WEATHER

Preparing for the Freeze

Source: Keenan & Associates

California is known as the land of golden sunshine, but come winter, many parts of California can be transformed into a winter wonderland, seeing significant snowfall and below freezing temperatures. While winter may be fun and games for reindeer, it can wreak havoc on building systems, requiring special preparations, especially prior to facility closures over the holiday period.

As a result of property losses seen over previous winter periods, Keenan & Associates has provided the following information as an additional resource for your Maintenance and Operations/Physical Plant staff as they prepare for this time of the year.

BEFORE COLD WEATHER HITS

EQUIPMENT

FOR BOILERS:

- Drain idle equipment completely.
- Elevate low points or provide drain valves on condensate return lines.
- Remove low points and dead ends where possible.
- Provide steam traps on piping or equip it with drain valves.
- Install low-water fuel cutoffs with a minimum of exposed piping and verify function.
- Consider heat-tracing lines for piping that carries water to the water glass, low-water fuel cutoff column and feedwater regulator.
- Provide alarms for important piping systems.

FOR WATER-COOLED EQUIPMENT (I.E., COMPRESSORS AND PUMPS):

- Provide adequate heat by placing the equipment in a heated enclosure or provide the proper antifreeze solution.
- Provide heat tracing and insulation on water-filled instrumentation and control lines.
- Use lubricants for low-temperature applications in equipment (e.g., pumps, blowers, and compressors), especially in outdoor or unheated indoor installations.
- For idle air conditioning systems, remove water from oil coolers and water jackets, and drain condensers of chilling units. Tag units "Refill with water before starting" to avoid equipment damage.
- Make sure fuel supplies will be adequate, particularly if supplied on an "interruptible" contract. If the back-up fuel is oil, verify that the tank is full and the delivery system to the heating unit is fully operational.

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- Check pressure vessel vents, relief valves, and safety valves to assure that moving parts are protected from water accumulation or freezing of vapor.
- Build and install windbreaks to protect outdoor equipment, piping, and instruments from wind chill.

BUILDINGS

Ensure the building shell is in good condition and secure. Close unnecessary openings.

Design building and equipment heating and insulation systems to maintain minimum 40° (4°) temperatures.

Check heating equipment to be certain it will be able to maintain building temperatures above 40°F (4°C) at the coldest points in the building (e.g., corners at the windward end of a building, at the eaves and in spaces with no direct heat).

Provide adequate and safe additional emergency heating equipment in areas prone to freezing and set it to activate automatically when temperatures fall below 40°F (4°C).

Identify any concealed spaces (i.e., the space above a suspended ceiling, crawl space below the floor, etc.) that may contain vulnerable piping. Consider providing temporary interior openings to allow heat to reach those areas and/or insulate/protect piping exposed to freezing temperatures.

FIRE PROTECTION EQUIPMENT

Place thermometers inside buildings at strategic locations, such as near sprinkler systems, to monitor building temperature.

Know the location of underground water mains. Ensure adequate depth of cover is maintained, especially where construction, excavation or erosion has occurred.

Insulate or otherwise protect exposed outdoor system supply water as it enters the building.

Check hydrants for tightness and repair any leaks. Also, check buried valves and repair any leakage.

Check both wet-pipe and dry-pipe sprinkler systems regularly to make sure they are ice-free.

Keep all fire protection-related equipment (e.g., hydrants, hose houses, pumper connections, and sprinkler control valves) free of snow and ice for easy access.

Maintain a temperature above 40°F (4°C) in rooms with dry-pipe sprinkler system valves and fire pumps, and a 70°F (21°C) minimum temperature in rooms with diesel engine-driven fire pumps.

For gravity and suction tanks, maintain water temperature above 40°F (4°C).

Drain automatic sprinkler systems as a last resort.

FOR DRY-PIPE SPRINKLER SYSTEMS:

- Maintain dry-pipe valve room temperature above 40°F (4°C) by insulating the enclosure and installing a safe space heater.
- Check piping pitch for drainage of condensate to low-point drains and install more drains if necessary.
- Drain low points frequently and install more drains if necessary.
- Make sure the system is thoroughly drained after annual trip test.
- Take the air supply for the compressor from within the space protected by the sprinkler system. If moisture build-up is a problem, provide an air dryer, or use compressed nitrogen.
- Repair air leaks in the piping system to keep the dry valve from tripping if compressor power is lost.

FOR FIRE PUMPS:

- Maintain pump room temperature above 40°F (4°C).
- For diesel engine drives, maintain a room temperature of at least 70°F (21°C).
- If pump suction is from an open reservoir, make sure the intake and pipe are below the frost level underground and deep enough in water to prevent ice obstructions.
- For gravity and suction tanks:
    - Flush circulating heaters and piping.
    - Make sure heaters' circulation pumps are operating.
    - Overhaul any steam traps and strainers.

DURING COLD WEATHER

GENERAL

DURING A COLD SNAP:

- The "weather watcher" should check the weather daily and keep the Emergency Response Team informed of cold weather conditions.
- Monitor and record temperatures in hard-to-heat areas that contain vulnerable equipment. Repeat every few hours during particularly cold weather.
- heck temperatures in critical areas at night and on weekends, as well as during the day.
- Check heat-tracing systems to make sure they are working properly.
- Drain water-cooled equipment that has not been otherwise protected.
- Drain condensed moisture from compressed air lines frequently.

LOSS OF HEAT:

If a facility should completely lose heat:

- Drain the equipment listed below
    - Process Piping
    - Condensate Piping
    - Boilers

- Hydraulically Operated Devices
- Air Conditioning Systems
- Water-Cooled Jackets
- Mill-Use Lines
- Heat Exchangers
- Process Equipment
- Compressors

- Institute emergency procedures for processes that are dependent on a steam or water supply.
- Drain piping systems that contain liquids other than water and are vulnerable to freeze-ups (e.g., solidification of a heat process material).
- Check pressure vessel vents and relief and safety valves for frost or ice.
- Take special care when thawing frozen piping and equipment. Avoid open flames.

ROOFING:

- Monitor the amount of snow on the roof and clear it before accumulations reach unsafe levels. Make sure proper fall protection is utilized.
- Keep roof drains open and free of ice.