



Risk Control

Equipment and Systems Outage Preparation and Recovery

What to do before, during and after an extended outage

Shutting down equipment and systems for extended periods can, if not done properly, result in equipment failures upon startup. Here are some tips to help your business reduce the risk of equipment problems at every stage: before an outage, during the outage and as you restore operations afterward.

Before: Develop a plan to properly shut down the equipment and systems.

A variety of issues may arise when equipment is idle: water and air may stagnate, fuel and lubrication systems can settle, vermin infestations are possible, leaks may develop and stocks of critical items may fall. Plus, some equipment just stays healthier with use. Where do you begin? Consider the following questions:

How long will the outage last?

- What equipment can be shut down during this period? Who will shut it down? Are any special procedures required for idling key machinery and equipment? Can it be electrically disconnected to prevent undesirable effects of power issues? Can water sources be shut off and drained to minimize the chance of water leakage? Has water chemistry been adjusted as necessary for this outage?
- What equipment must remain in operation? Who will be responsible for monitoring and servicing it?
- Will key technology assets, documents and supplies necessary to maintain business operations be removed to a secure location? Have computer programs been properly backed up?

How will the equipment and systems be cared for during the shutdown?

- What steps can be taken to ensure equipment and systems are ready for re-habitation? How can your business emerge from the downtime even better than before? How often will the equipment be inspected? How will fire protection and detection systems be inspected, tested and maintained?
- How will utility disruptions, such as power loss, be monitored? Are notification and response procedures/call trees in place for temperature-sensitive equipment and contents?



During: Monitor, service and inspect the equipment and systems.

The downtime may be an opportunity to inspect equipment that normally operates 24 hours a day. Crucial maintenance items may be conducted on key machinery and equipment during the outage. Periodic inspections of the facility's equipment and systems should be conducted at least once a week.

What should an effective, all-inclusive site inspection include?

- Conduct complete tours of the facility to identify any unusual smells, leaks or noises. These should be investigated and the appropriate corrective actions taken. Check all operating equipment and systems, and verify the equipment is operating within its normal parameters.
- Schedule and perform maintenance that may be completed while the equipment is idle per the original equipment manufacturer (OEM) and industry standards such as National Fire Protection Association (NFPA), American Society for Heating Refrigeration and Air Conditioning Engineers (ASHRE) and American Society of Mechanical Engineers (ASME). This will prepare the equipment to operate in the safest, most reliable and efficient manner possible when you return to normal operation.
- Perform routine inspections of the idled equipment to verify the shutdown condition of the equipment remains as desired. Water testing fuel and checking lube oil systems should be part of the regular preventive maintenance, and also completed before and after any outage. Water can settle out of petroleum products over time. Check your fuel and lubrication filters.

After: Prepare the equipment and systems for a return to normal operation.

When the time comes to return to normal operation, take the following steps to ensure a smooth transition:

- Have qualified individuals inspect the key machinery and equipment to ensure they are working as intended and necessary maintenance is completed.
- If electrical systems or portions of the electrical distribution were disconnected, these should be restored gradually (with no/minimal load) to reduce the risk of transient voltage (surge) that can damage equipment and electrical components.
- If production equipment was idled, follow manufacturer instructions for commissioning and restoring it to normal operating conditions.
- Verify the building systems and equipment that require third-party inspections are up to date.
- Have a licensed contractor or qualified employees inspect and service the Heating, Ventilation and Air Conditioning (HVAC) systems. It will be necessary to complete preventive maintenance on HVAC systems before the facility is re-occupied. Air filters may need replacement. Be sure to use the correct Minimum Efficiency Reporting Value (MERV) filter for your intended purpose. Take the opportunity to confirm makeup/fresh air intake levels to achieve high-quality air. Make sure your water towers are properly disinfected (See ASHRE 188), stagnant water is drained and systems have proper water treatment.
- Have a licensed boiler contractor service the boilers. All your controls and safety devices should be UL listed or equivalent. Those devices have testing procedures that should be followed prior to restarting any system. Verify that proper burner adjustments have been made to ensure proper efficiency.

Use this checklist to create a customized plan for your business.

Preparation

- Prepare a list of the equipment that will need to be shut down during the outage.
- Review the Original Equipment Manufacturer (OEM) requirements for shutting down the systems/equipment.
- Determine the best idle state of the equipment, in order to maximize preservation.
- Determine which qualified individual will shut down the equipment and how long it will take.
- Be prepared to perform maintenance during the outage.
- Develop a list of who will monitor and service the equipment left in operation.
- Check the status of all backup systems to verify they are up to date and operational.
- Determine how to maintain building safety and security.
- Develop a list of how to recover the equipment following the shutdown period.

During the Shutdown

- Open any unused or unnecessary circuit breakers.
- Move the technology assets, documents and supplies necessary for business operations to a secure location.
- Keep a log of the operating systems that includes routine maintenance, inspections and the operator's signature.
- Create a log of equipment that is shut down, including the name of the qualified individual that completed the OEM shutdown.
- Perform the shutdown maintenance items that can be done during this outage.

Returning to Operation

- Close circuit breakers and energize equipment gradually to minimize the risk of transient voltage (surge).
- Turn on the most essential equipment and wait 15 minutes before reconnecting other equipment to give the electrical system time to stabilize.
- Bring systems/equipment back online as directed by the OEM instructions, using contractors for all systems/equipment for which the plant lacks qualified personnel.
- Verify that controls are operational on all equipment.
- Ensure all systems/equipment requiring third-party inspections and certificates (e.g., boilers, wastewater systems, air quality) are up to date.

To learn more about how to manage your risks and increase efficiencies, please visit cna.com/riskcontrol.