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EPA
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NEED TO KNOW:

Anticipating the Public's Questions during a Water Emergency

Office of Research and Development
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Executive Summary

Since the events of September 11, 2001, improving the security of our nation's drinking water and wastewater infrastructure has been a high priority. As critical infrastructure, water systems can be subject to intentional attacks as well as unintentional contamination and must be protected. The U.S. Environmental Protection Agency (EPA) plays a critical role in this effort as the lead federal agency for water security.

This investigation was undertaken at the request of EPA to conduct research to: (1) compare public and drinking water professional personnel's assessments of critical information needs arising from the intentional contamination of a municipal water supply; and (2) obtain public evaluation of draft messages developed for such an occasion. The Oak Ridge Institute for Science and Education provided technical assistance.

Information was collected from both utility professionals and members of the public (water consumers) in four metropolitan areas in the United States (northeastern, southeastern, midwestern and western). Twenty-four one-hour discussions were held with a total of 38 drinking water utility professionals. Four two-hour focus groups with members of the general public who use the municipal water supply were conducted in each of the four study cities, with a total of 113 respondents participating.

Findings from the utility professionals were as follows:

PRO-1. Professionals generated a substantial list of questions which they thought might be asked by the public in the event of a contamination incident. This list went beyond questions raised by the public.

PRO-2. Professionals identified several aspects of municipal water systems they thought likely to be misunderstood by the public.

PRO-3. Professionals anticipated challenges in convincing the public that the water supply was once again safe following remediation.

Findings from the public were as follows:

PUB-1. Members of the public recognized the importance of the city water supply.

PUB-2. A number of respondents questioned the authenticity of a reverse 911 call used in a scenario with each group.

PUB-3. Members of the public readily generated an extensive list of questions, similar to the list generated by professionals.

PUB-4. The questions by the public most frequently cited by them as important focused on time until normal water service was restored, getting safe water, and personal safety.

PUB-5. Public respondents perceived an intentional contamination involving a biological agent to be more alarming than one involving a pesticide.

PUB-6. The term "attack" carried strong, negative, emotive connotations.

PUB-7. There was widespread belief among public respondents that a return to "safe" water meant the level of a contaminant is zero.

PUB-8. Public respondents offered a variety of suggestions for improving the messages tested.

Questions arising in response to a water-supply emergency were quite similar for professionals and the public, although there were some differences in emphases.

The detection and identification of the contaminant(s) used in an attack on a water supply form a critical information linkage for both the utility and the public. For the professionals, it is necessary for control, remediation, and public health protection. For the public it is a matter of maintaining personal safety and determining appropriate actions. Thus professionals and the public have the same high priority for somewhat different reasons.

There is the belief among some members of the public that water utilities frequently test for all possible contaminants. Water utilities may benefit from being transparent and proactive in educating consumers regarding testing procedures and their results.

Following an attack and remediation, convincing the public that their water supply is again safe poses substantial challenges. Professionals recognize that verification by multiple credible authorities will be required. Testing procedures are poorly understood by the public.

Most public respondents demonstrated little knowledge of reverse 911 call systems. Some questioned the veracity of the call put forth in the exercise. This can likely be diminished by including in the call message information addressing who is sending the message and where to go for confirmation, as well as utilization of multiple channels of communication.

If an intentional water contamination incident occurs elsewhere, water authorities must be prepared to address questions regarding security issues for their own systems. Consumers will be concerned that another attack is possible and will want to be assured of the safety of their water supply.

Using terms such as “terrorist” and “attack” tend to have some benefit in getting the attention of the public and increasing compliance with directives, but at a very high emotive cost. Limiting the use of these terms as much as possible is likely to be beneficial.

Future message development and refinement will benefit from attending to message features perceived by the public as positive -- such as being directive rather than providing “recommendations” and emphasizing protective actions.

Introduction

Since the events of September 11, 2001, improving the security of our nation's drinking water and wastewater infrastructure has been a priority. As critical infrastructure, water systems can be subject to threats and intentional attacks and must be protected. The U.S. Environmental Protection Agency (EPA) plays a critical role in this effort as the lead federal agency for water security. Other occurrences such as natural disasters and unintentional contamination can also threaten the safety of water supplies.

A critical need has been identified for the development of methodologies to effectively communicate risks associated with intentional contamination of a drinking water supply. EPA sponsored three crisis communication workshops in 2005 and 2006 during which draft messages were prepared for such emergencies. Anticipated questions were identified and draft messages developed through the cooperative efforts of experts from water agencies, public health, emergency response, law enforcement, as well as risk communication[1].

This investigation was undertaken at the request of EPA to conduct research to (1) compare public and water utility professional assessments of critical information needs and (2) evaluate draft messages developed during the above-mentioned workshops for appropriateness and effectiveness. Data were collected by means of structured interviews with one to four professionals per session and focus groups with six to eight members of the general public. The Oak Ridge Institute for Science and Education provided technical assistance.

The study included facilitated focus group discussions at each location.

1. US EPA. Effective Risk and Crisis Communication during Water Security Emergencies: Summary Report of EPA Sponsored Message Mapping Workshops. EPA/600/R-07/027. http://www.epa.gov/NHSRC/pubs/600r07027.pdf

Methods

Objectives and Target Audiences

The overall objective of this study was to provide practical information that crisis communicators can directly apply to planning and response. There were two target audiences: (1) drinking water utility professionals (those employed by an agency providing drinking water, hereafter referred to as "professionals"), and (2) consumers (members of the general public who use drinking water supplied by the respective agencies, hereafter referred to as "public").

More specifically, the objective for professionals was to explore the perceived information needs and priorities of the public following intentional contamination of their municipal drinking water supply. Objectives for consumers included exploring their anticipated information needs and priorities following intentional contamination of their drinking water supply, and exploring the appropriateness and effectiveness of messages drafted by EPA for delivery by utilities to the media and general public.

Recruiting and Data Collection

Locations

Information was collected from both drinking water utility professionals and water consumers across diverse geographical areas, including a large metropolitan area in the northeastern United States, a medium sized metropolitan area in the southeastern United States, a large metropolitan area in the midwestern United States, and a large metropolitan area in the western United States. All utilities serve more than 100,000 customers.

Professionals

To recruit professionals, the Association of Metropolitan Water Agencies provided contact information for an individual in the water utility for each city. ORISE coordinated planning with that contact. The contact scheduled interviews at the market research firm at which interviews were conducted.

Typically, members of senior management were interviewed individually, and other respondents were interviewed in pairs, with respondents being from different job classifications. A moderator conducted one-hour guided discussions. A total of 24 interviews were conducted, with a total of 38 professionals participating. The job classifications of professionals interviewed is summarized in Table 1.

Table 1. Job classifications of professionals

Job Classification	Number of Respondents
Public Information	6
Emergency Management	7
Plant Operations	8
Field Operations	7
Call Center	1
Senior Management	5
Other	4
Total	**38**

Professionals were acting in their official capacity and did not receive any financial incentives for participation in the study.

The Moderator's Guide for professionals is included in Appendix A. The screening instrument for professionals is included in Appendix B.

Public

Data from the public were collected by means of focus groups. Up to eight participants per group were assembled at a commercial market-research facility. There, a moderator guided a two-hour discussion. Four focus groups were conducted in each city. The Moderator's Guide for the public is included in Appendix A.

Members of the public (consumers) were recruited from an extensive database of perspective respondents by the professional market research firm at which focus groups were conducted. They received a financial incentive commensurate with the local rate for such a group. The screening instrument for members of the general public is included in Appendix B. Consumer participants were selected as follows:

- All were at least 18 years of age,
- None of the participants reported working in the media,
- None of the participants reported working in a health-related field, and
- None of the participants had participated in a market-research study within the last six months.

A total of 113 respondents participated in the 16 groups. Their demographic characteristics are summarized in Table 2.

Table 2. Summary of demographic characteristics of public-respondents (n = 113)

Age (years)	Number	Percent
18-34	32	28
35-44	29	26
45-54	24	21
55-64	21	19
65+	7	6
Minimum	19	--
Maximum	82	--
Gender		
Male	54	48
Female	59	52
Education		
High School Diploma	46	41
College Degree(s)	67	59
Race/Ethnicity		
Caucasian	79	70
African-American	17	15
Hispanic	10	10
Asian-American	4	3
Mixed	2	2
Other	0	0

Professionals and the Public

For both professionals and the public:

- All sessions were conducted in English,
- An audio recording of each session was made,
- No transcripts were prepared,
- Up to three professionals from EPA and ORISE observed from behind a one-way mirror, and
- An EPA representative was available to express appreciation and answer questions at the completion of each discussion.

Participant Information

Prior to participating in the study, each prospective respondent received a Participant Information Sheet providing such information as sponsorship of the study, their rights as a participant, risks and benefits in participating, and contacts for more information. Information sheets are included in Appendix C.

Findings – Professionals

PRO-1. Professionals generated a substantial list of questions which they thought might be asked by the public in the event of a contamination incident. This list went beyond questions raised by the public.

Professionals began by providing a list of questions addressing what information they thought the public would want or need to know in a drinking water contamination incident. The initial scenario was non-specific. Respondents first based their questions on knowing only that the water supply was unfit for use, with the cause unknown. Later they were asked to add issues likely to arise if the incident were known to be intentional, i.e., a terrorist attack. When their lists were complete, the professionals were provided five "votes" to indicate questions that they thought were most important/urgent – those which would have the greatest need to be addressed immediately in the course of events. One or more votes could be applied to any question, with multiple votes for a question indicating especially high importance.

From across the 24 interviews came a list of almost 400 questions, including duplicates and variants. Appendix D provides a summary of questions generated by professionals, including those they ranked as "Immediate" and other questions. For this summary, duplicates were removed and minor variants of questions with the same core issue combined. Additionally, a check mark under "Public" indicates that the question was raised at least once by public respondents. Questions were sorted into the following categories:

- The Incident,
- Who is Affected,
- Uses of Tap Water,
- Alternate Sources of Safe Water,
- Consumers Making Tap Water Safe,
- Exposure to Contaminant,
- Additional Information,
- Response and Recovery, and
- Terrorism.

A cursory review of the table addressing "Immediate" questions in Appendix D reveals that virtually all of the questions ranked highly by professionals were asked by the public. A review of the table addressing additional questions shows that professionals went somewhat beyond the public in the questions they felt professionals should be prepared to address.

Two additional observations arise from review of the professionals' questions. First, professionals readily recognize, and often expressed, the need for the participation of a number of agencies in responding to a drinking water contamination event. Examples include the participation of public health (e.g., "What are the symptoms of exposure?") and law enforcement (e.g., "Have you caught the terrorists?"). Second, in their thinking, the professionals went beyond residential use of water (e.g., fire protection and business issues) more so than the public.

Typical statements regarding the importance of informing the public include the following:

"It's imperative that we get as much information out as quickly as possible."

"The more information you give them, the better."

"If you can keep the…public informed…you can help the public to manage the situation."

PRO-2. Professionals identified several aspects of drinking water systems they thought likely to be misunderstood by the public.

Professionals perceived that the public was likely to misunderstand the complexity of a municipal water system. This includes, for example, the concept of pressure zones in such a system.

Also perceived as likely to be misunderstood was the potential ability to isolate portions of the system, thereby limiting the spread of contamination. This includes the presence of systems of valves to prevent backflow and to open or close access of water to specific areas. For those systems having multiple supplies of water, professionals generally believed that the public is unaware of the flexibility available in the source from which water is drawn. These aspects of systems are especially important given the public's intense desire to know exactly the area and persons potentially affected, and their assumption that contaminants were most likely to be introduced at the water source (see Findings PUB-6 on page 6).

The extent and limitations of the protection of water quality were also expected to be misunderstood, and discussions with members of the public were consistent with this (See Findings PUB-7 on page 6).

Quotes of Professionals

"'Why can't you just reboot the system?'"

"They take most of this for granted."

"[People have little idea] of the complications of getting it from [the source], purified, and pumped to their house at… psi."

Quotes of Public

"I don't know if I believe it could be that isolated."

PRO-3. Professionals anticipated challenges in convincing the public that the water supply was once again safe.

Professionals widely agreed that convincing the public that the water supply is usable after a major contamination event posed substantial challenges. They expressed the belief that confidence in water quality cannot be achieved by the water utility alone. External validation by public health agencies (local and state public health departments, and the U.S. Centers for Disease Control and Prevention) was seen as crucial. Elected officials, such as the governor or mayor, were also perceived to have credibility essential to success, with the perceived best choices for the situation varying somewhat by location. Professionals also perceived a clear demonstration of the extent of testing would be critical. This was consistent with issues raised in the public groups (see Findings PUB-7 on page 6).

Professionals

"The health information must come from health officials."
"That's going to be the key thing – who delivers the message."

"I think people are re-assured when they see the leaders … including senior scientists."

"You've got to test the heck out of it."
"…and you've got to test all the other places, too."

Public

"I need someone other than a government official."

"Prove it to me."

"I'd wait for someone else to drink it first."

"I'd have to have someone come out to my neighborhood, open the faucet, and drink it."

Findings – Public

PUB-1. Members of the public recognized the importance of the drinking water supply.

As a warm-up exercise, members of the focus groups were asked to rank the severity of the disruption of city services for two to three days. A score of one meant not at all severe, and a score of ten indicated very severe (See Appendix A.). Almost three-quarters of respondents scored water services at either nine or ten. In subsequent discussion they noted the necessity of water for life itself, as well as disposal of sewage and diverse other uses.

"You can't live without water."

"Losing water – that's devastating."

PUB-2. A number of respondents questioned the authenticity of a reverse 911 call used in a scenario with each group.

Respondents were read the following scenario: "You have just come home from work or running errands. The phone rings. When you pick up the phone you hear a recorded emergency announcement that there has been an attack on the water supply for [name of city]. Someone has purposely released a pesticide [or biological agent] into the water. The announcer says that, for now, the water may be unsafe and cannot be used for any purpose."

A number of respondents noted that if they received such a call, they would wonder if it was a hoax. There was widespread unfamiliarity with a reverse 911 system.

Additionally, respondents raised questions about the efficacy of such a system. More specifically, they doubted the efficacy if the system addressed only land lines and did not include cell phones. Further, they raised the issue of cell-phone customers having out-of-the-area numbers. Several respondents referred positively to systems now in use on some college campuses where a text message can be sent to all cell phones registered with the system. Respondents also spoke of the need to use diverse channels of communication (e.g., television, radio) to help ensure reaching as many members of the public as possible, as well as confirming the validity of the call. Professionals recognized this need as well.

"Is this real?"

"[I thought] 'It's a hoax.'"

"How did you get my number?"

PUB-3. Members of the public readily generated an extensive list of questions, similar to the list generated by professionals.

The 16 groups generated lists which totaled more than 300 questions, including duplicates and variants. As described above (Findings PRO-1 on page 3) there was substantial overlap with questions anticipated by professionals. Public respondents also raised some additional questions which professionals did not. These are summarized in Appendix F. A substantial number of the questions raised by the public but not by professionals were more specific versions of questions professionals identified as being of immediate importance. This was especially so for questions addressing alternate water supplies and exposure to the contaminant.

"As long as you're well informed, you're better off."

PUB-4. The questions by the public most frequently cited by them as important focused on time until normal water service was restored, getting safe water, and personal safety.

After generating a list of questions, public respondents were given six adhesive dots as votes and asked to indicate the questions they thought most important to them. They could use one vote on each of six questions, or multiple votes for a question they perceived as especially important, as they chose. The 12 questions which received the most votes were (from most to least) as follows:

- How long will it be until the tap water is safe again?
- How does one get safe water?
- Can something be done in the home to make the tap water safe?
- How dangerous is the contaminant?
- What is the contaminant?
- Who is affected?
- What if I have already drunk some of the contaminated water?
- What are the symptoms and long-term effects of exposure?
- What are the plans and processes for restoring the water supply?
- Where can I get additional information?
- What uses of tap water are safe?
- How long has the contaminant been in the water system?

Appendix G provides a raw list of all questions raised by the public.

Public

"I would definitely go into an action mode."

"I'm looking out for myself and my family."

Professional

"The big thing is duration for everybody."

"It always comes back to, 'Is the water safe to drink?'"

PUB-5. Public respondents perceived an intentional contamination involving a biological agent more alarming than one involving a pesticide.

Respondents remarked that biological agents were more alarming because of the possibility of the virus or bacterium replicating, increasing rather than decreasing the threat over time. They also believed that remediation of a biological agent was likely to be more difficult.

An intentional contamination involving pesticides was considered less alarming because pesticides are more familiar. Respondents remarked that pesticides already occur on fruit and are used by the public in their gardens.

"Big difference…we eat pesticides."

"Pesticides are used for a lot of things."

"[A biological agent] is much more scary."

"A biological agent will grow rather than be diluted."

"[Biological agent] automatic…sick, gut-wrenching feeling."

PUB-6. The term "attack" carried strong, negative, emotive connotations.

The consideration of intentional contamination of the supply of drinking water typically produced a pronounced emotional response, primarily anxiety. Professionals anticipated this response from the public. When the word "attack" was used, public respondents associated it with terrorism and the events of September 11, 2001. Consequently, if an attack were to occur on another municipal water supply, public respondents reported perceiving that all supplies are vulnerable. They envision a coordinated attack at multiple points and are "waiting for the other shoe to drop." They draw some comfort from having time to prepare. Consideration of an attack on a drinking water system elsewhere in the country brings about a strong desire to know how their supply is being protected.

Generally, when members of the public discussed how a municipal water supply would be attacked, they perceived the most likely point of attack to be at the source from which water was drawn (e.g., reservoir, river, aqueduct). They anticipate that contamination will spread throughout the system. This relates to the perceived inability to isolate a contaminant to a specific portion of the system (See Findings PRO-2 on page 4). The idea of dilution – of how much of a contaminant would be required to effectively contaminate a large body of water – seldom arose in discussion.

Public

"It made me scared."

"anger…panic…will there be others?"

"It's over there. You can prepare."

Professional

"I think the questions stay the same; the anxiety goes up."

"When you bring that up you've got a whole different ball game,"

"'If they did that, they got into my house.'"

PUB-7. There was widespread belief among public respondents that a return to "safe" water meant the level of contamination is zero.

Respondents demonstrated little knowledge of contaminants for which drinking water is routinely tested, the frequency of testing, or the idea of maximum allowable levels. Professionals recognized this (see Findings PRO-2 on page 4). Rarely a respondent referred to test results provided along with a water bill.

"You didn't figure this out until enough people got sick? What in hell's up with that?"

PUB-8. Public respondents offered a variety of suggestions for improving the draft messages tested.

Broadly, public respondents typically expressed preferences for:

- Direct answers to the questions,
- Short concise sentences in active voice,
- Protective actions for self and family,
- Directive (e.g. do/don't) information rather than "recommendations,"
- Information on results rather than process ("studying", "assessing", "investigating"),
- Imparting a sense of time/predictability to the extent possible, and
- Utilization of diverse media (e.g., TV, radio, web, social media, 911).

Appendix H presents the number of groups with which each draft message was tested, the messages, and comments made by the groups about them.

Conclusions and Recommendations

Questions arising in response to an emergency involving a drinking water supply were quite similar for professionals and the public. Both groups emphasized:

- Identification of the contaminant,
- The expected duration of the disruption of service,
- A very specific description of who/what area was affected,
- The possibility and consequences of exposure to the contaminant,
- The possible uses of tap water,
- The availability and logistics associated with alternative water supplies, and
- Regularly updated information.

There were some differences in emphasis. Professionals tended to more regularly address services other than residential (e.g., medical care, fire protection, businesses) – which of course they must do. The most frequently asked questions by the public focused on time, getting safe water, and personal safety. Obviously, drinking water utilities and other involved agencies will benefit from closely attending to information desired by the public.

The critical first link for both the utilities and the public involves the detection of the presence and identity of a contaminant used in an attack on a water supply. For the professionals, it is necessary for control, remediation, and public health. For the public, it is a matter of personal safety and helps determine their actions. Thus both have the same high priority for somewhat different reasons.

A related issue is the belief among some members of the public that water utilities frequently test for all possible contaminants. This disconnect could undermine the credibility of water utilities in case of intentional contamination and aggravate the challenges associated with rapid identity of contaminants. Water utilities can benefit from being transparent and proactive in educating consumers regarding testing procedures and their results. This may create more realistic expectations. Inclusion of a list of substances for which tests are conducted, the frequency of those tests, and results along with water bills form an example that may be helpful.

Following an attack and remediation, convincing the public that their water supply is again usable poses substantial challenges. Professionals recognize that verification by multiple credible authorities will be required. Testing procedures are poorly understood by the public, and the use of many test descriptions and numbers could engender confusion. Comparisons of test results to federal and state standards for safe drinking water may be helpful.

Most public respondents demonstrated little knowledge of reverse 911 call systems. Some questioned the veracity of the call put forth in the exercise. This can likely be diminished by including in the call message:

- Who is sending the message,
- Where to go for confirmation, and
- Using multiple channels of communication.

If there is intentional contamination of a water supply elsewhere, water authorities must be prepared to address questions regarding security issues for their systems. Associating an attack on a water supply with the terrorist attacks of September 11, 2001, the public will readily anticipate multiple coordinated attacks. They will want to be assured of the safety of their own water supply.

Using terms such as “terrorist” and “attack” tend to have some benefit at high emotive cost. Their use will get immediate and intense focus by the public, and probably more intention to comply with directives. On the other hand, public anxiety is likely to substantially increase. Among the consequences of such increased anxiety would be a decreased ability to assimilate information. Moreover, public trust in the utility is likely to be diminished because of the perception that it did not protect its citizens. On the whole, limiting the use of these strongly emotive terms as much as possible is likely to be beneficial.

The draft messages tested will benefit from revision, attending to both message features perceived as positive by the public, as well as those perceived negatively.

Appendix A

EPA Water Security

Moderator's Guide – Professionals

1. Introductions (5 minutes)

A. Introduce moderator
B. EPA sponsorship
   1. Opportunity, importance of participation
C. Audio recording, observers
   1. For reporting only
   2. No personal or city identifiers used
D. Respondent introductions
   1. First name
   2. How long with the utility and description of job responsibilities
E. Plan for the session: discuss issues the public would want/need to know in the event of a major water emergency.

2. Important Questions during a Disruption of the Water Supply (35 minutes)

A. Exercise: What should people know?
   1. Imagine it's been discovered that the water supply is no longer safe
      a. Could be chemical, biological, or mechanical
      b. Could be intentional (terrorism) or unintentional
   2. What do you think people should know? (LIST ON FLIPCHART)

      Probes: Incident
      Response/Authorities
      Response/Public
      Recovery

B. Ranking of questions
   1. Ask interviewee to rank questions
      a. Five most immediately important that they think the public should know
      b. Five less immediately important that the public should know.

3. Issues Thought Most Likely to be Misunderstood by the Public (10 minutes)

A. *Providing safe water is a complex operation. It seems likely that a fair percentage of the general public doesn't think often about how the system works or what the issues are if the system is not providing safe water. Based on your experience…*

B. What are some issues in a water-supply emergency that the public is most likely to misunderstand?
   1. Probes Incident
      Government response
      Personal protection
      Following directives
      Recovery

4. Wrap-Up (5 minutes)

A. Anything else EPA should know about this subject?
B. Thank you.
C. Introduce EPA representative: _____ would be glad to answer questions about the study or EPA activities.

EPA Water Security

Moderator's Guide – Public

I. Introduction (5 minutes)

- Introduce moderator
- EPA sponsorship – opportunity, importance of participation
- Recording, observers – for reporting only, no personal identifiers used
- Respondent introductions – first name, favorite hobby
- Plan for the session
  - Discuss public safety issue
  - Identify information people might want, actions people might take
  - Review some draft information sheets
  - About two hour session

II. City Services (10 minutes)

NOTE: Hand out worksheet: "City Services"

In the left-hand column of this worksheet is a list of city services. There is also space at the bottom for you to list other city services that are important to you. Let's assume that there is a terrorist attack and these city services are lost for several days. For each item, please rate ***how severe*** *the impact would be, for you and your family, if service were disrupted for several days.*

Please rate each item from 1, not at all severe, to 10, very severe. You can use any number from 1 to 10. When you're finished, we will talk about the scores you gave and the reasons for those scores.

NOTE: Respondents will work in pairs. Provide time for them to discuss each item, then debrief, getting responses from each dyad.

- Did you list **any other city services**?
- **Which item was most important** to you? What factors made it most important?
- **Which item was least important** to you? What factors made it least important?
- Was water a high priority for you, a low priority or somewhere in the middle? What factors did you consider in deciding on this position?

III. Exercise: Attack on the Water Supply – Questions and Information Needs (40 minutes)

[NOTE: If someone asks---the spokesperson is someone they trust and feel would do the best they could to keep people safe—who the person is providing the information is not an issue to them]

We want to focus the next several minutes of our discussion today on one of those city services – the water supply. I would like for you to get comfortable in your chair, close your eyes, and create in your mind's eye a vivid image of the following situation: Imagine it is a weekday evening.

You have just come home from work or running errands. The phone rings. When you pick up the phone you hear a recorded emergency announcement that there has been an attack on the water supply for [name of city]. Someone has purposely released a pesticide into the water. The announcer says that, for now, the water may be unsafe and cannot be used for any purpose. In your mind, make a note of the specific questions you have.

When you are ready, open your eyes.

You have probably come up with some really important ideas during this exercise. Take a few minutes to write on your pad anything that is so important that you want to make sure you don't forget it. Also, write down questions you would most want officials to answer at this point.

[NOTE: provide time for note-taking]

- Now, let's talk a little bit about this experience. First, **what questions did you have**, when you first heard the **phone announcement** about a pesticide in the water? What did you want or need to know from officials about this situation at that point?

Now, I would like to understand the relative importance of these questions. I'm going to give each of you two sets of five colored dots. I want you to use these five dots as votes, placing them on the flip chart paper next to the questions that are most important for you. If a question is really important to you, you may place more than one dot by that question to indicate how important it is.

NOTE: Count dots and debrief results

- **What would be your greatest concern** in this situation? Please tell me a little about your reaction to the situation you visualized a few minutes ago.
  - **What are the reasons?**
  - **What did you think** when you heard the information?
  - **How did you feel** when you heard the information?

- **What kinds of information** would you most want to receive during an event such as this
- **What kinds of information** would you want if the event happened in a neighboring community ten miles away? [if time permits]
- **What if** it were in another more distant city in your state? [if time permits]

IV. Materials Testing (50 minutes)

One thing we can be certain about is that if there is an attack on the water supply, people will want lots of information. It's important to EPA that people get information that effectively addresses their concerns. An important part of doing that is preparing now, rather than during an urgent situation. EPA has identified a number of topics – questions people are likely to ask or information they feel people would want to know. For most of the rest of our time together, we will be reviewing some of these.

We'll read one together. I'll ask you to mark it up – underlining the things you like, circling the things you don't like or want to change.

There are a few things I would like you to keep in mind for purposes of this exercise:

1. *It's important to put yourself in the situation. Continue to imagine the situation as you did in the last exercise. Stay in touch with what you are feeling, as well as what you are thinking. Both parts are important.*

2. *Keep in mind that the questions you are seeing are a sample. There are many more questions likely – too many for one group to look at in a reasonable amount of time. We can note other questions you have but remember that you are not seeing them all.*

3. *Remember that in the event of a terrorist attack on a water supply there will likely be a lot of press conferences and interviews with public health officials, elected officials, and others. TV, radio, newspapers, and the Internet will have lots and lots of coverage. All the issues will be addressed in a variety of ways.*

Exercise

- Assign partners so respondents are working in teams of 2+ people.
- Hand out fact sheet
- Provide background: As we work through some of these fact sheets together, you'll notice that all of these are set up the same way. First, there is a question at the top of the page. Second, there are three "key messages" in bold print. Third, for each key message there are three pieces of supporting information – examples, details that provide more information.

- Read through first fact sheet
  - What did you underline as important? Can you tell me the reasons why this information is important?
  - What did you circle? What changes should we make to this information?
  - What other reactions do you have to this fact sheet?

- Repeat for other fact sheets as time allows, rotating order.

V. Wrap-Up (15 minutes)

- What additional advice would you give someone who has to prepare or provide information to the public during a terrorist attack on the water supply?
- All the issues for today.
- Thank you.
- Introduce EPA representative: discussion may have raised some questions, _____ will be happy to try to address questions or concerns.

Worksheet: City Services

Some City Services	Impact of Service Disruption
Electricity	
Telephone	
Water	
Sewage Treatment	
Trash Collection	

1 = not at all severe
10 = very severe

City: _____ Date: _____

Time: _____

Appendix B

Screening Instruments

EPA Water Security -- Professionals

In each city, recruit as follows:

- 1 IDI with member of Senior Management
- 6 dyads (groups of two)
  - Within each dyad, respondents are to be from two different job categories as listed in Question 2, job classifications 01-05 below
  - Across dyads, all job classifications (Question 2, 01-05) should be represented.
- The seven interviews (1 IDI and 6 dyads) will be scheduled as follows
  - Day 1
    - 12:00 – 1:00 p.m.
    - 1:00 – 2:00
    - 3:00 – 4:00
    - 4:00 – 5:00
  - Day 2
    - 1:00 – 2:00
    - 3:00 – 4:00
    - 4:00 – 5:00

City: _____ Local Water Works

Contact: _____

Hello. My name is _____ and I am calling from the Oak Ridge Institute for Science and Education (ORISE). We are assisting the US Environmental Protection Agency in conducting a study about municipal water supplies. I understand _____ (EPA or local contact) has spoken to you about participating in this study [confirm]. We are calling to schedule your interview and ask a few brief questions for our records. I expect this will take less than five minutes.

1. ***First, are you an employee of the municipal water works for _____ (city)?***

   01 Yes
   02 No **(THANK AND TERMINATE)**

2. ***Which of the following activities best describes your primary duties at the water works?***

   (DOCUMENT ON GRID)

   01 Public Information
   02 Emergency Management
   03 Plant Operations
   04 Field Operations
   05 Senior Management
   06 Other **(THANK AND TERMINATE)**

3. ***How many years' experience do you have in this type of work – at this facility or similar ones?***

   (DOCUMENT ON GRID)

   01 _____ years

   (IF LESS THAN 1, THANK AND TERMINATE)

4. ***Are you willing to participate in the study?***

   01 Yes
   02 No

5. ***Are you available for the interview on _____ at _____AM/PM? The location is _____ (address). We will send directions to you.***

These are all of my questions.
The discussion will last about one hour.
Thank you for agreeing to participate in the study.

If you have any questions, or if scheduling conflicts arise, please contact _____ (name) at _____ (phone number).

Screening Instruments

EPA Water Security -- Public

In each city recruit
- 8 per group
- 4 groups
  - 6:00 and 8:00 p.m. Day 1 and Day 2

Good evening. My name is _____ and I am calling from _____, a market research firm. We are talking today with people in the area as part of a study being done by the US Environmental Protection Agency. We are not selling anything. We have a few brief questions and if you qualify and are interested, we will invite you to take part in a discussion group with other people in your area that will take place at a later date. I expect that answering these initial questions will take less than five minutes.

1. First, do you or does anyone in your household work for any of the following? **(THANK AND TERMINATE IF YES TO ANY OF THE FOLLOWING)**

01 Advertising, public relations and/or market research
02 Any form of media – TV, radio, newspaper, magazine
03 A health clinic, doctor's office or hospital
04 Other health related field

2. Have you ever participated in a market research study?

01 Yes → When was that? **(THANK AND TERMINATE IF LESS THAN SIX MONTHS AGO)**
02 No

3. How old are you? **(RECRUIT A MIX)**

(DOCUMENT ON GRID)

01 Under 18 **(THANK AND TERMINATE)**
02 18-34
03 35-44
04 45-54
05 55-64
03 65 or older
96 Refused **(THANK AND TERMINATE)**

5. VERIFY: Conversant in English?

01 Yes **(CONTINUE)**
02 No **(THANK AND TERMINATE)**

6. Document gender **(RECRUIT A MIX)**

(DOCUMENT ON GRID)

01 male
02 female

7. What was the highest grade or degree you achieved in school? **(RECRUIT A MIX)**

(DOCUMENT ON GRID)

01 High School Diploma or less
02 College Degree

8. What is your race? **(RECRUIT A MIX)**

(DOCUMENT ON GRID)

01 Caucasian
02 African-American
03 Hispanic
04 Asian
05 Mixed Race
06 Other _____

That is all of my questions. You do qualify for our discussion group and we would like to invite you to join us on _____ at _____ PM. The discussion will last about two hours. In appreciation for you time, you will be paid $XX at the time of the discussion.

Are you willing to participate?

01 yes
02 no

Appendix C

Participant Information Sheets

U. S. Environmental Protection Agency

Research: Opinions about a Public Health Issue

Information for Participants -- Professionals

Purpose of this survey

You are being asked to participate in a discussion being done by the U.S. Government's Environmental Protection Agency, with the assistance of The Oak Ridge Institute for Science and Education. In the discussion, you will be asked: (1) your opinions about communication materials that the Agency is developing to inform people about a public health issue; (2) your knowledge, attitudes, and beliefs about the issue; and (3) related issues. Your answers can help us develop materials to better inform the public. The discussion will be recorded (audio only) to be sure we get all the information.

Please remember that:

You choose to participate.
You are not required to answer the questions.
This session should last about one hour.
You are free to leave at any time without penalty.

Risks

The risks you take by taking part in the discussion are the same as you encounter in daily life.

Benefits

You will be better informed about a public health issue. You may have a sense of satisfaction from civic participation. Your answers may help us better inform the public and others about a public health issue.

Confidentiality

We will keep the information you give us private and confidential to the extent allowed by law. Your name will not be used in the reports, presentations, or publications. No statement you make will be linked to you by name. Only members of the research staff will be allowed to look at the records. When we present this study or publish its results, your name or other facts that point to you will not show or be used.

Persons to Contact

If you have questions about this session, or taking part in it, you may call:

Scott Minamyer
US Environmental Protection Agency
Cincinnati, OH
513-569-7175

If you need more information about your rights as a study participant, you may contact:

Chair, Oak Ridge Site-Wide Institutional Review Board, Oak Ridge Institute for Science and Education, Oak Ridge, TN 37831-0117
865- 576-1725

U. S. Environmental Protection Agency

Research: Opinions about a Public Health Issue

Information for Participants -- Public

Purpose of this survey

You are being asked to participate in a discussion being done by the U.S. Government's Environmental Protection Agency, with the assistance of The Oak Ridge Institute for Science and Education. In the discussion, you will be asked: (1) your opinions about communication materials that the Agency is developing to inform people about a public health issue; (2) your knowledge, attitudes, and beliefs about the issue; and (3) related issues. Your answers can help us develop materials to better inform the public. The discussion will be recorded (audio only) to be sure we get all the information.

Please remember that:

You choose to participate.
You are not required to answer the questions.
This session should last about two hours.
You will receive a cash incentive for participating in the discussion.
You are free to leave at any time without losing the cash incentive or other penalty.

Risks

The risks you take by taking part in the discussion are the same as you encounter in daily life.

Benefits

You will be better informed about a public health issue. You may have a sense of satisfaction from civic participation. Your answers may help us better inform the public and others about a public health issue.

Confidentiality

We will keep the information you give us private and confidential to the extent allowed by law. Your name will not be used in the reports, presentations, or publications. No statement you make will be linked to you by name. Only members of the research staff will be allowed to look at the records. When we present this study or publish its results, your name or other facts that point to you will not show or be used.

Persons to Contact

If you have questions about this session, or taking part in it, you may call:

Scott Minamyer
US Environmental Protection Agency
Cincinnati, OH
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If you need more information about your rights as a study participant, you may contact:

Chair, Oak Ridge Site-Wide
Institutional Review Board
Oak Ridge Institute for Science and Education
Oak Ridge, TN 37831-0117
865- 576-1725

Appendix D

Summary of "Immediate" and Other Questions Identified by Professionals

Professionals: "Immediate" Questions to be Addressed (A check mark in "Public's Questions" indicates the question was also raised by at least one member of the public)		
Topics	**Public's Questions**	**Professionals' Questions**
The Incident	✓ ✓	What happened? How did it happen?
Who is Affected?	✓ ✓	What are the specific areas affected? What about special-needs customers? What should they do? hospitals • school cafeterias • dialysis units • assisted living communities • immune-compromised individuals • elderly • disabled • children • day care • restaurants • manufacturers
Uses of Tap Water	✓ ✓	Is the water drinkable? Specifically, what can people do and not do with tap water? baby formula • drinking • pets • laundry • dish-washing • bathing • flush toilet • ice • cooking
Alternate Sources of Water	✓ ✓ ✓	Where and how can I get water that is 'safe'? Is bottled water 'safe'? Is well-water 'safe'?
Consumers Making Tap Water 'Safe'	✓ ✓ ✓	What actions do I need to take? Will boiling the water make it 'safe'? Is there anything the public can do to make their tap water 'safe' (e.g., filters, purification tablets, etc.)?
Exposure to Contaminant	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	What is the contaminant? How long has the water been contaminated? (already used it for drinking, baby formula, etc.)? What is going to happen if I drank some of this? What are the potential health effects? What are the symptoms of exposure? Am I in danger? How do I know if I have been exposed? Have there been any illnesses or fatalities so far? If manufacturers (e.g., bottlers) made and distributed product, what should they do? Will fire protection still be available? (Is is 'safe' to spray this on a house?
Obtaining Additional Information	✓ ✓ ✓	Where can I go for updates? How often will you update? Who will be giving updates?
Response and Recovery	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	How long will it be until the water supply returns to normal? How am I going to be sure when the water is 'safe' again? What is the utility and government doing to respond to this? Who is in charge? What are you doing to prevent this from happening again? Are there other agencies involved? Do you have emergency response plans for the system? Is there something we [the public] can do to help?
Terrorism	✓ ✓ ✓	Could this be a terrorist act? How did they get in? What should the public do if they see something suspicious? What are you doing to protect us, prevent further occurrences? Who did it? Has someone claimed responsibility?

Professional: "Other" Questions to be Addressed (A check mark in "Public's Questions" indicates the question was also raised by at least one member of the public)		
Topics	**Public's Questions**	**Professionals' Questions**
The Incident	✓	How could this have been prevented?
		Whose fault is it?
		When will I know what happened?
		Why don't you know what happened?
		Why did it happen?
	✓	Could it happen somewhere else?
		How did you come to know it [the supply] was contaminated?
	✓	Has this ever happened before?
Who is Affected?		Where does my water come from?
Uses of Tap Water		No Questions
Alternate Sources of Water	✓	Is there access to another water supply?
		How long will you provide bottled water?
Consumers Making Tap Water 'Safe'		How long should I boil water?
		Can you run the water?
	✓	Can contamination be treated at the treatment plant?
	✓	Will dilution help?
Exposure to Contaminant	✓	What do I do if I have already been exposed?
	✓	What do I do if I have symptoms?
		Can the fire department use the water to spray my house now?
		What if I inhale the fumes?
	✓	What if I get the water on my skin?
		What are you doing to protect the workers?
		Are first responders in jeopardy?
		How do I get tested?
	✓	I watered my garden; is the food contaminated?
		What are schools doing?
	✓	Is it 'safe' to pick my children up from school?
	✓	How will this harm my pets?
	✓	Should I get my child tested?
		Do I need to evacuate? To where?
Additional Information		Can I stay open for business? When can I re-open?
		How are you making sure that all of the community is being reached (e.g., non-English speaking)?

Professional: "Other" Questions to be Addressed (A check mark in "Public's Questions" indicates the question was also raised by at least one member of the public)		
Topics	**Public's Questions**	**Professionals' Questions**
Response and Recovery	✓	Have you prepared for this emergency?
		What do I do to flush the system in my house (e.g., water heater, dishwasher, pipes)?
		What are you testing? How often?
		Do you have enough resources to deal with this emergency?
		What resources are there for clean-up after event?
		Is there an issue with flammability of the contaminant?
		What will be done for fire protection?
	✓	How do you eradicate the agent?
		Will there be residual contamination in my pipes?
		Is there something we [the public] can do to help?
	✓	What will you do with the contaminated water?
		Who is paying for this?
		What is this going to cost me? (plumbing, medical, rate increases)
	✓	How will you determine that the water is 'safe' to drink again?
	✓	What are emergency personnel doing?
		What are long-term effects (e.g., replace water mains)?
Terrorism		Are we under attack?
		Why do you think it is terrorism?
		Were the terrorists embedded in the water department?
		What kind of background checks do you do on your employees?
	✓	Where did your security breakdown that allowed this to happen?
	✓	Have other areas or other cities been attacked?
		Is the rest of the system protected?
		Are there other attacks locally?
	✓	Have other water systems been attacked?
		Are there other threats (e.g., electricity)?
		Have you caught the terrorist(s)?

Appendix E

Raw List of All Potential Questions Generated by Professionals

(Not Listed by Categories)
List of Questions Generated by the Professionals

- What areas are impacted?
- Can we use water?
- If drinking water, what should they do?
- How long for water department to remedy situation?
- Anything public can do to make water drinkable?
- Who should they complain to?
- Who will be giving information? How?
- Do we know what the problem is?
- Is it okay for my pets?
- Will home treatments devices treat the water sufficiently to drink?
- What can they do with water?
- How do you know if corrected situation?
- Where can get potable water?
- Uses for water the public receives?
- If terrorist have you caught people?
- How come system was not protected?
- Terrorists- localized or multi-faceted?
- Terrorists embedded at water department?
- What should public do if they see something suspicious
- What did they do to compromise water system -- what contaminant?
- How long will impact last?
- Can I use the water and to what extent?
- If I can't use the water, where do I get water; when will I be able to use water again?
- When was the water contaminated? I just used water (baby formula)?
- What are we doing to fix the problem?
- Who screwed up? How did this happen?
- Can we shower, wash dishes, dog uses it, flush toilet?
- Special need customers: hospitals, school cafeteria; dialysis, assisted living; cancer and HIV patients; health issues sensitive to water quality
- Is there a risk of infection?
- What's wrong with the water?
- Can I drink it; wash my hands, how can I use it?
- How long until I can use it again?
- How long has this been a problem?
- What do I do if I've already been drinking/using it?
- How did you let this happen?
- What are you going to do to fix it? What do I do in the mean time?
- Do I have to buy bottled water? Are you providing water?
- How am I going to be sure when it is 'safe' again?
- How am I going to be confident – be sure water continues to be 'safe'?
- How is it going to harm my pets?
- What is this going to cost me? Plumbing issues; medical issues, rates increase?
- How will you prevent from happening again?
- Bottling companies made products -- what do I do?
- Industrial processes-impact?
- Do not use- can I still operate? Businesses, daycares (4 hour limit), schools, restaurants
- How do I know I've been exposed? Symptoms?
- What steps being taken to correct action?
- What public should do/not do? Can I drink water? Shower?
- Specific areas affected?
- How often communication will be sent out?
- How it happened?
- How long ago it happened?
- Symptoms?
- How handling situation?
- What are you doing to protect us?
- Should I evacuate?
- What are emergency personnel doing?
- How did we let it happened?
- What changes will you make to stop from happening again?
- Water 'safe' to drink/use, bathe, ice cubes, pets?
- How will it affect me? What do I do?
- When 'safe' to drink and use? When is the water lifted? Safe to drink again?
- When did it happen? When did you tell me? (already used contaminated water)
- How did it happen?
- How to prevent
- Whose fault?
- What do I do to flush my system in house? (water heater, dishwasher)
- How long has it been in the system? Timing? What to do if recent water used? Important for industries such as meat producers etc.
- If terrorist what is contaminant and what are symptoms? Does water treatment take care of contaminant?
- What are you testing? What are you doing to figure out what happened?
- What about immunocompromised patients? Special need patients?
- Resources for detailing what clean up after event?

- How do I get bottled water to elderly? Where do I get bottled water?
- I have young children. What should I do?
- When will I know what happened?
- Is water safe to drink?
- When will water be safe to drink again?
- Why don't you know what happened?
- Is the water hazardous to me, am I at risk?
- Where can I get bottled water?
- How long has water been unsafe? (made baby formula yesterday, dogs were given water, ice trays)
- Hand washing, is water safe for hand washing, does soap do it? Do you have to boil water to wash hand?
- How long boil water? Wait to cool off?
- Terrorist: How did it happen?
- Terrorist: Where did your security breakdown that allowed this to happen?
- Terrorist: Can you run water?
- Terrorist: Is there and issue with flammable contaminant?
- Terrorist: What to do for fire protection?
- Terrorist: How long will it take? When can I use it again?
- Terrorist: How do you eradicate agent
- Terrorist: When is this going to be over?
- Terrorist: Scope of issue? Other cities? Area of contamination?
- Can we drink the water?
- What can we use it for?
- When will we know specifics of the problem?
- When will it be resolved?
- What areas are affected?
- Hospitals/high risk -- What is being done to assist them?
- What are you doing to prevent?
- How often is water monitored?
- What security measures you have in place?
- What kind of background check do you do on your employees?
- Is it safe?
- How long have you know about this?
- What steps taking to solve crisis?
- What the extent of affected area?
- How long do you think it's going to last?
- Who is responsible?
- How did you let this happen?
- Are there other agencies involved?
- Do other public officials know?
- What do hospitals need to know?
- Who's managing the crisis? Who's in charge?
- Is it biological?
- What are symptoms people should look for?
- Does risk exist throughout system?
  - Isolate?
- Can we boil water?
- Affect children, dialysis, hospital patients, and seniors?
- Restaurants Is it safe for cooking and food preparation?
- Are first responders in jeopardy?
- How do you remediate contaminant?
- What are long-term effects? Replace water mains?
- Do you have enough resources to deal with emergency?
- Is it safe to drink?
- If not safe, when will you have it fixed?
- My dog drank water?
- I didn't hear about it until after have I been exposed?
- If not safe; what can I do with water?
  - Can we flush toilet?
  - Take shower?
  - Do I need to boil water?
  - Formula for child?
- Are we in the affected area? How big is area impacted?
- Where can I get more information?
- Was it intentional? What caused it?
- Terrorist: is the rest of the system protected (if one tank contaminated) what have you done about it?
- Terrorist: What about adjacent area?
- Terrorist: Is this an isolated event? Terrorist: What happened to cause contaminated? What's contaminated?
- Terrorist: What are you doing to make sure this doesn't happen again?
- System contaminated -- What do I do about it?
- Is it 'safe' to drink?
- Can I boil water to make it 'safe'?
- Can I bathe with it?
- Do I need to stop using the water?
- Where can I get water that is 'safe' to drink -- well, bottled?
- How long will it last?
- When did you first notice it?
- What happens when I drink some of this?
- Add chloride to make water drinkable?
- Is it terrorist?
- Where is source of contamination?
- Why did happen?
- How to prevent it?
- Have you caught terrorist?
- Ability to treat water?
- Is contamination localized/countywide?
- Will dilution take care of problem?
- Why didn't you have safeguards in place to keep terrorists out?
- What will you do with contaminated water?
- Who is going to pay for this?
- Who is going to help us?
- Is the water 'safe' to drink?
- What happened? What do you suspect?
- How did you come to know what was contaminated?
- What is in the water?
- What does the public need to do?

- When will you have more information?
- How will public get information?
- What is water department doing about it?
- What are potential health effects?
- Has this happened anywhere else?
- How isolated/dispersed throughout system?
- How are you keeping this from happening again?
- Why do you think it's terrorist or intentional?
- Law enforcement actions?
- Can we drink water?
- Why not drink the water?
- Any injuries or medical affects thus far? Is so where were they taken? Nature of injuries?
- What was the cause?
- What are the geographical boundaries of your order?
- Could this be terrorism?
- What's the nature of the emergency? Chemical, biological?
- Is this the same as boil order?
- Who is to blame?
- Where's the mayor?
- If drank water, what to do now?
- Can people cook?
- How long is this going to last?
- Does this supply to suburbs as well? Has their water been affected?
- What's being done to correct it?
- When will we get more information?
- Are we under attack?
- What can people do to make themselves safe?
- Are you evacuating?
- Have there been other episodes, other cities?
- Is it safe for parents to pick up children from school?
- What are symptoms people should look for?
- Can I drink water?
- Can I shower; bodily contact?
- Can I run tap at all?
- Fire department spray my house now?
- Can I make ice? Coffee?
- Give it to my dog?
- Where does water come from? Who is supplier?
- Can I use my toilet?
- When will I be able to use water again?
- How will you provide us bottle water?
- How long to be back to normal?
- How do we clean after incident (flushing lines, replace water heater)?
- Specialty uses -- hospitals (dialysis), restaurants (food prep), nursing homes, labs?
- If I've been exposed, what could happen to me? What are symptoms of exposure?
- Can I stay open for business?
- Is my water 'safe'?
- How long until water is 'safe'? If consumed water -- what to do?
- How long will it be in affect?
- What are symptoms?
- Extent of area being affected?
- What happened? How did water get contaminated?
- Who contaminated water?
- What step taken to make sure it doesn't occur again?
- What can I do to help? Flushing water?
- What type of harm if I've consumed tainted water?
- Do you expect more occurrences?
- What are you doing to prevent future attacks?
- Will my water be safe in the future?
- What can I do to make my water 'safe'?
- When will I hear more information -- schedule?
- Steps taking to alleviate situation?
- Has this ever happened before? Historical?
- Who coordinated with? Public health, other experts?
- Have you prepared for this emergency?
- What technology are you using to help you make this determination?
- Am I affected?
- How am I affected?
- How long am I going to be affected?
- What should I do?
- What do I have to do?
- How impacts my life?
- What steps city taken to remediate?
- Am I in danger?
- How could this have been prevented?
- How it happened?
- Why happened?
- Could it happen somewhere else?
- Could it happen again?
- Who did it?
- Why they did it?
- Are we vulnerable?
- Bottled water or no bottled water?
- Do I have to move? If so will facilities be provided?
- Severity of issue-safe to drink water?
- What's happening? Why can't drink water?
- What can I do in it? Bathe, drink, contact, water my plants? What is "use" if I can't use it?
- When will the issue be resolved? How long?
- Is there more threats? What about electricity, nuclear?
- How can I get water?
- Where will I go for dialysis?
- Is there something we can do to help?
- Is water 'safe' to drink?
- Bathe in?
- Cooking?

- Feed my pets?
- Fumes -- what if I inhale?
- Residual contamination in my pipes?
- Infant formula?
- Immunocompromised people?
- How long will this last?
- Safe to flush toilet?
- Terrorist: Does this affect water supply elsewhere?
- Terrorist: Other terrorist acts locally as well?
- What in water did you find that makes it unsafe?
- Is it terrorism?
  - What was poison? What was contaminant?
  - When did it start? How long been in system?
  - How do I get tested?
  - Drank water already am I okay?
  - Is food contaminated? Watered my tomatoes.
  - Will boiling work?
  - Will filters help?
  - Who did this? Why?
  - How many people are sick?
  - How did you allow this to happen? How did they do it?
  - What will you do to prevent this?
  - Do I need to evacuate? Where?
  - Where can I go to say updated?
  - What are schools doing?
- Can I get rid of it by boiling it?
- Can contamination be treated at treatment plant?
- What is the effect of this chemical on various people?
- Where do I get water?
- Is it safe to drink?
- How do I get water to pets?
- When will it be 'safe'?
- When can I re-open business?
- What areas are affected?
- Why didn't water department tell me?
- What can I do with water? Bathe, wash dishes, wash clothes?
- What harm can it cause?
- How did this happen?
- Why did you allow this to occur?
- How can the public stay informed, get updates?
- Is the water 'safe' for consumption?
- Is the water 'safe' for use?
  - Hospitals
  - Kidney centers
  - Reactor manufacturers
  - Restaurants
  - Day cares
- If not drinking, can I bath and use for other things?
- Who's impacted-specific geography?
- How long affected?
- Any other water providers available? Places I can get water?
- What happened? What caused emergency?
- What measure to make sure it won't happen again?
- What is utility doing to respond?
- How restore service?
- Protecting system from further incidents?
- How determine if safe to drink again? Testing entity? Credentials?
- Health Impact: What do I do if I've drank the water? Bathed? Got it on my skin?
- Impact on animals?
- Who to contact about health issues; where to get information?
- Protecting system from further incidents?
- Extent of problem, one community, service area?
- Notify as soon as possible, get message out right away
- Terrorism
  - Status of threat: How vulnerable are we to other acts?
  - How did they contaminate (at source, in water, internal or external)? Type of threat?
  - Still ongoing? Is it contained?
  - What caused it? Emergency preparedness procedures system-wide?
- How is public being protected?
  - How are employees being protected?
- Cause of incident: What happened bacterial? Terrorist attack?
  - Post attack: Is there anywhere else other areas of state that may be vulnerable?
- Access to other water supply?
- How long before services restart?
- What they can and cannot do specifically (Can they wash dishes and clothes, bath/shower, drink, baby formula? Can you wash hands with water? If so do you need antibacterial soap? Extent of how they can use water (protective actions)?
- Simple messages
- What to do if tainted water, how it affects them?
- Want to know government or officials are doing something; the amount of control you have over situation. Coordination: local state feds
- Magnitude of problem?
- Timing?
- How can I purify water?
- Alternate water sources?
- Where to go for help; website for basic information?
- Need disability information for public?
- Post: what to do with water heater, what to do after water is safe?
- What's the geographical boundary of event?
- Is it a do not drink or do not use?

- What can I do to make it ‘safe’?
- How long will it last?
- What caused it?
- What is the contaminant?
- Who did it?
- What are you doing to protect us?
- What is it?
- When did it occur? Did I drink it? What happens if I drank it?
- Anybody get sick so far?
- How did you know you had an issue?
- Where is it localized?
- How long will it take to get back to normal?
- Special need: Will hospitals have water?
  - If not, have to evacuate?
- Are you monitoring? What monitoring for?
- Who? What terrorist group? Who claimed it?
- How are you remediating it?
- Is our water ‘safe’?
- Will it be ‘safe’ in future?
- How did they get in? How was contaminant introduced?
- Are we continuously testing?
- Are we working with health department, other agencies?
- Will filters at home secondary treatment help?
- Get child tested?
- What are the symptoms?

Appendix F

Summary of Additional Questions Raised by Public Respondents

(But Not Professionals)

Additional Questions Raised by the Public	
Topics	**Questions**
The Incident	How long have you known about this before telling us? What else has been affected?
Who is Affected?	--
Uses of Tap Water	How much of our food supply requires water?
Alternate Sources of Safe Water	Where can I go that's not contaminated? How do I get out of the contaminated area? Is rainwater safe to use? How long will you provide water? What can we drink? Is there a back-up water supply?
Making Tap Water 'Safe'	--
Exposure to Contaminant	What will be the environmental impact? How will it affect wildlife? Is there any effect on local produce? Is the water in my pipes contaminated? How can I tell? Is there danger in being near the water supply [lake]? Does this apply to beaches, swimming pools? If the water is shut off can we use what we have in reserve [pipes, water heater]? Should I flush the toilet? Should I turn my water off? Can we fish? Should we avoid grocery store [produce sprayed with water]? What do I do with the water I already have [e.g., in dog bowl]? Will the contaminant dissipate over time?
Additional Information	How are people being notified other than by telephone? Is this real? How did you get my number? Who authorized this? Who do I contact if I have questions?
Response and Recovery	How long has this [do not use order] been in effect? Do we have to clean our filter system? Will they pay for it?
Terrorism	Does this constitute a crime? Will the person(s) be punished? What are you doing to find out who did it?

Appendix G

Raw List of Questions Generated by the Public

(Not Categorized)

List of Questions Generated by the Public

- How serious is this event? Is it deadly or something that will make you sick? Is it life threatening?
- How long has water been contaminated before announcement?
- Will stores that run out of bottled water be stocked quickly and on daily basis?
- How can we be sure that it is 'safe' after?
- Will it be somewhere to pick up fresh water?
- What should you do if have drank water?
- Can we boil water? Can we shower?
- Estimate of how long regular water service will be restored?
- Who did it? Will happen again?
- What's the radius of damage?
- Are they attacking anything else?
- Is this all water supplies? Well water?
- Has anyone died or become sick?
- Will affect entire population the same? Immunocompromised, infants, elderly
- How do we protect water so don't happen again?
- What can someone do if infected?
- Does this constitute as a crime? Will person be punished?
- What kind of contaminant is in water? Is it transferrable?
- How much water I have on hand? Where can get containers filled?
- How long will I be without water?
- Does the city have an emergency response plan so we can follow certain steps?
- Where can I purchase water?
- What if I drink water? What are the consequences?
- Can I boil water to make it 'safe'?
- How long has this been in effect?
- How did it happen?
- Who did it?
- Where can I go that's not contaminated?
- What's the poison? Is it just in the water?
- How much of food supply requires water to make it?
- Do I have baby wipes to clean myself?
- What's the context of attack and what are ramifications? Is air safe?
- How are people being notified besides telephone?
- What preventative measures could be used to counteract attack? Water purification? Antidote? Offset attack?
- Are public leaders doing something?
- Where to tune in to find out information on what's happening?
- What harm could the pesticide cause and can it harm skin?
- How long have you known about pesticide
- What preventative measures will be taken so it won't happen again?
- Will my family be okay?
- Estimated length of disruption?
- Level of danger -- low to severe?
- What do we do in the interim?
- What steps of going to be taken for water to be available?
- Is this real? How did you get my number? Who authorized this?
- Is it really that bad? Are my insides going to melt?
- How could we leave this resource unprotected?
- Who should I be mad at? Is it a terrorist organization?
- What are you doing to find out who did it?
- What is pesticide?
- What are the next steps to make water usable again?
- What is the water safe for? Shower? Boiling?
- Already drank water, what are affects?
- Are populations more vulnerable than others to this pesticide? Seniors, pregnant women, kids, those with health conditions?
- When did it happen (date/time)?
- Where can I go for additional information?
- How long (hold on usage)?
- Any home treatment
- Where's the boundary of the water affected
- Is it deadly if I drink it? Is it drinkable?*
- Where distribute clean water?
- What's being done to fix problem?*
- How long has this been going one? Side effects?
- What is in the water?
- Water distribution-priority to children 'Safe' to shower?
- How long will this be effect?
- 'Safe' to use boiled?
- Environmental impact?
- Impact on local produce?
- Water effect pets?
- Who's responsible for it?
- How long will this affect my job (lifeguard)?
- When did it get discovered and how?*
- Are we in any danger? Was it caught in time?
- What treatment applied to counteract event?
- Is there an antidote available?

- Recovery time? How long before water restored?
- Act of terrorism?
- What was chemical?
- How will be sure it is 'safe' again?*
- How will you prevent this from happening again?*
- Can it be filtered? Can you do something at home to remedy situation?
- Is water in pipes contaminated? How can I tell? How wide spread was contamination?*
- Signs and symptoms you are contaminated?
- Where can you get 'safe' water?
- Is there a plan for this disaster?
- Will this affect well water?
- Can I take a shower?
- How will it affect wildlife?
- Where can I get water for my animals?
- Do we have a clean filter system? Will they pay for it?
- Where? Just city water?
- Can the water be boiled and later used?
- What do I do if I've already drank water?*
- Projected length of time to clear this up?
- Where to buy water fast? Supply of safe water?
- How will I be notified? Updates?
- What happens if I bathe or have bathed in it?
- How pesticide affects people?
- Long term affects of contaminated pipes? Will infrastructure have to be replaced?
- What area is contaminated?
- Quarantine area? How do I get out of contaminated area?
- What's the emergency procedure plan?
- What can the water be used for?
- Who did it? How?
- How do you prevent it?
- Contact information for questions?
- Who is head agency? Who is in charge? (cleanup) EPA CDC
- Who exactly is it?
- What type of contaminant?
- How widespread is the problem?
- How long will affect water supply?
- What are you doing to contain problem? Steps being taken?
- What steps city taking to provide 'safe' water?
- Side effects if contaminated by water? Signs I have been poisoned?
- Where is nearest water supply? Nearest source of uncontaminated water?
- How authentic is message?
- Where can we get more information?
- Will filter or boiling get rid of contamination?
- What's being done to prevent it from happening again?
- What will city be doing to help us in meantime?
- What solutions have they came up with so far? How will you fix this?
- Is there a treatment for side effects of drinking contaminated water?
- Where can you get treatment?
- Effect on environment, not just us?
- When I did it happen?
- Do they need volunteers to help?
- What do I need to do to get through this?
- Treatment for you after exposure-hospitals, etc?
- What are long term effects to exposure?
- What is alternate source and how often will be available?
- What sources okay to use?
- Is there danger for being near water supply (lake)?
- Is there a hotline or website for questions about what and what not to do?
- Should I buy water?
- How long going to last?
- Can you purify at home?
- Is there going to be distribution centers to pick up water?
- Is rain water 'safe' to use?
- How much emergency water do I have? Where is it?
- How long was contaminated before we found out?
- What are effects if exposed?
- What is 'safe' to use -- well water, cans, soda?
- Is harmful to animals?
- Bottled water?
- What kind of plans to resolve issues?
- When did it happen?
- Surrounding areas impacted? If so where?
- What was the contamination?
- When will be 'safe' again?
- What's source of contamination?
- Which treatment plant is contaminated?
- Who did this? Are there any other threats?
- How was it discovered?
- Purified/distilled water okay?
- How long before back to normal?
- Will they be able to filter pesticide out of water?
- Where can we get uncontaminated water? Will city provide safe water?
- What steps can make water safe?
- What would happen if I drank water?
- Can the water be purified by boiling?
- How long will this go on?
- How long will it take to fix problem?
- How long before dissipate? Will it be airborne?
- What affects of contaminated water?
- Where is closest well?
- How long will we provide with water?
- How much inventory do I have?
- Do they turn water off? How can we use facilities?
- Are dishes affected?
- Is my dog water 'safe'?
- Has it affected coastal area?
- If water shut off, can we use what we have in reserves?
- Can I combine my resources with neighbors?

- At what point did detect contamination? Is it the entire system?
- Does this only affect the city only or suburbs?
- When did you find out?
- What does unsafe mean? Death?
- What if I have a filter, will it protect me?
- Can I boil it?
- Should flush toilet to let stored water out?
- Can we shower? Brush teeth?
- What areas affected? Suburbs?
- How did this happen?
- What is outcome?
- What's being done to fix?
- How to prevent from happening again?
- Are there water stations?
- How will know 'safe' again?
- Where go to get water? How far do I have to travel?
- How long was it before noticed contaminated?
- Has any fatalities occurred?
- Is there an age range? Are children more vulnerable?
- Has it happened before?
- What can we drink?
- Is it just tap water? Bottled?
- Is there a manufacturing plant affected? Restaurants?
- Who do I contact if I have questions?
- What are side effects?
- Can you filter water (coffee filter) to make safe?
- Does this include Lake Michigan?
- Can we fish?
- What contamination source?
- What if I'm already contaminated?
- What are symptoms?
- What should we avoid? Grocery store?
- How severe is it?
- When did I last consume water? Does this affect me? Affect my kids?
- Is there a back up supply of water?
- How will they get water to people?
- Will it continue to be dangerous after given the all clear?
- What other areas are affected?
- How much water do I have right now in my house?
- If contaminated water has been consumed what is going to happen?
- Have there been any fatalities thus far?
- How could it have happened?
- What plans does the city have?
- What is specific issue? What contaminated the water?
- How fast can I get to the store?
- How was it determined that contamination took place?
- When did it happen?
- Who did it?
- What can we be doing to help?
- How will we survive without water?
- How did you get my phone number?
- What causes the problem? Touching water, drinking it, bathing?
- Does it apply to beaches, swimming pools?
- Is it true? Is it a hoax?
- How will agent be removed from water sources?
- What exactly is agent?
- What is the duration -- How long to get it out?
- Can I get updates?
- Where can I get some water?
- How long has government known before telling us?
- How will this affect us in the long run?
- What communities and water systems are affected?
- What is effect of agent on a person?
- Who is following up the investigation?
- Who is responsible?
- When do we call EPA? Do we need to call them for guidance?
- When will water be safe to drink?
- Anything we can do to kill this agent?
- Why and how did it happen?
- What alternative water resources are there? Bottled water?
- Was the water I consumed affected?
- What in the water?
- How quickly before water is available again?
- What's the geographical area affected?
- How will you get rid of contaminated water in pipes?
- Can we boil water?
- Will we be informed when problem is fixed?
- How reliable is the information we're getting?
- Should we be watching for side effects if you have been in contact with water?
- How long will the water be out?
- What do I do if already drank water?
- What happens next?
- What is the nature of unsafe condition? Can I drink it, bathe, water plants, etc?
- Is anyone working on a resolution? Who?
- Can I boil water or add purification tablets to it?
- Who and when?
- What else has been affected?
- Is city/government going to be providing water?
- What do I do with the water I already have? Dog dish?
- Is bottle water safe?
- Am I going to be harmed by contact of water?
- Where was water contaminated?
- Do I have a contingency plan?
- Can it be corrected and when?
- What areas is this affecting?
- Is phone message legitimate?
- Who is responsible for reporting from this point?
- Is there a website, other sources of information
- Is contamination more harmful to specific groups (children)?

- Is ground water/well water contaminated?
- What is the contaminant?
- Who's calling? Is this a hoax?
- How long will this situation last? How soon will problem be fixed?
- Did I drink the water?
- When did it happen?
- Do I have supplies on hand?
- What is being done to fix the problem?
- How wide-spread is the problem?
- Can this agent be removed or neutralized?
- What kind of contaminant? How harmful?
- How will we know when it's safe?
- Which reservoir was contaminated?
- Is there anything else going on?
- Should I turn my water off?
- What happens if we drink the water?
- Should we go to the doctor?
- Where can I get more information? TV? Internet?
- Do they know who did the attack?
- Was it an attack/an accident/deliberate?
- What do I need to do? Where do I go?
- What is the contaminant?
- Can water be used if boiled?
- Is there and additive to sterilize the water?
- How long is this going to last? When will we be able to use again?
- How much drinking water do I have at home?
- How have authorities responded -- state, local, federal?
- How did this happen?
- Is there anything I can do personally to help situation?
- Are they going to provide water? bottled water?\
- Who did it? When?
- What do we do if we drank the water?
- Will the contaminant dissipate over time?
- Who's calling me?
- Can showers and bathes be taken if water tainted?
- What's the extent of problem? one part of city?

Appendix H

Message Testing: Messages, Testing Frequency, and Comments

by Public Respondents

Number	Question	Number of Focus Groups to Review
Pesticide Scenario		
5-1	What can you tell us about the water contamination?	4
5-2	What is the water utility doing now about the pesticide contamination?	4
5-3	How many people may have been contaminated?	4
5-4	What are the symptoms of exposure?	4
5-5	What should people do to protect children and the elderly?	2
5-6	If people cannot drink or touch the water, is there anything people can do with it? Do you accept responsibility for what happened?	2
5-7	Do you accept responsibility for what happened?	4
5-8	What should people do now for water?	4
5-9	How are you going to clean the system?	1
5-10	Once it is cleaned up, how will you know if the water system is safe?	4
5-11	How do you normally know the water is safe to drink?	4
Biological-Agent Scenario		
6-1	What happened?	2
6-2	What can you tell us about this contamination event?	4
6-3	Do you know exactly where the contaminant is within the drinking water system?	4
6-4	How did public health find out there was contamination?	2
6-5	Can people in the affected area use the water at all (bathing, washing dishes, making coffee)?	2
6-6	What are the health effects associated with exposure to [Insert biological agent]	4
6-7	How did the city find out there was contamination?	2
6-8	How or where can people in the affected area get safe water?	4
6-9	How did this happen?	2

5-1: What can you tell us about the water contamination?	Participant Comments
We have confirmed the presence of a pesticide in the drinking water. ■ The pesticide is [insert name of pesticide], which is used for [insert use]. ■ Levels of the pesticide are above recommended drinking water standards. ■ The drinking water in the following locations has been affected [insert locations]. **An investigation is underway to determine the source and amount of the pesticide.** ■ We are taking samples and conducting tests throughout the system. ■ Public health and hospitals are tracking and treating those who are ill. ■ Law enforcement is investigating the cause. **Effective immediately, people should not use the water.** ■ People and pets should not drink the water. ■ People should not use the water to bathe, shower, or wash. ■ Alternative sources of drinking water will be made available at the following locations [insert locations and show map].	**Important Information** ■ Pretty good, had timeframe. ■ Effective immediately most important. ■ Keep water locations bullet. ■ Affected immediately should have been first response. ■ Second group very vague. ■ First will worry about health—is there something we can do to prevent. ■ Want to hear results of testing after time (show decreasing). ■ "Levels of drinking water" too vague, take out because we can't test. ■ Tell us not to drink first. **Change/Modification** ■ Narrowed down location, liked it. ■ Should be third, first, and second. ■ 1, 3, 2 as order. ■ Concerned that people would still drink if they say above water drinking standards, so say how far above recommended. Remove recommended. ■ Wouldn't warn us not to drink water if below level; eliminate bullet "above recommended level' -- sounds optional. **Questions** ■ Third bullet of first question: what if people can't get to locations for water? ■ What to do if you already drank water? ■ Is there food on store shelves that was prepared using the water? Ice? ■ How often you going to give me updates? ■ How often are they testing water?

5-2: What is the water utility doing now about the pesticide contamination?	Participant Comments
We are testing water quality throughout the system. ■ We are taking samples at various locations. ■ [Insert laboratory name] is testing those samples. ■ The results of these tests will determine our next steps. **We have begun recovery operations.** ■ Our recovery operations are being coordinated with local, state, and federal agencies. ■ The CDC and other public health experts are advising us on potential health effects. ■ The US Environmental Protection Agency and other experts are advising us on how to clean the system. **Effective immediately, people should not use the water.** ■ People should not drink the water. ■ People should not use the water to bathe, shower, or wash. ■ Alternative sources of drinking water will be made available at the following locations [insert locations].	**Important Information** ■ Shows a logical set of steps. ■ First two bullets "don'ts", but last gives a sense of hope. ■ Peace of mind that they are monitoring water ■ CDC sounds serious ■ After Katrina make feel leery of agencies. ■ Know that utility people are working now: reactive ■ Testing and recovery should be happening at the same time. ■ This would make me think there is information that they are not sharing. ■ Laboratory name not significant. ■ "Result will determine next steps" makes me feel like they don't know enough to be definitive ■ I take it as they haven't got a clue; doesn't tell us anything ■ No timeframe of situation (how long water affected; how long will testing take) **Change/Modification** ■ Recovery should be last paragraph. ■ More like diagnostic would be better because recovery means fix it to most people **Questions** ■ What about pets? ■ Call information? ■ How credible is this laboratory? Have they tested before? ■ When is this going to be taken care of?

5-3: How many people may have been contaminated?	Participant Comments
We are assessing the number of people who might be affected. ■ Health officials are tracking calls and complaints. ■ Samples have been sent to state laboratories for testing. ■ Results of the tests will help us better determine affected areas. **We are working closely with local hospitals.** ■ Hospitals are prepared to provide treatment. ■ Hospitals are also providing medical advice. ■ The CDC is providing advice to us and the hospitals. **We are coordinating our response efforts with other organizations.** ■ In special cases, we will make door-to-door visits. ■ Hospitals and nursing homes will receive priority attention. ■ Other communities have offered resources and support.	**Important Information** ■ Three main bullets are important. ■ Sounds very serious. ■ Sounds really bad. ■ I want to know exact symptoms and where to go for treatment. ○ If not exact then everyone will be worried and go to ER for cold, nausea, headache ■ Begins to answer question but they don't yet have answer. ■ I want to see how many people have died: are all in same neighborhood or area. ■ Wordy, they could all be condensed "hospital are providing treatment and advice" I'm a skimmer. ■ Pretty generic answer ■ Believe it's an initial statement so it is vague. **Change/Modification** ■ Add who gets priority regarding care ■ Exact name of hospitals for which side of city ■ If pesticide is known identify symptoms **Questions** ■ What are you suppose to do, go to hospital and sit in ER? ■ They're testing it. How are hospitals prepared? ■ Who to contact -- CDC or hospital? ■ How quickly will they will recognize what it is? ■ What are special cases? What qualifies someone for having authorities go door to door? ■ Which communities? ■ What is a special case to go door to door?

5-4: What are the symptoms of exposure?	Participant Comments
Symptoms depend on exposure. ■ Because of the unusual smell and taste, most people will not drink the water. ■ Because of the small amounts of pesticide involved, most people will not breathe amounts large enough to cause harm. ■ Skin penetration is unlikely unless there has been prolonged contact with the water. **The pesticide can enter the body through drinking, breathing, or skin contact.** ■ Exposure is typically not life threatening. ■ Most people who have been exposed and have symptoms will fully recover. ■ The biggest concern is exposure by drinking a large amount of contaminated water. **There are many symptoms.** ■ People who drank more than a quart of the water may experience nausea, an upset stomach, and vomiting. ■ People who are experiencing symptoms should not be encouraged to vomit. ■ Call 911 immediately or go to an emergency room if you have symptoms.	**Important Information** ■ Center section is right to the point. ■ Call 911 is important. ■ Hopeful message :most people will recover ■ Second two paragraphs are more important. ■ Third point is most important. ■ Middle statement is most important. ■ First section is hypothetical -- "most people won't' drink the water." ■ Don't want people to make own decisions and determinations, want them to do this and that. ■ First bullet allows people to make own judgment -- not good. ■ Contradicting information about vomiting ■ Don't understand first section ■ Too much speculation ■ Didn't really tell symptoms if didn't drink more than quart. ■ Keep it simple. ■ Hear people being contaminated with pesticides all the time and it doesn't seem immediate or threatening. **Change/Modification** ■ Third, second, first paragraph should be new order ■ Order how we read pill bottles; mirror way used to reading. ■ Reorder to 2, 3, 1 **Questions** ■ Giving us characteristics of water rather than symptoms; symptoms are common with other illnesses ■ What is prolonged contact?

5-5: What should people do to protect children and the elderly?	Participant Comments
Children and the elderly need special protection. ■ Children and the elderly are more vulnerable to illness than other populations. ■ Children are more vulnerable because they have less developed body defenses. ■ The elderly are more vulnerable because they may have weakened immune systems. **Children and the elderly should be especially careful not to contact the water.** ■ Children and the elderly should not bathe using the water. ■ Children and the elderly should not swim in the water. ■ Children and the elderly should not wash dishes using the water or use dishes washed in the water. **Children and the elderly should be especially careful not to drink the water.** ■ Children and elderly should drink only bottled water. ■ Children and the elderly should not drink beverages prepared with the water. ■ Parents should not prepare infant formula using the water.	**Important Information** ■ Felt last bullet was most important. ■ Three headlines most important. ■ Second paragraph most important. ■ Last paragraph; 1st bullet is important. ■ Last two sections most important; tell me what I can do and what I can't do. ■ First section really off on tangent, not addressing specific issue. ■ Excluding other populations (immunocompromised, other ill) ■ Make short: no bathing, no washing. ■ First bold line is vague. ■ Last two bullets of third section are very specific. ■ Need to add "tap" water to distinguish from bottled. **Change/Modification** ■ Eliminate second section completely. ■ Reword: only drink beverages with "bottled" water. ■ Reword: Do not bathe using tap water, do not swim, do not wash dishes, etc. ■ Could combine some bullets about bathing, swimming, etc. ■ Add: you can't use this for anything, so no one can misinterpret that; clear and concise. ■ Move first section to bottom. **Questions** ■ What about everyone else?

5-6: If people cannot drink or touch the water, is there anything people can do with it?	Participant Comments
Our primary concern is the pesticide entering the body through drinking. ■ People should not drink the water or cook with it. Boiling does not remove a pesticide. ■ People should not drink beverages prepared with the water or make infant formula. ■ People should keep children and pets away from the water. **People can water their plants, gardens, and lawns with the water.** ■ People should wear gloves to prevent skin contact with the water when using a hose. ■ Avoid breathing aerosolized water from sprinklers. ■ Avoid creating run-off that could contaminate the sewer system. **Skin contact should be avoided, especially if contact is prolonged.** ■ People should not use the water for washing dishes. ■ People should not use the water to take baths or showers. ■ It is okay to flush toilets.	**Important Information** ■ First and third are great, very descriptive; second less critical. **Feedback** ■ Like order of first and third paragraphs. ■ Like language such as AVOID. ■ Tell people what not to do, because it's confusing to add what you can do. ■ Be direct and to the point. ■ Keep all "do's" together and don't's" together. **Change/Modification** ■ Take out second paragraph. **Questions** ■ Wondering about flushing toilets. Wouldn't that splash something around? ■ Who in a crisis is going to be wondering about my garden? ■ Using language such as should remove; use stronger language

5-7: What should people do now for water?	Participant Comments
At this time, people should not use the water. ■ People should not drink the water. ■ People should not use the water to bathe, shower, or wash. ■ Boiling the water will not make it safe. **We will provide regular updates on our testing.** ■ Updates are available on our Web site [insert Web site]. ■ Updates will be broadcast through local radio and TV. ■ Updates are available from our information line at [insert number]. **People from affected areas should drink only bottled water.** ■ Free bottled water will be available at the following locations [insert location] at [insert times]. ■ Bottled water should be used for cooking and other uses. ■ Bottled water should be used for pets.	**Important Information** ■ Thee mediums of communication ■ Some important information ■ Second bullet under updates is positive. ■ Nice, to the point ■ Simple and more to the point ■ Not everyone has internet access. ■ Use reverse 911. ■ Provide a timeline. ■ Tells me to not touch water. ■ The middle section has nothing to do with question; good information just not answering question. ■ Last couple of bullets are common sense ■ Bathe, shower, wash -- repetitive **Change/Modification** ■ Add something about formula. ■ "Don't' use water under any circumstance" (rewrite 1st bullet). ■ Condense bullet points; simpler and to the point ■ Put "don't touch water!" ■ Add website, TV can be delayed. ■ Say this is dangerous; serious; wording should be more intense. ■ Reword: tap water has been affected, bottled water safe. **Questions** ■ Want to know where to buy water and what the limit is per household

5-8: Do you accept responsibility for what happened?	Participant Comments
Our most immediate concern is the safety of the water. ■ We are working to identify impacted areas. ■ We are working to minimize the spread of the pesticide in the system. ■ Our goal is to restore normal service throughout the system as quickly and safely as possible. **We will help determine the cause of the incident.** ■ It is possible that the contamination was unintentional. ■ We are working closely with law enforcement as they conduct their investigation of the incident. ■ The investigation should identify the source of contamination. **We are responsible for making changes in our operations, if needed.** ■ After the incident has been addressed, standard procedure is to review our emergency response plan and make any necessary changes to improve it. ■ We will review the actions we took following the discovery of the pesticide. ■ We will know more once the investigation is complete.	**Important Information** ■ Shouldn't they know what to do (continuity plan)? ■ Feel insecure and unsettling ■ Reassuring because they have made it seem like they have a plan and were double checking. ■ "Our goal" too vague; they should know what the problem is. ■ Part two was scary because obviously something is bad -- alarming? ■ Seems like they are scrambling. ■ Feel nervous because nothing's been done yet. ■ Makes me feel optimistic. ■ Working on finding impacted area -- you have no idea about affected area. ■ Language is too vague. ■ Want public to know it's a problem, but make everyone feel like they are part of impacted area until you can verify exactly. ■ Doesn't really answer question. ■ I want to hear what you are doing. What are you working on? ■ Not really telling us anything; doesn't speak to the question of responsibility. ■ More details ■ Need to know what you are doing now. ■ Low priority question **Change/Modification** ■ First section, first and second bullet could be combined; can get rid of second bullet ■ Third bullet actually answers the question.

5-9: How are You Going to Clean the System?	Participant Comments
We are evaluating which parts of the distribution system need to be cleaned. ■ We will take samples from throughout the distribution system. ■ We will analyze the samples to determine where pesticide is present in the system ■ We will also use water-flow models to determine which parts are affected. **We will use flushing and other cleaning methods as applicable.** ■ We are consulting with experts at federal, state, and local agencies. ■ We will select methods that are safe and effective for dealing with pesticides. ■ We will select cleaning methods that will enable us to meet regulatory requirements for this pesticide. **We will selectively replace pipes if needed.** ■ We will replace pipes based on results from the testing program. ■ Replacement pipes are readily available. ■ We have extensive experience replacing pipes.	**Important Information** ■ Secondary message ■ Could have just said we are working hard to fix situation. ■ See it as a secondary press release; add link for more information. ■ Doesn't seem really important in the scheme of things.

5-10: Once it is cleaned up, how will you know if the water system is safe?	Participant Comments
Testing will confirm the absence of harmful levels. ■ We will collect water samples at multiple locations along the distribution system. ■ Samples will be tested for [insert pesticide name] at laboratories. ■ The tests are highly accurate in detecting the pesticide. **Federal and state agencies determine what level is considered safe.** ■ The water system will not be put back into service until the contamination is reduced below this level. ■ This cleanup level is based on protecting human health against long-term effects for all age groups. ■ The public health department will verify that levels are safe. **We will continue testing to ensure that levels remain safe.** ■ We will monitor for elevated levels of the pesticide. ■ We will report any problems and take necessary actions. ■ Water users should report any unusual odors, coloration, or other problems by calling our hotline at [insert number].	**Important Information** ■ Last bullet makes people worry; after you did all this testing, it gets to my house and still smells. ■ Where the hell else are they going to test water? ■ Don't need too much information, just enough. ■ Some details are important but don't leave room for more questions. ■ This is conforming to federal standards not my state. ■ Reduce below safe level, still not using water; sounds vague! Give me a number of how far below safe level it will be. **Change/Modification** ■ Feels like federal and state should be first. ■ Move procedural information up front. **Questions** ■ IS there a standard process? ■ How often and how long? Give specific numbers.

5-11: How do you normally know the water is safe to drink?	Participant Comments
We continuously test the water for safety. ■ The law requires us to check water safety daily. ■ We continually meet or do better than water quality standards set by the U.S. Environmental Protection Agency. **Testing is done in partnership with the local health department.** ■ The water utility and the local health department have experts on staff with specialized knowledge of testing procedures. ■ Our experts test the water daily. **We will inform you when testing shows that the water is safe to drink and use.** ■ We will provide updates through the media. ■ We also post updates on water quality on our Web site at [insert Web address]. ■ People can also call our telephone hotline for updates at [insert number].	**Important Information** ■ It's good that it gives someone without computer access a number to call. ■ Define what agency is talking -- "us." ■ The law requires to test water daily. Who wouldn't do that? ■ Does daily need to be said twice? ■ Was surprised they checked water daily; thought it was once a week, monthly. ■ For the most part do like 3 statements. ■ Pretty reassuring ■ Like phone number information. **Change/Modification** ■ Change order to 2, 3, 1 ■ Reword: tested throughout the day **Questions** ■ How many times daily?

6-1: What happened?	Participant Comments
Terrorists contaminated part of the water system with [insert biological agent]. ■ People have reported gastrointestinal illness. ■ [Insert biological agent] causes nausea, vomiting, and diarrhea, but it is generally not life threatening. ■ If you are experiencing symptoms, please seek immediate medical attention. **We have contained the contamination [insert map showing system and indicating affected area].** ■ The affected area has been isolated from the rest of the water system. ■ Sampling for additional contaminants is currently being performed. ■ Additional public announcements will be made as more information becomes available. **We recommend people living in this area [insert boundaries] boil their water.** ■ Bring your water to a rolling boil for [insert number] minutes and let cool before drinking. ■ Fact sheets and other information are available on the following Web site [insert Web site] or at our toll-free telephone line [insert telephone number]. ■ Alternative drinking water is available at [insert address of location].	**Important Information** ■ Who understands gastrointestinal? Understand reading level and target audience. ■ It's too broad saying terrorist contaminated -- try to narrow it down. ■ I will call doctors office but some people will go to ER because they don't have insurance. ■ "Additional public announcements" could be alarming. You mean there's more? ■ The word "terrorist" illicits fear; until sure do not raise fear. ■ Terrorist -- people think of 9/11 immediately. **Change/Modification** ■ Add media for adding facts on this message. **Questions** ■ How severe is this? ■ What is alternative drinking water? Be more clear.

6-2: What can you tell us about this contamination event?	Participant Comments
There has been an intentional contamination of the water system. ■ We are currently working with local law enforcement and the FBI in response to this event. ■ We know the location of the point of introduction [insert location], and are currently working to define the area affected. ■ We are also working to sample our entire system for indication of other areas that may be contaminated. **Most people infected with this bacterium will have mild to moderate illness.** ■ [Insert biological agent] infection can cause diarrhea and vomiting. ■ The very young and old, and people with weakened immune systems are typically most at risk. ■ If people are having symptoms, they should consult their physicians. **We have issued a "do not use" notice in response.** ■ "Do Not Use" means do not use the water for drinking, bathing, or cooking. It is safe to flush toilets. ■ We are recommending the use of alternative sources (such as bottled water) until we lift the "do not use" notice. ■ We are working to contain and clean up this contamination and will provide more information as soon as it becomes available.	**Important Information** ■ Hits a lot of important points. ■ Covered base really well; but it's a premature script. ■ Need to say "will keep you updated." ■ Makes me nervous: infection and symptoms; knowing people getting sick and you don't know how severe it's going to be doesn't make me feel good. ■ Saying they don't know if other areas are affected may make people more worried. ■ "Biological agent" most people won't understand and it can cause more questions. ■ Very last bullet is a good conclusion. **Change/Modification** ■ "Do not use" part should be moved up before people getting sick. **Questions** ■ I want to know how long.

6-3: Do you know exactly where the contaminant is within the drinking water system?	Participant Comments
We know the source of the contamination. ■ The police and FBI have identified a location in the [insert name] neighborhood where the contaminant was introduced. ■ The police are currently treating this contamination event as an act of terrorism. ■ Evidence collected at the scene confirms that the source of the water contamination came from this location. **We are currently working to clearly define the area affected.** ■ We are sampling and analyzing the water system around that location. ■ We are looking at the water distribution system to specifically define the affected area. ■ Sample results can be expected from the laboratory within 48 hours. **At this time, illness has been reported only in this area [insert boundaries].** ■ In addition to the localized sampling, we are sampling throughout the system for evidence of contamination. ■ Preliminary water quality testing indicates that this contamination has not spread throughout the system. ■ If you have questions as to whether or not you may be affected by this event, please call our 24 hour hotline at [insert number].	**Important Information** ■ Letting us know you know the source helps with anxiety level. ■ Third bullet under first section was confusing; sounds redundant and unnecessary. ■ "Preliminary testing" makes me wonder if water really safe. ■ Like hotline information ■ If they saying they are trying to find affected area, it contradicts the entire first section about finding it. ■ Terrorist makes panicky; but we are so in tune to hearing that now. ■ Be transparent. ■ Makes it more serious; can get attention of people. ■ Sounds like it's under control; reassured. ■ The hotline will be crowded; use internet and other methods. ■ Last bullet point not sufficient. ■ Don't feel like it's under control. ■ Concerned that it's going to take me 48 hours to tell me what's in the water; say we are on it right now, as quickly as we can. ■ Inconsistency saying you found it because you name neighborhood; then you say you are looking for it ■ Tell me where it is right now. **Questions** ■ Do you know what area it's in? ■ I want to know if CDC is involved.

6-4: How did public health find out there was contamination?	Participant Comments
RODS – our public health surveillance system – showed a higher than normal number of illnesses in the community. ■ The Real-time Outbreak Disease Surveillance (RODS) system examines emergency department data from area hospitals and over-the-counter drug sales. ■ Recent RODS data has shown an increase in the number of emergency room patients with diarrhea and GI symptoms. ■ RODS data has also shown an increase in the sale of over-the-counter anti-diarrheal medications from local drug stores. **Water samples were collected by the water utility.** ■ Samples were collected within the impacted areas. ■ Samples were collected throughout the distribution system. ■ Additional sampling and analysis will be conducted as needed. **Further investigation indicates that the public water system is the likely source.** ■ The health department interviewed patients to investigate the cause of their illness. ■ Clinical laboratory tests supported the diagnosis. ■ The health department worked with the water department to verify the cases occurred within the water department's service area.	**Important Information** ■ Third bullet statement is most important. ■ First bullet gives too much information. ■ Can't believe this would be the first thing they would say. ■ Need stats: How many people hospitalized for GI problems? ■ I want to know severity. ■ Felt like they were working on situation. ■ I like them giving symptoms. ■ These symptoms aren't ones that make people run to doctor, can just get over the counter medicine. ■ Makes me feel like this was in water for a while. ■ Monitoring system should be within water system. ■ Unfamiliar with RODS ■ Had to interview patients to understand is not good because it means it's been in water for awhile. **Change/Modification** ■ "Samples are collected throughout distribution system" should say have collected or are collecting. ■ Get rid of third bullet of first section ■ Third statement should be second. **Questions** ■ Would like to know how recent; how long has testing been going on? ■ How long have people had symptoms? ■ Just because I have these symptoms doesn't mean I automatically go to doctor and the pharmacy (how many days could this be)? ■ Do we really rely on the RODS system for diagnosis of incident?

6-5: Can people in the affected area use the water at all (bathing, washing dishes, making coffee)?	Participant Comments
If you live in the affected area (see map), your water may still contain [insert biological agent]. ■ This bacterium can cause illness when people come in direct contact with it. ■ The "do not use" notice is based on taking a conservative stance to protect against any resulting illness. ■ The protection of public health and safety is the basis for all aspects of this advisory and response. **This should not affect fire fighting.** ■ The fire department has informed us that they will continue to use this water as needed to fight fires. ■ Bacteriological contamination of this type does not prohibit its use for firefighting purposes. ■ Fire protection will continue during the emergency. **People should avoid direct contact with this water at this time.** ■ People in this area are advised to not drink, cook, bathe, give to pets, or otherwise use the water where personal contact may occur. ■ We are working as quickly as possible to resolve this issue and restore full use of the drinking water system in the affected areas. ■ We will inform you of any change in the use advisory.	**Important Information** ■ The third section answers the question ■ First section very important because it's saying we can't drink or bathe. **Change/Modification** ■ Second bullet in first part irrelevant ■ Firefighter information is irrelevant ■ No information about cleaning stuff ■ Think they are giving us a good picture. ■ The firefighting statement is inconsistent. How can you use contaminated water for fire? Wouldn't it spread in soil and air? This comes out of left field. ■ Third bullet should be first.

6-6: What are the health effects associated with exposure to [Insert biological agent]	Participant Comments
[Insert agent] is a bacteria that affects the gastrointestinal system. ■ Frequent hand washing will help control the spread of [insert agent]. ■ The water utility has treated the water with higher but safe levels of chlorine to kill the [insert agent]. ■ Use alcohol-based hand cleaners until the water is safe to drink. **Symptoms will generally last for 7 – 10 days.** ■ Primary symptoms include nausea, vomiting, and diarrhea. ■ People with symptoms should contact their health care providers for treatment information. ■ People can call the public health hotline at [insert number] for more information about [insert biological contaminant]. **[Insert agent] does not typically cause long-term health effects.** ■ [Insert agent] is generally not life threatening. ■ The most vulnerable groups include small children, the elderly, and people with weak immune systems. ■ [Insert biological contaminant] infection is treatable by [insert treatment].	**Important Information** ■ Telling me to wash with antibacterial hand washing doesn't compute. ■ Suggest washing hands frequently but not telling why use antibacterial. ■ Last paragraph was reassuring. ■ Language such as "typically" not settling. ■ Counterintuitive to say water is contaminated but clean yourself; verify with consumption, etc. ■ Want percentage. ■ First paragraph bullets don't support bold statement **Change/Modification** ■ Get rid of first bullet or put first and third bullet together. ■ Add web link **Questions** ■ You're putting chlorine in my water. What are the side effects? ■ Why not list serious side effects? ■ When will it be safe? Provide date. ■ What's generally not life threatening? What does that mean? List information about severe symptoms.

6-7: How did the city find out there was contamination?	Participant Comments
Hospital reports from [insert names of hospitals] indicate higher numbers of cases of ill patients than normal. ■ [Insert number] hospitals have reported a total of [insert number] cases during a [insert number]-day period. ■ The number of hospital patients with gastrointestinal symptoms is well above normal. ■ The reports were provided to the health department as part of the community's medical tracking system. **The health department identified [insert biological contaminant] in the water system as the cause.** ■ The health department conducted interviews with ill patients to determine the cause. ■ The health department's investigation also included laboratory tests. ■ The health department contacted the water authorities and indicated there may be a waterborne problem. **The water utility reports [insert biological contaminant] in samples collected from the water system.** ■ The water utility initiated testing after notification from the health department. ■ The water utility is identifying impacted areas. ■ The water utility will continue to sample and test the water, and we will keep you posted.	**Important Information** ■ Can follow the process and it answers questions but it's not what you want to hear. ■ Proactive to interview ill patients; thought it was positive. ■ Don't want possibilities tell me yes or no. ■ The water authority only initiated testing after health department contacted them. Don't they test water daily, and shouldn't they have found it first? **Change/Modification** ■ Add CDC has been notified ■ Restate: would intensify testing; because "initiated" makes it seem as water not tested often. **Questions** ■ Why did they wait to do testing until health department initiated the call? ■ Isn't EPA the first agency to deal with biological agent?

6-8: How or where can people in the affected area get safe water?	Participant Comments
Water is being made available to households in the affected area [insert boundaries]. ■ The city is setting up distribution centers for the affected area. ■ We are able to distribute [insert number] gallons of water per person. ■ Disabled or other individuals who cannot get to a distribution center should call [insert number] for assistance. **Hospitals in the affected area will have supplies of safe drinking water.** ■ The water utility has arranged for the provision of water treatment units for the hospital system. ■ People should not go to a hospital for their household's supply of emergency water. ■ Health clinics in the area are also receiving supplies of emergency drinking water. **Please follow the "do not use" drinking water order.** ■ People are not to use the water for cooking, bathing, or any other personal contact uses, including for pets. ■ Ongoing samples of the water system are being taken. ■ We will let you know when the water is again safe to use.	**Important Information** ■ Makes me feel good. ■ They have to let us know that they are going to tell us when water is safe again. Isn't that obvious? ■ Do not use: first bullet is confusing; think I can drink it but they don't want the supply to run low; I think it is referring to bottled water--confusing. ■ Give me the basics: tell me what I can or can't do . ■ Use social media. **Change/Modification** ■ Swap bullets two and three because they are giving two different messages ■ Third section: Is this referring to bottled water or tap? Add do not use TAP water not bottled water. **Questions** ■ Where are distribution centers being set up? ■ Who can they distribute to? ■ So can you go to health centers for water? ■ How are you going to let me know water is safe -- text, email, news? Tell me how I will find out; use as many mediums as possible.

6-9: How did this happen?	Participant Comments
A terrorist group has claimed responsibility. ■ Police found a note at [insert location]. ■ The group who left the note is on the FBI watch list. ■ The investigation to find the perpetrators is ongoing. **Terrorists introduced the bacteria into the location's plumbing system.** ■ Police found equipment at the location. ■ Laboratory results verify traces of [insert bacterial agent in containers near the equipment. ■ Initial tests by the water utility confirm traces of [insert bacterial agent] in the water system in the vicinity of this location. **Authorities have found the contamination source.** ■ Residents reported suspicious activities in and around this location. ■ Equipment at the location is consistent with this kind of attack ■ Fact sheets related to [insert biological agent] bacteria were found as well.	**Important Information** ■ As soon as you give us terrorist information you are opening it to copy cat to do it again. ■ Not a fan of word terrorist. ■ I don't' care who did it. Bottom line I want to know how this is affecting me and when will it stop. ■ Opens questions about what other things may be happening. ■ Noting contaminated source was positive. ■ Let us know if there are other anticipated dangers.

Appendix I

Contacts for More Information

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