



UTILITY SERVICE DISRUPTION: RESTORATION & RECOVERY

RESTORING BUSINESS OPERATIONS

Restoring a business or operation following loss of critical utility service for an extended period, especially during adverse weather conditions, can create a unique set of issues that increase risk to employees and property and require a well thought out restoration and recovery plan. Loss of power for extended periods may be unplanned or intentional (rolling blackouts) with no or limited advanced warning to customers.

These disruptions can lead to property damage and business impact due to lack of power. They can also lead to loss of finished goods and work in process from significant water damage when accompanied with cold weather events where heat cannot be maintained on premises and freeze-ups of process, domestic and fire protection sprinkler systems are possible. Freeze-ups can go unnoticed until the weather warms up or heat is restored. After a pipe is frozen and begins to thaw, the pressure caused by the water that begins to rush through the pipe threatens to cause piping to rupture.

Work with your contractor to identify any freeze-susceptible system components and develop a plan to protect those aspects. Generally, piping exposed to the elements should be either dry pipe or of an acceptable anti-freeze system. Other temporary freeze protections such as insulation and heat tracing are viable options.

Draining and temporarily decommissioning susceptible systems should be a last resort option. Stakeholders must understand that while fire sprinkler systems are turned off, the building is at risk of catastrophic fire damage. Only with careful consideration and planning should any system be shut down.

PLANNING FOR A POTENTIAL EVENT

Minimizing damage from non-weather water damage or utility loss is best supported by planning well in advance for potential shutdowns and loss of critical utility services and developing a restoration and recovery plan for when services return to normal. The following best practices are recommended when risk cannot be eliminated.

- **Secure the Building:** Ensure that the entire structure is secured from unauthorized exterior access and that exterior lighting is fully functioning along the perimeter. Access detection systems should be continuously monitored.
- **Inspect and Maintain Heating Systems:** Have your heating/ventilation contractor conduct a thorough pre-winter inspection of all heating systems to make sure they're functioning properly. Maintain and even increase internal heating to prevent freezing of liquid-filled mechanical systems such as domestic water and fire protection systems (consider 50° F minimum).
- **Make Contingent Arrangements for Temporary Heating Equipment:** Establish relationships and an agreement with a reputable heating contractor or supplier for access to portable or temporary heating equipment. You'll want to be prepared in the event of a service outage to the structure which compromises the ability to maintain heat within the structure to at least 45° F.
- **Establish a Water Damage Prevention Plan:** A plan should be developed which provides equipment and supplies for water or fluid cleanup following a pipe or fitting failure from physical damage, freeze/thaw or damage from weather. The plan should establish responsibilities of key employees for identifying and responding to a water damage event, and include a facility drawing that highlights water shutoff valve locations and which systems they control. Additionally, a water damage response cart can be prepared which comprises a variety of tarps, water "fences" or dam material, cleanup supplies, water vacuum(s), portable submersible pumps, mops, buckets and other items that can assist employees in the rapid shutdown of water source and required cleanup to minimize further damage.
- **Develop an Alternative Energy Plan:** Consider alternative energy sources when utility loss is a critical risk to operations. Alternative sources may include emergency power generators or battery energy storage systems which can provide adequate power for a period of time enabling personnel to

relocate susceptible goods or processes, or conduct an orderly shutdown of critical systems. This may include engagement with a contractor offering emergency power generation mobile equipment and modifying electrical services in advance to easily accept emergency power as well as local fuel storage for emergency power generators.

- **Maintain Fire Protection Systems in Service:** Have all fire protection and detection systems thoroughly inspected by a reputable contractor to assure all systems are in good working condition and that all systems are sufficiently monitored.
- **Arrange for Real-Time and IoT Monitoring of Critical Systems:** Consider installing remote monitoring systems for critical conditions such as building temperature, water detection, loss of power, low-water fuel trips on boilers, water temperature on water storage tanks and other critical process controls.
- **Contract a Security/Watch Service:** Hire a 3rd party security company if you can't provide the needed manpower for property security internally. The frequency and access to the building interiors should be negotiated upfront and specific area conditions or concerns addressed. It's smart to plan for daily property visits.

PREPARATION FOR AN IMPENDING EVENT



When an imminent weather event has been forecast which has the potential to disrupt normal power service due to high winds, sub-freezing temperatures, ice and snow conditions or even flooding, management of facilities at risk should consider implementing the following practices prior to the event occurrence:

- **Inspect and Tour the Entire Facility for Vulnerabilities:** Walk through and inspect the entire facility to identify vulnerabilities to weather and pest access points and quickly make any necessary repairs. Remove combustible materials away from the building exterior to limit fire risk. Inspect the roofs to ensure roof drains, gutters and downspouts are clear of obstructions. Repair any roof damage that may compromise interiors or the structure.
- **Shut Off Non-Critical Utilities:** Shut off all utilities that aren't required for fire protection, fire alarms, sump pumps, heating or other critical processes or equipment. This task should be carefully considered in every case.

- **Shut Off and Drain Unnecessary Plumbing:** Draining unnecessary plumbing and shutting supply valves could prove a significant help in limiting frozen piping and subsequent water damage that might occur if power and heat is shut off, whether planned as in rolling blackouts or unplanned from ice, snow or power interruptions.
- **Disconnect Non-Critical Appliances and Equipment:** Disconnect and shut off all appliances such as hot water heaters, cooking appliances, machinery and equipment at each unit and the main circuit breaker.
- **Secure and Acquire Temporary Heating Equipment:** Pick-up or have temporary heating and power equipment delivered to the facility and placed into required position. Where necessary, safely arrange for fuel supply for the temporary equipment and store in safe area and away from ignition sources.
- **Check Water Damage Response Equipment:** Ensure that water damage response supplies and equipment are readily available and in plentiful supply. Check that the rapid response water damage cart is accessible and supplied with required equipment and materials. Review procedures with members of the water damage response crew.
- **Secure and Position Emergency power Generation Equipment:** Contact your pre-arranged contractor to move power generation equipment into position for transfer when necessary. Check to ensure auxiliary fuel storage tanks or supplies are topped off and piping and valving is protected from freeze.
- **Inspect any Battery Energy Storage Systems:** Confirm that any BESS capacity on site is in good working condition and ready for transition to primary power source for critical processes or equipment. Where connected to vulnerable solar panel arrays, check to ensure snow and ice removal equipment and

materials are in adequate supply and stored where easily accessible and not impacted from ice and snow.

- **Arrange for Sufficient Snow Removal Services:** Snow removal is an important safety and property protection service in winter months. If in-house resources don't allow for sufficient snow removal, retain a reliable and vetted contractor. Snow removal should include roofs where heavy loading may lead to roof collapse or other structural damages.

MANAGING DURING A PROLONGED LOSS OF UTILITY SERVICES



When events or conditions dictate that services such as power, water, heat or other be discontinued for a longer duration, business operators should first confirm that their business continuity and disaster recovery plan has been actuated and is in progress. The BCP response tasks should be initiated ensuring that business operations can continue, even if in a limited fashion, by transitioning to other facilities or locations that can provide make-up capacity or services. Additionally, the following actions should be considered and implemented as appropriate:

- **Continue Frequent Regular Inspections and Building Tours:** Where possible and safe, have assigned personnel attend the location frequently throughout the event to ensure that all precautions put into place when the shutdown of power and other utilities occurred are still in place and that no damage has occurred. Usually the best person to conduct this visit is a facilities engineer intimately familiar with the systems and structure. A location-specific check list of all building areas and systems is a prudent way to ensure all key aspects are reviewed during the periodic visits.
- **Continue Monitoring Emergency Power Generation or Heat Equipment:** Where temporary power generation (e.g. generators) or temporary heating equipment has been placed into service prior to the imminent event, confirm that the equipment is being inspected frequently to monitor proper and safe operation, adequate clearances from combustibles are being maintained, temporary electrical cords are in good condition and safely distributed and that alternative fuel supplies are adequate for continuation of services.
- **Check Building System Monitoring:** Continue to review or monitor any surveillance and building system service reports to identify potential issues or changing conditions that could lead to a loss



event. This includes building temperature, intrusion detection signals, surveillance recordings, fire pump cycling, boiler temperature and fuel trip signals and others. The building should maintain a minimum temperature of 45° F at all times.

- **Inspect for Water Damage:** Continue to check and inspect all areas for obvious and hidden water damage and leaking into building spaces, including in roof attics and crawl spaces. Where the building will be completely idled with no need for domestic water services, consider closing water valves and draining pressured systems (not including fire sprinkler systems, which should always remain in service). This will help limit the severity of water damage originating from a failure of the domestic systems. If water damage is identified and where safe to do so, implement water damage prevention tasks using the WDPP cart and supplies or, for larger damage, actuate the WDPP restoration and response team or vendor.
- **Relocate Critical Finished Goods:** Where deemed necessary and as incorporated in the Business Continuity Plan, relocate finished goods to another location that is not affected by the power outage or severe weather event. This may be prudent to either continue moving finished goods and/or to prevent damage to them if a freeze and thaw situation develops that would release water or fluids into the storage space and damage the goods.
- **Relocate Critical Equipment and Machinery:** Where deemed necessary and as incorporated in the Business Continuity Plan, relocate critical equipment



and machinery to an alternative location that has been designated, configured and arranged to provide make-up capacity of production.

- **Actuate Crisis Communication Plan:** When disruptions in the operations are imminent,

identified communication procedures and tasks within the Business Continuity Plan should be enacted and assigned to authorized individuals. This includes notification of the situation and expected disruptions to all employees, vendors and especially customers so that expectations are clear as to delivery of orders, delays on orders, and other important information that these stakeholders should be made aware of.

RESTORING FOLLOWING AN EVENT

When a significant disruption from a weather and power event ends, the work is just beginning for many businesses that have been either idled or seriously disrupted during the event. Restoration and recovery of normal operations in addition to repairs of property damage incurred during the event, becomes the critical focus for business operators and can make the difference in regaining market share and normal revenues. A robust Business Continuity Plan developed in advance of these types of events, enables a business to position themselves to restore and recover as quickly as possible. A short list of actions and considerations highlight the most important focus to recover from a prolonged loss of utility and severe weather event:

- **Cleaning Up a Water Damaged Business:** When water damage or flooding has created damage to physical property, one of the first steps toward recovery involves cleaning and remediation which can be a difficult and disheartening task. It can also be dangerous. Here is information to help you get started – safely. The information presented here is provided in more detail in our After Flooding TIPS document and is presented mostly in checklist format providing the following considerations:
 - a) Take Immediate Steps to Ensure Personal Safety
 - b) Secure the Buildings and Utilities
 - c) Identify Damage and Begin Cleanup of Building Contents
 - d) Decontaminate Buildings and Contents
 - e) Ensure Worker Safety During Cleanup
- **Inspection of Electrical Systems Prior to Restoration:** Have a qualified electrician inspect and conduct proper testing of the electrical systems prior to beginning operations. This could include thermographic imaging, re-torque of typically higher-demanding electrical circuits, testing overload protection, checking transformer oil conditions, etc.

- **Restoration of Primary Power:** Power restoration at a premises that has suffered a significant and prolonged power disruption requires highly skilled personnel to ensure that all electrical switchgear and motor control centers. This start-up should be conducted with at least 2-3 person teams if possible for safe and preventative power restoration to the facility.
- **Re-Powering Circuits:** A plan should be created prior to powering the various circuits in the facility. The plan should be systematic versus engaging all at once so that issues may be identified independently. All equipment and machinery that operates from electrical power should be inspected for safe condition and readiness for power restoration. This includes confirming all switches, disconnects, etc. are in the fail safe position with each piece of equipment being fully inspected for prior to power being restored to that machinery. This should be done with at least 2-3 person teams if possible. Incident histories have shown that many failures can occur at start-ups.
- **Utility Service Restoration:** Where possible, conduct thorough physical inspections of the utilities. For items such as boilers or furnaces, the required inspections, cleaning and purging should be completed prior to putting them into service. If your maintenance staff does not have the expertise to complete the processes safely, engage a qualified vendor. Where multiple gas-fired equipment exists, they should be actuated individually with integrity checks before engaging subsequent equipment items.
- **Restoration of Normal Heating:** Inspection of all areas of the facility should be conducted prior to normal heating being restored to ensure that any potential thawing of frozen piping has already occurred. Inspect all areas and hidden spaces (ie,

attics, unoccupied areas) thoroughly and frequently as normal heat is being returned, confirming that mechanical personnel are increasing heat within the premises at a slow, deliberate rate. Make certain that adequate personnel are positioned in the premises to quickly isolate or shut down domestic or fire protection systems in the event a piping system should suffer a break or piping failure during heat-up.

- **HVAC Equipment Restoration:** HVAC systems should be inspected for proper functioning of monitoring and control features. Dampers, ductwork, fuel or power supply, ventilation openings and equipment, etc. should be investigated for good condition and proper operation. In addition to this, these systems should be fully sanitized and disinfected prior to operation. Inspect all refrigeration equipment for proper operation, monitoring control features, collection of waste/dirt/dust, and clean and ready for operation prior to start-up. Where there are multiple refrigerant systems installed, start each one up individually and ensure proper function before engaging subsequent systems. Similar to the above, these systems should be fully sanitized and disinfected prior to operation.
- **Visual and Physical Inspection of Fire Protection Systems:** These systems should be visually and physically inspected per NFPA 25, Inspection, Testing and Maintenance of Water-Based Fire protection Systems and other pertinent standards where applicable, to ensure proper operating conditions.
- **Restoring Impaired Fire Protection Systems:** For systems that were impaired for any reason (i.e., draining of systems to prevent freezing, etc.), they should be flushed to remove any potential obstructions, re-charged and put back in service. Follow the proper impairment handling procedures that were previously implemented and/or recommended.
- **Inspect and Test All Fire Detection Systems:** Inspect and test all fire detection systems to ensure control panels are functional, and annunciation checks are conducted for internal alarm notification devices and receipt of notification at central station monitoring.
- **Restoration of Production and Processing Equipment:** Conduct a thorough visual inspection to see that no damage (vandalism, pest damage, etc.)



has occurred. This includes ensuring components are in good condition, piping is clear, and valves are in good working condition. Processes utilizing flammable gases or liquids should be fully purged prior to being put in service. Integrity of joints and use-point devices should be checked and in good condition prior to engaging any systems. Some equipment may need to be re-commissioned and/or recertified prior to activation and use. Follow proper commissioning practices to ensure compliance.

- **Business Continuity Plan Review:** Review your business continuity plan and refer to restoration and recovery procedures to make sure all necessary administrative, production, service and other process restoration actions are implemented. Review and follow all developed business restoration checklists including reaching out to key vendors, suppliers and employees to make certain everyone is in line with the planned restart and that all processes can be supported. For important machinery, it may be prudent to do a thorough inventory of potential needed spare parts before machinery start-ups. Where dependencies on vendors or suppliers exist and are out of sync with the planned restart, identify alternatives for service, supplies, equipment, etc.

and put action plans in place to ensure business restart is as comprehensive as possible.

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