Incident Action Checklist – Extreme Cold and Winter Storms

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that water and wastewater utilities can take to: prepare for, respond to and recover from extreme cold. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Extreme Cold and Winter Storm Impacts on Water and Wastewater Utilities

Cold weather brings with it the potential for freezing temperatures, heavy snowfall and ice incidents that can have multiple impacts on a community. Impacts to drinking water and wastewater utilities may include, but are not limited to:

- Pipe breaks throughout the distribution system, due to freeze/thaw cycles
- Loss of power and communication lines
- Limited access to facilities due to icy roads or debris such as downed tree limbs
- Reduced work force due to unsafe travel conditions throughout the service area
- Source water quality impacts due to increased amount of road salt in stormwater runoff
- Potential flooding risk due to snowpack melt and ice jams (accumulations of ice in rivers or streams)
- Potential surface water supply challenges as ice and frozen slush can block valves and restrict intakes

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from extreme cold and winter storms.

Example of Water Sector Impacts and Response to a Winter Storm

Kentucky 2009 Ice Storm

Kentucky experienced a severe winter storm in January 2009 that resulted in the largest power outage in the state's history. The storm began as a mixture of snow, followed by sleet and freezing rain coupled with strong winds. Although there was advanced notice of hazardous weather, the storm was more severe than anticipated and significant impacts to the water sector occurred. Ninety water utilities regulated by the Kentucky Public Service Commission (PSC) were impacted by the ice storm, and over 32,000 customers were without water at some point during the storm. One utility, the Hickory Water District in Graves County, Kentucky, lost all service during the storm. Although the Water District had approximately 48 hours of water storage, they were unable to supply water to their customers once that storage was exhausted, as they were without power and had no back-up power source.

A significant number of utilities had service restored the day after the ice storm as a result of prioritization by electric providers. Following the ice storm response, the PSC provided a number of recommendations to water and wastewater utilities on how to better prepare for future incidents. Recommendations included issuing consumer advisories prior to incidents that may result in service disruptions, considering the establishment of interconnections, and joining a mutual aid network, such as WARN.

Source: Kentucky Public Service Commission,

"Ike and Ice: The Kentucky Public Service Commission Report on the September 2008 Wind Storm and the January 2009 Ice Storm."

My Contacts and Resources

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
	Local EMA	
	State EMA	
	State Primacy Agency	
	WARN Chair	
	Power Utility	

Planning

- Incident monitoring:
  - Storm Prediction Center (National Oceanic and Atmospheric Administration [NOAA])
  - Winter Weather Safety and Awareness (NOAA)
- Winter Storms: The Deceptive Killers (NOAA)
- Planning for an Emergency Drinking Water Supply (EPA)
- National Weather Service Weather Alerts (NOAA)
- All-Hazard Consequence Management Planning for the Water Sector (Water Sector Emergency Response Critical Infrastructure Partnership Advisory Council [CIPAC] Workgroup)
- Vulnerability Self Assessment Tool (VSAT) (EPA)
- How to Develop a Multi-Year Training and Exercise (T&E) Plan (EPA)
- Preparing for Extreme Weather Events: Workshop Planner for the Water Sector (EPA)
- Tabletop Exercise Tool for Water Systems: Emergency Preparedness, Response, and Climate Resiliency (EPA)
- Make a Plan (FEMA)

Coordination

- Water/Wastewater Agency Response Network (WARN) (EPA)

Communication with Customers

- Salt Pollutes postcard (tips for customers on ways to reduce salt) (Minnesota Pollution Control Agency [MPCA])

Facility and Service Area

- A Fresh Look at Road Salt: Aquatic Toxicity and Water-Quality Impacts on Local, Regional, and National Scales (United States Geological Survey [USGS] and Wisconsin State Laboratory of Hygiene [WSLH])
- The Kentucky Public Service Commission Report on the September 2008 Wind Storm and the January 2009 Ice Storm (Kentucky Public Service Commission [KYPSC])

Power, Energy and Fuel

- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)

Documentation and Reporting

- Federal Funding for Utilities In National Disasters (Fed FUNDS) (EPA)

Mitigation

- Climate Resilience Evaluation and Awareness Tool (CREAT)
- Adaptation Strategies Guide (EPA)

Actions to Prepare for Extreme Cold and Winter Storms

Planning

- [ ] Actively monitor weather conditions for inclement weather.
- [ ] Review and update your utility's emergency response plan (ERP), and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first, in case of water service disruptions.
- [ ] Develop an emergency drinking water supply plan and establish response partner contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of winter storms and how your utility may have been impacted. Consider taking actions to mitigate extreme cold, snow and ice storm impacts to your utility, including those provided in the "Actions to Recover from Extreme Cold and Winter Storms: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Outlining response activities, roles and responsibilities and mutual aid procedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop or full-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be considered and addressed in the design and operations
  - Establishing communication protocols and equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to discuss:
  - How restoring system operations may have higher priority than establishing an alternative water resource
  - Potential points of distribution for the delivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.

Actions to Prepare for Extreme Cold and Winter Storms *(continued)*

- [ ] Work with community partners to ensure the utility is properly prioritized when determining plowing and road salting/sanding operations.
- [ ] Ensure credentials to allow access will be valid during an incident by checking with local law enforcement.
- [ ] Sign up for mobile and/or email alerts from your local EMA, if available.

Communication with Customers

- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water, warnings that service disruptions are likely due to extreme winter weather) and distributing them to customers using appropriate mechanisms, such as reverse 911. Keep in mind that the notice may need to be delivered prior to the storm to be effective.
- [ ] Instruct customers on how to prevent pipe breaks in their homes (e.g., insulating outdoor faucets, drip warm water from an indoor faucet) and what to do if a pipe breaks.

Facility and Service Area

- [ ] Inventory and order extra equipment and supplies, as needed:
  - Motors
  - Fuses
  - Chemicals (ensure at least a two week supply)
  - Cellular phones or other wireless communications device
  - Emergency Supplies
    - Salt
    - Shovels/snow blowers
    - Tarps/tape/rope
    - Cots/blankets
    - First aid kits
    - Foul weather gear
    - Plywood
    - Flashlights/flares
    - Bottled water
    - Batteries
    - Non-perishable food
- [ ] Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.
- [ ] Prepare equipment and vehicles to start and run in cold weather (e.g., tune ups, batteries, engine block heaters).
- [ ] Develop a GIS map of all system components and prepare a list of coordinates for each facility.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Prior to a storm, apply road salt/sand as necessary, and pre-stage snowplow equipment.
- [ ] Consider installing wind or snow drift barriers at critical facilities.
- [ ] If surface water systems are equipped with intake heaters, ensure they are maintained and in working order before winter begins.

Personnel

- [ ] Identify essential personnel and ensure they are trained to perform critical duties in an emergency (and possibly without communication), including the shut down and start up of the system.
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.

Actions to Prepare for Extreme Cold and Winter Storms *(continued)*

- ☐ Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- ☐ Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- ☐ Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.

Power, Energy and Fuel

- ☐ Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- ☐ Document power requirements of the facility; options for doing this may include:
  - Placing a request with the US Army Corps of Engineers 249th Engineer Battalion (Prime Power): http://www.usace.army.mil/249thEngineerBattalion.aspx
  - Using the US Army Corps of Engineers on-line Emergency Power Facility Assessment Tool (EPFAT): http://epfat.swf.usace.army.mil/
- ☐ Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
- ☐ Fuel vehicles and fill fuel tanks to full capacity and ensure that you have the ability to manually pump gas in the event of a power outage. Ensure this equipment and other hazardous materials are located in a safe zone.
- ☐ Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- ☐ Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergency fuel.

Example of Water Sector Impacts and Response to a Winter Storm

2014 Northern Ohio Winter Water Shortage

In January 2008, ice accumulation on the intake valves for Avon Lake Regional Water severely reduced water production and caused the utility to ask customers to reduce usage. Avon Lake Regional Water's source water is Lake Erie, and it provides water to over 200,000 residential and commercial customers in multiple communities in and around the western Cleveland suburbs. The utility contracted with another company to put six additional pumps into Lake Erie to increase water flow to the plant. This involved workers cutting through ice 300 feet from shore to put new pipes in the water. The utility was forced to deliver two sets of automated phone calls to residents: the first asked them to reduce water use by refraining from washing clothes or taking long showers; the second asked people to stop using water altogether, if possible. Mayors in communities affected by the water shortages worked with their local EMAs to discuss contingency plans in the event of a fire. At least one county declared a State of Emergency in order to free up resources around the state if they were needed.

The City of Cleveland was able to supply water to several communities served by Avon Lake Regional Water Authority through interconnections. Its intakes were not affected, as they are farther out into Lake Erie where the water is deeper.

Source: The Cleveland Plain Dealer, "Water shortage reaching critical point in Avon as utility tries another way to pull water from the frozen lake."

Actions to Respond to Extreme Cold and Winter Storms

Coordination

- [ ] Notify your local EMA and state regulatory/primacy agency of system status.
- [ ] If needed, request or offer assistance (e.g., equipment, personnel) through mutual aid networks, such as WARN.
- [ ] Assign a representative of the utility to the incident command post or the EOC for the community.

Communication with Customers

- [ ] Notify customers of any water advisories and consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions.
- [ ] Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are intact.

Drinking Water Utilities

- [ ] Inspect the utility and service area for damage. Identify facility components (e.g., valve boxes) and fire hydrants that have been buried in snow, frozen in ice or are inaccessible.
- [ ] Systems that utilize surface water should monitor intakes, as ice and frozen slush can block valves and cause restrictions.
- [ ] Ensure pressure is maintained throughout the system and isolate those sections where it is not.
- [ ] Isolate and control leaks in water transmission and distribution piping.
- [ ] Monitor source water quality, develop a sampling plan and adjust treatment as necessary; increased usage of road salt within the service area may be a concern for utilities.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- [ ] Utilize pre-established emergency connections or setup temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.

Wastewater Utilities

- [ ] Inspect the utility and service area, including lift stations, for damage and power availability. Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.
- [ ] Notify regulatory/primacy agency of any changes to the operations or required testing parameters.
- [ ] Monitor the type and amount of bacteria in the treatment process, as severe cold can affect growth rates.
- [ ] Consider curtailing or ceasing secondary treatment wasting procedures during periods of heavy freezing rain or snowmelt to conserve bacteria and prevent it from washing out of the plant.

Documentation and Reporting

- [ ] Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs of damage at each work site (with time and date stamp). Proper documentation is critical to requesting reimbursement.

Actions to Respond to Extreme Cold and Winter Storms *(continued)*

- [ ] Work with your local EMA on the required paperwork for public assistance requests.

Personnel

- [ ] Account for all personnel and provide emergency care, if needed. Caution personnel about known hazards resulting from severe winter weather.
- [ ] Deploy emergency operations and clean-up crews. Identify key access points and roads for employees to enter the utility and critical infrastructure; coordinate the need for snow and ice clearance with local officials and/or emergency management or prioritize it for employee operations.

Power, Energy and Fuel

- [ ] Use backup generators, as needed, to supply power to system components.
- [ ] Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to generators.
- [ ] Maintain contact with electric provider for power outage duration estimates.

Image by Nick Fillipelli, Northeast Ohio Regional Sewer District

Notes:

Actions to Recover from Extreme Cold and Winter Storms

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Assign a utility representative to continue to communicate with customers concerning a timeline for recovery and other pertinent information.

Facility and Service Area

- [ ] Complete damage assessments.
- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs: http://water.epa.gov/infrastructure/watersecurity/funding/fedfunds/
- [ ] Develop a lessons learned document and/or an after action report (AAR) to keep a record of your response activities. Update your vulnerability assessment, ERP and corresponding extreme cold and winter storm contingency plans.
- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to the increased frequency of extreme cold and intense snow and ice storms when planning for system upgrades (e.g., replacing weak pipes to reduce the risk of main breaks, landscaping and tree trimming to minimize debris issues).

Notes: