

Incident Action Checklist – Source Water Contamination

For on-the-go convenience, the actions in this checklist are divided into three “rip & run” sections and are examples of activities that ground water and surface water utilities can take to prepare for, respond to, and recover from an incident that impacts source water. You can also populate the “My Contacts” section with critical information that your utility may need during a source water contamination incident. Disclaimer: Each incident is unique and may involve specific response actions that are not outlined in this checklist. Please consult with your drinking water regulatory agency and emergency management on all actions.

Source Water Contamination Incidents and Water Utilities

Increasingly, utilities face source water challenges as they try to ensure the delivery of safe drinking water to their customers. Source water contamination can occur through natural, accidental, or intentional causes such as wildfires, harmful algal blooms (HABs), spills, and releases, and can impact both surface water and ground water systems. When source water contamination occurs, regardless of the cause, it requires a measured and appropriate response to ensure the contamination can be mitigated before interfering with treatment or entering the distribution system.

Contaminants in source water can be difficult to treat, which could lead to:

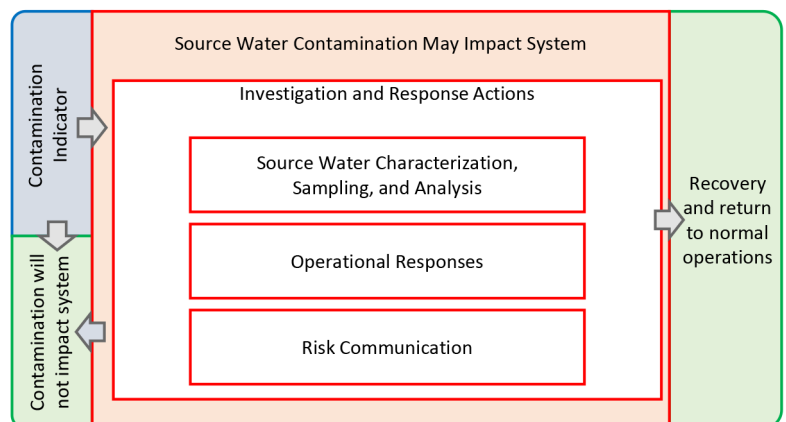
- Interference with water treatment operations such as floc formation, filtration, and disinfection.
- Immediate shut down of a surface water intake, especially if the contaminant cannot be removed by existing treatment processes or may damage plant infrastructure.
- Immediate shut down of a well if a spill occurs at the wellhead.
- Increased levels of contaminants entering the treatment system.
- Pass through of contaminants into finished drinking water.
- Prolonged drinking water outages that can impact both human health and a community’s economy.

While there is a risk for source water contamination in many areas, the risk to the actual water utility will depend on the specific characteristics of each system’s source water protection area.

Refer to EPA’s companion [incident action checklists](#) for specific information and actions regarding other incidents, including HABs and wildfires, that can affect source water quality. Source water incidents may impact distribution water quality if the contaminants enter the distribution system. Refer to EPA’s companion incident action checklist for distribution system contamination for more information.

The overall framework for responding to a source water contamination incident is shown in Figure 1. The timeframe for each process will be determined on an incident-specific and site-specific basis. The time to complete the entire process can vary from a few hours or days to months and years if an aquifer is impacted. Incident- and utility-specific constraints will guide the decision-making process that is unique for each contamination incident. Utilities should determine which activities they have the capability to perform internally and which activities they will rely on relationships with response partners, mutual-aid agreements, or utility contracts to perform.

Figure 1. Source Water Contamination Process



Actions to Prepare for a Source Water Contamination Incident



This section includes actions to plan for and actively monitor for a contamination incident that could impact your source water.

Plans and Procedures

- Conduct or update a [risk and resilience assessment](#) (RRA), as described by Safe Drinking Water Act (SDWA) Section 1433, to identify threats to your source water. EPA recommends that all systems conduct an RRA, even if not required. Consider utilizing your most recent [source water protection assessment and plan](#) to inform the RRA. Factors to consider include:
 - The industrial, wastewater, power, fuel storage, oil, and natural gas refining facilities in your source water protection area.
 - History of releases in your source water (including near wellheads). For a review of releases to sources of drinking water across the U.S., see the EPA report [Occurrence of Releases with the Potential to Impact Sources of Drinking Water](#).
 - Transportation of hazardous materials in your water source or over roads and bridges near your water source.
 - History of drought and wildfire in your source water protection area.
 - Prevalence of agriculture in the area and potential for fertilizer or pesticide releases or harmful algal bloom development.
- Based on the results of the RRA, conduct a thorough source water contamination threat inventory for your source water protection area.
 - America's Water Infrastructure Act (AWIA) Section 2018 allows a community water system to have access to hazardous chemical inventory data (also known as Tier II data) collected under the Emergency Planning and Community Right to Know Act (EPCRA) for any facilities that store or handle hazardous chemicals within that system's source water protection area.
 - Exchange 24-hour contact information with any facilities considered a threat to your source water and request notification in the event of a release.
- Identify methods and laboratories that could analyze chemicals stored or handled at facilities in your source water protection area that present a high risk.
- Evaluate the ability of available water treatment processes to remove or neutralize chemicals stored or handled at facilities in your source water protection area that present a high risk.
- Develop or update your [emergency response plan](#) (ERP), as described by SDWA Section 1433 or state regulations, based on the results of your RRA and source water contamination threat inventory. EPA recommends that all systems have an updated ERP, even if not required.
 - Utilizing the [National Incident Management System](#) principles, be sure to incorporate your response structure, using the Incident Command System (ICS), into your ERP.
 - Ensure all 24-hour emergency contacts are updated.
 - Include source water contamination response capabilities, procedures, training, assets, personnel, and response partners.
 - Include plans for actions in case of supply chain interruptions to critical components and chemicals.
- Develop and implement a water quality monitoring plan for source water for both normal water quality monitoring as well as for the most likely contaminants based on your RRA and source water contamination threat inventory. Monitoring regularly can detect water quality changes and serve as an indicator of a potential issue.
 - The plan should include parameters, locations, site access information, personnel, frequency, sampling procedures, analytical methods, laboratories for the analyses, criteria for expected ranges, baseline data, and follow-up procedures for atypical results.

Actions to Prepare for a Source Water Contamination Incident



- Identify a lead and a team of individuals who can prepare for and perform critical duties (i.e., shutting down intake/well or making process changes) during a source water contamination incident.
- Develop pre-planned responses for the most likely contaminants in your source water protection area based on information gathered from your RRA and source water contamination threat inventory.
- Identify options to reduce water demand that includes pump strategies and user conservation options.
- Update or develop an [emergency drinking water supply plan](#) that specifies the following:
 - Current back-up sources of water (interconnections, emergency well, etc.).
 - Regularly test and exercise back-up sources.
 - Develop procedures to account for differences in water quality from back-up sources.
 - The number of connections, the approximate population served, and the quantity of water needed to meet daily demand.
 - Multiple other sources of emergency water (both raw and finished) such as a backup raw water source, additional interconnections, or hauling treated water to a storage tank or a point of distribution in case current back-ups are impacted.
 - Who is responsible for obtaining and distributing emergency drinking water supplies, including logistical and security considerations.
- Develop a [Risk Communication Plan](#) (RCP), as deemed appropriate by the utility or per drinking water regulatory agency requirements, as part of your ERP to communicate potential hazards and unknown factors to employees, first responders, the public, and other stakeholders.
- Identify the required communication steps and appropriate actions that may be taken to inform customers and the general public if contaminants are detected in raw water or have the potential to affect finished water.
 - Develop template statements and public notices to provide rapid communications at the beginning of an incident.
 - Include curtailment notices that instruct customers to reduce usage and conserve water to help extend the time intakes or wells can be shut down, such as restrictions on watering lawns.
- Document roles and responsibilities of utility personnel and response partners (i.e., local officials, regulatory agency, local and state emergency management, public health officials, etc.) regarding the communication of public information, if necessary, during a contamination incident.
- Identify appropriate communication mechanisms such as reverse 911 and/or wireless emergency alerts.
- Ensure your utility has a Health and Safety Plan (HASP) template that can be modified for different field and laboratory activities associated with a source contamination event in which you must conduct sampling or be in close contact with the contaminant.
- Develop and maintain a list of laboratories that can support sample analysis during a source contamination event. EPA's [Drinking Water and Wastewater Laboratory Network](#) page has information on how to [access laboratory support](#).
- Develop an information management strategy to collect, document, and manage the information that may be generated during a contamination incident, including field reports, sampling and analysis results, personnel time records, invoices, and response partner information.
 - Establish a protocol for staff to communicate results and issues to ensure they are quickly and accurately conveyed to decision-makers.

Actions to Prepare for a Source Water Contamination Incident



- Coordinate the information management strategy with the RCP. Information management contributes to an effective communication strategy to ensure the public, partners, and all personnel stay informed.
- Determine if a local organization or agency exists in your area that monitors and communicates emergencies for your source water. Examples of such organizations include [ORSANCO](#).
- Develop a list of 24-hour emergency hotlines such as state and federal spill hotlines and hazmat response. Include construction and environmental contractors that can assist in response and recovery.

Identify possible staging areas for response partners or mutual aid crews if needed in a response, and the availability of local facilities to house crews. If staging or housing is not possible, be sure to inform external responders when requesting their assistance.

Coordination

- Develop a robust notification network for when spills or releases occur in your source water protection area. The network should include your State Emergency Response Commission (SERC), emergency management agency (EMA), state drinking water regulatory agency, facilities from your source water contamination threat inventory, water systems that utilize the same water source, and other response partners.
- Receiving a direct notification from the impacted facility will enable a faster response than even the best water quality monitoring plan.
 - Contact your SERC to ensure you receive notifications of spills or releases as required by AWIA Section 2018.

Join your state's [Water and Wastewater Agency Response Network](#) (WARN) or other local mutual aid network. In addition, check to see if you are included in a statewide mutual aid law.

Identify and coordinate with all water systems that utilize the same water source. For surface water systems, upstream systems can serve to warn downstream users as those upstream may be affected by source water contamination first. Be sure to have 24-hour contact information, since source water contamination incidents can happen at any time.

Develop and maintain a list of critical customers and large volume users who could be impacted by a temporary shut-down of the contaminated water source (e.g., hospitals, nursing homes, dialysis clinics, manufacturers, wholesale customers).

Share your source water monitoring plan and your emergency drinking water supply plan with your regulatory agency, local EMA, health department, and consecutive systems.

Coordinate with response partners (e.g., law enforcement, public health, regulatory agency, local/state mutual aid network) and determine how they can assist your utility during a source water contamination incident such as providing information on the contaminant, helping with water distribution if needed, providing sampling data to help determine utility actions, or providing updates on clean-up of the contamination.

Coordinate with your Local Emergency Planning Committee (LEPC) to obtain Tier II hazardous chemical information for all facilities within your source water protection area and to understand the chemical emergency response plan for your area. More information is available at <https://www.epa.gov/epcra>.

Coordinate, if possible, with your area's 911 dispatch center to receive direct notifications of transportation accidents that involve releases.

Confirm all utility and response partner emergency contacts and their contact information.

Actions to Prepare for a Source Water Contamination Incident



Water System Operations

- Review existing treatment processes (e.g., pre-oxidation, powdered activated carbon on-site, changing coagulation conditions) and evaluate flexibilities and options within those processes for managing and treating contaminants. Based on your specific water system:
 - Inspect and exercise all elements of the intake and treatment systems, particularly infrequently used elements like isolation valves, to confirm function and understand response options.
 - Identify and review pretreatment options that can be implemented on demand or on short notice.
 - Identify modifications or treatment strategies that can be implemented on demand or on short notice.
 - Establish a test procedure to evaluate if pre-treatment/modified treatment options will be effective.
 - Catalog information about each process.
 - Determine timeframe for sustaining operation of modifications (short-term or long-term).
 - Identify treatment chemical suppliers for increased demand and fuel/generator capabilities and supplements.
- Evaluate water storage levels in a typical day (low and high demand times) and back-up sources to determine how long an intake or well can be shut down before it impacts your ability to serve customers.
 - Evaluate options for the adjustment of water use by customers, such as water conservation, to extend the timeframe for the intake or well to be shut down. Coordinate these options closely with response partners and Risk Communication efforts to ensure feasible and effective implementation.
- Determine if your utility can draw raw water from different wells, intakes, or different intake depths from the same water source or can draw from other sources, as well as what limitations exist for each option.

- Monitor for any other changes (e.g., decreased filter run time, increased backwash times, etc) that could indicate a potential source contamination incident.

Training

- Complete [Incident Command System](#) (ICS) training.
 - Ensure multiple utility personnel are trained on Key Leadership Positions (e.g., Incident Commander, Operations Section Chief, Public Information Officer) in case people are sick or on vacation during an incident.
 - Coordinate with your local response partners or your WARN or other mutual aid network if additional trained personnel are needed.
 - Identify and practice elements of a Unified Command with your response partners.
- Conduct training on recognizing site hazards and implementing the relevant procedures in the ERP for safety and security measures.
- Conduct internal briefings, training, and exercises regularly to ensure utility staff are aware of all preparedness, response, and reporting procedures and to help improve execution of those procedures.
- Conduct or participate in external (e.g., local EMA, health department, drinking water regulatory agency) exercises regularly to understand roles and responsibilities and improve coordination and response execution.
- Identify and train multiple people that can serve the role of Public Information Officer, whose role is to continuously notify customers and the public of updates.
- Familiarize yourself with the EPA's [Water Contamination Response Resources](#), [Drinking Water Treatability Database](#), and the resources under the Plan Ahead Section on the [Drinking Water and Wastewater Laboratory Network](#) website.

Actions to Respond to a Source Water Contamination Incident



This section includes actions for once a contamination incident is confirmed to have impacted your source water.

Safety First

- Constantly assess the scene, know your surroundings, and move to a safe area if necessary.
- Pay attention to all emergency alerts, instructions, and leave the contaminated area immediately if told to do so by authorities.
- Develop an incident-specific HASP using your template for common environmental hazards. Precautions taken will be based on the actual contaminant in the source, if known. Some source contamination specific risk mitigation actions include the following:
 - Avoid skin contact with the water.
 - Minimize time spent at the sampling location.
 - Do not eat, drink, or smoke.
 - Wear personal protective equipment (e.g., gloves, safety glasses/goggles).
 - Fill sampling containers slowly to avoid volatilization.
 - Rinse the outside of sample bottles with laboratory grade water or decontaminate with a bleach wipe.
 - Evaluate health and safety risks of a contaminant before conducting odor tests.
- Fatigue during extended periods of emergency work is common and dangerous. Be sure to get plenty of rest and stay alert. Identify backup personnel for extended events.
- Carry a first aid kit, and an automated external defibrillator if possible, and avoid unnecessary risk.

Preliminary Actions

- Once source water contamination is discovered, notify the pre-designated water contamination lead and utility personnel.
 - Identify the physical location of the incident.

- Notify and coordinate with the state drinking water regulatory agency and local EMA of your water system's status.
 - Continue to coordinate with these agencies throughout the incident as response actions and treatment changes may need approval.
- If a local organization or agency exists in your area that monitors and communicates emergencies for your source water, be sure to stay in contact with them throughout the incident.
- Execute your Emergency Response, Risk Communication, Emergency Drinking Water Supply, and Health and Safety plans, as needed.
- Monitor social media, news outlets, and telephone hotlines for any information relevant to the incident.
- Begin and continue to document all events, timeframes, and any resulting impacts until the water system resumes normal operations. All information can be used to validate findings or for post-incident investigations.

Investigation and Response

Coordination

- Coordinate with local emergency management to identify a contact to establish clear lines of communication to provide critical and current information on the incident so operational decisions can be made (see below for detailed information needed).
 - It is critical for water systems to receive detailed information about the contaminant(s) and incident, including the location, mass/volume released, and if the contaminant is continuing to be released, to select appropriate response actions.
- Notify and coordinate with the local health department.

Actions to Respond to a Source Water Contamination Incident



- Coordinate sampling and monitoring efforts with other responding agencies and labs to efficiently use resources and share information.

- Identify leading and trailing edge of plume.
- Estimate time of impact, duration, and expected concentration.

Notifications

- Notify all staff of the situation and any plans and proposed actions.
- Notify utilities that have interconnections with your utility and those with the same water source.
 - Discuss partnering and coordination on any response actions, such as sampling efforts.

Conduct Sampling

- Identify the contaminants present in the source water and obtain the SDS for each. Obtain a “pure” sample of the contaminant(s), if possible, directly from the source of the contamination.
- Confirm the contaminant(s) concentration at both the source of the contamination and in the source water/raw water near the intake or in the groundwater near the well.
- Identify monitoring parameters, including general water quality parameters that may act as indicators of the contaminants.
- Identify sampling and monitoring locations in the source water, treatment system, and finished water storage.
- Identify appropriate sampling and analytical methods for monitoring and laboratories capable of supporting.
- Identify contaminant plume time-of-travel characteristics:
 - Determine flow characteristics.
 - Identify current and predicted weather conditions and other factors that may impact flow.

Response Actions

- For surface water systems, determine if the contaminant is floating or mixed in the water column. If floating, determine if you can utilize your intake or switch intake depths if possible. If necessary, close the raw water intake.
- For groundwater systems, determine if the contaminant can migrate within the aquifer toward other wells and the need to shut down the well(s).
- Determine if it is feasible to divert the contaminant away from the intake (e.g., booms) or well (e.g., excavate ground).
- Determine if the contaminant(s) can be treated or removed through normal treatment processes.
- Evaluate and implement additional pre-treatment options (e.g., powdered activated carbon), if feasible. Determine if adjustments to normal treatment processes will treat or remove the contaminant(s).
- Implement distribution system contamination response procedures if the contaminant is expected to pass through treatment processes and enter the finished water. Refer to the companion “Distribution System Contamination Incident Action Checklist.”
- Implement your emergency drinking water supply plan, as needed.
- Determine how long the intake/well can be closed at current water storage levels.
- If the contaminant has not reached the intake/well, determine if finished water production can be increased to build additional storage ahead of the plume arriving.

Actions to Respond to a Source Water Contamination Incident



- Document all events, timelines, and resulting impacts so that this information can be used as part of the post-incident investigation.

Communication with Customers

- Assign a trained Public Information Officer to provide information and updates to the public, elected officials, and the media regularly.

- Issue any advisories to the public (e.g., mandating conservation if needing to maintain storage capacity, proactive actions utility is taking), as warranted and in consultation with your state drinking water regulatory agency.

- Keep customers regularly updated on the incident through local media, social media, a website, or other mechanisms. Updates should continue until the contamination is resolved or regular operations resume (if changes were necessary due to the incident).

Notes:

Actions to Recover from a Source Water Contamination Incident



This section includes actions once a contamination incident that impacts your source water has ended.

- Conduct remediation efforts (e.g., backwash, replace media, decontaminate components) to return to normal operations at the treatment plant and other infrastructure, if needed.
- Resume normal operations (e.g., reopen intake or begin using the well, stop pretreatment, revert any treatment adjustments).
- Notify customers and update any advisories issued once you and your state drinking water regulatory agency have deemed the situation safe.
- Continue providing updates to customers regarding current mitigation actions as well as preparation for future incidents.
- Finalize and compile all incident-related documentation (sample results, response actions, overtime hours, equipment used, invoices, receipts, photographs, etc.).
- Develop an after-action report (AAR) to document your response activities and lessons learned, including what went well and what could be improved.
- Create an improvement plan (IP) based on your AAR and use the IP to update your RRA, ERP and source water management plan. Share lessons learned with utilities that have interconnections with your utility, if applicable.
- Revise budget and asset management plans to address increased costs from response-related activities and follow-up actions.
- Coordinate with your state drinking water regulatory agency and local emergency management to identify possible mitigation and long-term adaptation measures that can help prevent source water contamination incidents in the future or increase utility resilience when they do occur.
 - Consider longer-term source water protection strategies for the watershed or wellhead protection area.
- Consider impacts related to source water contamination incidents when planning for system upgrades (e.g., treatment changes).
- Conduct annual utility-specific source water protection awareness training with all employees.

Notes:

Communication

- [Developing Risk Communication Plans for Drinking Water Contamination Incidents](#) (EPA)
- [Drinking Water Advisory Communication Toolbox](#) (CDC)
- [Need to Know: Anticipating the Public's Questions during a Water Emergency](#) (EPA)
- [Revised Public Notification Handbook](#) (EPA)
- [Effective Risk and Crisis Communication during Water Security Emergencies](#) (EPA)
- [Water Utility Communication During Emergency Response](#) (EPA)
- [NIMS Basic Guidance for Public Information Officers](#) (FEMA)

Response

- [Water Contamination Response Resources](#) (EPA)
- [Drinking Water Treatability Database](#) (EPA)
- [Water Utility Response On-The-Go](#) (EPA)

Notes: