazards) to water suppliers. An online drinking water quality monitoring system is in development.

A Citizen's Advisory Council has been working with the utility to improve communication with customers and to develop public information about a variety of topics, including drinking water quality and storm water pollution prevention. The Water Revenue Assistance Program provides copies of "Know Your Rights as a Residential Water and Sewer Customer." Multiple "Fact Sheets" are available online regarding general water quality issues.

Demographic analysis of factors that could impact communication around contaminants for the city of Philadelphia reveals:

- The percentage of people living below poverty is nearly twice the national average
- The percentage of population of non-English speaking residents is slightly below the national average.
- The percentage of owner-occupied households is below comparable U.S. statistics.
- The percentage of renter-occupied households is above the national average.
- The percentage of customers who are over-age 65 is on par with national data.

PORTLAND WATER BUREAU, PORTLAND, ORE.

1120 S.W. Fifth Avenue
Portland, OR 97204
Administration: (503) 823-7404
Customer Service: (503) 823-7770
www.portlandonline.com/water

The Portland Water Bureau delivers drinking water to more than 800,000 people who live in the Portland metropolitan area. Included in that number are wholesale contracts with 19 water purveyors. The primary water source is the Bull Run Watershed located 26 miles east of downtown Portland in the Mt. Hood National Forest. Portland also uses groundwater from the Columbia South Shore Well Field as a high-quality supplemental water supply.

The Portland Water Bureau acts in partnership with the citizens it serves, regulatory agencies, and a network of regional water suppliers. The Portland Utility Review Board, a citizens' committee, advises the city council on water, sewer, stormwater, and solid waste financial plans and rates. Citizens provide input and feedback on policy issues through a variety of forums.

The Drinking Water Quality Report (CCR) is mailed to all customers in June of each year and is available in Spanish, Russian, and Vietnamese. In addition, the Triannual Water Quality Analyses post detailed water quality information three times a year. A fact sheet has been developed: "Lead in Water and Plumbing." For questions/concerns regarding water quality issues, a Water Quality Line is available. The Bureau's Web site lists it as the only water utility in the nation with a daily news blog: The Water Blog. The City of Portland Auditor's Office conducts an annual Customer Satisfaction Survey on government services. For 2005-06, a majority of the population rated overall water quality and water service as either "good" or "very good."

Demographic analysis* of factors that could impact communication around contaminants for the City of Portland reveals:

- The percentage of residents who fall below the poverty level is just about equal with national data.
- The percentage of non-English speaking populations is slightly below the national average.
- The percentage of owner-occupied houses is below the national average.
- The percentage of renter-occupied households is above average.
- The percentage of over-age 65 individuals is almost equal to overall U.S. statistics.

*Demographic data taken from the 2000 U.S. Census. Information about the utilities themselves comes from their Web sites.

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AIDS Treatment Data Network. 2006. Cryptosporidiosis [Online]. Available: <http://www.atdn.org/simple/crypto.html>. [cited May 11, 2007].

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ABBREVIATIONS

AP	Associated Press
APIC	Association for Professionals in Infection Control and Epidemiology
ATSDR	Agency for Toxic Substances and Disease Registry
AVIP	Anthrax Vaccine Immunization Program
AWWA	American Water Works Association
AwwaRF	Awwa Research Foundation, now the Water Research Foundation
BPA	Bisphenol A
CARC	Cancer Assessment Review Committee
CCL	Contaminant Candidate List
CCR	Consumer Confidence Report
CDC	Centers for Disease Control and Prevention
CEM	Comprehensive Emergency Management
DBP	Disinfection byproduct
DDT	dichlor-diphenyl-trichloroethane
DES	diethylstilbesterol
DHS	Department of Health Services
DNR	Department of Natural Resources
EDC	Endocrine disrupting chemical
EMA	Emergency Management Agency
EMS	Emergency Medical Service
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FTA	Federal Transit Authority
GAC	Granular activated carbon
GIS	Geographic Information System
HAAs	haloacetic acids
HUS	Hemolytic uremic syndrome
IOU	Investor Owned Utility
IPCS	International Programme on Chemical Safety
IRIS	Integrated Risk Information System
LADWP	Los Angeles Department of Water and Power
LEP	Limited English proficiency
LEPC	Local Emergency Planning Committee

MCL	Maximum Contaminant Level
MHD	Milwaukee Health Department
MHO	Medical Health Office
MTBE	methyl tertiary butyl ether
MWW	Milwaukee Water Works
NACCHO	National Association of County and City Officials
NDMA	nitrosodimethylamine
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRDC	Natural Resources Defense Council
NTZ	nitazoxanide
PAC	Project Advisory Committee
PCBs	polychlorinated biphenyls
PDF	Portable Document Format
PESP	Pesticide Environmental Stewardship Program
PHIX	Public Health Information eXchange
PPB	Parts per billion
PPT	Parts per trillion
PSA	Public Service Announcement
PUC	Public Utilities Commission
PWD	Philadelphia Water Department
RFP	Request for proposal
RUP	Restricted use pesticide
THMs	trihalomethanes
UCMR	Unregulated Contaminant Monitoring Rule
USDHS	United States Department of Homeland Security
USEPA	United States Environmental Protection Agency
USGAO	United States General Accounting Office
USGS	United States Geological Survey
WIIFM	What's in it for me?

Contaminant Risk Management Communication Strategy and Tools

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Risk Communication Strategy and Tools: Guidelines for Communicating About Drinking Water Contaminants

Subject Area: Management and Customer Relations




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The Water Research Foundation (formerly Awwa Research Foundation or AwwaRF) is a member-supported, international, 501(c)3 nonprofit organization that sponsors research to enable water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers.

The Foundation's mission is to advance the science of water to improve the quality of life. To achieve this mission, the Foundation sponsors studies on all aspects of drinking water, including resources, treatment, distribution, and health effects. Funding for research is provided primarily by subscription payments from close to 1,000 water utilities, consulting firms, and manufacturers in North America and abroad. Additional funding comes from collaborative partnerships with other national and international organizations and the U.S. federal government, allowing for resources to be leveraged, expertise to be shared, and broad-based knowledge to be developed and disseminated.

From its headquarters in Denver, Colorado, the Foundation's staff directs and supports the efforts of more than 800 volunteers who serve on the board of trustees and various committees. These volunteers represent many facets of the water industry, and contribute their expertise to select and monitor research studies that benefit the entire drinking water community.

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For its subscribers, the Foundation serves as a cooperative program in which water suppliers unite to pool their resources. By applying Foundation research findings, these water suppliers can save substantial costs and stay on the leading edge of drinking water science and technology. Since its inception, the Foundation has supplied the water community with more than $460 million in applied research value.

More information about the Foundation and how to become a subscriber is available on the Web at **www.WaterRF.org**.

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Preface

These Guidelines on risk and crisis communication and the accompanying CD-ROM are intended to help drinking water utilities provide risk management information to their customers, consumers, stakeholders, and media about potential and actual threats to the water supply from 12 substances, organisms, or contaminant classes. These Guidelines distill a vast amount of existing literature around risk communication and crisis and emergency communication. The result is a coordinated, simple step-by-step communication strategy that drinking water utilities of all sizes can employ before, during, and after routine, emerging, and emergency contaminant situations. (A list of helpful resources is available on the CD-ROM at the back of this document.)

On the CD-ROM at the back of the Guidelines is a list of resources to help drinking water utility managers and executives design and implement risk and crisis communication plans. Resources for public health professionals are also available there.

From a long list of substances and microorganisms that were identified as drinking water contaminants, contaminants of emerging concern, or contaminant candidates, the project team identified 12 priority contaminants that addressed a combination of health risk and contaminant types. They are:

1. Algal toxins – as a class
2. Deliberate contaminants – as a class with *Bacillus anthracis* as an example
3. Atrazine
4. *Cryptosporidium*
5. Disinfection Byproducts – with nitrosodimethylamine (NDMA) and trihalomethanes (THMs) as examples
6. *E. coli*
7. Endocrine disrupting compounds (EDCs) – as a class
8. Lead
9. Methyl tertiary butyl ether (MTBE)
10. Perchlorate
11. Pharmaceuticals – as a class

Sets of risk and crisis communication tools are found in these Guidelines as well as on the CD-ROM in formats that can be copied or easily downloaded and modified. These tools serve as examples that drinking water utilities can adapt for their specific needs for risk and crisis communication. The tools have been tested with project partner utilities, and select tools have been tested with their target audiences, including media, pregnant women, parents of young children, senior adults, immunocompromised adults, people with limited language proficiency, health care providers, and local level public health professionals.

A series of research activities, including a literature review, interviews, and focus groups contributed to the development of these Guidelines and tools. These activities are documented in the final report included on the CD-ROM. In addition, the CD-ROM includes a list of resources, which can provide additional information about risk and crisis communication, specific contaminants, U.S. Environmental Protection Agency (USEPA) guidance, and public health resources.

These Guidelines and CD-ROM were developed as part of the Water Research Foundation Project 4001, Contaminant Risk Management Communication Strategy and Tools. Jane Mobley, Ph.D., Jane Mobley Associates, and Elisa Speranza, CH2M HILL, served as co-principal investigators for this project.

Acknowledgments

The research team gratefully acknowledges the following individuals for their assistance and contributions in preparing and reviewing these Guidelines and tools.

Special recognition goes to the Project Advisory Committee:

- Jeanne M. Bailey, Fairfax Water, Fairfax, Va.
- Sue L. Pennison, Drinking Water Inspectorate, London, England
- June M. Weintraub, Sc.D., San Francisco Department of Public Health, San Francisco, Calif.

Special Advisors included:

- Rose Kyprianou, USEPA, Washington, D.C.
- Adam Lovell, Sydney Water Corporation, Sydney, Australia

The research team is especially grateful to the Partner Utilities and their staff for their input on the project, including:

- Anniston Water Works, Anniston, Ala.
- City of Durham, North Carolina Department of Water Management, Durham, N.C.
- City of Portland Water Bureau, Portland, Ore.
- Philadelphia Water Department and Water Revenue Bureau, Philadelphia, Penn.
- WaterOne (Johnson County), Lenexa, Kan.

Also making these Guidelines and tools possible were the members of the National Association of County and City Health Officials (NACCHO) Environmental Health Committee; local public health agencies in and near partner utility communities; and public health professionals whose interviews contributed to the development of materials that would be suitable for use by public health agencies as well as by drinking water utilities.

Special recognition and appreciation belong to the four Water Research Foundation project managers assigned to Project 4001, who worked diligently to ensure the successful completion of this project. They offered their time, wisdom, and support to the PAC and project team. They are: India Williams (retired), Kenan Ozekin (interim), Shonnie Cline, and Susan Turnquist.

CHAPTER 1:

Introduction

"It is fundamentally necessary to change our thinking – to think of disaster as not special."

– Dr. Lee Clark, specialist in Disaster Studies, Rutgers University, and advisor to the Department of Homeland Security (1.1)

What's in it for me?

Professionals in the drinking water industry who were interviewed for this study commented that they were too busy doing their job of providing quality, safe water to speculate on what might happen and expend resources, preparing for a "what-if" event. Yet, emergencies are not uncommon and cannot be thought of as "special" events, or even unexpected. They occur daily in communities across North America and, as a result, are a reality that calls every vital infrastructure – including drinking water – to prepare for the worst.

In fact, drinking water utilities have recorded scores of incidents around water contamination – accidents, vandalism, hoaxes, plots, threats, and outright attacks – before and after 9/11 and the Anthrax attacks that followed. (1.2)

As a result of 9/11, the fields of risk and crisis communication have grown rapidly, yet the amount of literature around drinking water utility risk communication is limited. Water utilities may have some element of risk assessment and management, but nearly half of water utilities in the United States have no communication plan, and at least half have no dedicated communication staff. For mid-sized and small water systems, the absence of any communication plan or staff means no coordinated, strategic communication effort to give customers credible, timely information so they can make good decisions. (1.3) The annual Consumer Confidence Report (CCR) is a fundamental component of a water utility's risk and crisis communication approach. This annual report is a communication and public awareness tool that can be the basis for applying other tools and strategies to start risk communication and relationship building with consumers about emerging contaminants.

For a community system faced with turbidity or media inquiries about the presence of pharmaceuticals in the supplies, the unprepared responses, "no comment," or, "we're not putting out more information than we have to put out" will not be sufficient to hold off the torrent of questions, doubts, rumors, fears, bad press, public distrust, and possible lawsuits. (1.4)

A risk communication strategy prepared in advance can help a drinking water utility deal with these consequences that can harm its reputation, operations, business success, customers, and the community's public health. The Risk Communication Strategy and Tools provide a practical response to the need for coordinated risk and crisis communication plans specifically around drinking water contaminants – 12 particular substances, organisms, or classes of contaminants were identified as high priority because they represent different risks and pose specific health concerns.

Though water treatment technologies successfully remove most contaminants from water supplies, there are several which are considered to be of "emerging concern." These contaminants of emerging concern and candidate contaminants present the dynamic of uncertainty in providing information to the public and media. Few studies have been done on the health effects of some contaminants and little is known about the long-term effects of exposure to other contaminants, such as algal toxins and atrazine. In addition, new studies bring into question previous links between contaminant exposure and disease.

Communicating about contamination of the water supply requires open dialogue with community partners, regulatory agencies, the media, and, most importantly, the public. Risk communication should educate people about the facts surrounding the risk without creating alarm and provide actions people can take to help protect themselves and the water supply.

How to use these guidelines

The Risk Communication Strategy and Tools provide a resource to utilities that can be immediately used to improve public and local health agency outreach through a set of pre-designed and formatted risk communication tools around 12 contaminants of current or potential concern.

To address some of the ongoing and recurring challenges in providing risk communication to customers, consumers, elected officials, other stakeholders, and the media, these Guidelines present a decision-making process along with prepared resources that drinking water utilities can use to develop more consistent and effective risk and crisis communication planning, strategies, actions, messages, and tools.

These Guidelines do not provide an in-depth study of risk communication practices and principles that could apply to any and all risk issues faced by a drinking water utility, such as drought and floods. They do, however, offer a coordinated methodology for leading utilities through the steps of creating communication strategies that will address both risk strategy (materials prepared and communicated ahead of time to help manage the **risk** of water contamination through information and prevention); and **crisis** strategy (activities and materials to help protect, respond, and recover in the event of a contamination emergency).

Why should my utility bother with risk communication?

1. Risk communication and issues management can help protect a utility's reputation and possibly its bottom line financially. (1.3)
2. A contaminant issue or event that creates public concern or outright danger is inevitable. (1.1)
3. Eliminating contaminants in a water supply is much easier than getting misinformation or speculation out of a utility's communication pipeline.
4. Studies show that ratepayers who are better informed are less critical of a utility, even when problems arise. (1.5)
5. Functional working relationships with partners and stakeholders will be necessary for an effective response, including the communication of important public health information and protective actions.
6. Those same working relationships will assist in deploying human and capital resources efficiently.
7. Consumers, ratepayers, and other stakeholders will be more likely to accept guidance and work with the utility to address contaminants of emerging concern if they are included in discussions and planning through risk communication activities.

How these guidelines were developed

A series of research activities provided the basis for the development of the Risk Communication Strategy and Tools:

1. A literature review of currently available material, including the Stage 2 Disinfection Byproducts (DBPs) risk communication material already developed by the Association of Metropolitan Water Agencies (AMWA); American Water Works Association (AWWA); and USEPA. Also reviewed were available specific contaminant material already in use in the drinking water industry and media reports.
2. One-on-one interviews with selected utility personnel (utility partners and others) and public health professionals to gather information on the 12 priority contaminants as well as pressing communication issues around contaminants in general.
3. An overview of utility customer communication research and examples of risk communication strategies from the large body of knowledge about risk communication in general. Because there is not a great amount of literature around drinking water communication strategies, this overview included research into existing risk communication strategies in allied critical infrastructure industries.
4. Rigorous examination by subject matter experts of information included in specific contaminant tools to ensure scientific accuracy and applicability.
5. Beta tests of the draft tools with potential end users of the information, including at-risk populations, public health professionals, media, and partner utilities.
6. Revision of these Guidelines and tools based on feedback from the focus groups, interviews, and material reviews.

How these guidelines are organized

The Risk Communication Strategy and Tools outline a general strategy for communicating about drinking water contamination:

- Understanding Risk and Crisis Communication
- Step One: Lay the organizational foundation
- Step Two: Make risk communication work
- Crisis Communication Planning
- Tools and Templates

Each section includes checklists and tips to assist water utilities in navigating through risk and crisis communication planning.

What to expect

The Risk Communication Strategy and Tools offer a common approach for communicating about drinking water contaminants, but are not designed to be a "one-size-fits-all." Drinking water utilities vary by size, geographic location, age of infrastructure, customer demographics, and types of contamination most frequently threatened or encountered. When to communicate, what to say, and to whom will depend largely on the incident itself. In interviews, some utilities were not concerned about atrazine getting into the water supplies, while elsewhere utility staff were unfamiliar with perchlorate. Every utility is unique, yet there are commonalities among them when it comes to effective, credible risk communication.

Two themes that appear throughout these Guidelines are the importance of **preparation** and **partnerships**. These themes emerged from project research as being critical to the success or failure of a water utility's ability to communicate effectively, accurately, and clearly about contaminants, contaminants of emerging concern, and actual contamination events.

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CHAPTER 2:

Understanding Risk and Crisis Communication

The National Research Council defined risk communication as "an interactive process of exchanging information and opinion among individuals, groups, and institutions; often involves multiple messages about the nature of risk or expressing concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management." (2.2)

What is risk?

Risk is the "likelihood of an adverse event and its negative impact." (2.1) Even when risk is not well defined, people experience concern about the unknown.

Water utilities are challenged to reach out and communicate with consumers and the public about the risk of drinking water contamination. This is particularly true for contaminants of emerging concern because the science is still developing and there are few clear-cut answers.

What is risk communication for drinking water utilities?

In the water industry, risk communication is an exchange of information *and* opinion among the utility, consumers, and other stakeholders, including partner agencies, such as wastewater and public health. This exchange of information and opinion assists customers as they evaluate information, put it in the context of their unique circumstances, and make health-related decisions for themselves and their families. Risk communication can occur during a non-emergency situation or may be part of crisis communication.

What is crisis communication?

Crisis or emergency risk communication relays the risk and benefits of different courses of action to agencies, consumers, and other stakeholders during an emergency or disaster. These messages explain scientific and technical information in a way intended to prompt listeners to take particular actions quickly.

A National Academy of Sciences report defined success in risk communication as "the extent that it raises the level of understanding of relevant issues or actions for those involved and satisfies them that they are adequately informed within the limits of available knowledge." (2.2)

Tip #1

Acknowledge uncertainty. Be prepared to say, "I don't know," when you don't. If appropriate, commit to finding out the requested information. Be sure to follow through.

What are some examples of risk and crisis communication?

- A fact sheet is a risk message.
- Annual Consumer Confidence Reports are risk communications.
- Public meetings, citizen advisory boards, and interactions with the media are examples of risk communication.
- A press conference announcing a contamination event and providing public direction on what to do is an example of crisis communication.

Why is risk communication complex for drinking water utilities?

Risk communication seeks to inform acceptable exposure levels to chemicals and microorganisms. Utility personnel rightfully value science and research. The public, however, may value other concepts, for example, openness or reliability. Zero is the only acceptable level of exposure among many members of the public. Drinking water utilities understand that zero levels of contaminants are not scientifically feasible.

As a result, risk communicators must take into account:

- Credibility of scientific resources relied upon;
- Accuracy of the message and any suggested action; and
- Openness and fairness of how the message was constructed and delivered, as perceived by the message recipient.

Why is discussing contaminants of emerging concern especially hard?

The science for contaminants of emerging concern is evolving and the uncertainty around doses and duration of exposure is disconcerting to consumers and the public. The utility is challenged to be accurate with what is known as well as comfortable with uncertainty and the accompanying public anxiety. The utility can expect diverse and contradictory input from consumers and stakeholders when it engages them in discussions about contaminants of emerging concern.

What helps in discussing uncertainty?

The water utility's reputation of customer service and perceived openness will influence how its communication and outreach efforts are viewed by consumers and the public. If the history has been difficult, additional effort will be needed to restore relationships and create confidence in the utility's commitment to hearing, understanding, and working to respond to consumer concerns about emerging contaminants.

Making risk communication work

- ☐ **Build partnerships.** This is a crucial activity especially when responding to contaminants of emerging concern and in situations where it is important to communicate with special or sensitive populations. Drinking water utility partners include public health agencies, wastewater, environmental health agencies, first responders (law enforcement, fire, hazmat, paramedics), and the media. *(See Tools and Templates for Principles of Community Engagement)*

- ☐ **Strengthen the working relationship with local public health entities** through contaminant risk communication activities that can help the utility's public health mission and increase the potential for future partnership activities. In a contamination crisis, the public's health will depend on clear, quick, actionable, and credible information based on common messages from the utility and public health agencies. This kind of outreach is almost impossible to put in place under the pressures of immediate emergency. The USEPA recommends integrating public health planning into a utility's emergency response planning. (2.3)

- ☐ **Monitor emerging issues in the community.** An issue is "any development – usually in the public arena – which, if it continues, could have a significant impact on the operation or future interests of the organization." (2.4) Issues can be identified by actively reviewing all media reports about the utility, customer comment cards, and complaints. By identifying issues early, the utility has an opportunity to engage stakeholders and audiences in discussion and information sharing before the situation escalates into a crisis.

Risk Communication Principles

The USEPA has Seven Cardinal Rules of Risk Communication:

1. *Accept and involve the public as a legitimate partner.*
2. *Plan carefully and evaluate your efforts.*
3. *Listen to the public's specific concerns.*
4. *Be honest, frank, and open.*
5. *Coordinate and collaborate with other credible sources.*
6. *Meet the needs of the media.*
7. *Speak clearly and with compassion.*

(Visit <www.epa.gov/stakeholders/pdf/risk.pdf> for more information about the rules of risk communication.) (2.5)

The utility performs multiple roles when communicating about risk, including:

- *Service provider with duties to consumers and ratepayers based on legal and regulatory responsibilities;*
- *Expert on its own operations and the science and technology of water treatment; and*
- *Communicator with a stake in the outcome that may be involved in efforts to persuade consumers and stakeholders to change behavior and/or perceptions.*

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2.5 Covello, V., and F. Allen. 1998. EPA Document OPA-87-020: Seven Cardinal Rules of Risk Communication. [Online]. Available: <http://www.epa.gov/pubinvol/pdf/risk.pdf>. [cited July 28, 2008]

CHAPTER 3:

Drinking Water Contaminant Risk Communication: Getting Started

- Lay the organizational foundation
- Risk communication team roles and responsibilities
- Communication policies and procedures

Lay the organizational foundation

☐ **Initiate discussion about how the utility communicates about risk.** Anyone in the utility can start the discussion about adopting an overall risk communication strategy.

☐ **Obtain formal, written commitment** from utility leadership to develop a risk communication strategy and to adopt a crisis communication plan. A successful risk communication strategy has the commitment of a utility's governing structure.

☐ **Assemble a team.** A team brings together a blend of knowledge, skill, and experience within the utility that can provide a broad base of information and perspectives to identify issues. A risk communication team can implement different phases of a risk communication plan.

☐ **Decide and assign team members' roles.** Specifically assign roles to individuals to foster accountability. Since team roles are often linked to ongoing job responsibilities, consider inclusion of Risk Communication Team responsibilities in performance goals and evaluations. The size of the team will vary with the utility. In small utilities one person may fulfill several roles and be responsible for carrying out many tasks.

Risk communication team roles and responsibilities

The size of a Risk Communication Team will vary with the utility. Even if the team is only one or two people, the following highlights the activities that will be needed. Small utilities can prioritize responsibilities based on the knowledge, skills, and availability of staff.

Team Leader (This may be a utility's Public Information Officer, Communication Specialist, or a manager assigned to public communication.)	
Role:	Convene team for periodic planning and when there is an event requiring a concentrated response Organize and oversee longer-term communication and relationship building activities with strategic partners and community stakeholders
Responsibilities:	▪ Make assignments, direct resources, evaluate overall team efforts, and communicate with management or governing board. ▪ Develop messages as needed for risk and crisis communication. Consider prescripting or "mapping" messages that are predictable. (3.1) ▪ Review and approve all written materials before distribution and obtain necessary utility clearance to release information. ▪ Keep risk and crisis communication plan alive by regularly reviewing and updating the plan, communicating changes to the team and the utility, and leading debriefing activities; lead stakeholder/audience analysis; and ensure that analysis is regularly updated. ▪ Have applicable knowledge of utility policies and procedures and monitor application of risk communication principles. ▪ Monitor community and social environment for water-related issues and concerns that may affect the utility even if there is no agreed upon scientific risk.

Tip #2

While it's important to have a designated, trained spokesperson, other utility staff should be coached on how to respond to the media if approached. Rather than saying "No comment," they can be advised to use such phrases as, "I'm working on responding to the X. You can contact Y at [phone number] and [he or she] will be glad to provide you with any information we can confirm at this time."

Tip #3

A good collaborative activity is to become involved in source water or watershed management activities with other community organizations and partner agencies.

The watershed management efforts could provide an opportunity to build working relationships while addressing a public concern.

Utility Spokesperson (Small- and medium-sized utilities may have the Team Leader double as a spokesperson.)	
Role:	Communicate directly with electronic and print media through briefings and interviews and interact directly with the public
Responsibilities:	▪ Be knowledgeable about utility functions and information clearance policy. ▪ Execute principles of good communication in small and large groups as well as with the media. ▪ Monitor personal performance for consistency with risk communication principles. ▪ Provide advice to others on the team who may also find themselves acting as spokespersons. ▪ Avoid having a key operational person act as a spokesperson. If there is an actual contamination event, this person will be involved in responding.

Media Relations	
Role:	Coordinate and track contact between utility and all forms of media
Responsibilities:	▪ Support spokesperson ▪ Track and document media requests and utility responses in an event (*See Tools and Templates for Media Log Template*) ▪ Provide guidance on longer-term media strategy for contaminants of emerging concern (e.g., tracking local media stories about contaminants of emerging concern, making subject matter experts available for interviews, spearheading placement of informational items in local media) ▪ Participate in stakeholder/audience identification and analysis ▪ Act within utility guidelines on information clearance and communication policies with media relations personnel of other strategic partners

Public Information (Can be combined with Media Relations although it has a different focus)	
Role:	Manage the communication mechanisms for communicating directly to the public
Responsibilities:	▪ Plan for, activate, and participate in hotlines, special newsletters, correspondence, and Web site ▪ Monitor public response to events as well as communication and outreach efforts by utilities ▪ Key participant in stakeholder/audience identification and analysis

In-House Communication (Can be combined with Public Information)	
Role:	Keep utility employees informed about risk and crisis communication plans as well as activities implemented during an event or outreach effort
Responsibilities:	▪ Utilize utility structure and existing conduits for communication to reach employees ▪ Monitor employee responses and reactions and supply that information to the team

Subject Matter Experts (Technical and Operational)	
Role:	Provide technically sound and scientifically accurate information and advice to the Risk Communication Team
Responsibilities:	▪ Keep team informed of changes in technical and scientific information that may affect communication and outreach efforts ▪ Provide subject matter expertise to other members of the team, especially when preparing to engage the media, public, and other stakeholders ▪ Be knowledgeable about and apply risk communication principles for conveying statistical information such as probabilities ▪ May interact with media when technical or operational expertise is required to answer questions

Tip #4

- **Conduct an audit of utility communication tools. What tools are already in place?**
- **Assess relationships with other agencies in the community. Who are the utility's partners and how active is the relationship?**
- **Review relationships with government leaders, customers, consumers, media (including ethnic media), and other stakeholders in the community. Who are the utility's audiences and how does the utility communicate with each one?**

Possible Risk Communication Goals

- *Enhance public knowledge about the scientific understanding of various contaminants*
- *Give the public guidance on protective behavior and actions*
- *Elicit levels of concern equal to the hazard*
- *Build utility credibility by*
  - *Participating in dialogue with partner agencies, ratepayers, and other stakeholders that meets needs and addresses concerns*
  - *Conveying interest in understanding other perspectives about contaminants*
- *Equip ratepayers and stakeholders to make informed decisions and take action by*
  - *Promoting mutual understanding between the utility and those it serves as well as community participation in assessing the risk and determining corresponding policies and actions*

Partner Agency Liaison	
Role:	Establish working relationships and provide consistent conduit of information among the utility, primacy agency, public health department, and partner responding agencies
Responsibilities:	▪ Maintain up-to-date contacts and relationships with primacy and responding agencies and working knowledge of the different roles and legal responsibilities among all these agencies ▪ Be knowledgeable about utility policies and procedures for notifications, communication, information clearance, and any other activity that might be triggered by either a surge of public concern about a contaminant or a crisis

Water utilities may need to add other team members to address specific issues, including:

Risk Manager/Insurance Carrier Contact	
Role:	Actively participate in risk analysis and development of risk communication messages

Finance	
Role:	Assure there are financial resources available to support the establishment and maintenance of a risk communication plan/program; advise on financial consequences of crisis (e.g., capital improvements to repair or replace aging infrastructure)

Human Resources	
Role:	Advise executive leadership on how to build Risk Communication Team responsibilities into performance evaluation tools

Government Affairs	
Role:	▪ Interface with elected officials and their staff ▪ Inform utility about legislation and regulatory activity

Legal Counsel	
Role:	Advise about legal factors that need to be communicated in managing contamination risks as well as about statutory and regulatory requirements

Communication policies and procedures

- ☐ **Select and train spokespersons.** Spokespersons should be equipped to translate scientific and technical information into clear language as well as describe utility practices. Listening, handling emotional situations, and managing angry people are also good skill sets for spokespersons because they are often in environments with intense emotion.

- ☐ **Assess and update existing utility policies, procedures, and communication tools.** Determine if the following policies exist. If they do, determine whether they are up-to-date or need some revisions to reflect current practices.

Partnership building is a form of community engagement in which groups of people who are connected by geography, demographics, and common interests work collaboratively on issues of mutual concern.

For drinking water utilities, building partnerships requires integrating the technical knowledge and skills of the utility with those of public health, emergency management and response, and community organizations. Partnerships that specifically deal with water contamination require the drinking water utility management to take leadership in engaging diverse constituencies in informal, formal, and supportive networks within the community.

"We meet with the health department once a month since the (Cryptosporidium) outbreak 13 years ago. We talk about what's going on at the plant and disease in the community. Participants include water, research, environment, wastewater, stormwater, and the local regulatory agency is invited. It's a real model for how to work together."

Carrie Lewis,
Milwaukee Water Works

Tip #5

Whatever is communicated by the utility and reported to the community and the media must be accurate.

The communication policies identified here will aid in the creation and update of policies necessary to have in place during a drinking water contamination event. Again, the size of the utility will determine which policies are applicable.

1 Policy: Formally identify the team leader as a member of the utility emergency planning committee

- ☐ Is the team leader included in overall utility emergency planning?
- ☐ Is the team leader included in the initial round of internal utility notifications?
- ☐ Is the team leader assigned to be a part of all ongoing internal briefings with executive staff and/or the governing board during an event?

2 Policy: Verify the occurrence of an event

- ☐ Has an explicit policy statement been developed about the utility's commitment to "be first, be factual, and be honest" in its communication?
- ☐ Has the utility clarified with the public health department and response partners how early in an event they wish to be contacted?
- ☐ Who is responsible for confirming information about an event affecting water quality?

3 Policy: Determine who should be notified

- ☐ Who are the people within the organization (internal) who should be notified of an event?
- ☐ Which external stakeholders or partner agencies need to be notified of an event?
- ☐ Who is assigned to handle internal and external notifications if there is an event?
- ☐ Are there specific target time frames?

4 Policy: Utility verification of information prior to release

- ☐ Who has the authority to approve the release of confirmed information? Is there a backup person who can perform these functions?
- ☐ Is there a written outline or process for how approval will occur?

5 Policy: Identify a spokesperson to speak on behalf of the utility in a crisis situation

- ☐ Is there one person to speak for the utility?
- ☐ Is there a plan in place to identify roles and avoid overlap in job functions in emergency response?
- ☐ Is there protocol for addressing requests for interviews with the media? Have all utility staff been informed of this protocol?
- ☐ How will utility staff handle media requests to physically access the location of the event and the emergency operations center?
- ☐ Is there a media relations policy that describes the utility's approach to media?
- ☐ Does the policy provide guidance on communicating with media under normal and emergency circumstances?

6 Policy: Joint Agreements or Memoranda of Understanding for joint response operations

- ☐ Have utility employees participated in discussions with local public health officials about how the two organizations will coordinate operations in an emergency?
- ☐ Have questions about authority, delegation, and decision-making been addressed?

7 Policy: Joint Agreements or Memoranda of Understanding with partner agencies for joint releases of information

- ☐ Have utility employees participated in discussions with local public health officials about how the two organizations will coordinate communications in an emergency?
- ☐ Has the utility compared its verification and information release procedures with the public health department, primacy agency, and other response partners and is there agreement on how to manage any differences?
- ☐ Have both entities formally signed off on these agreements?
- ☐ Are there any areas of disagreement that need to be addressed?

Tip #6

Even in an emergency, consider having at least two individuals review press releases or other written communication before release. This acts as a filter for catching errors.

Inventory
Review other two-way communication activities with ratepayers and other stakeholders. Does the utility:

- ☐ Have a Citizen Advisory Committee?
- ☐ Sit on a community board or panel related to health or water quality?
- ☐ Give tours to schools or community groups?
- ☐ Have or participate in a speakers bureau?
- ☐ Participate in emergency management activities in the community?
- ☐ Write a column for the local newspaper?

Resources
Both risk and crisis communication need resources; however, crisis communication resource needs will be more extensive. Examples of necessary resources include:

1. Staff and support staff time and possibly overtime;
2. Space, possibly in another location;
3. Communication equipment that can function in the event of a power failure; and
4. Equipment and supplies.

References:

3.1 Covello, V., S. Minamyer, and K. Clayton. 2007. *Effective Risk and Crisis Communication During Water Security Emergencies: Summary Report of EPA Sponsored Message Mapping Workshops.*

CHAPTER 4:

Drinking Water Contaminant Crisis Communication Planning

Emergency planners are fond of saying that while nobody can predict when the next emergency will happen, one should expect that a disaster will occur at some time.

Understanding the steps leading up to and the stages of a crisis makes it possible to create advance plans so that when the unexpected and dangerous happens, the process moves smoothly.

A utility's best response to contaminant risk is preparedness. The CD-ROM in the back of this guide provides examples of plans. While reviewing these plans, reflect on the following phases of planning and questions to build your own plan to guide you through different stages of a contamination event.

Phase 1: Plan ahead

Organize

☐ **Conduct an inventory of existing risk communication tools.**

1. Contact lists: Assemble contact information for all individuals and agencies that may be involved in responding to a crisis contamination event. Create databases of contact information for important people and agencies, including internal responders, first responders (fire, police, emergency management), primacy agencies, public health, media, community organizations with links to special populations, faith-based organizations, and external subject matter experts. Note that all contact information should be checked **at least annually** to be sure it is accurate. There should be at least two hard copies of each contact list, one of which is stored offsite in an easily accessible location.

Tip #7

Contact information, such as e-mail addresses and cell phone numbers, tend to turn over. Be sure to establish and implement a procedure that regularly tests contact information for continued validity. Assign a specific utility staff member to implement the procedure.

If there is a crisis, spokespersons must deliver pre-approved messages in ways that acknowledge the sensitivity, difficulty, and likely fear that is inherent in the crisis and the type of contaminant involved.

Sample Contact List

Name	Position	Office Phone	Fax	E-mail	Cell Phone	Weekend/ Holiday Phone	Alt. Contact
John Doe	Team Leader	555-1234	555-4321	John.Doe@waterutility.org	555-9876	555-4444	Tom Smith

(See Tools and Templates for Communications Team Database)

2. Basic media kit: Assemble a kit with information about the utility and checklists of items to be added or customized in the event of an actual emergency. Be sure to include:
   - Annual Consumer Confidence Report (CCR)
   - Newsletters
   - Map of the utility's service area
   - Frequently Asked Questions (FAQs) about the utility's water quality monitoring and treatment activities

3. Protocols for contact: These will specify under what circumstances audiences should be contacted about a contamination event as well as who within the utility is responsible for initiating and documenting contact.

4. Determine what templates, forms, and documents can be developed and approved prior to an event.
   - Identify messages that can be pre-scripted for likely contaminant scenarios.
   - Develop a framework or template for messages that cannot be pre-scripted. (See Message Framework Template in Tools and Templates.)

☐ Identify what resources are needed for the risk and crisis communication team

- Staff time, including administrative support and supplies
- Meeting space
- Brochures and newsletters
- E-mails, Web sites updates, Twitter, and other e-communication
- Portable exhibits
- Tools that can be used by speakers bureaus
- Media tours
- Time and personnel to attend community functions
- Media training for utility spokesperson and backup

Coordinate

☐ Define goals for specific risk communication activities. (See list of possible goals in Chapter 3)

☐ Conduct a stakeholder and/or audience analysis to gather firsthand knowledge about stakeholder perspectives, values, and expectations.

- What does the utility know about the different demographics, special interest groups, and populations with functional needs in communication, medical care, independence and supervision?
- What are the communication needs and barriers of various groups?
- Which groups does the utility need to seek out and listen to with the additional benefit of building relationships? (See Chapter 5, Tools and Templates for Audience Analysis Worksheet)

☐ Schedule meetings with partner agencies to discuss their notification procedures, guidelines they follow and other factors that will affect working relationships during an event.

☐ Identify all existing emergency plans developed by the utility and its partner agencies and compare requirements and identify gaps. Review the following a develop a matrix for quick reference:

- Types of situations covered
- Protocols applying to water contaminants
- Plans for communicating with customers, community stakeholders, external response partners and internal audiences
- Guidelines for tracking and translating technical information
- Procedures to develop, approve, and distribute information for the public
- Other information related to risk and crisis communication

Communicate

☐ Inform utility staff and response partners about risk and crisis communication plans

- Assign tasks and functions to utility staff, consistent with the size and capability of the utility.
- Equip staff that has specific roles and responsibilities in risk and crisis communication with tools they will need.
- Provide media training. Consider National Incident Management System (NIMS) training.

Possible channels to communicate risk include:

- *Blast fax;*
- *Cell phones;*
- *Door-to-door distribution;*
- *E-mail;*
- *Fliers;*
- *Landline telephones;*
- *Posters;*
- *Public meetings;*
- *Reverse 911;*
- *Text messaging;*
- *Traditional mail;*
- *TTY systems; and*
- *Web sites.*

Tip #8

All documents should have a date and identify who generated the document as well as who approved it.

Have at least two copies of your risk communication notebook in separate physical locations.

Electronic copies of all documents are also a good backup.

☐ Match communication methods with the needs of different group during an event, such as planning for TTY capability for people who are deaf and hard of hearing or establishing contact with ethnic media representatives in the community.

☐ Consider the best use of electronic and digital communication for notifying consumers in light of specific consumer characteristics. (For example, older adults are less likely to use the Internet.)

☐ Start a conversation with stakeholders.

- Seek out and interact with community groups.
- Offer a speakers bureau on such topics as how the utility monitors water quality, source water and watersheds, and how water gets to the faucet.
- Use open-ended questions to learn more about what stakeholders know and about what they are concerned. (See p. 30 "Conversation Starters.")

Document

☐ Build a risk and crisis communication notebook (electronic and hardcopy).

- Keep all planning materials in an organized and accessible format, such as a large three-ring binder.
- Use an index in the front and tabs to separate different sections.
- Include documents, such as the utility's written commitment to risk communication planning, contact lists, checklists, policies and procedures, sample forms, and other documents.

Phase 2: On alert – A possible event has been reported

Organize

☐ Inventory utility's technical and operational expertise for communicating about the potential threat.

☐ Activate crisis communication team members or staff who can

- Begin to think about messages – what has been prepared and approved and what may need to be created.
- Anticipate special message requirements for sensitive populations or those customers with particular communication needs, such as those who have limited English proficiency or low literacy skills.

- Review contact lists for community based organizations (CBOs) or trusted individuals who will be credible in delivering messages to populations with functional needs in receiving, understanding and acting on messages.

Coordinate

- ☐ Participate in executive or governing team discussions about the event.
- ☐ Locate contact information public information officers or communication staff at external response partners, such as public health.
- ☐ Locate contact information for media.
- ☐ Review external response partners requirements and preferences.

Communicate

- ☐ Review responsibilities with each person on the crisis communication team. Discuss:
  - Accountability
  - Lines of communication and decision making
  - Applicable policies and procedures that guide responsibilities
  - Interface of responsibilities with other utility staff and partner response agencies
- ☐ Contact utility's local and state agencies about the possible event.
  - Consult local and state agencies before issuing any information to the media or public.
- ☐ Update prepared materials by contacting EPA Web site (http://www.epa.gov/safewater) for technical information and Centers for Disease Control and Prevention Web site (http://www.cdc.gov/healthywater/drinking) for health impacts.
- ☐ Prepare to meet special communication requirements related to culture, language, and literacy among customers and consumers, including language translation of materials.
- ☐ Coordinate public communication efforts with partner response agencies.

Document

- ☐ Log events, assignments, and other pertinent information.

Tip #9

Web sites should be compliant with the Americans with Disabilities Act (ADA) standards for accessible design issued by the U.S. Department of Justice. Standards are available at <www.ada.gov/stdspdf.htm>.

Audiences

Internal:

Executive leadership

Governing board

Utility employees (especially those who may be in contact with the public, such as customer service staff)

External:

Businesses and industries

Consumers

Customers and ratepayers

Emergency management

Ethnic media

Fire department

Government leaders (city, county, state)

Healthcare professionals and hospitals

Law enforcement

Local public health department

Mainstream media

Public facilities, e.g., schools

State primacy agency

Special population representatives (community-based organizations)

Wastewater

Phase 3: Stand by – Contamination event is determined to be credible

Verify

- ☐ Identify sources of information both internal to utility and external, such as law enforcement. Confirm facts and events.
- ☐ Consider what and how to communicate to external response partners, such as public health, and to consumers about verified information and that which is uncertain.

Organize

- ☐ Confirm that individuals assigned to specific tasks have necessary resources.
- ☐ Review priorities for communicating if there is a confirmed determination and match responsibilities to available staff.
- ☐ Activate communication policies, such as those related to information verification and release.

Coordinate

- ☐ Coordinate with local and state agencies and response partners to determine if a Public Notice or Health Advisory is likely to be issued.
- ☐ Finalize initial Public Notice, Health Advisories, and media releases and seek approvals.
- ☐ Inform executive or governing team about:
  - Coordination that will occur with response partner agencies.
  - Next steps for communicating with consumers and media if thee is "confirmed determination" and their role, e.g., spokesperson.
- ☐ Outline potential schedule for media briefings and updates.
- ☐ Make preliminary logistical arrangements for media briefings.
- ☐ If alternate water sources are likely to be utilized, coordinate with appropriate utility staff so that information is available for media briefings and public information activities.

Communicate

- ☐ Refresh utility staff and governing body knowledge of applicable communication policies.
- ☐ Consult local and state agencies about releasing information to the public.
- ☐ Inform other utility staff that will be activated if there is "confirmed determination", e.g., call center or customer service staff.
- ☐ Outline information or write script that will be used by call center or customer service.
- ☐ Prepare individual who will act as utility spokesperson.
- ☐ Alert technical or scientific expert(s) that they will likely be activated.
- ☐ Assemble media packets.

Document

- ☐ Log events and assignments.
- ☐ Track all contacts from external sources, including customers and media.

Phase 4: Go live – Confirmed determination

Verify

- ☐ Continue to verify and update information as it becomes available.
- ☐ Apply verification policies.

Organize

- ☐ Confirm arrangements for media or press briefing.
- ☐ Set up call center or hotline.
- ☐ If using Web site or other Internet channels, initiate posting of content. Assign staff to monitor.

Coordinate

- ☐ Coordinate the release of any required Public Notice or Health Advisories with local and state agencies and response partners.

Tips for communicating in difficult situations

- *Prepare physically and mentally to listen with full attention.*
- *Reflect to individuals and audiences that you understand*
  - *What they have experienced and*
  - *The feelings, values and interests that motivate their concerns.*
- *Make sure you understand the question before formulating a response.*
- *Respond with language that is factual, straightforward, descriptive, and precise.*
- *Convey respect for both the people and the issues raised.*
- *Be alert to signals that communication is not meeting the audience's needs and ask questions to be sure that your responses are more focused.*

- ☐ Work with utility staff and partner response agencies to collect information about rumors or misinformation.

Communicate

- ☐ Issue Public Notice and/or Health Advisory in collaboration with partner response agencies such as local and state agency and public health.
- ☐ Execute media briefings and establish reliable schedule for subsequent briefings.
- ☐ Activate call centers.
- ☐ Activate or post Web materials (if using).
- ☐ Respond to rumors.
- ☐ Distribute and update information about alternate water sources, if applicable.
- ☐ Provide ongoing support to spokespersons and subject matter experts.

Document

- ☐ Log all media inquiries and contacts.
- ☐ Log rumors, sources, and resolutions.
- ☐ Track all coordination with local and state agencies and partner response agencies.
- ☐ Log inquires from agencies, community organizations, and other stakeholders and follow-up.

Phase 5: Stay steady – Remediation and recovery begins

Verify

- ☐ Continue to verify and update all information as it becomes available.

Organize

- ☐ Review staffing and communication demands as situation stabilizes.
- ☐ Review all communication activity to be sure it reflects shift in focus.

Tip #10

Be sure to record important comments from the discussion, identify action items to follow up, and produce a written summary for later review.

Controlling Rumors

- *Charge team members and partners to listen for rumors and misinformation.*
- *Identify circulating rumors.*
- *Agree upon a method for tracking down sources and devote time to verifying.*
- *Use reliable communication methods to distribute rumor corrections.*
- *Log all rumor control activities for After-Action analysis.*

Coordinate

- ☐ Continue close coordination with local and state agencies and partner response agencies.
- ☐ Establish coordination with additional agencies involved in recovery and remediation.

Communicate

- ☐ Update all messages in all channels and through all sources.
- ☐ Update consumers about testing and analysis results, protective guidance, and information on water supply availability either through the system or alternate sources.
- ☐ Monitor for information overload among consumers and the public.
- ☐ Monitor whether media interest is waning.

Document

- ☐ Continue to log all media inquiries and contacts.
- ☐ Continue to monitor rumors, sources, and resolutions.
- ☐ Log coordination with previous and new partner response, recovery, and remediation agencies.

Phase 6: Wind down– Return to normal operations

Verify

- ☐ Confirm orders to return to normal operation.

Organize

- ☐ Identify communication tasks to wind down recovery and return to normal operations.
- ☐ Deactivate any special communication mechanisms used during the event.

Coordinate

- ☐ Coordinate media and public information tasks with local and state agencies and partner response agencies.
- ☐ Schedule After Action Reviews with local and state agencies and partner response agencies to assess communication efforts.

Trust is a product of commitment, credibility and competence demonstrated through actions that convey reliability and accountability.

Communicate

- ☐ Schedule media briefing to announce conclusion of event and resumption of normal operations.
- ☐ Revise online communication tools to reflect resumption of normal operations.
- ☐ Conduct organized outreach to consumers to elicit feedback about the utility's performance as a communicator.
- ☐ Report to utility leadership about lessons learned, gaps identified and plans for updating risk and crisis communication plan and policies.

Document

- ☐ Review and analyze all logs, consumer hotline calls, Web site hits, and any other data that can give a snapshot of the communication effort and the response.
- ☐ Identify policy changes or communication gaps that need to be filled.
- ☐ Identify consumer and community relationships that need to be established or strengthened.
- ☐ Revise and update crisis communication plan.
  - Identify additional communication policies that are needed.
  - Identify roles or responsibilities that need to be changed or added.

Conversation starters

1. *What is your understanding of our water quality monitoring process?*
2. *In your experience, how responsive has the utility been to consumer/ratepayer concerns?*
3. *What kinds of concerns do you have about water quality?*
4. *What kind of information about water quality would you find useful?*
5. *How would you like to receive that information?*

Tip #11

Train individuals who have first contact with ratepayers to recognize growing concern among the public and obvious crisis signals. Keep them updated on which utility staff should receive that information.

CHAPTER 5:

Drinking Water Contaminant Risk Communication Tools and Templates

- How to use these tools and templates
- Contaminant fact sheet templates
- Contaminant public notification templates
- Contaminant media release templates
- Media advisory sample template
- Media advisory example
- Message framework worksheet
- Media log
- Working with the media in an emergency
- Audience analysis worksheet
- Risk communication team contact database
- Principles of community engagement
- Tips for reaching public health and other response partners
- Risk communication principles

How to use these tools and templates

These pre-designed and formatted tools and templates are provided as a resource that can be used to improve communication with public health, customers, media, and the general public about drinking water contaminants. All documents are designed in Microsoft Word®, which allows them to be electronically modified by utilities to address differences in contaminant issues, customer demographics, geographic locations, size, and age of infrastructure.

- Consult with your local and state agencies before issuing any fact sheet, public notification, or media release.
- Photocopy templates in this guide or download them electronically from the CD-ROM attached to the back of the guide.
- Insert utility name and logo on fact sheets and public notifications by cutting and pasting electronically or manually.
- Copy news releases and media advisories on utility letterhead.
- Translate fact sheets and public notifications into languages prevalent in communities. Language translation is absolutely necessary for effective communication in communities with significant populations of limited English proficient or non-English speaking people.
- Use tools to prepare risk communication material for public awareness and educational efforts.
- Incorporate tools into utility emergency planning process. Waiting to individualize these tools until a crisis occurs will be too late.
- Establish relationships with grassroots organizations before a crisis. These organizations can help contact many hard-to-reach people through such communication methods as telephone trees, door-to-door visits, fliers, and call centers.
- Be sure all information is up-to-date. Visit the USEPA Web site (http://www.epa.gov/safewater) and contact local public health agencies.

Contaminant fact sheet templates

- Contaminant fact sheets are designed for many audiences:
  - Customer service representatives
  - Customers
  - Public health professionals and other health care providers
  - Business owners

- Media representatives
- General public

- These fact sheets can provide a template to communicate about other contaminants when information about other substances is inserted within the format of the fact sheet.

Contaminant public notification templates

- Consult with your local and state agencies before issuing any official public notification.
- The public notification templates in this Guide are designed to comply with USEPA regulations on public notification for drinking water utilities. However, the USEPA recommends that water utilities use templates in its Revised Public Notification Handbook 2007 (EPA-816-R-07-003) found at http:///www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotificaiton_pnhandbook.pdf.
- Follow the EPA decision tree in the handbook for guidance about when to use a Public Notice.
- In addition to locations recommended by the USEPA, post these official notifications in ethnic groceries or businesses that serve people with limited or no English speaking skills.
- The notice must be translated into the language(s) prevalent in a community.

Contaminant media releases templates and media advisory example

- The contaminant media releases serve as guides for water utilities to use in sending out news releases about drinking water contamination.
- These templates are most appropriate for print media, including Web sites.
- Broadcast media (television and radio) prefer to receive information in a more abbreviated form with bulleted details. A sample media advisory shows how a utility can easily meet those requirements by simply answering the what, when, where, who, and how of the incident.
- A fact sheet about the contaminant should accompany both types of media outreach.

A word about ethnic media:

- One out of every four Americans uses ethnic radio, television, newspapers, and electronic media for information.
- To effectively reach diverse audiences, water utilities should

include local ethnic media outlets in distribution of news releases and advisories.

Audience analysis worksheet

Risk communication, particularly around drinking water contamination, will be more successful if utility communicators take time to know and understand the people who have a connection or stake in drinking water safety.

- Population information can be acquired through U.S. Census data, customer surveys, and building relationships with community partners, such as public health agencies, community- and faith-based organizations, and schools.
- Audience analysis will identify racial, ethnic, and cultural demographics of service areas and guide translation of materials into the prevalent language(s).
- Audiences will vary depending on the contamination event and its location, duration, and extent. Different types of contamination may have different audiences.
- Audiences can be segmented by geographic location (specific service areas), demographics, citizen groups, government officials, internal staff, priority users, special needs, and management.
- Audiences interested in drinking water contamination information can include (in alphabetical order):
    - Businesses (hotels, motels, printers, industries, and restaurants)
    - Customers (residential)
    - Employees
    - Environmentalists
    - Federal and state agencies and officials
    - Fire and police departments
    - Health care providers
    - Local elected officials
    - Media
    - Public health
    - Recreational enthusiasts
    - Schools, day care facilities
    - Sensitive populations, such as people with weakened immune systems, pregnant women, parents of infants and young children, elderly persons, or persons with chronic illness

- Special populations, such as people with limited or no English proficiency, people with physical, mental, or sensory disabilities, and people who by circumstance or choice are not reached by mainstream communication
- Water utility governing body

Message framework worksheet

- When a contamination event has occurred, the crisis communication team should complete the Message Framework Worksheet before making external notifications.
- This preparation will allow the crisis team to speak as one voice with one message during and after an event.
- Customer service associates and other employees who meet the public will also find this message worksheet helpful when answering questions.

Media log

- The Media Log is activated in the second hour of a crisis when notifications begin.
- The Media Log should be maintained by the media relations (or public information) team member.
- Keeping track of calls and responses provides a track record on media interest and the utility's responsiveness during a drinking water contamination incident.
- The log will be useful in debriefing meetings after the crisis is over.

Working with the media in an emergency

- This tip sheet goes hand-in-hand with the Message Framework Worksheet and will help a drinking water utility be ready to meet the press in the event of a drinking water emergency.
- The questions are typical of those the media will ask about a drinking water contamination incident.
- Answers should be written before notifying or meeting with the media and must be brief, factual, and honest.
- This preparation will help the utility spokesperson be prepared and confident.

Risk communication team contact database

- Use this database form to keep track of contact information for members of the utility's Risk Communication Team.
- Maintain the database electronically or manually.
- Information should be updated at least annually.

Principles of community engagement

- This tip sheet provides science-based and practical guidelines to assist water utilities in engaging their communities around drinking water issues.

Risk communication principles

- This tool provides the USEPA's Seven Cardinal Rules of Risk Communication.

Contaminant Fact Sheet Templates

FAST FACTS
WHAT DOES ALGAL TOXINS IN THE DRINKING WATER MEAN?

Algal Toxins [cyanobacteria]
Pronunciation: sahy-*uh*-noh-bak-teer-ee-*uh*

What are algal toxins?

Algal toxins are made naturally in ponds, streams, and lakes. These toxins or algal "blooms" can be blue, green, brown, or red. They smell like fresh-cut grass.

Q & A

Are algal toxins a regulated drinking water contaminant?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) has no standards for algal toxins. They are considered contaminants of emerging concern. New technology has led experts to find certain chemicals, including algal toxins in the water. These compounds have likely been around for many years but were not found by older technology. With this new information, water utilities and the USEPA are becoming more aware of the risks of these substances.

Where does it come from?

Algal "blooms" grow in warm, slow-moving waters that are rich in nutrients. Some examples are fertilizer run-off and septic tank overflows. The water may smell musty if algal toxins get into the drinking water.

How can algal toxins get into drinking water sources?

Algal toxins can be found in drinking water that is taken from lakes, rivers, or other bodies of water contaminated with harmful algal blooms.

How are people exposed to algal toxins?

People can come into contact with algal toxins by:

- swallowing drinking water that has toxins
- breathing in steam or mist that has toxins
- eating fish that live in water that has algal toxins

What are the health effects? Who is at risk?

Most kinds of algae are not dangerous to humans and animals, but there are types that make powerful toxins and can make you sick. Kids and pets are at higher risk because they weigh less and their bodies cannot fight high levels of the toxins.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

Algal Toxin Exposure – How do I know if I've been exposed?

If you have been exposed to algal toxins, you will experience one or more of the following: rash, hives, watery eyes, sore throat, stomach flu, kidney and liver failure, nervous system problems, nausea, diarrhea, and vomiting. If you think you have been exposed to algal toxins, contact your health care provider immediately.

Treating Algal Toxins in the Water

Water treatment plants can remove algae from the drinking water supplies.

Can home treatment systems remove algal toxins?

Granular activated carbon home treatment units can remove and reduce algal levels. If algal toxins get into the water supply pipelines, you should not rely on home treatment. You should follow the advice of your water supplier and health officials about whether to drink or use the water.

Removing algal toxins from the environment

The best protection against algal toxins is to reduce the potential for their creation. Strong environmental programs are needed to reduce nutrients that support the growth of algal blooms, which can lead to creation of algal toxins in the water.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

RESOURCES

Environmental Hazards & Health Effects, Harmful Algal Blooms (HABs) – Centers for Disease Control and Prevention, 2004 – http://www.cdc.gov/hab/about.htm

Blue-Green Algae – North Carolina Public Health, 2006 – http://www.epi.state.nc.us/epi/oee/bluegreen.html

FAST FACTS
WHAT DOES BACILLUS ANTHRACIS IN THE DRINKING WATER MEAN?

Bacillus anthracis
Pronunciation: b*uh*-sil-*uh*s an-threy-sis

What is *Bacillus anthracis*?

Bacillus anthracis (*B. anthracis*) is a spore-forming bacterium that causes a disease called Anthrax. Anthrax is found in animals with hooves, such as cows and pigs, and can infect humans. Anthrax has no color or odor and resists standard drinking water disinfection. It can stay in soil for many years and is not affected by extreme heat, cold, bleach, or ultra-violet light.

Q & A

Is *B. anthracis* a regulated drinking water contaminant?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) does not have a standard for *B. anthracis* or other bioterrorism agents that might contaminate drinking water supplies. Although intentional anthrax contamination of drinking water supplies in the U.S. has not been reported, federal officials continue to perceive the risk to be great. The Centers for Disease Control and Prevention has categorized anthrax as a Class A, or high priority, agent that poses a risk to national security.

Where does it come from?

B. anthracis is found in agricultural areas in South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East.

How can *B. anthracis* get into drinking water sources?

B. anthracis could get into the water from infected animals or animal products. An act of bioterrorism also could contaminate the water supply.

How are people exposed to *B. anthracis* in drinking water?

People are exposed to *B. anthracis* in the following ways:

- The most common method of exposure is either drinking or inhaling drinking water that contains *B. anthracis.*
- Absorption of the bacteria into the skin is less harmful. This causes a boil-like bump to appear on the skin, which is followed by a painless sore with a black center.
- Humans also can be exposed to *B. anthracis* bacteria by handling products from infected animals or inhaling anthrax spores from infected animal products (i.e., wool).
- Additional exposure can occur by eating undercooked meat from infected animals.

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LOGO

What are likely health effects?

Anthrax can be deadly to men and women. Treatment for anthrax is a 60-day antibiotic regimen. Women who are pregnant or may become pregnant and suspect they are infected need to inform their health care provider. Certain antibiotics cannot be prescribed to pregnant women. *B. anthracis* is not contagious and does not spread from person to person.

What are the symptoms of exposure to *B. anthracis*?

Symptoms will vary depending on how someone is exposed. The following list is a description of what symptoms may occur by exposure type.

- Absorption through the skin causes a raised itchy bump to appear. It looks like an insect bite. It will eventually turn black at the center.
- Eating or drinking anthrax bacteria may cause nausea, loss of appetite, vomiting and fever and can lead to severe stomach pains, bloody diarrhea, and shock.
- Inhaling the bacteria may cause cold-like symptoms and will quickly lead to severe breathing problems and shock.

How do I know if I've been exposed?

There is no official screening that can test for anthrax. It can be diagnosed by finding the bacteria in the blood, skin, sores, or phlegm. Health care providers also can test for *B. anthracis* by measuring certain antibodies in the blood.

Removing *B. anthracis* from the environment

Typically, areas and surfaces exposed to *B. anthracis* will be disinfected with chemicals, such as chlorine or chlorine dioxide.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

RESOURCES

Bacteria Fact Sheet – San Francisco Public Utilities Commission, 2006 – http://sfwater.org/detail.cfm/MC_ID/13/MSC_ID/162/C_ID/607/Keyword/Anthrax

Anthrax: What You Need to Know – Centers for Disease Control and Prevention, 2003 – http://emergency.cdc.gov/agent/anthrax/needtoknow.asp

Questions and Answers About Anthrax: Frequently Asked Questions – Centers for Disease Control and Prevention, 2005 – http://www.bt.cdc.gov/agent/anthrax/faq/

FAST FACTS
WHAT DOES ATRAZINE IN THE DRINKING WATER MEAN?

Atrazine
Pronunciation: a-tr*uh*-zeen

What is atrazine?

Atrazine is a chemical used to control weeds found in crops, golf courses, and residential lawns. Atrazine was more widely used in the United States in the late 1980s. In 1993, its use was significantly restricted to weed control in crops to limit its impact on lakes, streams, rivers, and groundwater.

Q & A

Is atrazine a regulated drinking water contaminant?

The U.S. Environmental Protection Agency (USEPA) has set the Maximum Contaminant Level (MCL) at 3 parts per billion (ppb). This MCL is the highest level of atrazine allowed in public water supplies. Water systems are required to reduce atrazine levels to below 3 ppb.

What is parts per billion (ppb)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums).

Where does atrazine come from?

Atrazine is released into the environment through its use as a herbicide and causes run-off into bodies of water after rain or snow washes it off the land. Atrazine may also be released into the environment through wastewater from manufacturing facilities. It can stay for a long time in soil because it does not easily break down in water.

How are people exposed to atrazine?

Most people are exposed to atrazine by:

- coming into direct contact with atrazine
- digging in dirt that has atrazine
- eating vegetables from crops treated with atrazine
- drinking water contaminated with atrazine

What are the health effects? Who is most at risk?

Some people who drink water containing atrazine that is well in excess of the MCL for many years could experience reproductive difficulties or problems with their cardiovascular system.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

How do I know if I've been exposed to atrazine?

Most physicians can test blood for atrazine. Blood is drawn within 24 to 48 hours of exposure and sent to a laboratory for testing. The blood tests cannot determine if a person's health will be harmed.

If levels of atrazine in drinking water exceed the MCL of 3 ppb in the public water supply, the water department must notify the public. At that time, if the problem has not been resolved, the public could be notified about alternative drinking water supplies to prevent health risks.

Treating Atrazine in the Water

Can home treatment systems remove atrazine?

There are products that meet the USEPA's drinking water standard for atrazine. Such devices need to be specifically designed to remove atrazine and tested before and after installation.

Removing atrazine from drinking water

If the MCL is consistently above 3 ppb, the water department or other supplier must reduce the atrazine to be consistently below 3 ppb. The USEPA has approved a method for removing atrazine from drinking water called granular activated carbon.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Atrazine and Drinking Water: Understanding the Needs of Farmers and Citizens – Purdue University Extension, 2006 – http://www.btny.purdue.edu/Pubs/PPP/PPP-66.pdf

Chemical WATCH Factsheet: Atrazine – Beyond Pesticides, 2003 – http://www.beyondpesticides.org/pesticides/factsheets/Atrazine.pdf

Technical Factsheet on ATRAZINE – U.S. Environmental Protection Agency, 2006 – http://epa.gov/ogwdw/dwh/t-soc/atrazine.html

ToxFAQs for Atrazine – Agency for Toxic Substances & Disease Registry, 2003 – http://www.atsdr.cdc.gov/tfacts153.html

FAST FACTS
WHAT DOES CRYPTOSPORIDIUM *IN THE DRINKING WATER MEAN?*

Cryptosporidium
Pronunciation: krip-toe-spore-idium

What is *Cryptosporidium*?

Cryptosporidium is a parasite that causes an illness called cryptosporidiosis. It lives in the small intestines of humans and animals. A hard outer shell protects the parasite so it can live outside the body for long periods of time. The shell also makes *Cryptosporidium* hard to kill with chlorine-based water disinfection treatments.

Q & A

Is *Cryptosporidium* a regulated drinking water contaminant?

The U.S. Environmental Protection Agency (USEPA) requires water systems using water from lakes, rivers, reservoirs, or oceans to clean and filter the water to remove more than 99% of any *Cryptosporidium* in the drinking water.

Where does *Cryptosporidium* come from?

Cryptosporidium is found in soil, food, water, and on surfaces that have come in contact with the stool of animals infected by the parasite. Under favorable conditions of temperature and moisture (such as in cold water), *Cryptosporidium* can survive for months outside its animal host.

How does *Cryptosporidium* get into drinking water?

Cryptosporidium can get into drinking water when the water comes in contact with stool from an infected person or animal. Heavy rain and melting snow can carry the parasite in untreated sewage, polluted stormwater, and contaminated soil into the sources of our drinking water (lakes, streams, reservoirs, rivers and some unprotected ground water sources).

How are people exposed to *Cryptosporidium*?

People are exposed by:

- drinking inadequately treated contaminated water
- eating food that was fertilized or otherwise contaminated by infected human or animal stool
- swallowing contaminated water from lakes, rivers, swimming pools
- touching people or animals who are infected

What are likely health effects? Who is most at risk?

The most common symptoms of cryptosporidiosis are watery diarrhea and cramping. Vomiting, fever, loss of appetite, weight loss, and dehydration also may occur. The symptoms usually last one to two weeks. *Cryptosporidium* can infect all people. Young children and pregnant women are at higher risk for experiencing dehydration related to cryptosporidiosis. People with weakened immune systems should seek medical treatment immediately if they believe they may be infected. Their symptoms may be more severe and can lead to serious illness.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

How do I know if I've been exposed to *Cryptosporidium*?

A stool sample can detect *Cryptosporidium*. Tests for *Cryptosporidium* are not routine. If you think you've been exposed, ask your health care provider to specifically request the test.

Treating *Cryptosporidium* in the Water

Can home treatment systems remove *Cryptosporidium*?

Not all home or office filters remove *Cryptosporidium*. Filters that are certified for "cyst removal" at absolute one micron can remove *Cryptosporidium*. People with weakened immune systems and those who want to take extra precautions should boil their water for at least one minute.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Cryptosporidium – Washington State Department of Health, 2002 – http://www.doh.wa.gov/Notify/factsheets/cryptosporidiosis.htm

Cryptosporidium Infection – Centers for Disease Control and Prevention, 2008 – http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/2004_PDF_Cryptosporidiosis.pdf

Cryptosporidiosis – AIDS Treatment Data Network, 2006 – http://www.atdn.org/simple/crypto.html

Cryptosporidiosis Disease Fact Sheet – Colorado Department of Public Health and Environment, 2001 – http://www.cdphe.state.co.us/dc/Epidemiology/crypto_fs.html

FAST FACTS
WHAT DOES E. COLI *IN THE DRINKING WATER MEAN?*

Escherichia coli* or *E. coli
Pronunciation: esh-*uh*-rik-ee-*uh* koh-lahy or ee koh-lahy

What is *E. coli*?

Escherichia coli (*E. coli*) bacteria are found in the intestines and feces of people and animals. There are many different strains of *E.coli*. Most strains *E. coli* bacteria are necessary and beneficial to our digestive system; however, several strains of *E. coli* can cause disease. *E. coli* strain O157:H7 is such a disease-causing strain. It produces a toxic poison that can make people very sick.

Q & A

Is *E. coli* O157 a regulated drinking water contaminant?

E. coli O157:H7 is not currently a regulated drinking water contaminant. The EPA requires monitoring for the presence of *E. coli* as an indicator of fecal contamination in drinking water under the Total Coliform Rule. The EPA does not regulate any specific strains of *E. coli.* The presence of *E. coli* is seen as an indication that the water is subject to fecal contamination and that it could be contaminated with disease-causing organism (such as *Cryptosporidium, Hepatitis A, Campylobacter* and pathogenic strains of *E. coli)* that are shed in human and animal waste. *E. coli* O157 is only one of many fecal microorganisms identified in recent years that may cause illness in people. *E. coli* O157 can easily be killed by standard drinking water disinfection.

Where does it come from?

E. coli is found in the stool of people and animals. The toxic O157:H7 has frequently been identified in the stool of cows and deer.

How can *E. coli* O157 get into drinking water sources?

E. coli 0157 and similar disease-causing *E. coli* in drinking water indicates that the water came in contact with untreated sewage or animal waste. Melting snow or rainfall can wash the bacteria from the ground into creeks, rivers, lakes, or groundwater. If these sources are used for drinking water and the water is not treated properly, *E. coli* can end up in the water people drink.

How are people exposed to *E. coli* O157?

- Water: Runoff can wash bacteria into ground and surface water sources. If not treated properly, the bacteria can get into water that comes out of a faucet.
- People: Improper hand washing by those infected with the bacteria spreads *E. coli* O157 to others.
- Food: The bacteria can be spread through undercooked beef and unpasteurized milk from infected cattle.

What are likely health effects? Who is most at risk?

Toxic strains of *E. coli*, such as O157, can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some people who are elderly, and people with severely weakened immune systems.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

How do I know if I've been exposed?

If you are experiencing symptoms associated with infection from toxic strains, such as *E. coli* O157, and you have reason to believe that it is in the drinking water, consult your health care provider. Infection can be detected through a stool sample; however, most laboratories do not test for the hazardous strain of *E. coli*. It is important to ask that the sample be tested for this organism. Anyone who has sudden bloody diarrhea should seek medical attention and discuss with their medical provider the need to have their stool tested for harmful *E. coli*.

Treating *E. coli* in the Water

Ground water that is not disinfected can be a source of drinking water contaminated with harmful *E. coli.* Water utilities using surface water sources, which are less likely to have harmful *E. coli,* disinfect with such methods as chlorine, ultra-violet light and ozone.

What can I do at home to make sure my water is safe?

Water utilities are required to notify you if your drinking water is unsafe. Therefore, if you have not been notified of a problem concerning *E. coli*, you can assume your water is free of the bacteria. However, if you want to take extra precautions you can bring your water to a rolling boil for at least one minute to remove bacteria. Most home water filters will not remove *E. coli*.

If you have a private drinking well, you should have your water tested yearly. For more information about how to have your water tested, contact your local or state health department.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Basic Information about E. coli O157:H7 in Drinking Water – U.S. Environmental Protection Agency, 2006 – http://www.epa.gov/safewater/contaminants/ecoli.html

E. coli in Drinking Water – State of Connecticut Department of Public Health, 2005 – http://www.frwa.org/publications/ecoli.pdf

Escherichia coli O157:H7 – Centers for Disease Control and Prevention, 2006 – http://www.cdc.gov/nczved/dfbmd/disease_listing/stec_gi.html

FAST FACTS
WHAT DO ENDOCRINE DISRUPTORS IN THE DRINKING WATER MEAN?

Endocrine Disruptor
Pronunciation: en-d*uh*-krin dis-ruhpt-er

What is an endocrine disruptor?

Endocrine disrupting compounds (EDCs) are chemicals – natural and man-made – that interfere with the endocrine system and may cause health problems in humans, fish, birds, and wildlife. The endocrine system is made up of glands that produce hormones that regulate growth, reproduction, behavior, and other bodily functions of human beings and animals.

Q & A

Are endocrine disruptors regulated drinking water contaminants?

The U.S. Environmental Protection Agency (USEPA) regulates those EDCs that are known to harm human health and the environment, such as atrazine, dioxin, polychlorinated biphenyls, and dichlor-diphenyl-trichloroethane. Many other chemicals suspected of being EDCs are not yet regulated. As of September 2009 USEPA does not have standards for this contaminant group.

[Utility name] tests water that comes into our treatment plants and water that goes out to your home to ensure the highest quality. Improved technology allows us to detect chemicals in tiny amounts – parts per billion (ppb), parts per trillion (ppt), or even parts per quadrillion (ppq). Regulated EDCs are monitored to keep them within drinking water standards.

What are parts per billion (ppb), parts per trillion (ppt), and parts per quadrillion (ppq)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums). One part per trillion is the same as one drop of water in 13,750,000 gallons (250,000 – 55 drums). One part per quadrillion is the same as one drop of water in 13,750,000,000 gallons (250,000,000 – 55 gallon drums).

Where do endocrine disruptors come from?

EDCs can be used in making bug and weed killers, some plastics, rocket fuel, cosmetics, paints, adhesives, asphalt, rubber, food packaging, perfumes, hair preparations, and much more. They can be found in foods, some plastic bottles, toys, birth control pills, soybeans, caffeine, over-the-counter drugs and prescription medicines, and many other everyday products.

How can endocrine disruptors get into drinking water sources?

Heavy rains and melting snow can carry EDCs from our yards, driveways, highways, parking lots, ranches, and farms into the sources of our drinking water. EDCs in landfills can seep into rivers, streams, and water

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

under the ground. When people take medicines that contain EDCs, small amounts pass through the body and are flushed into the wastewater system. EDCs can enter water as a byproduct of chemical and manufacturing processes. Wastewater and water treatments do not remove all EDCs.

What is the risk to human health?

- Endocrine disruptors can change the amount of hormones a human or animal produces, imitate the hormones, or reduce their effects. Hormones affect how tall we grow and develop, how we reproduce, our blood sugar, our energy levels, and responses to stress and injuries.
- A great deal of research suggests EDCs harm animals; however, scientists are trying to understand the relationship between human diseases and exposure to EDCs.

What should I do?

- Educate yourself about EDCs in the products you use at home and work.
- Ask your city or county for approved state or local collection sites for household hazardous waste, such as paints, batteries, and bug and weed killers.
- Properly use and dispose of household chemicals and medicines.

What is the water industry doing to help?

The USEPA's Endocrine Disruption Screening Program will identify potential EDCs and determine their adverse effects, risk to human and animal health, and need for regulation. The USEPA also has a drinking water contaminant candidates' list to identify unregulated contaminants that may require national regulation in the future. The list includes chemicals suspected of being EDCs. The National Institute of Environmental Health Sciences is also working on ways to understand which chemicals disrupt the endocrine system, how EDCs work, and their possible effects on humans.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

EPA Special Report on Endocrine Disruption – U.S. Environmental Protection Agency, 1997 – http://www.cgrer.uiowa.edu/people/carmichael/downloads/Fall2004GreenEnggCourseWebPage/GreenEnggPapers/endrocrine_factsheet.pdf
Endocrine Disruptors – National Resources Defense Council, November 1998
Endocrine Primer – Endocrine Disruptor Screening Program (EDSP) – U.S. Environmental Protection Agency 2007 -- http://www.epa.gov/endo/pubs/edspoverview/primer.htm
Endocrine Disruptor Research Initiatives – U.S. Environmental Protection Agency, 2006 – http://www.epa.gov/endocrine/edrifact.html

FAST FACTS
WHAT DOES LEAD IN THE DRINKING WATER MEAN?

Lead
Pronunciation: led

What is lead?

Lead is a bluish-gray metal found in parts of the earth's crust. It has been used for thousands of years in many ways, and can be found throughout the world. It is used in household plumbing materials and water service lines. Homes built before 1986 are likely to have lead pipes, plumbing fixtures, and solder. Lead is also used in the production of batteries, ammunition, and devices to shield X-rays.

Q & A

Is lead a regulated drinking water contaminant?

The U.S. Environmental Protection Agency (USEPA) requires water utilities to control the lead in water. The action level for lead is 15 parts per billion (ppb).

What is parts per billion (ppb)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums).

How can lead get into drinking water sources?

Lead does not easily dissolve and is rarely found in lakes, rivers, streams, reservoirs, and ground water, but can enter drinking water through a process called corrosion. Corrosion is the wearing away of metal caused by a chemical reaction between water and metal. For example, when water is left standing overnight in pipes containing lead, the lead begins to seep into the water. Soft water and acidic water are more corrosive and more likely to dissolve lead from solder and pipes than hard water.

How are people exposed to lead?

- The most common way to come in contact with lead is through swallowing or inhaling lead paint chips or dust.
- The USEPA estimates only 10% to 20% of lead exposure comes from drinking water.
- Infants who consume mostly mixed formula can receive 40% to 60% of their lead exposure from drinking water.
- Bathing and showering in water with high lead levels is okay because human skin does not absorb lead from water.

What are likely health effects? Who is most at risk?

Effects of exposure will change from person to person and depend on dose and the length of time. Infants, young children, and pregnant women are at the highest risk for health effects from lead exposure. Lead exposure can result in delayed physical and mental development, as well as reduction in attention span and learning abilities. It can cause kidney problems and high blood pressure in adults.

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State Water System ID# [Utility ID#].

LOGO

Lead exposure – How do I know if I've been exposed?

If you suspect your water contains unsafe levels of lead, you should have your tap water tested. Testing is the only way to confirm lead is present. [Water System] regularly tests for lead, however these tests reflect a system-wide picture rather than conditions at a specific outlet.

The Centers for Disease Control and Prevention recommends that all children be routinely screened for lead poisoning. If a child's blood-lead level is at or above a safe level, the local health department will help the child's family find out where the lead is coming from and how to stop exposure.

Treating Lead in the Water

Unlike with some other water contaminants, boiling does not remove lead from water. It can even concentrate the lead. However, there are several ways customers can reduce their risks of lead exposure. Some of them include:

- Flush your water system by running cold water for one to two minutes [Utilities: If a longer flushing time is required, indicate here] after it has been sitting in the pipes for more than six hours.
- Only drink or cook with water that comes out of the faucet cold. Water that comes out warm or hot can contain higher levels of lead.
- Prepare baby formula with cold water or bottled water; infants may get between 40% and 60% of their lead exposure from drinking water.
- Purchase a water filter that is certified to remove lead.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Is there lead in my drinking water? – United States Environmental Protection Agency, 2005 – http://www.epa.gov/safewater/lead/pdfs/fs_leadindrinkingwater_2005.pdf

Lead in Water: Questions and Answers – Centers for Disease Control and Prevention, 2007 – http://www.cdc.gov/nceh/lead/faq/leadinwater.htm

Lead ToxFAQs – Agency for Toxic Substances and Disease Registry, 2005 – http://www.atsdr.cdc.gov/tfacts13.pdf

* The USEPA recommends utilities use its templates that contain mandatory health effects language to communicate about lead. The templates are available on the Lead homepage: http://www.epa.gov/safewater/lead/index.html

FAST FACTS
WHAT DOES MTBE IN THE DRINKING WATER MEAN?

methyl tertiary butyl ether
Pronunciation: meth-uhl tur-shee-er-ee byoo-til ee-ther

What is MTBE?

Methyl tertiary butyl ether, or MTBE, has been added to gasoline since 1979. MTBE is added to gasoline to reduce carbon monoxide produced by automobiles. This helps reduce the amount of harmful ozone in the air.

Q & A

Is MTBE a regulated contaminant?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) did not have a standard for MTBE. A 1997 Drinking Water Advisory states that water with levels of MTBE between 20 and 40 ppb (parts per billion) or below will probably not cause the water to taste or smell bad for most people. Some states have set their own limits on MTBE. It is currently on the USEPA's Contaminant Candidate List (CCL) for possible regulations.

What is parts per billion (ppb)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums).

How can MTBE get into drinking water sources?

MTBE is usually stored in underground tanks that can leak into ground and surface water. It also can enter the water supply through pipelines, spills, stormwater runoff, and gases released from boat engines.

What are the health effects?

Although MTBE can create a bad taste and odor in water at very low levels, the USEPA decided that there is not enough data to measure its health risks at low levels. While the 1997 Drinking Water Advisory for MTBE indicates it is unlikely that it will cause health effects at levels between 20 to 40 ppb or below, the USEPA is re-evaluating the health risks of MTBE. The status of the MTBE assessment can be tracked at: http://cfpub.epa.gov/iristrac/index.cfm.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

How do I know if my water contains MTBE?

Water with levels of MTBE around or above 20 to 40 ppb smells like paint thinner. Some people may even notice it at lower levels. If you think your water may contain MTBE, contact [Utility Name]. Those who use well water may want to have their water tested. If you want to have your water tested, call the USEPA's Safe Drinking Water Hotline (1-800-426-4791) or go to http://www.epa.gov/safewater/faq/sco.html to find a certified laboratory in your area.

Can it be treated?

There are processes that can remove MTBE from soil and water, although the process can be difficult and take time. There are also some home treatment systems that can successfully remove MTBE; however, you should ensure that a treatment system is certified to remove MTBE before purchasing it.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Contaminant Focus: Methyl Tertiary Butyl Ether (MTBE) – U.S. Environmental Protection Agency, 2006 – http://www.clu-in.org/contaminantfocus/default.focus/sec/Methyl_Tertiary_Butyl_Ether_(MTBE)/cat/Overview/

Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Methyl Tertiary-Butyl Ether (MtBE) – U.S. Environmental Protection Agency, 1997 – http://www.asua.org/docs/EPA_Factsheet_on_MTBE.pdf

ToxFAQs for Methyl tert-Butyl Ether (MTBE) – Agency for Toxic Substances and Disease Registry, 1997 – http://www.atsdr.cdc.gov/tfacts91.html

FAST FACTS
WHAT DOES NDMA IN THE WATER MEAN?

NDMA [Nitrosodimethylamine]
Pronunciation: Nitro-sod-im-methyl-amine

What is NDMA?

NDMA, or Nitrosodimethylamine, is caused during water treatment when too much chlorine or chloramine goes into the water and mixes with natural materials making what are referred to as disinfection byproducts (DBPs). NDMA can be used to make rocket fuel, herbicides, pesticides, household cleaners, and toiletry products.

Q & A

Is NDMA a regulated drinking water contaminant?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) does not have a standard for DBPs. [Note to Water Utility: tailor to appropriate state regulations.]

How can NDMA get into drinking water sources?

NDMA contamination can happen in two ways. NDMA can be created during the water treatment process when too much chlorine or chloramine goes into the water and mixes with natural materials. Industry pollution also can cause contamination if byproducts with NDMA are introduced into the water.

How are people exposed to NDMA in drinking water?

- People are exposed to NDMA through drinking water, food, and consumer products.
- Breathing contaminated water particles could also result in exposure.
- The most common way people are exposed to NDMA is through industrial sources, food, and consumer products.

What are likely health effects? Who is most at risk?

Effects of exposure depend on dose, duration, and how a person is exposed. Lab testing on animals shows that exposure to NDMA can cause nausea, vomiting, headaches, and other effects. Exposure to high levels of NDMA may cause liver damage and can cause cancer in some people.

How do I know if I've been exposed?

Blood and urine tests can show a person's exposure to NDMA. Testing must be completed soon after exposure.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

Treating NDMA in the Water

If NDMA is found in drinking water, water utilities have a few options for water treatment. The most common method is direct removal using photolysis by ultra violet (UV) light. There are other non-traditional options that are not used often because they are slow and not cost efficient. UV light is considered the best technology and most effective way to get rid of NDMA; however, UV dosages for treating NDMA are likely to be greater than those required for disinfection. Water suppliers can minimize NDMA formation by making sure polymers and disinfectants are used correctly to treat the water.

Can home treatment systems remove NDMA?

Typical home water filters are not able to remove NDMA. Home water treatment systems that include UV light for disinfection of the water can destroy some of the NDMA that may be present.

How is MTBE removed from the environment?

NDMA can be removed from the natural environment through photolysis or through biological degradation within soils and waterways.

What should I do?

If you think NDMA may be in your water, contact your water supplier to determine if they have detected the contaminant, or review their yearly consumer confidence report. If you have concerns about the potential short- or long-term health effects from exposure to NDMA, contact your primary health care provider.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Nitrosodimethylamine (NDMA) Information – San Francisco Public Utilities Commission, 2006 – http://www.sfwater.org/detail.cfm/MC_ID/10/MSC_%20ID/51/MTO_ID/NULL/C_ID/1865

N–Nitrosodimethylamine – U.S. Environmental Protection Agency, 2007 – http://www.epa.gov/ttn/atw/hlthef/nitrosod.html

ToxFAQs for N-Nitrosodimethylamine – Agency for Toxic Substances and Disease Registry (ATSDR), 1999 – http://www.atsdr.cdc.gov/tfacts141.html

FAST FACTS
WHAT DOES PERCHLORATE *IN THE DRINKING WATER MEAN?*

Perchlorate
Pronunciation: per-khlor-eyt

What is perchlorate?

Perchlorate is made of chlorine and oxygen. It can either be found in nature or made by man. Man-made perchlorate is widely used in rocket fuel, fertilizers, fireworks, road flares, ammunitions, and paint and enamel production. It dissolves easily in liquid and can stay in the soil for many years under normal conditions.

Q & A

Is perchlorate a regulated drinking water contaminant?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) does not have a standard for perchlorate. The USEPA has set a guideline for Perchlorate of 24.5 parts per billion (ppb). This is a guideline for consumers and health officials. It is not a USEPA drinking water rule that utilities must follow. Some states have created their own limits for perchlorate in drinking water.

What is parts per billion (ppb)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums).

Where does it come from?

Perchlorate is a naturally occurring and man-made chemical used to create solid rocket propellant. Militaries around the world use 90 percent of the man-made perchlorate.

How can perchlorate get into drinking water sources?

Perchlorate can reach both groundwater and surface water sources. It is most commonly found in groundwater as a result of spills that have soaked into the soil. Perchlorate dissolves and moves quickly in water. Small amounts can be present in the water supply without being harmful.

How are people exposed to perchlorate?

- The most common way to be exposed is swallowing soil or drinking water that contains perchlorate.
- Skin exposure is not likely because perchlorate is not absorbed easily through the skin.
- Because perchlorate is not moved easily in steam or vapor, breathing it in is unlikely.

What are the health effects? Who is most at risk?

The thyroid gland is most seriously affected by perchlorate. Pregnant women and fetuses, infants, and individuals with thyroid problems are at the highest risk for problems due to exposure to perchlorate.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

How do I know if I've been exposed?
Ask your water supplier if tests for perchlorate are conducted and if the results are available. The easiest way for an individual to find out if he or she has been exposed to perchlorate is through a urine test. Testing must be done quickly because perchlorate leaves the body after eight to 12 hours.

Treating perchlorate in the water
Many treatment systems can reduce levels of perchlorate to below health advisory levels. These include ion exchange, granular activated carbon, reverse osmosis, and biological treatment. Ion exchange is the most common water treatment used.

Can home treatment systems remove perchlorate?
It is possible for a home treatment system to remove perchlorate, but it depends on the system design and technology used. The technologies listed above are available as home treatment devices, although some types are less common.

Removing perchlorate from the environment
When perchlorate is found in drinking water, water utilities increase monitoring, research the source of the contamination, and take action to reduce exposures. State and local health and environmental agencies help investigate sources of contamination and their removal beyond the water utilities' control.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

ToxFAQs for Perchlorate – Agency for Toxic Substances and Disease Registry, 2005 – http://www.atsdr.cdc.gov/toxguides/toxguide-162.pdf

DTSC's Perchlorate Best Management Practices (BMPs) – Department of Toxic Substances Control, 2006 – http://www.dtsc.ca.gov/HazardousWaste/Perchlorate/index.cfm

FAST FACTS
WHAT DO PHARMACEUTICALS IN THE DRINKING WATER MEAN?

Pharmaceuticals
Pronunciation: fahr-m*uh*-soo-ti-k*uh*lz

What are pharmaceuticals?

Pharmaceuticals are medicinal drugs, including prescription and veterinary medicines and over-the-counter drugs. Examples include antibiotics, antidepressants, caffeine, hormones, nicotine, painkillers, and steroids. They also include chemicals in personal care products, such as cosmetics, detergents, fragrances, hand sanitizers, insect repellants, shampoos, and soaps.

Q & A

Does the USEPA regulate pharmaceuticals?

As of September 2009, the U.S. Environmental Protection Agency (USEPA) does not have standards for this group of contaminants. Pharmaceuticals (and personal care products) are not monitored by the USEPA but are considered "emerging" contaminants.

[Utility name] tests water that comes into the plants and water that goes out to you to ensure high quality. New technology detects chemicals and organisms in small amounts – parts per billion (ppb) or parts per trillion (ppt). There are no rules for pharmaceuticals in the drinking water.

What are parts per billion (ppb) and parts per trillion (ppt)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums). One part per trillion is the same as one drop of water in 13,750,000 gallons (250,000 – 55 gallon drums).

Where do pharmaceuticals come from?

Chemicals we use every day in our homes, in farming, and in manufacturing get into the sources of our drinking water.

How can pharmaceuticals get into drinking water sources?

- When people or animals take medicines, small amounts pass through the body and are flushed into the water system.
- Some drugs and products that are put on the skin are washed into a sink or shower drain.
- Some people flush extra medicines down the toilet or pour them down a sink or drain.
- Most water treatments do not remove all pharmaceuticals.

What is the risk to human health?

- The risk to humans is uncertain. The presence of contaminants does not mean that drinking water is a human health risk.
- To date, no research has found that humans are harmed by pharmaceuticals in drinking water.
- The amount of pharmaceuticals found in drinking water in some cities are at levels that are measured in parts per billion (ppb) or parts per trillion (ppt), far below a prescribed dose.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

What should I do?

Chemicals in medicines and personal care products may hurt wildlife, birds, and fish. To protect the environment, throw away unused medicines correctly.

- Crush pills and dissolve with a small amount of water; mix with kitty litter, coffee grounds, or sawdust; place in a sealable plastic bag and put into the trash. Remove labels on prescription bottles before disposing of them.
- Ask your city or county for approved collection sites, such as household hazardous waste programs.
- Ask your pharmacist about take-back programs for returning unused prescriptions.
- Some prescription drugs should be flushed instead of thrown in the trash. Check labels for instructions about proper disposal.

What is the water industry doing to help?

The drinking water industry, the USEPA, and other federal agencies are doing research to find out about the risk to human health and to create solutions to problems with pharmaceuticals.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Proper Disposal of Prescription Drugs – Office of National Drug Control Policy, 2007 – http://www.whitehousedrugpolicy.gov/drugfact/factsht/proper_disposal.html

SMARxT DISPOSAL: PhRMA joins APha, FWS initiative – American Pharmacists Association, 2008 – http://www.pharmacist.com/AM/PrinterTemplate.cfm?Section=Pharmacy_Today2&template=/CM/HTMLDisplay.cfm&ContentID=15809

Associated Press Report Finding Pharmaceuticals in Water Supplies – Common Dreams News Center, 2008 – http://www.commondreams.org/news2008/0311-09.htm

FAST FACTS
WHAT DO THMs IN THE DRINKING WATER MEAN?

Trihalomethanes
Pronunciation: tri-hal-uh-meth-ànz

What are trihalomethanes?

Trihalomethanes, known as THMs, are made when chlorine mixes with natural substances, such as plant debris, in lakes and streams. The amount of THMs in drinking water can change over time and is affected by many factors, including water temperature.

If chlorine or some other form of disinfection is not used in drinking water treatment, the public would be exposed to serious health risks. The use of chlorine – which began in the first part of the 20th century – got rid of many widespread illnesses from waterborne diseases, such as dysentery, hepatitis A, cholera, and typhoid. Chlorine also kills many viruses, bacteria, and protozoa, such as *Legionella* and *Giardia.* Water utilities are always working to protect drinking water while balancing the possibility of creating chemical byproducts during the disinfection process.

Q & A

What are the human health risks?

- There may be a possible association between chlorinated water or THMs and bladder cancer.
- Pregnant women should consult their health care provider.

Does the U.S. Environmental Protection Agency (USEPA) regulate THMs?

Yes. For common THMs, the USEPA sets a limit of less than 80 parts per billion (ppb) on an annual average. Water systems are required to check THM levels and give the results to the authorities and to their customers. More information about drinking water safety can be found at: http://www.epa.gov/safewater.

What is parts per billion (ppb)?

One ppb is one part in one billion. One part per billion is the same as one drop of water in 13,750 gallons (250 – 55 gallon drums).

How are people exposed to THMs?

THMs are created when the chlorine added by water utilities to remove bacteria and germs from the drinking water mixes with organic matter in the fresh water supplies. People who drink or shower in this water are then exposed to higher than normal levels of THMs.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#].

LOGO

What should I do?

- Ask your health care provider for additional information on the health risks associated with these compounds.
- Read your annual water quality report to learn about violations of drinking water standards.

How can water utilities resolve this problem?

Programs to reduce THMs and other disinfection byproducts focus on reducing the amount of natural material in the source water and/or by changing the water treatment process. Each water utility looks at its water supply and treatment process to determine the best way to reduce THMs.

How can I get more information?

Contact:
Phone:
E-mail:

Public Health Department
Contact:
Phone:
E-mail:

U.S. Environmental Protection Agency (USEPA)
Web site: www.epa.gov

Resources

Disinfection Byproducts: A Reference Resource – United States Environmental Protection Agency, 2008 – http://www.epa.gov/enviro/html/icr/gloss_dbp.html

Trihalomethanes and Our Water Supply – John Capece, Ph.D., 1998 – http://www.southerndatastream.com/thm/index.htm

Trihalomethanes in Drinking Water – World Health Organization, 2005 – http://www.who.int/water_sanitation_health/dwq/chemicals/THM200605.pdf

Contaminant Public Notification Templates

Public Notice: Important Information About Your Drinking Water

Tests Show Algal Toxins in [Utility Name] Drinking Water

[Utility Name] regularly tests for bacteria in its drinking water. On [date, time, and place], algal toxins were found in the utility's raw water source. **THIS IS NOT AN EMERGENCY.**

What should I do?

- Avoid recreational activities in the water (i.e., skiing, boating, and sailing). Inhaling or skin contact with contaminated water can lead to infection.
- Do not allow children or pets to drink, swim, or dive into areas that may be contaminated.
- Although algal toxins do not harm fish, do not eat fish from contaminated water.
- Do not drink water that has a musty smell or taste or that has a blue or green tint.

What does this mean?

There is no immediate risk. Standard treatment methods remove algal toxins from finished drinking water. Algal toxins are created naturally in ponds, streams, and lakes. They form in warm, slow moving waters that are rich in nutrients. These toxins or algal "blooms" can appear blue, green, brown, or red and smell like fresh cut grass.

What is being done?

[Utility Name] is working with authorities to determine the source of the contamination. When algal toxin levels return to normal, you will be notified.

{Note to Water Supplier: Actions will be tailored to the specific treatment method, such as: shutting off the contaminated source, treating the source to remove or reduce the algae, or treatment adjustments at the treatment plant.}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, e-mail, address]
Health Department Contact: [Name, title, phone, e-mail, address]

Please share this information with other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

PUBLIC NOTICE: DRINKING WATER WARNING

[**Utility Name**] Water is Contaminated with ***Bacillus Anthracis***

SWITCH TO AN ALTERNATIVE WATER SOURCE IMMEDIATELY

Bacillus anthracis [b*uh*-**sil**-*uh*s **an**-threy-sis], the bacterium that causes the disease **anthrax**, was found in the [drinking water supply] on [date]. These bacteria can cause severe sickness and potentially death. If you suspect infection, contact your health care provider immediately. **DO NOT USE THE WATER. SWITCH TO AN ALTERNATIVE WATER SUPPLY.**

What should I do?

- Alternative water sources should be used for drinking, making ice, brushing teeth, personal hygiene, washing dishes, and food preparation until further notice.
- Do not use the shower or bath, or boil the water. Breathing in contaminated water particles or absorbing water through the skin can lead to infection.
- Do not allow small children to play in soil that may have been exposed to water contaminated with anthrax.

What is being done?

[Utility Name] is working with authorities to determine the source of the contamination. *Bacillus anthracis* levels will be removed by [anticipated date of contamination resolution].

{Note to Water Supplier: Specific actions will be tailored to the specific event, such as: "[Utility Name will be flushing the treatment plant and distribution system and retesting daily to determine when the contamination is no longer present in the system. This change will be in place by [date]. Further notices about this change will be made throughout this process."}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, e-mail, address]
Health Department Contact: [Name, title, phone, e-mail, address]

Please share this information with other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

[Utility Name] has Levels of **Atrazine** Above Drinking Water Standards

[Utility Name] routinely tests the water supply for harmful contaminants. On [date, time, and place] atrazine was found at [amount], violating a drinking water standard of 3 parts per billion. **THIS IS NOT AN EMERGENCY.**

What should I do?

- DO NOT boil your water as it can cause atrazine to become concentrated. If you have specific health concerns, consult your health care provider.
- You can obtain more information on atrazine by calling [Utility Name] at [telephone number] or the USEPA hotline at 1-800-426-4791.

What does this mean?

Atrazine (a-tr*uh*-zeen**)** is used to kill weeds found in crops, golf courses, and residential lawns. It was more widely used in the Untied States in the late 1980s. In 1993, its use was significantly restricted to weed control in crops to limit its impact on lakes, streams, rivers and ground waters.

Some people who drink water that contains atrazine well in excess of the maximum contaminant level over many years could experience problems with their cardiovascular system or reproductive difficulties.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: [Describe the corrective action.] "The [Utility Name] has increased testing and is working with [name of health agency] and [name of environmental agency] to identify the source of atrazine and eliminate or reduce the levels found in the drinking water." Alternative language: "The [Water Supplier] has shut down Well [number] in [geographic area] which appears to have been the primary source of atrazine in the drinking water. Well [number] will not be turned back on until atrazine levels have receded or been reduced.

We hope to resolve the problem within [anticipated time frame].}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

[Utility Name] detects ***Cryptosporidium*** in Water Supply

The **[Utility Name]** provides treatment to assure the safety of your drinking water against potentially harmful contaminants, including a pathogen called *Cryptosporidium*. On [date, time, and place] the treatment provided did not meet federal or state standards {Note to Water Supplier: Be specific, describe the violation} and samples collected at [location] showed positive levels of *Cryptosporidium* in our raw water source. **THIS IS NOT AN EMERGENCY.**

What should I do?

- The water is safe to drink. If the water becomes unsafe to drink, you will be notified immediately. Any emergencies will also be announced on [give TV and/or radio stations where they can get additional information].
- You can obtain additional information on *Cryptosporidium* by calling [Utility Name] at [telephone number] or the USEPA hotline at 1-800-426-4791.

What does this mean?

Cryptosporidium **(krip-toe-spore-idium)** is a parasite that causes an intestinal illness called cryptosporidiosis. It is found in soil, food, water, or surfaces that come in contact with infected human or animal stool.

Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause cryptosporidiosis. Symptoms of cryptosporidiosis include nausea, cramps, diarrhea, and headaches.

Cryptosporidium can infect all people. Young children and pregnant women are at higher risk for experiencing dehydration related to cryptosporidiosis. People with weakened immune systems should seek medical advice about ways to reduce their risk of illness due to *Cryptosporidium,* as their symptoms can be more severe and lead to serious illness.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: “The [Utility Name] is working to correct the treatment problem. [Describe filtration process.] The [Utility Name] is testing for elevated levels of *Cryptosporidium* while the issue is being resolved.” We anticipate correcting the problem within [anticipated time frame].}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

PUBLIC NOTICE: DRINKING WATER WARNING

[Utility Name] Water Contaminated with *Escherichia coli (E. coli)*

BOIL YOUR WATER BEFORE USING

[Utility Name] routinely monitors the water supply for bacteria, including *E. coli*. On [date, time, and place], *E. coli* was found in the [location tested]. These bacteria can make you sick. People with weak immune systems should contact their health care providers or local health department with concerns. **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.**

What should I do?

- Boil water for one minute before drinking to kill bacteria or use another water supply, such as bottled water. Until further notice, boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and cooking food.

- Anyone who experiences sudden bloody diarrhea should seek medical attention and discuss with their medical provider the need to have their stool tested for *E. coli*. When untreated, *E. coli* infections can lead to serious health problems in some people.

- You can get additional information on *E. coli* by calling [Utility Name] at [telephone number] or the USEPA hotline at 1-800-426-4791.

What does this mean?

Escherichia coli (esh-*uh*-**rik**-ee-uh **koh**-lahy), commonly known as ***E. coli***, are bacteria found in the intestines of people and animals.

Fecal coliforms and E. coli are bacteria. If they are found in the water, it may mean the water is contaminated with human or animal wastes. Bacteria in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely weakened immune systems.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: [Utility Name] has eliminated the source of the contamination, installed or upgraded disinfection, changed sources, etc. Be sure to include information about when and how people will be notified that the water is safe to drink.}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

[Utility Name] Has Levels of [Endocrine Disrupting Chemical] Above Drinking Water Standards

[Utility Name] routinely tests the water supply for possible contaminants. On [date, time, and place], [endocrine disrupting chemical] was found at [amount]. **THIS IS NOT AN EMERGENCY.** You are receiving this notice [Water utility please fill in cause for notice].

What should I do?

- You DO NOT need to boil your water or use an alternative water supply (such as bottled water). However, if you have specific health concerns, consult your health care provider.
- You can obtain additional information on [name of endocrine disrupting chemical] by calling [Utility Name] at [telephone number] or the USEPA Hot Line at 1-800-426-4791.

What does this mean?

This is not an emergency. If it had been, you would have been contacted immediately.
[endocrine disrupting chemical] is used [identify use, e.g., pesticide, chemical manufacturing, herbicide].

For potential health effects from drinking water with [endocrine disrupting chemical name], consult the USEPA Web site http://www.epa.gov/safewater/contaminants/index.html or call your local water supplier.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take. Such as: [Describe the corrective action.] "The [Utility Name] has increased monitoring for the [endocrine disrupting chemical] and is working with [name of health agency] and [name of environmental agency] to identify the source of the [endocrine disrupting chemical] and eliminate or reduce the levels found in the drinking water." Alternative language: "The [Utility Name] has shut down its Well [number] in [geographic area] which appears to have been the primary source of [endocrine disrupting chemical] in the drinking water. Well [number] will not be turned back on until [endocrine disrupting chemical] levels have receded or been reduced.

We anticipate resolving the problem within [anticipated time frame].}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

Tests Show **Lead** in [Utility Name] Water

[Utility Name] found elevated levels of lead in drinking water in some homes/buildings. On [date, time, and place] lead was found above the allowable amount in the [Utility Name] tested [date]. Lead can cause serious health problems, especially for pregnant women and young children. **THIS IS NOT AN EMERGENCY.** Please read this information closely to see what you can do to reduce lead in your drinking water.

What should I do?

- DO **NOT** BOIL YOUR WATER TO REMOVE LEAD. Boiling does not remove lead and can actually increase its concentration.
- Flush your water system by running cold water for one to two minutes when it has been sitting in the pipes for more than six hours. [Utilities please adjust flush times if necessary.]
- Call [Utility Name] at [telephone number] to find out how to have your water tested for lead.

What does this mean?

Lead is a bluish-gray metal found in parts of the earth's crust. Lead does not dissolve easily and is rarely found in source water. It enters drinking water through a process called corrosion. Corrosion is a wearing away of metal caused by a chemical reaction between water and metal. Lead is found in plumbing materials and fixtures, especially in homes built before 1986. Soft water or acidic water is more corrosive and more likely to dissolve lead from solder and pipes than hard water.

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: [Describe the corrective action.] "The [Utility Name] is working to correct the problem through [adjusting corrosion control system, instituting a lead service line replacement program, flushing the distribution system, etc.]. We anticipate resolving the problem within [anticipated time frame].}

Where can I learn more?

For more information, call:
Water Utility contact: [Name, title, phone, email, address]
Health Department contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

Tests Show **MTBE** in [**Utility Name**] Water

The **[Utility Name]** regularly tests the water supply for harmful contaminants. On [date, time, and place], methyl tertiary butyl ether (MTBE) was found in the [location tested]. **THIS IS NOT AN EMERGENCY.**

What should I do?

- Use another water source to avoid bad tastes and smells.
- Purchase a water filter approved to remove MTBE.
- Call [Utility Name] at [telephone number] to learn how to have your water tested for MTBE.

What does this mean?

MTBE has been added to gasoline since 1979. MTBE reduces carbon monoxide released by automobiles and reduces the amount of harmful ozone in the air. It is usually stored in underground tanks that can leak into ground and surface water. MTBE can also enter the water through pipelines, spills, and gases released by boat engines, storm water runoff, and air pollution.

MTBE can create a bad taste and odor in water at very low levels. The Drinking Water Advisory for MTBE says it is unlikely to cause health problems at levels between 20 and 40 ppb or below. Currently, the USEPA is re-evaluating the health risks of MTBE. The status of the assessment can be tracked at: http://cfpub.epa.gov/iristrac/index.cfm.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: The contaminated well has been removed from service and will not be returned until MTBE levels return to within standards, treatment has (or will be) installed to reduce the MTBE levels, etc.}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notification: Important Information About Your Drinking Water

[Utility Name] Water Contains **NDMA**

NDMA (nitrosodimethylamine) was found in the [water supply] on [date]. This can cause serious health problems after long-term exposure. If you suspect you have been exposed to NDMA, please contact your health care provider immediately. **THIS IS NOT AN EMERGENCY.**

What should I do?

If you believe there might be NDMA in your water, contact your water supplier to find out if they have detected the contaminant, or review their yearly consumer confidence report. If you have concerns about possible short- or long-term health effects from exposure to NDMA, contact your health care provider.

What does this mean?

NDMA is created during the water treatment process when disinfectants, such as chlorine and chloramine, mix with natural materials in the water. This chemical reaction creates new substances called disinfection byproducts. NDMA is one of these byproducts.

What is being done?

{Note to Water Supplier: Actions will be tailored to the specific event. Such as: "[Utility Name] is working with authorities to find the source of the contamination and ways to prevent future contamination. Or, [Utility Name] is reviewing its disinfection practices to ensure that levels of NDMA are low while still disinfecting the water to provide all its consumers a safe, reliable supply of drinking water.

This change will be in place by [date]. Other announcements about this change will be made throughout this process."}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, e-mail, address]
Health Department Contact: [Name, title, phone, e-mail, address]

Please share this information with other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Public Notice: Important Information About Your Drinking Water

Tests Show **Perchlorate** in [**Utility Name**] Water

The **[Utility Name]** routinely tests the water supply for harmful contaminants. On [date, time, and place], perchlorate was found in the [location tested]. **THIS IS NOT AN EMERGENCY.**

What should I do?

- You DO NOT need to boil your water or use another water supply. If you have specific health concerns, consult your health care provider.
- Pregnant women, young children, and individuals with thyroid conditions may be at a higher risk and should seek advice from their health care providers about drinking the water.
- You can get more information on perchlorate by calling [Utility Name] at [telephone number] or the USEPA Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

Perchlorate (per-**khlor**-eyt) is made up of chlorine and oxygen and can be found in a wide variety of manmade products or occur naturally. Manmade perchlorate has been used to produce road flares, fireworks, fertilizers, and rocket fuels.

Perchlorate is not considered harmful in small amounts, but exposure over a long period may harm the thyroid gland. It may cause problems in pregnant women and individuals with existing thyroid conditions.

What is being done?

{Note to Water Supplier: This section would be tailored to the specific steps you take, such as: "The [Utility Name] has increased testing of perchlorate and is working with [name of health agency] and [name of environmental agency] to find the source of the perchlorate and eliminate or reduce the levels found in the drinking water." Alternative language: "The [Utility Name] has shut down Well [number] in [geographic area] which appears to have been the primary source of perchlorate in the drinking water. Well [number] will not be turned back on until perchlorate levels have been eliminated or reduced.}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, email, address]
Health Department Contact: [Name, title, phone, email, address]

Please share this information with all other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

SAMPLE TEMPLATE

Public Notification: Important Information About Your Drinking Water

Tests Show **Pharmaceutical** Chemicals in [**Utility Name**] Water

[**Utility Name**] regularly tests for chemicals in its drinking water supply, including many prescription drugs and over-the-counter medicines. On [date tested] samples tested at [level of chemicals detected] parts per billion (ppb). There are no standards for safe levels of pharmaceuticals. **THIS IS NOT AN EMERGENCY.**

What should I do?

- Nothing at this time. To learn results from the monitoring, call [utility phone number].
- Information about drinking water safety is available through the USEPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

Pharmaceuticals are prescription and veterinary medicines and over-the-counter drugs, such as antibiotics, antidepressants, caffeine, hormones, nicotine, painkillers, and steroids. Drinking water professionals are studying the risk to human health and working to find solutions to challenges connected to pharmaceuticals.

How will it affect me?

This is **NOT an emergency situation**, and there is **NO immediate health risk**. However, some chemicals in pharmaceuticals can harm wildlife, birds, and fish. To protect the environment, learn how to properly dispose of unused or expired medications by calling [utility name] or ask your pharmacist.

Where can I learn more?

For more information call:
Water Utility Contact: [Name, title, phone, e-mail, address]
Health Department Contact: [Name, title, phone, e-mail, address]

Please share this information with other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

SAMPLE TEMPLATE

Public Notification: Important Information About Your Drinking Water

Tests Show **Trihalomethanes** (THMs) in [**Utility Name**] Water

[**Utility Name**] regularly tests for trihalomethanes in its water supply. On [date of violation], samples tested at [location tested] measured [amount] parts per billion (ppb). This, combined with samples from the previous nine months, is in excess of the U.S. Environmental Protection Agency's (USEPA) maximum contaminant level (MCL) of 80 ppb as an annual average for THMs. **THIS IS NOT AN EMERGENCY.**

How will it affect me?

- There is **NO immediate health risk to the general public.**
- Pregnant women should consult their healthcare provider. High levels of THMs may have an effect on pregnancy.
- Long-term exposure to high levels of THMs may be associated with cancer, particularly bladder cancer.

What does this mean?

THMs (tri-hal-uh-meth-ànz*)* are byproducts created when chlorine, which is added to clean the water and to get rid of harmful bacteria and viruses, mixes with natural material in the water. Drinking water professionals try to find the best ways to treat drinking water supplies to decrease the formation of THMs.

Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased chance of getting cancer, particularly bladder cancer.

What is being done?

[Utility Name] is working to determine the source of the contamination. THM levels are expected to return to a safe amount by [anticipated date of contamination resolution].

{Note to Water Supplier: Specific actions will be tailored to the specific event, such as: "[Utility Name] has started to change the disinfection process from chlorination (chlorine) to chloramination (chloramines). This will reduce the levels of THMs in the drinking water while maintaining the bacteriological safety of the water. This change will be in place by [date]. Further announcements about this change will be made throughout this process."}

Where can I learn more?

For more information, call:
Water Utility Contact: [Name, title, phone, e-mail, address]
Health Department Contact: [Name, title, phone, e-mail, address]

Please share this information with other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by [Utility Name].
State Water System ID# [Utility ID#]. Date Distributed: [insert date]

LOGO

Contaminant Media Release Templates

DATE

FOR IMMEDIATE RELEASE

Contact: [XXXXXXXXXX, *Title, Phone, E-mail*]

Harmful Algae Found in [Utility Name] Drinking Water Supply

[CITY, STATE] – Water samples taken [Date] from [Location of testing] revealed high levels of toxins produced by a harmful algae bloom, said [First Name/ Last Name, Title, Name of Utility].

"We are issuing this advisory to let people know what is in their water," [Last Name] said.

Algae are microscopic plants that are created naturally in water and form the base of the aquatic food chain. Most algae are not harmful, but a few can be transferred through the food chain and harm fish, birds and humans.

These harmful algae blooms can appear blue, green, brown or red and smell like fresh cut grass. They form in warm, slow-moving waters that are rich in nutrients, such as fertilizer run-off and septic tank overflows.

Drinking water may have a musty smell or taste if the toxins form in a drinking water source, such as a lake or reservoir. The water itself may have a blue or green tint.

The [Utility Name] is working to find the source of the contamination and contain any drinking water sites that may have been compromised by the algal toxins.

(more)

"We are committed to ensuring the safety and quality of the water we provide to our customers. We are working to resolve the issue within [time frame]," said [Last Name]. "We will communicate with customers through our Web site [Web site address] and through print and broadcast media when the algal toxins have been removed from [site tested]."

Algal toxins can be absorbed into the skin, inhaled through water particles and swallowed through contaminated water or soil. Each method of exposure can cause varying symptoms. Avoid drinking untreated water near contaminated areas, eating fish that may have been exposed to the harmful algal bloom and participating in recreational water activities until further notice. Also, avoid using or drinking water that is discolored or has an unusual smell and report it to [Utility Name].

"Please report any unusual smelling or discolored water to us at the contact number below. If you have concerns about possible exposure to algal toxins, please contact your health care provider immediately," [Last name] said.

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip]. Health questions about algal toxins should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

Drinking Water Contaminated with Anthrax – Do Not Use

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] revealed spores of the bacteria, *Bacillus anthracis* (*buh*-**sil**-*uhs* **an**-threy-sis) – the bacteria that causes anthrax, said [First Name/Last Name, Title, Utility Name].

"This is an emergency, but it is extremely important to remain calm," [Last Name] emphasized. "We are warning our customers not to drink, shower, boil or use tap water for any purpose. Use alternative water sources immediately. We are working to return drinking water service to normal as soon as possible."

[Note to utility: Provide information here, if available, about distribution of bottled water, including time, date, address, and quantity limit.]

There are no safe levels of *Bacillus anthracis*. It is a danger to everyone, [Last Name] said.

Alternative water sources should be used for drinking, making ice, brushing teeth, personal hygiene, washing dishes and food preparation until further notice. Boiling water will not remove anthrax; it can be spread through steam vapor. Avoid showering and bathing with tap water, [Last Name] said.

Bacillus anthracis is a spore-forming bacterium that is resistant to standard water disinfection methods, extreme hot or cold, and can survive for years in water, and decades in soil. It causes the highly infectious disease known as anthrax.

[Utility Name] is working with authorities to determine the source of the contamination and ways to prevent future contamination. [Note to utility: Whether terrorism is suspected or not, include a statement from the Emergency Preparedness/Homeland Security spokesperson.]

"We are committed to ensuring the safety and quality of the water we provide to our customers. We are working to resolve the issue within [time frame]," said [Last Name]. "When the *Bacillus anthracis* levels are resolved, we will communicate with customers through our Web site [Web site address] and through print and broadcast media."

Anthrax is not contagious; it does not spread from person to person. *Bacillus anthracis* can be spread through absorption by the skin, inhalation of contaminated water and consuming contaminated water or soil. Each method of exposure can cause varying symptoms. People who believe they have been exposed to *Bacillus anthracis* should contact their physician immediately.

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about *Bacillus anthracis* and/or anthrax should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [Name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [XXXXXXXXXX, *Title, Phone, E-mail*]

High Levels of Atrazine Detected in Town's Drinking Water

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] showed high levels of the chemical atrazine (**a**-tr*uh*-zeen), said [First Name/Last Name, Title, Utility Name].

"We are issuing a notice to let people know what is in their water. We will continue to communicate with the public as more information is gathered," [Last name] said.

Atrazine is used to kill weeds found in crops, golf courses and residential lawns. It was more widely used in the United States in the late 1980s. In 1993, its use was significantly limited to weed control in crops to limit its impact on lakes, streams, rivers and ground water. Since the utility detected atrazine at levels above the Environmental Protection Agency's safety standards, the use of atrazine is prohibited in the watershed until further notice, [Last name] said.

"We are committed to the safety and quality of the water we provide to our customers. We are working to fix the issue within [time frame]," said [Last name]. "When the elevated atrazine levels are resolved, we will let customers know through our Web site [Web site address] and through print and broadcast media."

[Note to utility: Provide information here, if necessary, about distribution of bottled water, including the time, date, address and quantity limit.]

According to the U.S. Environmental Protection Agency, atrazine is not likely to cause cancer in humans. Some people who drink water with high levels of atrazine over a

(more)

short period of time could have problems with their heart, lungs, kidneys or adrenal glands. People who are concerned about possible exposure to atrazine should contact their health care provider.

For more information, contact [First name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about atrazine should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

[Utility Name] Detects *Cryptosporidium* in Water

[CITY, STATE] – On [Date], the treatment provided by [Utility Name] did not meet federal or state standards {Note to Water Utility: Be specific, describe violation} and samples taken from [drinking water source] showed positive levels of *Cryptosporidium* (krip-toe-spore-idium), said [First Name/Last Name, Title, Utility Name].

Symptoms of a cryptosporidiosis infection may include watery diarrhea, cramping, vomiting and a low-grade fever. *Cryptosporidium* can infect all people. Young children and pregnant women are at higher risk for experiencing dehydration related to cryptosporidiosis. People with weakened immune systems should seek medical advice about ways to reduce their risk of illness due to *Cryptosporidium,* as their symptoms can be more severe and may lead to serious illness.

"We are issuing this advisory to let people know what might be in their water. We will continue to communicate with the public as more information becomes available," [Last Name] said.

Cryptosporidium is a parasite that causes an intestinal illness called cryptosporidiosis. It is found in soil, food, water or surfaces that come in contact with infected human or animal stool. [Utility Name] is working to correct the treatment problem and prevent *Cryptosporidium* contamination of treated drinking water in the future. *[Note to Utility: Please describe at this point what is known about the problem, such as a filter breakdown.]*

(more)

"We are committed to ensuring the safety and quality of the water we provide to our customers. We are working to correct the issue within [time frame]," said [Last Name]. "When the treatment problem is resolved we will communicate with customers through our Web site [Web site address] and through print and broadcast media."

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about *Cryptosporidium* should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

E. coli Detected in Town's Drinking Water
BOIL WATER BEFORE CONSUMING

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] revealed that the water is contaminated a toxic strain of the bacteria *Escherichia coli* (esh-*uh*-**rik**-ee-uh **koh**-lahy), commonly known as *E. coli*. The toxic strain has been identified as [strain name]," said [First Name/Last Name, Title, Utility Name].

"The public should not drink the water without boiling it first," [Last name] emphasized. "These bacteria can cause severe illness. Until further notice, water should be boiled for one minute before drinking, making ice, brushing teeth, washing dishes and preparing food."

Toxic strains of *E. coli* such as [name of identified strain] are typically found in the feces of infected humans or animals. The bacteria in these wastes can cause serious illness. They may pose a special health risk for infants, young children, and some elderly people. Symptoms include diarrhea and nausea. Anyone who experiences sudden bloody diarrhea should seek medical attention and discuss with a medical provider the need to have a stool test for *E. coli.*

"We are committed to ensuring the safety and quality of the water we provide to our customers. We are working to determine the source and resolve the issue using [method of removal] within [time frame]," said [Last Name]. "The public will be notified when the boil water order has been lifted."

(more)

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about *E. coli* should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

[Utility Name] Addresses Concerns About [Chemical] in Local Drinking Water

[CITY, STATE] – Samples collected by the [Utility Name] recently showed the presence of [chemical], a chemical that at high levels is suspected of interfering with the production and action of hormones in the human body, said [First Name, Last Name, Title], spokesperson for the utility.

Tests conducted [Date] from [Location of testing] showed the presence of [name of endocrine disrupting chemical]. While no drinking water standards have been set by the U.S. Environmental Protection Agency (USEPA) for [chemical], the [Utility Name] has started a sampling program to identify all possible contaminants in its water sources to assure that its consumers receive the highest water quality possible.

"We are issuing an advisory to let people know what is in their water. If concerned about possible exposure to [chemical], people with severely compromised immune systems, elderly people, pregnant women, or parents of infants may want to seek advice from their health care providers," [Last Name] said.

[Utility Name] is working with authorities to determine the source of the contamination and ways to prevent future contamination.

(more)

"Our most important priority is the health of our community. We are working to identify possible problems and resolve them before they affect our customers, " said [Last name]. "We will continue to communicate with people through print and broadcast media and on our Web site."

The chemical [name of endocrine disrupting chemical] is not regulated by the USEPA and is commonly used as [identify use, e.g., as a pesticide or in the manufacture of industrial chemicals]. While little is known about potential health effects from drinking water with low levels of [chemical], you may wish to consult the USEPA Web site http://www.epa.gov/safewater/contaminants/index.html for additional information.

[Name of endocrine disrupting chemical] is considered an endocrine disruptor because it may interfere with the glands that secrete hormones that travel through the blood stream to many different parts of the body. These hormones regulate growth and development, reproduction, behavior, reactions to stress, metabolism and other bodily functions.

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about this chemical should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

Lead Levels Exceed Federal Requirements

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] showed lead levels above federal standards, said [First Name/Last Name, Title, Utility Name].

"We are issuing an advisory to let people know what is in their water. Parents should take extra precautions because lead exposure can cause health problems in infants and small children. We recommend flushing your water system by running the water on cold for one to two minutes [If a longer time is required, indicate here.] after it has been sitting in the pipes for more than six hours," [Last Name] said.

Do not boil the water. Boiling does not remove lead and can even concentrate its levels in the water, [Last Name] said.

Lead is a metal that is found in nature and used in the production of plumbing pipes and fixtures. It enters the water through a process known as corrosion, which causes the lead from plumbing materials to wear away and seep into the water.

"We are committed to the safety and quality of the water we provide to our customers. We are working to correct the issue within [time frame]," said [Last Name]. "When the problem is resolved, we will communicate with customers through our Web site [Web site address] and through print and broadcast media."

(more)

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.

People who are concerned about possible exposure to lead in their drinking water should contact their health care provider.

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about lead should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [XXXXXXXXXX, *Title, Phone, E-mail*]

MTBE Detected in Water Supply

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] showed methyl tertiary butyl ether (MTBE) said [First Name/Last Name, Title, Utility Name].

"We are issuing an advisory because we want to let people know what is in their water. The water is safe to drink, but may have a bad taste or odor," [Last Name] said.

MTBE is added to gasoline to reduce carbon monoxide and ozone released by automobiles. [Utility Name] is working to locate the source and ways to prevent future MTBE contamination.

"We are committed to the safety and quality of the water we provide to our customers. We are working to correct the issue within [time frame]," said [Last Name]. "When the issue is resolved, we will let customers know through our Web site [Web site address] and through print and broadcast media."

According to the U.S. Environmental Protection Agency's (USEPA) 1997 Drinking Water Advisory, MTBE can create a bad taste and odor in water at very low levels. Currently, the USEPA is re-evaluating the health risks of MTBE to determine health risks at low levels of consumption.

People who have health concerns about possible exposure to MTBE in their drinking water should contact their medical provider.

(more)

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about MTBE should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [XXXXXXXXXX, *Title, Phone, E-mail*]

NDMA Discovered in Drinking Water Supply

[CITY, STATE] – Water samples taken [Date] from [Location of testing] revealed high levels of a contaminant of emerging concern called NDMA, said [First Name/Last Name, Title, Utility Name].

"We are issuing this notice to let people know what is in their water," [Last Name] said. The [Utility Name] is working to contain any drinking water sites that may have been compromised by NDMA.

NDMA (nitrosodimethylamine*)* is one of a class of chemicals that can form during the water treatment process when disinfectants react with organic materials in the water. This chemical reaction creates new substances called disinfection byproducts. NDMA is one of these byproducts.

[Utility Name] is working with authorities to determine the source of the contamination and ways to prevent future contamination.

"We are committed to ensuring the safety and quality of the water we provide to our customers. We are working to resolve the issue within [time frame]," said [Last Name]. "When the NDMA has been removed from the [site tested], we will communicate with customers through our Web site [Web site address] and through print and broadcast media."

(more)

NDMA can affect humans who breathe contaminated water particles or swallow contaminated water, soil or food. Long-term exposure to high levels of NDMA in food has been associated with cancer.

"If you are concerned about possible exposure to NDMA, please contact your health care provider," [Last Name] said.

For more information, contact [First Name/Last Name,Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about NDMA should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [Name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

Perchlorate Detected in Drinking Water Supply

[CITY, STATE] – Drinking water samples taken [Date] from [Location of testing] showed high levels of a chemical called perchlorate, said [First Name/Last Name, Title, Utility Name].

"We are issuing an advisory to let people know what is in their water," [Last Name] said.

Perchlorate (per-khlor-eyt) occurs naturally in some soils or can be man-made. Manufactured perchlorate is commonly used in rocket fuel, fireworks, explosives, airbags, and gunpowder. [Utility Name] is working with authorities to find the source of the contamination and ways to prevent future contamination.

"We are dedicated to the safety and quality of the water we provide to our customers. We are working to correct the issue within [time frame]," said [Last Name]. "When the high perchlorate levels are resolved, we will communicate with customers through our Web site [Web site address] and through print and broadcast media."

Though perchlorate is not believed to be harmful in small amounts, extended exposure has been associated with thyroid problems, which can cause trouble with the nervous system and the metabolism. Pregnant women, young children, people with thyroid problems and others who are concerned about possible exposure to perchlorate should talk with their health care provider, [Last Name] said.

(more)

MEDIA RELEASE TEMPLATE

For more information, contact [First Name/Last Name, Title] at [Utility Name], [phone number] or [e-mail address], or by mail at [street address, city, state, zip].

Health questions about perchlorate should be directed to [appropriate local public health entity] at [phone number] or [e-mail address]; or the state department of [name of appropriate state health agency] at [phone number].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name*, Title, Phone, E-mail]

[Utility Name] Addresses Concerns About Drugs in Local Drinking Water

[CITY, STATE] – [Utility Name] has found [no or trace amounts of] prescription drugs and over-the-counter medicines in its drinking water supplies in its most recent testing, said [First Name/Last Name, Title, Utility Name].

"Recent news reports about the presence of prescription drugs and over-the-counter medicines in drinking water supplies have raised concerns about the quality and safety of tap water. We monitor water that comes into and goes out of our plant to ensure the highest quality for our customers and have found [no or number found] pharmaceuticals," [Last Name of spokesperson].

[*If pharmaceuticals were detected, list them here. If none were found, skip this and the next paragraph. Go to paragraph beginning with the word "Pharmaceuticals."*] Pharmaceutical chemicals that were detected are: [list]

There is no known risk to the public's health. The pharmaceuticals were found in amounts that measured in parts per billion (ppb) and parts per trillion (ppt). One ppb is the same as one drop of water in 13,750 gallons (250 fifty-five gallon drums); one ppt is the same as one drop of water in 13,750,000 gallons (250,000 fifty-five gallon drums)," said [Last Name of spokesperson].

(more)

Pharmaceuticals, such as painkillers, antibiotics, tranquillizers and personal care products are not regulated by the U.S. Environmental Protection Agency (USEPA), but are considered contaminants of emerging concern. The Safe Drinking Water Act contains no rules for testing or standards for detectable levels of pharmaceuticals, said [Last Name of spokesperson].

[Utility Name] has expanded its efforts to monitor its water supplies to include chemicals not yet regulated by the EPA, said [Last Name of spokesperson].

"Research shows some pharmaceuticals can cause ecological harm to wildlife, birds and fish," said [Name of spokesperson].

"To protect the environment, we urge consumers to dispose of their unused medicines properly. Most medicines and personal care products should be put in a plastic bag, mixed with kitty litter, coffee grounds or sawdust, then sealed and put into the trash," said [Last Name of spokesperson].

More information about regulated chemical contaminants in [Utility Name]'s water is available in its annual report, which is available on its Web site at [Web address], or by calling the utility at [area code-phone number of utility].

###

DATE

FOR IMMEDIATE RELEASE

Contact: [*Name, Title, Phone, E-mail*]

[Utility Name] Violates Water Quality Standard

[CITY, STATE] – Drinking water provided by [Utility Name] recently tested above federal standards for trihalomethanes (tri-hal-uh-meth-ànz), which are chemicals that form during the treatment process.

Tests conducted from [time and date] to [time and date] at [plant location] showed trihalomethanes (THMs) in amounts above the levels set by the U.S. Environmental Protection Agency (USEPA), said [First Name, Last Name, Title], spokesperson for the utility.

“We are issuing an advisory to let people know what’s in their water,” [Last Name] said.

“Our most important priority is the health of our community. We are working to correct this situation within [estimated time frame],” [Last Name] said. “We will let people know through print and broadcast media and on our Web site [Web site address] when tests show that the levels of THMs again comply with USEPA limits.”

THMs form during water treatment when chlorine or other disinfectants combine with natural organic or inorganic materials found in lakes and streams. Disinfectants are used to kill a variety of viruses and bacteria and prevent the spread of waterborne disease, [Last Name] said.

(more)

THMs have been linked with an increase in cancer among people who are exposed for many years to THM levels that exceed the USEPA standard.

[Utility Name] is working with state and local authorities to determine how the contamination occurred and what actions need to be taken to prevent a similar incident in the future, [Last Name] said.

People who are concerned about possible exposure to THMs or other disinfection byproducts should contact their health care provider.

For more information, contact [First Name/Last Name, Title] at [Utility Name] [phone number], or [e-mail address], or by mail [street address, city, state, zip].

For health questions about THMs, contact the local public health department at [phone number] or [e-mail]; or the state department of [name of public health and/or environmental agency] at [phone number].

###

Other Tools and Templates

[Insert Utility Logo]

[DATE] **Contact:** [name, phone number]
[e-mail]

MEDIA ADVISORY

WHAT: [Utility Name] found [name of contaminant – give phonetic pronunciation] in sources of drinking water. [Explain what the contaminant is, (i.e., a chemical, organism; man-made, natural, etc).]

WHEN: [Time and date]

WHERE: [Location where contamination was found]

HOW: [Explain how the contaminant entered the drinking water system and how it was detected.]

WHO: [Name of spokesperson, contact information]

BACKGROUND:
[Use this area to explain if the situation is or is not an emergency. If appropriate, explain symptoms that people might experience from drinking the contaminated water. Identify people who might be at higher risk (pregnant women, small children, people who are elderly, with chronic diseases or whose immune system is compromised.) Explain when updates can be expected and a Web site or hotline people can use to find out more information.]

LOGO

March 1, 2009

Contact: John Doe, 555-555-5555
jdoe@abcutility.gov

MEDIA ADVISORY

WHAT: ABC Utility found positive levels of *Cryptosporidium* (krip-toe-spore-idium) in samples taken from the Big River, a main source of drinking water for Pleasanton. *Cryptosporidium* is a parasite that causes intestinal illness.

WHEN: The samples were found at 6 p.m., Dec. 31, 2008.

WHERE: The samples came from the main intake pipe on the river.

HOW: ABC Utility is investigating how the *Cryptosporidium* entered the source water. The U.S.Environmental Protection Agency requires ABC Utility to clean and filter its water to remove more than 99 percent of *Cryptosporidium* from drinking water that goes to customers.

WHO: Jane Smith, general manager, ABC Utility, 555-555-5550.

BACKGROUND:
This is not an emergency. ABC Utility is issuing this advisory to let people know what is in their water. People with weak immune systems, infants, and young children may experience more severe symptoms, including watery diarrhea, cramping, vomiting, and a low-grade fever. As a precaution, people can disinfect the water by boiling it for one minute.

For more information, visit www.abcutility.gov or call the utility's hotline at 555-555-5551.

Message Framework Worksheet

Spokesperson Name: ____
Contact Information:
Phone: __________________________ Fax: ____________________________
Emergency phone type (i.e., satellite, cell): ________________________________
Number: _________________________
E-mail: ____

[Date]
[Time]

Date and time of next expected update: _____________________________

Details

What: [Provide verified information about what has happened and how the utility is responding.]

So what: [Describe why the contaminant may be harmful and which population groups may be at risk.]

Now what: [Outline action steps people can take to protect themselves.]

[Tip: Describe possible risks and how they may affect different populations (e.g., pregnant women, people who are immuno-suppressed).]

Media Log

Date	Time	Name of Caller	Media Outlet	Phone Number	Question Asked	Transferred	Transferred To	Callback Needed
6/10	9 a.m.	James Smith	Tribune	555-3124	What is the estimated time for resolution?	Y / N	Bill Jones	Y / N

Working with the Media in an Emergency

The media is crucial to a utility's plan for reaching the public with information they need to make good decisions for themselves and those for whom they are responsible. The media's unique and valuable role as the leading two-way channel of information in a community makes them the primary link with the public in any situation, whether talking about risk or in the event of a real threat to the drinking water supply.

Preparation and practice go a long way toward helping a drinking water utility have a professional, working relationship with the media in its community. Part of that preparation is having the answers to a few basic questions before talking with the press in the event of a drinking water contamination emergency. Develop answers to the following questions before addressing the media.

- Who is the utility's contact person/spokesperson? (Provide a name and contact information)

  ____

  ____

- What contaminant was found in the water supply? (Provide pronunciation) ______________

  ____

- When was the contaminant found? (Time and date) ______________________________

  ____

- Where was the contaminant found? ______________________________

  ____

- Can the media access the contamination site? ______________________________

  ____

- How did the contaminant get into the drinking water supply? ______________________________

  ____

  ____

- Why did this happen? ______________________________

  ____

  ____

  ____

- What can happen to people who drink water with this substance in it? * ____________________

  ____

  ____

- Who is most at risk for adverse health consequences? ________________________________

  ____

  ____

- What actions should people take to protect their health? ______________________________

  ____

  ____

  ____

- Who is in charge of the situation? ____

  ____

- What is being done to resolve the situation? ______________________________________

  ____

  ____

  ____

- When is the situation expected to be resolved? ____________________________________

  ____

- Who else is working to resolve this situation? ____________________________________

  ____

  ____

- When will more information be made available? ___________________________________

  ____

*Specific questions about health issues – such as the number of people ill or hospitalized – should be referred to the public health authority in the community.

Audience Analysis Worksheet

What are the boundaries of the area affected by the contaminant? ______________________

____

____

____

What identifying characteristics, such as physical conditions, describe the customers in this area? (i.e., pregnant women, the very old or very young, etc.) __________________________

____

____

____

Are there any special communication needs that need to be addressed with the people in the area? (i.e., non-English speaking, blind/visually impaired, deaf/ hard of hearing, etc.) _____

____

____

____

What is the preferred way to receive messages? (i.e., television, radio, newspapers, Web, e-mail, etc.) ____

____

____

____

Are there any community- or faith-based organizations that may represent or interact with the people in this area? Who are the leaders of these groups? Do they have their own communication conduits, such as newsletters or Web sites, which might be used for communication surrounding the contamination? ______________________________________

____

____

____

____

Who are the trusted sources or spokespeople for the people affected? What is their contact information?____

____

____

____

Is there a history of or known concerns within the area about water quality? ____________

____

____

____

How would people in the affected area come in contact with the contaminant? (i.e., people living in older parts of the community whose homes may have lead pipes) ______________

____

____

____

How might a remediation effort affect people in the area? ____________________________

____

____

____

Risk Communication Team Contact Database

Name	Position	Office Phone	Fax	E-mail	Cell Phone	Weekend/ Holiday Phone	Alt. Contact
John Doe	Team Leader	555-1234	555-4321	John.Doe@ waterutility.org	555-9876	555-4444	Tom Smith

Principles of Community Engagement

Principles of Community Engagement (CDC, 1997) represents the first time that the relevant theory and practical experience of community engagement has been synthesized and presented as practical principles, or guidelines, for this important work. It defines key concepts and insights from the literature that support and influence the activities of community engagement. This publication, available online at [www.cdc.gov/phppo/pce], sets the standard, and continues to be used nationally and internationally.

Principles of Community Engagement provides science-based and practical guidelines for engaging the public in community decision-making and action around guarding water supplies, protecting health, and preventing disease. These guidelines can help drinking water executives and managers and community leaders, including public health professionals, improve communication, promote common understanding, and strengthen coordination, collaboration, and partnership efforts among themselves and community members and institutions.

The principles, a set of nine fundamental guiding ideas, form the core of the document and hold true for efforts across public health disciplines regardless of the initiating organizations:

1. Be clear about the purpose or goals of the engagement effort and the populations and/or communities you want to engage.

2. Become knowledgeable about the community in terms of its economic conditions, political structures, norms and values, demographic trends, history, and experience with engagement efforts. Learn about the community's perceptions of those initiating the engagement activities.

3. Go into the community, establish relationships, build trust, work with the formal and informal leadership, and seek commitment from community organizations and leaders to create processes for mobilizing the community.

4. Remember and accept that community self-determination is the responsibility and right of all people who comprise a community. No external entity should assume it can bestow on a community the power to act in its own self-interest.

5. Partnering with the community is necessary to create change and protect health.

6. All aspects of community engagement must recognize and respect community diversity. Awareness of the various cultures of a community and other factors of diversity must be paramount in designing and implementing community engagement approaches. (Engaging these diverse populations will require the use of multiple engagement strategies).

7. Community engagement can only be sustained by identifying and mobilizing community assets, and by developing capacities and resources for community decisions and action.

8. An engaging organization or individual change agent must be prepared to release control of actions or interventions to the community and be flexible enough to meet the changing needs of the community.

9. Community collaboration requires long-term commitment by the engaging organization and its partners.

Tips for Reaching Public Health and Other Response Partners

TIP #1: Create opportunities for collaboration

- Encourage utility staff to reach out one-on-one to counterparts in the local public health department and other response agencies.
- Take advantage of existing emergency preparedness meetings to meet counterparts, share information, and build working relationships.
- Sponsor a workshop or tabletop exercise and invite the local health department and other agencies that will be involved in responding to a contamination event or even a public concern about an emerging contaminant. For guidance: http://cfpub.epa.gov/safewater/watersecurity/trainingcd.cfm.

TIP #2: Topics of common interest

- Compare decision-making procedures in partner agencies under different types of circumstances.
- Compare emergency plans.
- Communicate about widespread issues.
- Co-fund materials and programs.
- Coordinate public education efforts on lead and other contaminants.
- Discuss cooperative problem-solving.
- Discuss approaches to releasing information during an event with uncertain public health implications. For example, water utilities may prefer confirmation of a threat before releasing information. Public health professionals may prefer to share information as soon as there is a potential concern, adding information as it becomes available or confirmed. These differences are important to identify and discuss before an event occurs.
- Discuss each agency's procedures for verifying information.
- Discuss science advances and organizational policies changes. Talk about what types of changes about which each agency wants to be notified.
- Identify similar roles during a contamination event. For example, the public health department may be responsible for confirming some types of contaminants.
- Identify water issues that affect public health.
- Share contact information and back up contact information.
- Talk about a regular schedule for sharing information.

TIP #3: Use scenarios to test different requirements and responses

- Use different scenarios to test different approaches and plans of action.
- Walk through how to respond to a contamination event of an infectious agent with a known health consequence. Contrast that with the response to a contamination event of a chemical contaminant with an unknown health consequence but high public concern.

TIP #4: Formalized agreements
(Explore these requirements before discussing the actual communication practices that may need a formalized agreement or memorandum of understanding to execute.)

- Be clear internally about the steps required for the utility to develop formal agreements with other agencies.
- Determine any utility-defined limits on the length of inter-agency agreements.
- Determine the procedural details that should be a part of the negotiation and finalization process (review period, internal review processes, and time constraints).
- Identify limits on the types of organizations or agencies with whom the utility can form an agreement.
- Identify and agree on a time frame for regular review of inter-agency agreements. This may be more frequent than the actual terms of the agreement. Identify and agree on what changes in circumstances should also trigger reviews.
- Identify limits on the types of agreements the utility can enter or the subjects that may be addressed.
- Identify the authority to approve the initiation of an agreement process. Who has the authority for final approval?
- Understand the other agency's process. Mutually desirable agreements may fall through on differences in procedures, timelines, and understandings. (Check list adapted from http://www.epa.gov/safewater/watersecurity/pubs/guide_interim_cmp_wsi.pdf, page 29)

TIP #5: Keep the relationship alive
- Assign responsibilities to a specific position in the utility for building and maintaining working relationships with public health and other partners.
- Include information about joint activities in reports to consumers, such as the Consumer Confidence Report, newsletters, and other communication tools.
- Incorporate the responsibilities into a performance goal that will be evaluated regularly.
- Report to the utility's governing board to build support and increase awareness about the value of these relationships.

Risk Communication Principles

The USEPA has Seven Cardinal Rules of Risk Communication:

1. *Accept and involve the public as a legitimate partner.*
2. *Plan carefully and evaluate your efforts.*
3. *Listen to the public's specific concerns.*
4. *Be honest, frank, and open.*
5. *Coordinate and collaborate with other credible sources.*
6. *Meet the needs of the media.*
7. *Speak clearly and with compassion.*

(Visit <www.epa.gov/stakeholders/pdf/risk.pdf> for more information about the rules of risk communication.) (5.3)

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5.1 Mobley, J., Ph.D., K. Reinhardt, C. Tatham, and E. Tatham, Ph.D. 2006. Strategic Communication Planning: A Guide for Water Utilities. Denver, Colo.: AwwaRF and AWWA.

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CHAPTER 6:

Conclusion

Drinking water utility professionals are faced with a complex array of challenges on a daily basis. All day, every day, they do their best to maintain safe and sufficient supplies of drinking water to serve the needs of their communities. The greatest challenge of all, however, is being able to answer the question: “Is my water safe to drink?” The nuances of answering that basic question require a great deal of thought and careful consideration of both the technically correct information *and* the environment in which the answer will be received.

By developing a coordinated risk communication strategy and tools, utility staff at all levels will be well informed and ready to answer with clear, consistent, and credible information to customers, media and to each other during routine emergency and crisis events.

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CHAPTER 3:

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CHAPTER 5:

5.1 Mobley, J., Ph.D., K. Reinhardt, C. Tatham, and E. Tatham, Ph.D. 2006. Strategic Communication Planning: A Guide for Water Utilities. Denver, Colo.: AwwaRF and AWWA.

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Abbreviations

ADA	Americans with Disabilities Act
AMWA	Association of Metropolitan Water Agencies
AWWA	American Water Works Association
CBOs	Community-based organizations
CCL	Contaminant candidate list
CCR	Consumer confidence report
DBPs	Disinfection byproducts
EDCs	Endocrine disrupting compounds
FAQs	Frequently asked questions
MCL	Maximum contaminant level
MTBE	Methyl tertiary butyl ether
NACCHO	National Association of County and City Health Officials
NDMA	Nitrosodimethylamine
NIMS	National Incident Management System
PAC	Project advisory committee
PPB	parts per billion
PPQ	parts per quadrillion
PPT	parts per trillion
THMs	Trihalomethanes
USEPA	United States Environmental Protection Agency
UV	Ultra-violet

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