



# Wastewater Response Protocol Toolbox: Planning For and Responding To Wastewater Contamination Threats and Incidents

December 2011

## Module 5: Public Health and Environmental Impact Response Guide

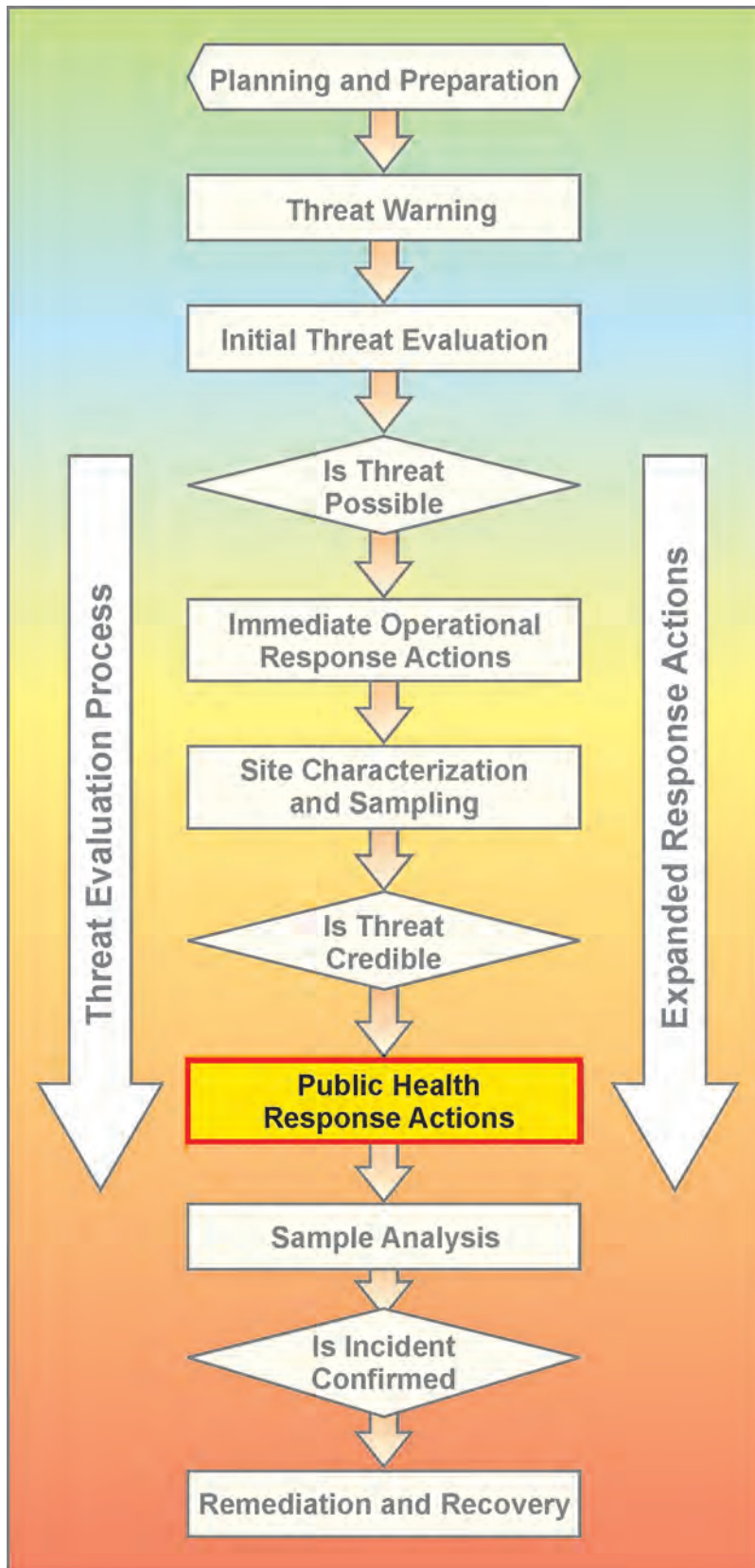


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## 1 Introduction

Module 5 provides guidance for the public health and environmental protection response to a wastewater contamination threat or incident. The response is one component of the overall threat management process which is described in Module 2, the Contamination Threat Management Guide. This response includes those actions taken by utilities, health entities, and regulatory agencies to decrease the public health and safety consequences, as well as negative effects on the environment, which may result from a contamination threat or incident. Public health and environmental responders in this context include the utility, local and state health and environmental departments, the EPA, and the Centers for Disease Control and Prevention because they may all be involved in choosing and implementing the public health/environmental response actions taken during a contamination incident.

The public health and environmental protection response consists of the five actions listed below:

### Action taken before a threat occurs

- Plan the public health and environmental response

### Actions taken after a threat occurs

- Determine the public health and environmental consequences resulting from this particular wastewater contamination incident
- Implement appropriate operational responses
- Implement public notification
- If necessary, make available short term alternate sanitary services



## 2 Plan the Public Health/ Environmental Response (Pre-threat Phase)

The public health/environmental response should be planned and coordinated between utilities, public health agencies, and environmental regulatory agencies before a threat occurs. Utilities document their planning when preparing their Emergency Response Plan (ERP). State and local health agencies typically develop a Public Health Response Plan that covers responses to all types of public health emergencies (including but not limited to water emergencies). Regulatory agencies have developed extensive environmental protection plans to be used in response to a variety of contingencies. In their planning, utilities, health agencies, and regulatory agencies should address several issues as they relate to a response in the event of a threatened or actual contamination event in a wastewater system.

First, during the planning phase, the roles and responsibilities of the agencies involved in public health and environmental impact response should be identified. At this point, the utility should define its intended role in future public health/environmental impact responses.

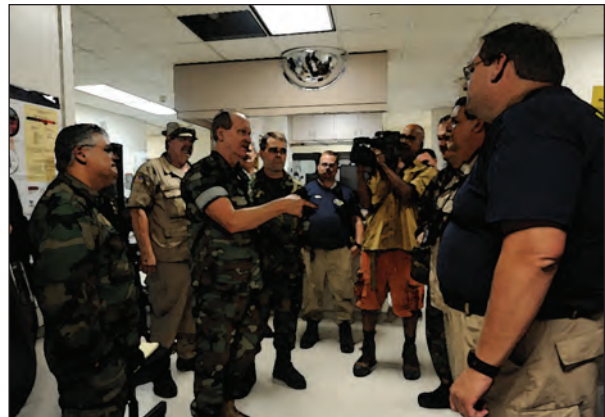
Secondly, an effort should be made to integrate public health and environmental protection agency planning into the utility's ERP. The utility should investigate how the public health response plans of local and State health departments, and the environmental protection plans of regulatory agencies, address wastewater contamination incidents. They should then integrate appropriate portions of these plans into the utility ERP.



The utility should also develop a communications strategy. Rapid and reliable communications are crucial to ensuring a prompt and coordinated public health and environmental response. Plans should be made, prior to an incident, that describe who should be notified, when and how they should be notified, and what types of information they should be given consistent with any applicable laws and regulations. A backup communication and notification system should be put into place in the event that phone networks are not functioning. Those notified may include emergency responders, government and non-governmental agencies, critical customers such as hospitals, and the public. Especially important is two-way communication between wastewater utilities and public health agencies. The Incident Commander (who may or may not be from the utility) should report contamination threats to the public health agency so that physicians and hospitals

can be on alert to report potential signs and symptoms to the health department. Similarly, public health agencies should communicate with wastewater utilities regarding unusual symptoms being reported by the medical community that may have a connection to wastewater.

Finally, prior to a threat being received, the involved organizations should develop plans for operational and public health responses to be taken during a threat or incident. The operational steps should be designed to minimize the impact of a contamination event on public health and the environment. The plan should identify the agency or organization that is responsible for carrying out the action(s), as well as the circumstances under which certain actions are to be taken. The organizations should also assess the feasibility and potential effectiveness of these operational steps. At the same time these agencies should determine the potential impacts of specific response actions on the community.



It is during the planning phase that gaps in operating procedures, technical capabilities, and communications should be identified and addressed. As with all response plans, regularly exercising the public health/environmental impact plan is critical to effective implementation during an emergency.

Exercises should involve not only the utility but also health agencies, regulatory agencies, and public safety response agencies.

The remaining four actions, described below, should be taken following the utility becoming aware of an accidental or intentional contamination threat. These actions may be taken individually, or in combination, at any point throughout the threat management process. However some actions may be required to be taken at specified times.



### 3 Determine the Public Health Consequences and Environmental Impacts Resulting from the Contamination Event (Post-threat Phase)

Once the possible identity of the contaminant (or contaminants) has been determined, the utility and other responders should obtain information on the properties and potential health and safety consequences of the contaminant, as well as possible impacts on the environment and wastewater operations. This information will help inform response decisions. Some public health/public safety factors of concern include the acute and chronic health effects of human exposure to the contaminant, exposure routes of concern (e.g.,



inhalation or dermal contact), contaminant concentrations that are toxic or infective, and the flammability of vapors. Environmental factors of concern include the stability of the contaminant in water and the potential impact of the contaminant on living organisms in the receiving waters as well as on downstream users of the receiving waters (e.g., drinking water utilities). Operational concerns include the ability of wastewater treatment processes to remove or inactivate the contaminant, as well as the contaminant's potential to damage the biological treatment process in the wastewater plant.



A good source for information on properties, health effects, and environmental impacts of a variety of chemical, biological, and radiological contaminants of concern for drinking water and wastewater is EPA's Water Contaminant Information Tool (WCIT). For these contaminants, WCIT provides information about relevant topics such as chemical or pathogen properties, medical aspects, toxicity, as well as decontamination methods for wastewater infrastructure and the effect of wastewater treatment processes on contamination concentrations. Access to this



secure, web-accessible database is available to water utilities, regulators, health agencies, and others free of charge. However, prior registration is required. Additional information on WCIT is available at <http://www.epa.gov/wcit>.

Another factor relevant to determining the consequences of a contamination event is assessment of the actual spread of the contaminant in the wastewater system. This assessment can be accomplished using manual methods which are simply based on the utility's knowledge of flow patterns in the collection system. The assessment can also be conducted through the use of hydraulic models such as EPA's SewerNet.

SewerNet is an integrated, GIS-based simulation model for consequence assessment of sanitary and storm water collection systems affected by contamination events. It can be applied to any storm, sanitary, or combined sewer system. The model is capable of predicting the routing of contaminated storm water and/or sanitary flow through the sewer network, from points of collection to treatment facilities or direct discharge points. It can account for chemical transformations

and losses that might occur during transport, such as volatilization or adsorption onto pipe walls, and can analyze the consequences of a variety of contamination scenarios. Additional information on SewerNet is available at the following website:  
<http://eh2o.saic.com/iwqss>.

The Contaminant Characterization and Transport Worksheet (Appendix 13) is a form that could be used to help organize information that will lead to the identification of the contaminant. It can also facilitate decisions on appropriate operational responses and provide more accurate information for public notification.

#### 4 Implement Appropriate Operational Responses (Post-threat Phase)

Certain operational responses, identified during the pre-threat phase planning process, may be implemented in response to a 'Possible' or 'Credible' contamination threat. The objectives of operational response actions should be to minimize exposure of the public and wastewater system employees to the contaminated wastewater, decrease the negative impact on the environment, lessen the potential impact on the wastewater infrastructure, and provide additional time to evaluate whether or not the threat is 'Credible' or 'Confirmed.' Some operational responses include the following and can be implemented if consistent with applicable laws and regulations:

- Isolate and store contaminated wastewater (e.g., in backup storage basins or tanks, if available).
- Slow the influent flow of wastewater into the treatment plant to permit more extensive treatment.



- Isolate redundant unit wastewater treatment processes, if available, to prevent the contaminant from damaging the entire treatment process.
- Increase disinfectant concentrations to reduce the passage of infectious pathogens through the treatment plant and into the environment



Because some of these actions could violate permit conditions or the Clean Water Act, these actions should only be taken after consultation with the regulatory agency. If the utility is considering a bypass, the utility should note that the conditions for a bypass are described in 40 CFR 122.41(m). If the permittee knows in advance of the need for a bypass, it shall submit prior notice at least ten days before the date of the bypass, if possible. In the case of an unanticipated bypass, the permittee shall submit on 24 hour notice if the following conditions are met: (A) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; (B) there were no feasible alternatives to the bypass, and (C) the permittee submitted notices as required under paragraph (m)(3) of this section. CWA Section 301(f) governs the discharge of any radiological, chemical, or biological warfare agent, any high-level radioactive waste, or any medical waste, into the navigable waters. The cost of restoring the contaminated plant versus the environmental and economic damage to the watershed must be carefully considered. In addition, downstream drinking water treatment plants should be notified since this could impact their ability to provide safe drinking water to the public.

The Public Health Response Action Worksheet in Appendix 14 can be utilized to organize information to aid in the evaluation of containment options, issuance of public notification, and provision of alternate sanitary services.

## 5 Implement the Public Notification Strategy (Post-threat Phase)

Public notification will be a key component of an effective response to a ‘Credible’ threat or ‘Confirmed’ incident. It may also be required by applicable laws and regulations. Public notification may be needed to reduce or mitigate exposure to a contaminant and prevent panic. In the case of a ‘Credible’ contamination threat, if time allows, the utility should consult with the wastewater primacy agency, and the public health agency, to determine whether or not the situation warrants public notification.

Once the decision has been made to notify the public, it is important to evaluate the type of information that should be delivered to the public. Any available information about the suspected contaminant will support the process of developing a notification message. If the identity of the contaminant is known with a sufficient degree of confidence as a result of the threat evaluation, then the public





notification may be crafted to deal with the specific risks to public health and safety posed by the contaminant. At a minimum generally, the public notification could include:

- Description of the contaminant
- How the contaminant was introduced into the wastewater system
- Geographical extent of the affected area
- Potential risks to which the public may be exposed (e.g., explosive fumes and/or toxic vapors)
- Protective actions the public should take (e.g., evacuation)
- Actions being taken by authorities to control the situation
- Reassurance that the public will be kept informed

In an extreme situation, it may become necessary to advise the public not to flush toilets (Do Not Flush order). This could occur, for example, if the drinking water supply had become contaminated with substances that present an inhalation risk if aerosolized or volatilized. In this situation, the public would probably also receive a Do Not Use order for the drinking water system. In the event that it becomes necessary to communicate with the public concerning a contamination event in the wastewater system, the communication will most likely occur through the media

(TV, radio, newspapers). Methods such as email notices, reverse 911, and door-to-door notifications may also be used. To facilitate this communication, and maintain the credibility of the utility, as well as public health and regulatory agencies, it is important to maintain a communications plan, try to establish a working relationship with the local media prior to an event, and deal with the media in a forthright manner.

## 6 Make Available Short Term Alternate Sanitary Services (Post-threat Phase)

In the event that the wastewater collection system, or a portion of it, is temporarily not usable, the response will have to include provision of alternate sanitation options. A similar situation occurred in the past when portions of the wastewater collection system were destroyed by explosions in Akron, Ohio (1977) and Louisville, Kentucky (1981) as described in Module 1 of the Toolbox. Options for temporary sanitary facilities may include deployment and maintenance of portable toilets, home waste treatment devices, or packaged systems.



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The wastewater utility and local authorities may or may not have the resources to provide alternate sanitation facilities. In the event that local resources are overwhelmed, state and federal agencies may need to provide assistance.

## 7 Summary

The public health and environmental response to an intentional or accidental wastewater contamination event includes the actions taken to control the public health/safety, property/ infrastructure damage, and environmental consequences resulting from biological, chemical or radiological contaminants.

The utility should plan the response with other organizations prior to receipt of a threat. This includes identification of the roles and responsibilities of agencies involved in the response, development of a communication strategy, and evaluation of the feasibility of various operational responses.

Once the utility and other responders become aware of a contamination threat, they should determine the public health and environmental consequences resulting from the contamination, implement operational responses, notify the public, and if necessary, provide alternate sanitary services.

Much of the success of the public health and environmental response depends on adequate pre-planning and effective communications among all the response organizations involved.

## 8 Appendices

The following are examples of forms that may be used to facilitate the public health response:

- Contaminant Characterization and Transport Worksheet
- Public Health Response Action Worksheet

These forms can be found in the Appendices located at the end of the Toolbox.

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