

RiskTopics

Management practices: Locations unoccupied long-term and restart procedures April 2020

There are many reasons for a facility to be unoccupied or idled on a long-term basis. Regardless of why, consider the measures offered in this document to prepare the facility for shutdown, monitor the facility during the shutdown, and manage restart as normal operations resume.

Introduction

Whether a location is a retail store or manufacturing plant, there may be times when the location will be closed and unoccupied on a long-term basis. For the purposes of this document, long-term means more than one month.

During a long-term shutdown, consider implementing the measures offered in this document to maintain care, custody, and control of the unoccupied location.

The measures offered in this document are for property protection purposes. Measures beyond property protection are outside the scope of this document.

Protecting idle assets

Expect unoccupied locations to gradually deteriorate unless deliberate steps are taken to care for the building as well as its utilities and contents.

Deterioration may be promoted by vandalism, rodents, weather, humidity, moisture, water leaks, and a lack of periodic system operation. Minimize the impact of these and other sources of deterioration by considering the guidance in this document.

These measures are intended to minimize the deterioration of idle assets and reduce the challenges of restoring normal operations once the idle period is over.

Discussion

Human presence and building monitoring

When a location is unoccupied on a long-term basis, the lack of normal human presence may delay the discovery of abnormal conditions such as vandalism, rodent damage, electrical faults, or even the loss of building heat during cold weather.

Early discovery of abnormal conditions may allow intervention before serious property damage develops.

Preparing for a shutdown

During an idle period, utility systems and production machinery may be shut down and isolated. This may reduce potential sources of physical damage such as water leaks, fuel leaks, or electrical faults.

While idle systems should benefit from reduced wear and tear, they may remain subject to other forms of deterioration, such as corrosion, which may be more detrimental than normal wear and tear.

Maintaining buildings and systems

Even an idle building may need to keep a range of utilities and other systems or features in service. These may include the system listed under “Routine inspection, testing, and maintenance” in the Guidance section of this document.

Active systems should continue to receive the same inspection, testing, and maintenance they receive as when the building is in normal use. Appendix A addresses systems that have been idled.

Maintaining routine management programs

While a building is idle, there will still be a need for routine management programs including housekeeping, hot work, fire protection impairments, fire teams, and emergency response plans.

Emergencies such as earthquakes, fire, floods, hurricanes, and wildfires may still occur while a building is idle. Recognize that reduced human presence will likely impact the effectiveness of existing emergency plans.

Resuming normal operations

It is anticipated there will be an intent for the building to resume normal use following an idle period. Consider the guidance offered in this document, including restart considerations, to minimize the challenges during the restart of operations.

Guidance

Important note

Consider the guidance offered in this document; however, it is understood that customers will determine if the guidance is safe or legal. We understand and support a customer’s responsibility to safeguard people and obey laws.

Human presence and building monitoring

Once a building is shut down, implement a formal program to monitor the building. This may be a combination of:

- Guard service
- Building visits
- Remote electronic monitoring
- Supplemental outside patrols

Guards service

Guard service consists of guards stationed onsite at all times to monitor and patrol the premises.

Consider an onsite, professional guard service for any unoccupied location, but especially those that are:

- Higher-value
- Strategically important to future business operations
- Exposed to a high-crime area

Where an onsite guard service is provided, consider using normal personnel selection processes or contractor selection processes to choose guards who will be qualified for the intended duties and responsibilities.

Provide management for the guards to confirm duties are performed and maintain supervision.

Have guards conduct hourly patrols following a compulsory route so all important areas (indoor and outdoor) are visited during each patrol. Arrange hourly patrols as follows:

- Documentation
 - Use securely mounted and tamper resistant stations spaced along to patrol route
 - Use a recording device to document visits to each station
- Records
 - Limit patrol record access to management
 - Review patrol records on a regular basis such as weekly

Provide guards with instructions such as:

- How to conduct patrols
- How to conduct and complete a periodic building inspection checklist
- How to report and document emergencies and deficiencies

Maintain contact with onsite guards

Maintain communications with the guards working onsite. Have guards communicate on a regular basis. This will verify the communication pathway is intact and ready for use at any time to report abnormal property protection conditions.

Daily visits

Where an unoccupied building is not attended by an onsite guard service, assign a person to visit the location daily.

In consultation with Zurich, consider extending the visit frequency to weekly where the location has remote electronic monitoring (see below) and is:

- Lower-value
- Not critical to future business operations
- Not exposed to a high-crime area

Increase the visit frequency in cold weather, especially when extreme cold weather is expected (such as an Arctic blast).

Also, conduct a visit immediately following any severe weather event.

Maintain contact with persons visiting unoccupied buildings

Maintain communications with the person conducting visits to unoccupied buildings. Have the visiting person communicate with management as they arrive and depart the site. This will verify the communication pathway is intact and ready for use at any time to report abnormal property protection conditions.

Remote electronic monitoring

Whether using a guard service or daily visits, use all available means to electronically monitor the unoccupied building from a constantly attended remote location staffed by qualified persons prepared to take appropriate action if abnormal conditions are detected. Consider the following systems:

- Fire detection and alarm systems
- Intrusion alarm systems
- Building management systems
- CCTV (closed-circuit television) systems

If a fire detection or alarm system is not provided for the building, it may be possible to install a wireless system (owned or leased) as an interim measure. However, such systems should be provided in accordance with standards such as BS EN 54 or NFPA 72.

If a CCTV system is not provided, consider a temporary WIFI-based system as an interim measure.

Supplemental outside patrols

Provide outside patrols to supplement onsite guard service or daily visits. Supplemental outside patrols may be provided by a contract guard service or possibly by local police. Have the outside patrol observe the entire location perimeter, all features in the yard, and all exterior building doors and windows. The objective is to visually identify, report, and act upon signs of trespassing, vandalism, arson, or building intrusion.

Unoccupied building documentation

Implement a formal documentation process to be completed by onsite guards or personnel periodically visiting to report on the condition of the unoccupied building. Consider using the Appendix B checklist.

Reporting frequency

Onsite guards should complete a report at least daily, and personnel visiting an unoccupied building should complete a report following each visit.

It is anticipated the intent is for the unoccupied building to resume normal operations at some point in the future. To reduce the challenges associated with resuming normal operations, consider the guidelines in this document.

Preparing for a shutdown

During a shutdown, some building services may be kept in service. However, many building services as well as production operations will likely be idled.

Procedure before a planned shutdown

See Appendix A for guidance to consider as a building is shutdown on a planned basis.

Procedure following a shutdown in response to a crisis

If a building was shut down due to a crisis, it is likely the shutdown action was expedited, possibly in response to orders from local authorities. In such cases, as conditions permit, take time to implement the planned shutdown guidance in Appendix A at the first opportunity.

Maintaining buildings and systems

Daily inspections

During a shutdown, implement a program of daily inspections to maintain care, custody, and control over the idle building.

Consider using the daily checklist offered in Appendix B.

The checklist provides an outline of selected conditions for an assigned person to check. The checklist includes check boxes to indicate where deficiencies have been noted, and a field to enter the date the deficiency was corrected. A comment field is also provided.

Consider modifying the checklist as needed to tailor it to specific needs of a location.

Where the daily visit frequency is extended to weekly, in consultation with Zurich, complete the checklist on a weekly frequency as well.

Routine inspection, testing, and maintenance

While a building is idle, there may be a range of systems continuing in normal service. These may include, but are not necessarily limited to:

- Boilers
- Burglar/intrusion detection systems

- Doors, windows, fences, and gates
- Drainage systems (roof, site, etc.)
- Electrical distribution systems including generators
- Fire doors
- Fixed fire protection and detection systems
- Life safety systems (required by local authorities such as emergency lighting and exit signs)
- Lifts and elevators
- Lighting (normal, emergency, indoor, and outdoor)
- Lightning protection
- Portable fire extinguishers
- Seismic gas shutoff valves
- Ventilation systems

Maintain inspection, testing, and maintenance practices for systems remaining in use during the idle period. Follow the guidance of equipment manufacturers, system designers, and legal authorities.

Fire protection and detection

For further information, see the white paper ***Inspection, testing, and maintenance (ITM) - Fixed fire protection and detection***.

Control of birds, rodents and other vermin

Maintain controls over birds, rodents and other vermin while a building is idle. The intent is to limit the adverse impact of vermin from a property conservation perspective. For example, avoiding damage to:

- Electrical insulations which could lead to electrical breakdown and fire
- Piping insulations which could lead to freezing
- Plastic piping which could lead to leaks

Maintaining routine management programs

Maintain all routine management programs include housekeeping, hot work, fire protection impairments, fire teams, and emergency response plans.

Housekeeping

Maintain housekeeping and waste disposal standards.

Hot work

Do not allow hot work to be performed without following all elements of a hot work permit system.

Hot work program

For further information, see the Risktopic *Management Practices: Hot work in permit required areas*.

Fire protection impairments

Avoid un-necessary impairments; however, for those impairments that do occur, follow all elements of a fire protection impairment program.

Impairment program

For further information, see the Risktopic *Management Practices: Fire Protection Impairments*.

Fire teams

A fire team is intended to support firefighters responding to an emergency at your facility. The fire team performs non-firefighting tasks in support of those who fight the fire.

For unoccupied periods (idle shifts or closed locations), consider contingency plans to support the responding public fire service. For example:

- Provide the public fire service with access to building keys as well as maps showing building layout, hazards, and locations to shutoff or isolate utilities.
- Prepare a means to have fire team members return to the location should a fire occur.

Fire team program

For further information, see the Risktopic *Manual firefighting: Fire team*.

Emergency response plans

Take time to review all emergency response plans relevant at the time the location is to be idle. This may include emergency response plans for:

- Arctic blasts
- Earthquake
- Fire
- Flood
- Intrusion/ Vandalism

- Snow storms
- Tropical cyclone, typhoon, or hurricane
- Wildfire

Reduced human presence onsite during shutdowns may impact the effectiveness of emergency plans developed when the building is in normal operation and normally staffed. Evaluate and update the emergency plans that are relevant during the idle period, so they are as likely as possible to be effective if needed.

Proactive installation of emergency plan measures

Consider implementing proactive elements of relevant emergency plans that will save time should an emergency develop. However, avoid implementing measures that may have adverse effects.

The following are two examples of possible proactive actions that could have adverse effects:

- Proactive installation of flood gates or hurricane shutter over exterior doors (local regulations may not permit proactive elements obstructing emergency exits)
- Proactive closing air intakes in a wildfire-prone region (this may eliminate ventilation needed to control temperature and humidity within the idle building)

Resuming normal operations

It is anticipated there will be an intent for an idle building to resume normal use at some point. When it is time to resume operations, review the guidance offered in Appendix C for restart considerations intended to minimize the challenges of resuming normal operations.

Conclusion

For locations that will be unoccupied for more than a month, consider the measures offered in this document to prepare the facility for shutdown, manage the facility during the shutdown, and manage restart as normal operations resume.

References

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Other

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- NFPA 54. National Fuel Gas Code. Quincy, MA; NFPA, 2018. Online.
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- OSHA Safety and Health Topic Page. Control of Hazardous Energy (Lockout/Tagout). Washington, DC, USA; Occupational Safety and Health Administration. Web. Web accessed 20200331.
<https://www.osha.gov/SLTC/controlhazardousenergy/index.html>

Appendix A – Preparing for a long-term shutdown

The following is an outline of steps to consider when preparing a location for a long-term shutdown.

If a shutdown is initiated in response to a crisis, it may not have been possible to consider these measures immediately. In such cases, consider implementing these measures at the first opportunity.

Communicate with local emergency services

Where the local emergency services dispatch center collects and stores location information, notify them of unoccupied buildings and emergency contact information. Help them keep this information up to date.

If conditions permit, contact local fire and police services to allow them to become more familiar with your unoccupied location and how to access the site and buildings.

Fire team program

For further information, see the Risktopic *Manual firefighting: Fire team*.

Make your building an undesirable target

Unoccupied buildings are a target for intruders who may intend to vandalize property, set fires, or steal valuables (possibly including copper wires, condenser coils, etc.).

To make an unoccupied building an undesirable target to intruders, consider the following measures:

- Where fencing is provided, keep it intact with gates closed and locked
- Provide visible signage conveying appropriate messages such as:
 - No trespassing
 - Buildings electronically monitored for intrusion
 - Premises patrolled by security
- Verify exterior doors and windows are equipped with secure locks
- Arrange for police or a private security company to patrol the premises on a regular basis
- Provide and maintain outdoor perimeter lighting on all sides of the building
- Provide and maintain visibility of all building exterior surfaces
- Eliminate features that may provide hiding places for intruders such as foliage, waste containers, trailers, and yard storage
- Keep yards free of storage and combustible materials.
- Remove and dispose of waste materials
- Remove access to roofs and windows or provide barriers

Key and card access systems

Where a key system is used for building access, consider reclaiming all keys to restrict access to the few people with assigned responsibilities during the shut-down. An alternative is to re-key exterior doors.

Where a card access system is used to control entry through exterior building doors, consider restricting card access to the few people assigned responsibilities to the unoccupied building management program.

Incoming mail and deliveries

Place mail service on hold or redirect mail deliveries to an occupied location unless there is a plan to collect mail daily.

Suspend all deliveries except those specifically expected.

The intent is to avoid the accumulation of combustible materials outside the building.

Utility systems

Most buildings depend upon a range of utility systems to support normal operations. In preparation for a long-term unoccupied period, have qualified persons take time to prepare each system for the idle period. Some systems may be kept in service, and some systems may be taken out of service. In each case, maintain all systems in accordance with manufacturer and system designer guidelines and legal requirements.

Maintain a record of all valves closed and disconnects opened during the idle period to facilitate the restarting process and avoid potential damage during restart. Where services are isolated, consider using lockout/tagout procedures to avoid unintended restoration of the services.

Lockout/tagout

For further information, see guidance such as:

- US OSHA. [OSHA Safety and Health Topic Page – Control of Hazardous Energy](#).

Boilers

Perform a "Wet Lay Up" of boilers that will not be operated during the unoccupied period. Specifically, shut the boiler down and fill it with treated water (boiler water) to eliminate air pockets.

Alternately, drain the boiler, open the boiler, and dry all internal surfaces. Leave the boiler open for ventilation until it is prepared for restart.

Building heat

Verify building heat is available during cold weather in any area with water-filled systems or contents subject to freezing. Consider water-filled systems for heating, cooling, domestic water, fire protection water, and process water.

An option is to drain water-filled systems; however, considerable effort may be required to effectively drain systems to avoid freeze damage.

If water-based fire protection systems are to be drained, follow impairment procedures.

Drainage and de-watering systems

Verify drainage systems remain unobstructed and de-water systems, including pumps, are in service and maintained.

Electric

Turn off power to lights, systems, and equipment that will not need power during the unoccupied period.

Unplug portable electric equipment not needed during the unoccupied period.

Maintain power to needed systems such as building heat, ventilation systems, and fire systems; however, shut off all other power using the disconnects as close to the source as possible.

Fixed fire protection

Verify all fixed fire protection systems are in service unless the hazards they protect are eliminated.

Where a fixed fire protection system has been taken out of service, provide inspection, testing, and maintenance as part of its recommissioning process. In addition, report the fire protection impairment using the Zurich program or other adopted program.

Impairment program

For further information, see the Risktopic *Management Practices: Fire Protection Impairments*.

During cold weather, verify adequate heat and freeze-protection (heat tracing and lagging) are maintained for water-filled systems that remain in service.

Freeze protection

For further information, see the Risktopic *Management practices: Cold weather freeze-ups*.

Fixed fire detection

Verify fixed fire detection systems are in service.

Fuels (gas and oil)

Verify fuel tanks for engine-driven fire pumps and engine-driven generators are full.

Turn off fuel to fuel-fired equipment that will not be in service during the unoccupied time.

Close fuel system valves to isolate sections of pipe supplying only idle equipment.

Close fuel system valves to entire buildings where all connected fuel-fired equipment is idle.

Shutdown fuel oil pumps where they support no active fuel-oil fired equipment.

Purging of fuel-gas piping

Where fuel piping is to be purged of fuel, follow appropriate purging procedures such as [NFPA 56, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems](#).

Generators

Verify generator systems are available to maintain power should normal power be interrupted. During cold weather, follow manufacturer's guidelines to maintain room and engine block temperature.

If power is not needed, follow manufacturer's guidelines to mothball the generator.

Lifts and elevators

Maintain lifts and elevators in service and operate them through their full travel at least weekly to minimize potential problems associated with inactivity.

Lightning protection

Verify lightning protection systems are maintained during the idle period.

Transportation and lifting equipment

Where forklifts, cranes, and similar equipment should be maintained in accordance with manufacturer's instruction and local regulations, actions may include removing fuel, batteries, and power (lockout/tagout).

Seismic gas shutoff valves

Verify seismic shutoff valves are in service and maintained for any gas systems that remain in service.

Ventilation

Verify airflow and humidity control is provided for electrical rooms, elevator machine rooms, and other areas with systems or contents in need of atmosphere control.

Water heaters

Where water heaters will not be in service, isolate and drain the unit.

Water systems

Shutoff and drain water-filled piping that does not need to remain in service. Specifically check and drain all low points.

Shutdown ice machines, remove ice, and drain water.

Production machinery

As production will not continue during the unoccupied period, prepare production machinery for the extended idle period.

Clean machinery

Remove process materials, residues, fugitive dusts, and oily accumulations to avoid damage, corrosion, or material that may support fire or explosion.

Protect exposed metal surfaces

Exposed metal surfaces may be subject to corrosion during the idle period. Follow manufacturer's guidance for measures to protect these surfaces. This may include applying a thin film of oil or grease in an effort to inhibit corrosion.

Control humidity

Some production machinery elements such as motors and control systems may be subject to damage by humidity during idle periods. Consider the need for ventilation or local heating to control humidity until production resumes.

Control dust, insects, and vermin

Consider the need to cover and seal openings in control systems and instrumentation to protect from dust, insects, and vermin.

Rotating elements

For machinery with rotating elements, provide monthly shaft rotation to maintain shaft seals and reduce the likelihood of bearing damage.

Lubricants and fluids

Consider adding corrosion inhibitors to lubrication and cooling fluids in accordance with manufacturer's specifications.

Hazardous materials

For the purposes of this guidance, hazardous materials include flammable liquids, combustible liquids, flammable gases, combustible dusts, combustible metals, pyrophoric materials, oxidizing materials, organic peroxides, water-reactive materials, and explosives. These materials are typically identified with placards following government regulations.

To the extent possible, remove hazardous materials from unoccupied locations. Where that is not possible, secure the materials in their designated storage location following local regulations, manufacturer's guidance, and Safety Data Sheet guidance.

Organic peroxides

Some organic peroxides may be refrigerated to minimize the likelihood of detonation or deflagration. Where organic peroxides are refrigerated for this purpose, provide back-up power to maintain refrigeration during any interruption of normal power.

Additional considerations

Chilled storage

Where possible, empty and shutdown coolers and freezers. Remove any residual ice and condensate.

Laundries

As part of the shutdown process, take time to clean lint collectors, perform housekeeping to remove any fugitive lint on building and equipment surfaces, and replace filters.

Swimming pools

Where swimming pools will not be shutdown, maintain secure storage for pool chemicals in accordance with local regulations, manufacturer's guidance, and Safety Data Sheet guidance.

Keep in mind some pool chemicals are classified as oxidizers (hazardous materials).

Appendix B – Daily checklist

Consider using the following checklist daily to detect, report, and track conditions related to property conservation for idle buildings. Modify the checklist as needed to meet individual building needs.

| Daily idle building checklist | | | |
|--|--|---------------------|----------|
| Location: | | Inspection by: | Date: |
| Item | Item okay? | Date item corrected | Comments |
| A. Outside ground-level checks | | | |
| 1. Exterior doors and windows: <ul style="list-style-type: none"> No visible damage or intrusion attempts Normally closed and locked or secured | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 2. Fence and gates: <ul style="list-style-type: none"> No visible damage Gates normally closed and locked | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 3. Outside lighting <ul style="list-style-type: none"> No visible damage Lights working | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 4. Outside CCTV cameras: <ul style="list-style-type: none"> No visible damage or signs of tampering | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 5. Housekeeping: <ul style="list-style-type: none"> No trash or debris accumulations | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 6. Waste bins: <ul style="list-style-type: none"> Empty or routinely empties Kept away from buildings and other structures | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 7. Vehicles: <ul style="list-style-type: none"> No unauthorized vehicle on premises | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 8. Drains and drainage: <ul style="list-style-type: none"> Not obstructed | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 9. Security signage: <ul style="list-style-type: none"> Provided as appropriate such as: <ul style="list-style-type: none"> No trespassing Building monitored for intrusion Premises patrolled by security | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| B. Outside rooftop utility checks (if accessible) | | | |
| 1. Drainage and drains: <ul style="list-style-type: none"> No ponding water No obstructed drains | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 2. Housekeeping: <ul style="list-style-type: none"> No debris | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 3. Rooftop equipment (where present): <ul style="list-style-type: none"> Secured in place No visible damage | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 4. Lightning protection (where present): <ul style="list-style-type: none"> Secured in place No visible damage or missing components | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

| Daily idle building checklist | | | |
|---|--|---------------------|----------|
| Location: | | Inspection by: | Date: |
| Item | Item okay? | Date item corrected | Comments |
| C. Inside checks (include items where present at the location) | | | |
| 1. Fire pumps • Control panel normal (automatic position) • Valves open (suction and discharge) | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 2. Automatic sprinklers and other fire extinguishing systems • Systems normal (valves open, no alarms, no leaks) | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 3. Fire detection and alarm systems • System normal (no alarm, supervisory or trouble signals) | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 4. Intruder alarms: • System normal (no alarm or trouble signals) • System activated in unoccupied areas | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 5. Building heat (during cold weather): • Adequate in all areas requiring heat | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 6. Building humidity: • Normal | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 7. Housekeeping: • No uncontrolled waste or debris | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 8. Water leaks • No visible leaks (water on floor, stained ceilings) | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 9. Floor drains: • Not obstructed | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 10. Technical (mechanical) rooms: • Temperature and humidity normal • No unusual noise or vibration • No visible damage or leaks | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 11. Lifts or elevators • Operating normal | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 12. Fuels (gas or oil) • No signs of leaks • No visible damage to piping or pipe support | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 13. Hazardous materials • Stored appropriately if not removed | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 14. Chilled storage (coolers & freezers): • No visible signs of abnormal operation | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| 15. Birds, rodents and vermin • No signs of animals | <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

Appendix C –Restarting idle facilities

When restarting idle facilities, consider the following actions before, during, and after start-up.

Additional guidance

For additional guidance, see the Risktopic Long term *Lay-up of Process and Industrial Plant*.

Provide a planned procedure for process and equipment restart. Follow manufacture’s guidelines using qualified staff or contractors.

Review the shutdown procedure to verify the isolation and disconnection actions taken for shutdown are reversed in an appropriate order.

Allow only qualified persons to turn on utilities or restart processes. Qualified persons may include electricians, plumbers (for fuels), or process equipment operators.

Before start-up

Before start-up, consider the following:

- All systems
 - Verify environmental conditions are suitable (such as temperature and humidity)
 - Verify contaminants are controlled (such as dust, dirt, and oily residues)
 - Correct abnormal conditions before proceeding to start-up
 - Complete any legally required actions on pressure vessels, water heaters, boilers, lifting equipment, elevators, escalators, and other equipment or systems prior to start-up
- Utility systems
 - Verify electric power supplies remain locked out/tagged out
 - Verify main switch gear, circuit breakers, and miscellaneous electrical apparatus are clean (air supply should not be used for cleaning), dry, and tight
 - For transformers, conduct a dissolved gas oil test to check for oil quality and water absorption
 - Verify equipment fuel valves are shut off

Returning after a wildfire evacuation

When returning to locations following a wildfire evacuation, clear accumulated soot away from air intakes before starting systems that may draw contaminants into equipment or buildings. Also, clear soot from drainage systems and any open tanks.

- Machinery
 - Follow manufacturer’s guidance for commissioning and pre-start instructions such as cleaning and lubrication
 - Conduct an oil sampling program for mechanical equipment to check oil quality

- If motors, controls, or machinery have been subject to flooding, verify they are completely dried and serviced PRIOR to start-up
- Fuel-fired equipment
 - For fuel-fired equipment, have a certified technician test all fuel train and burner components in preparation for start-up

During start-up

- All systems
 - Monitor for abnormal conditions such as circuit breaker trip, heating, sparking, vibration, noise, or odor
 - Where abnormal conditions occur
 - Interrupt the start-up process
 - Shut down the system
 - Correct the source of the abnormal condition before resume the start-up process
- Electrical
 - If idle longer than a 1-year period, a complete electrical inspection including infrared testing should be considered on primary electrical components
- Machinery
 - Follow manufacturer’s pre-start instructions such as cleaning and lubrication
 - All critical safety controls for air, steam, or water supply shall be tested by a certified technician
 - Where needed, follow the manufacturer’s emergency shut down procedures

After start-up

During the 24 hours following start-up, monitor the for signs of abnormal operation.

- Utility systems
 - Electric – As these systems are present in most building areas, tour the building to sense any abnormal conditions such as smoke or the odor of electrical breakdown
 - Fuel system – As these systems are present between the fuel source and the points of use, tour the building where the piping is routed to sense any abnormal condition such as the odor of natural gas or the leakage of fuel oil.
 - Where an abnormal condition is detected, have a qualified person isolate the condition by operating the nearest upstream disconnect or valve
- Machinery
 - Have qualified operator attend the machinery with more frequent checks
 - Monitor bearing for vibration and temperature
 - Use thermal imaging to monitor temperature of rotating equipment
 - Where abnormal operation is detected, have the qualified operator implement the emergency shutdown procedure for the machinery involved

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