

Drinking Water Emergency Exercises Summary Report

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CH2MHill, Kennewick, WA
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for the Office of Drinking Water
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This summary report and the Tabletop Exercise Planning Guide are available on the DOH website at <http://www.doh.wa.gov/ehp/dw/>. Individual reports for each of the three exercises may be requested from the Office of Drinking Water security coordinator.



Introduction

This summary report compiles the results from three tabletop exercises conducted at the direction of the Washington State Department of Health, Office of Drinking Water. The exercises were conducted separately with Washington water utilities from the cities of Kennewick, Vancouver and Redmond in July 2004.

The purpose of these exercises was to provide a learning environment to acquaint participants from a variety of response agencies with each others' emergency responsibilities and procedures, and to determine shortfalls and successes in emergency response that could result from a significant intentional drinking water contamination event. The experiences from these exercises and knowledge gained are applicable to water system emergencies in general. The selected scenarios included chemical contamination (hydrogen cyanide), biological contamination (botulism), and suspected (threatened) biological contamination (ricin).

This summary report aggregates the findings of the three exercises and provides key information learned. Such lessons can be useful in conducting future water system emergency exercises, and in preparing for real-life emergency response. Data was collected and analyzed, and particular themes emerged that applied to all three of the exercises. These are:

1. Communication and information exchange are needed among all agencies involved in water system emergencies.
2. Understanding roles and responsibilities before an emergency will aid response during an emergency.
3. Water sampling procedures are vital and need to be developed.
4. Communications with the public can be improved, and water systems must be prepared to work with the media.
5. Conducting a successful exercise and capturing the lessons learned from it requires particular techniques.

These five themes are presented here in a format that identifies issues related to each theme, discusses what went well and what didn't regarding the issues during the exercises, and describes possible solutions to address those issues.



How the exercises were conducted

The Federal Emergency Management Agency's (FEMA) eight planning steps were followed to develop these tabletop exercises. The planning produced a well-researched and organized scenario for each exercise. The process for planning and delivering a tabletop exercise has been developed into a DOH Office of Drinking Water, Tabletop Exercise Planning Guide available through the DOH Office of Drinking Water. The eight planning steps are:

1. Conduct a needs assessment (to determine a plausible contamination scenario).
2. Define the scope of the exercise (including participants and ground rules).
3. Develop a statement of purpose and write the exercise directive (in the guide, available from DOH).
4. Develop the exercise objectives.
5. Compose the introductory narratives (provided to participants).
6. Develop major and detailed events.
7. List expected actions (provided to the controllers/evaluators during their two-hour training session, the day prior to the exercise).
8. Prepare problem statements or messages (information injects were provided in sequence to participants as the emergency scenario unfolded).

One person from each water utility acted as the “trusted agent” while assisting the project team. The “trusted agent” helped to develop a confidential and appropriate exercise scenario relevant to their water system. Each of the three scenarios were then presented to a group of controllers and evaluators from the DOH Office of Drinking Water, utility personnel acting as the “trusted agent,” other water utility technical experts, and personnel from CH2MHill and ECO Resources Group experienced in water system operations, emergency management, and public communications.

An evaluation of each exercise was completed and includes observations by evaluators, and analysis of feedback from participants. The participant feedback during each of the exercises provided valuable information regarding the conduct of the exercise, perception of roles and responsibilities, and response proficiency.

The exercises attracted a high level of participation from local, state, and federal agencies, as well as other emergency response and health organizations (*Figure 1, page 4*). Identifying the appropriate participants, inviting them, and confirming their attendance was more time consuming than expected. Invitations began about four months prior, and were being confirmed up to the day of the exercises. Participation from first responder agencies such as

fire departments and emergency management was easy to solicit, whereas the equally important city administrator was somewhat more difficult in two cases. In the end, we were able to confirm participation from city officials at each of the exercises.

The number of participants and observers in attendance was limited, in order to efficiently manage the pace of exercise play. Attendance included 38 participants in Kennewick, 38 participants in Vancouver, and 45 participants in Redmond. Participants began each exercise with only the information provided by the exercise director during a half-hour briefing prior to the beginning of the exercise. The participants gradually learned more from injects of scenario information provided in sequence throughout the exercise period.

Participants were initially separated into four groups at tables (*Figure 1, page 4*), representing:

- Exercise Controllers
- Emergency Operations Center (EOC)
- Incident Command
- Offsite Support Agencies

Community response (*e.g.*, hospital, chemical supplier, etc.) and regulatory organizations (*e.g.*, DOH, EPA, etc.) were combined at one table or split between two tables, depending on the size of the group participating.

Participants were free to switch tables before the exercise started if they felt another was more appropriate, and were also free to move among tables during the exercise.

Each exercise included a group of controllers and evaluators that monitored the tables during exercise play. Controllers assisted to clarify information, and evaluators tracked and recorded response actions.

Following completion of each exercise, controllers and evaluators discussed their observations during a break-out session. Following that discussion, a “hotwash” review was conducted with the entire participating group, reviewing what went well during the exercise, what did not go well, and what actions might be important for water systems to take in the future. The exercise director summarized the observations of the controllers/evaluators for the benefit of the participants and to elicit additional discussion among the group as a whole. Participant feedback forms were collected and analyzed for any issues not captured or discussed during the exercise that related to the conduct of the exercise, participant roles and responsibilities, and participant proficiency during response.

Information contained in this summary report was derived from three data sources: controller/evaluator observations, participant input during the “hotwash” review, and participant feedback forms.

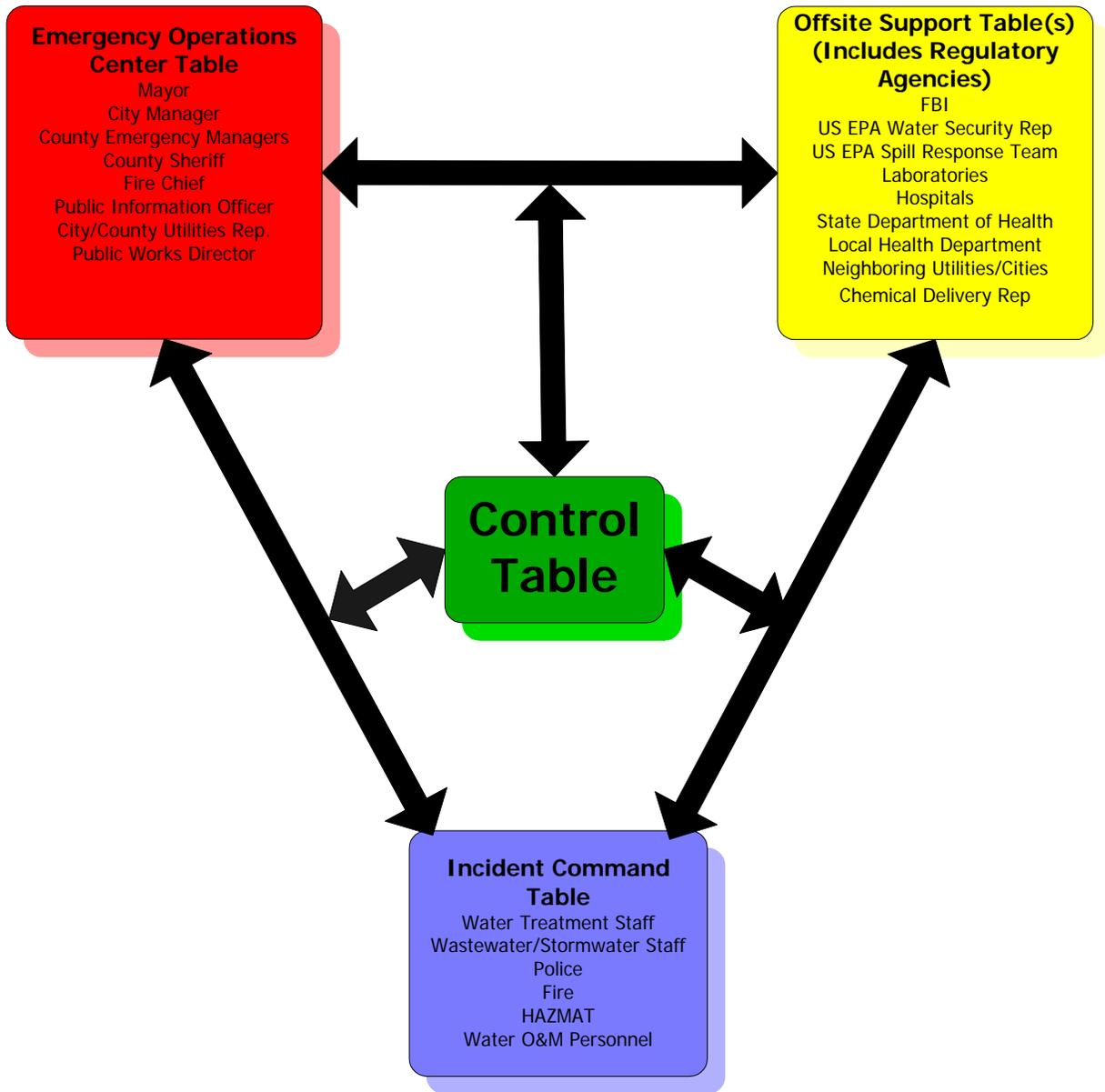


FIGURE 1
 Typical Emergency Exercise Attendees at the Tables in the Exercise Room



Understanding the themes from the exercises

After completing the exercises and reviewing the data, the project team recognized particular themes that applied to all three emergency scenarios. Many issues surfaced within each of these themes, and participants' responses to the issues were sometimes productive and sometimes indicated that the participant needed, or wanted more information or training. The exercises enabled participants to develop solutions to some issues, and these are included in this section.

The key lessons learned from the exercises, lead to ideas and improvements for water systems to consider when preparing for emergency response. These ideas are presented here as suggested actions based on the experience gained at the exercises. They are not intended to be prescriptive by DOH or the exercise team. The actions described are intended to help water systems and other response agencies improve emergency response to a water contamination event. Some actions may be associated with more than one theme, but are listed only once.

The five themes that emerged are:

1. Communication and information exchange are needed among all agencies involved in water system emergencies.
2. Understanding roles and responsibilities before an emergency will aid response during an emergency.
3. Water sampling procedures are vital and need to be developed.
4. Communications with the public can be improved, and water systems must be prepared to work with the media.
5. Conducting a successful exercise and capturing the lessons learned may require particular techniques.

Theme 1: Communication and information exchange are needed among all agencies involved in water system emergencies.

Each exercise brought together representatives from various agencies that needed to work alongside each other during the emergency. The exercises demonstrated that these representatives were not aware of each other's specific roles, not of the capabilities and resources available to them from the other agencies. The exercises revealed a need for response agencies such as emergency management, fire, and law enforcement to establish channels for communication and information exchange with water systems about responding to all types of drinking water emergencies. Establishing these channels prior to an actual emergency would serve to familiarize responders with the breadth of possible emergency scenarios involving drinking water. Additionally, these early communications would help to establish relationships and identify key individuals responsible for making response decisions. Participants determined that this need could be met through:

Workshops, such as training exercises:

Participants expressed that the emergency exercise was useful and eye-opening, particularly because of meeting the people from support agencies. Participants suggested that such exercises occur regularly and at least once a year, and include multiple response agencies.

Emergency response plan sharing and review within utilities and between agencies:

Participants were slow to refer to their emergency response plans at the onset of the exercises. Moreover, response plans did not contain contamination event checklists that could be used quickly, avoiding lengthy information searches when time is crucial. The more often response plans are discussed throughout the year, the more likely they are to be of use during an emergency. Sharing response plans with the local fire department, police department, and emergency management agency will help those responders become familiar with the needs of the water system and their personnel during an emergency.

Suggested actions.

- Water utility emergency response plans should be coordinated and reviewed with offsite support agencies including county emergency management, fire, police, and public health agencies.
- Utilities should understand how other response agency emergency plans address drinking water events. Training should be coordinated, as needed, on utility response capabilities and expectations for support.
- Utilities should coordinate with city and county EOCs regarding requirements for the activation of the EOC at the appropriate level of response before an emergency.
- Utilities and local health jurisdictions should understand the incident command system (ICS) and the application of ICS for water system emergencies, and provide ICS training for key staff at all levels.
- Public information officers from response agencies, utilities, cities, and support agencies should develop a joint communication plan with procedures for coordinating and delivering messages before an emergency event.
- Water utilities should participate in local emergency planning activities through their local emergency planning committee (LEPC) or equivalent organization.

Theme 2: Understanding roles and responsibilities before an emergency will aid recovery during an emergency.

One key objective of these exercises was to learn about the roles and responsibilities that the participating entities assume when responding to a large-scale drinking water emergency. During all three exercises, it became apparent that the roles and responsibilities of each entity were not well understood by the other participants. Some participants modified their roles and responsibilities to adequately support their hypothetical response to the event. A benefit of the exercises was the self-assessment by participants of their actual roles and responsibilities during these types of events. The self-assessments were detailed in the participant feedback forms and are captured in the individual exercise reports.

At the onset of the first exercise, participants were not asked to introduce themselves and describe what they perceived to be their roles and responsibilities. As a result, some confusion existed throughout the exercise about the roles and capabilities of other agencies for certain support activities such as sample gathering and analysis, and incident command interface. Subsequent exercises included participant introductions at the beginning of each exercise. The introductions proved valuable in identifying who was represented, what role (actual or perceived) each participant played in the scenario, and providing an indication of where to access resources.

Roles and responsibilities generally were addressed in the emergency planning and response documents for each of the agencies. However, many of the roles and responsibilities were not clearly defined as they related to a water system contamination event. Additionally, the capabilities of other agencies for response support to these types of events were also not included in the planning and response documents. Some participants modified their initial perceptions of individual roles and responsibilities to improve interface and support during the exercise. The following are examples of specific needs or helpful actions related to roles and responsibilities from the exercises:

- Participants who took on the role of the EOC director recognized the need to determine the status of actions throughout the exercises to ensure participants were aware of the response actions at a given moment. Priorities for response and recovery are necessary for participants to function efficiently. Priorities constantly changed during the response. Accordingly, briefings to the EOC and incident command focused on the current status of response activities. The exercises in which status updates occurred every half hour showed a faster response to the situation than the exercises that had only one or two status updates.
- Water systems and other agencies needed to better understand how incident command is used to manage emergencies and their role in support of the incident command. Specifically, incident command should integrate public health and utility personnel early in a response scenario.
- Use of personal protective equipment was vital for collecting contaminated water samples, and water system employees trained in their use would speed sample collection. If a water system was not trained, it was imperative they know who to contact with proper training that could respond quickly.
- State and local health departments need to be prepared to provide water system personnel with information pertaining to the health effects of chemical or biological contamination.

Suggested actions.

- Water utilities, emergency responders, health jurisdictions, and municipalities should arrange training opportunities to familiarize themselves with each others' roles and responsibilities during various types of emergency events.
- Utilities should review current emergency response plans to ensure that actions taken by emergency response personnel are adequately covered, and identify the key agencies that would have significant support responsibilities during an emergency.
- Utilities and emergency response agencies should familiarize themselves with the resources available from state and federal sources, especially the Washington Department of Health, EPA's emergency response units, and the Washington Department of Ecology's spill response team.

Theme 3: Water sampling procedures are vital and need to be developed.

None of the water systems demonstrated they had a water sampling plan for use during a contamination event. Participants worked to develop a plan during the emergency exercise, and typically stumbled over questions like, "Who should collect the sample?" "Where should samples be collected?" and "Where should the samples be sent?"

Water systems, along with DOH, EPA, and other agencies, need to develop sampling protocols for use during contamination events. Water samples need to be collected as soon as possible when an event is discovered and processed according to a plan that includes transporting samples, chain-of-custody, and obtaining analysis.

It generally was understood from these exercises and from the wealth of knowledge provided by the EPA that sampling could involve multiple laboratories because no single laboratory can typically handle all testing. The EPA has developed a compendium of laboratories that is available only to registered state and federal users and water utilities at:

<https://cfint.rtpnc.epa.gov/cetl/lblogin.cfm>

A list of relevant laboratories should be referenced as part of the sampling procedures.

The majority of participants were unfamiliar with the capabilities of the EPA emergency response unit, which include field screening, sample collection, and the provision of resources, among other actions.

Suggested actions.

- Utilities should develop protocols for collecting contaminated water samples, including the use of personal protective equipment, transport of samples, laboratories capable of doing analysis of various contaminants, and method for receiving the analysis. Additionally, water utility emergency response plans should include a consequence assessment of the sampling results for notification of response agencies, regulators, and offsite support agencies.
- Utilities should develop "quick reference" checklists that include actions for sample collection and support to incident command. The checklists should include steps that define response priorities, such as isolating the system, notifications, and recovery.

- A protocol for use of GIS mapping should be developed by the water utility to support the emergency response effort, if GIS capability exists at the water system.
- The value of any water utility modeling capability for water distribution isolation should be identified by the water utility. Use of this model should be formalized to support the emergency response effort. The modeling capabilities should be discussed with emergency response agencies so they understand their use in helping assess the extent of the emergency.

Theme 4: Communications with the public can be improved, and water systems must be prepared to work with the media.

Many lessons regarding public communication were learned during these exercises. Each exercise involved releasing information to the public, and these releases were not always timely or accurate, as is occasionally true in real-life emergencies. News releases and briefings to the media contained information that was not current. In some instances, the up-to-date information was not passed along to the public information officer during preparation and review of the news release. Live news conferences were held and typically delivered by high-ranking city officials. The individuals attending the news conference were caught off guard by the lack of current information and development of key messages. This led to embarrassing moments during the briefing.

Information related to protecting public health was slow to be released during some of the exercises. News releases and live briefings did not emphasize steps the public needed to take to protect themselves. Public protection was a key message that needed to be delivered. Another common mistake was the use of acronyms when talking to media and the public. This required clarification by the individual(s) giving the briefing and distracted from the message. When news releases are distributed or press conferences are held, the use of acronyms should be avoided. Additionally, questions were asked in Spanish and German, which confused the spokespersons. Bilingual news release formats should be made available when appropriate, and the support of an interpreter at the news briefing would help in areas where segments of the population are bi-lingual.

During these exercises, media inquiries were directed solely to the public information officer of the water system or city. Realistically, media inquiries could be directed to various sources of information. Future training of water system personnel should address the potential magnitude of media and public inquiry, and to whom inquiries should be directed. Designating a trained spokesperson to address public inquiry and media questions is essential to keep messages clear and consistent. Additionally, messages should be coordinated closely with the EOC, city officials, and other agencies to keep them consistent.

Suggested actions.

- Utilities should identify key facilities that could be potentially affected in an emergency event (hospitals, schools, care facilities, neighboring utilities) and include them in a contacts list that is updated annually.

- Relationships should be established between PIOs, and message content and delivery should be coordinated before an emergency event.
- Utility personnel should be instructed and trained on what to do when contacted by the media. Key persons that may have interaction with the media should receive training for dealing with risk and crisis communications.
- Utility personnel who can support developing news releases for non-English speaking populations should be identified. News briefings or conferences should have appropriate translators available, including for the hearing impaired.

Theme 5: Conducting a successful exercise and capturing the lessons learned from it requires particular techniques.

Conducting tabletop exercises requires trained individuals experienced in developing and delivering these types of trainings. The participants and project team felt these exercises were organized and well executed. Observations and improvements were applied to each of the exercises to make them more successful. Capturing the exchange of information and actions during the exercise is crucial for being able to adequately evaluate exercise play, identify gaps, and understand the relationship between the various responders and support agencies. A summary of the following ideas and suggestions for conducting exercises may be helpful for future exercises:

- Use a city or county EOC with breakout rooms for regulatory or response personnel who would not normally be located in the EOC during an actual emergency. The EOC creates an environment of a “real” emergency. Most EOC’s are equipped with a wide range of audio/visual technology that can be utilized during the exercise. Breakout rooms help to create the real-life distance of agency representatives who would normally not hear the discussions of first responders and EOC staff in an actual emergency.
- Assign scribes at each of the tables to support the controller and evaluator, and to ensure that accurate data is collected, including information being exchanged, actions taken, and timing of both. Information that is not captured on paper will often be lost before the exercise is discussed at the end of the day.
- Brief participants prior to beginning the exercise about the pace of information, and explain that some will experience delayed entry into the exercise due to their limited knowledge early in the scenario. Participants expected to begin playing in the exercise immediately, and those at tables other than incident command, were frustrated when information did not come to them. In an actual emergency, information would not reach those participants until water system personnel or first responders followed communication protocols.

- Conduct participant introductions before initiating the exercise. Ask participants to describe their roles and responsibilities during an emergency event. Remind participants to use the list of attendees as a resource throughout the exercise.
- Select a room adequate to comfortably accommodate the number of participants in the exercise. Try to ensure enough distance between tables to limit the amount of information that can be overheard from other tables. It is advantageous to have additional rooms available in which to place groups such as off-site support and regulators.
- Incorporate public officials in exercises as much as possible. Their role is crucial in decision making, coordinating resources, and communicating with the public and other government officials. Public officials need to understand the roles and responsibilities of the various response agencies, and know whom to contact for information and updates.



Summary of feedback from the exercises

Feedback from participants, staff, and observers who attended these tabletop exercises considered them to be highly successful. As a learning experience, participants appreciated the opportunity to interface with other response agencies and conduct face-to-face discussions of response requirements. This type of interaction among this diverse group of participants proved invaluable. Many of the response actions initiated during the exercises were well executed. While improvements could be made, the exercises pointed out that a diverse group of response agencies could come together and successfully respond to a major drinking water contamination event.

The vast majority of participants were very pleased with what they learned, the interaction they had with others during the exercises, and with the gaps that were exposed during the course of the exercises. Participants felt that exposing gaps during these types of exercises gave them an opportunity to apply what they learned to existing processes in order to avoid missteps during an actual emergency.

The exercises involved the right mix of participants necessary to accomplish the established objectives. Attendees felt the scenarios were appropriate and the sequencing and timing of information injects were well organized. In addition, participants felt the exercise materials supported the learning objectives. However, a significant number of participants felt that more information was required and more time was needed to cover the objectives in greater depth.

In conclusion, most participants felt that the response actions by everyone during the exercise were realistic and that the learning experience better prepared them for an actual emergency. Each participant was provided with a feedback form to record his/her impression of the value of the exercise. Completed feedback forms were received from 80 of the 106 non-project team participants, or 75 percent. Some of the categories and general results are summarized as follows:

Has the exercise provided value to improve your work performance?

99 percent of the respondents indicated the exercises provided value and were worth the time spent in participation.

Was the location of the exercise appropriate?

85 percent indicated the location was appropriate. Many indicated the desire for more space or for the exercise location to be within the Emergency Operations Center.

Were the participants given the opportunity to practice/apply their training and experience during the exercise?

92 percent indicated satisfaction with the level of training and experience.

Did the exercise focus on what participants need to do in their response positions?

90 percent indicated applicability to response positions.

How realistic were the response actions today?

93 percent indicated the response actions were realistic.