**OPERATIONS DIVISION**
**STANDARD OPERATING PROCEDURE**

**OD/SOP 08.12 Freeze Protection Protocol**

**DATE: October 27, 2014**

## PURPOSE

This Operations Division Operating Policy and Procedure (OD/OP) establishes procedures to be followed in protecting equipment and facilities from damage during times of freezing weather.

## REVIEW

This Operations Division Operating Policy and Procedure will be reviewed in October of each year by the Energy Manager, HVAC Superintendent, ELOM Foreman, Systems Maintenance Foreman, and Emergency Maintenance Supervisor. The Energy Manager will subsequently present it to the Energy Committee. It will then be approved by the Assistant Vice President for Operations.

## POLICY AND PROCEDURE

1. **Definitions**

    a. AHU: Air Handling Unit

    b. Chilled Water Pump (CWP): Device used to pump chilled water through the cooling coil of the AHU.

    c. Chilled Water valve: Device used to regulate the flow of chilled water through the cooling coil of the AHU.

    d. Environmental Control Systems: Computers used to monitor and make adjustments to Air Handlers, Chilled Water systems, Hot Water systems, etc., in campus facilities.

    e. Exceptions: Buildings or AHUs which require special procedures not covered in this Operating Policy. They will be listed on Appendix A, *Exceptions*.

    f. FAB: Face and Bypass Damper. A damper which bypasses inlet air flow around the pre-heat coil.

    g. Heating Valve and Pre-Heat Valve: Device used to regulate the amount of steam or hot water to the heating coil of the AHU.

    h. Hot Water Pump (HWP): Device used to pump hot water to the heating coil of the AHU.

i. MAT: Mixed Air Temperature

j. OAD: Outside Air Dampers

k. OAT: Outside Air Temperature

l. Operator: The Emergency Maintenance Operator on duty.

m. Software Override (SWO): A command on the Front End Computer to change the state of a device in the field. The command must be manually released.

**2. Procedures According to System Mode/Status**

a. When an AHU is running properly:

No action will be taken on any AHU that is online and running properly.

b. If an AHU transmits a MAT Low Temperature Alarm whether or not the AHU is running:

1. Ensure the Heating Valve is 100% open. If not, issue a SWO to open it to 100%.

2. If so equipped, override the Pre-Heat Valves open and the FABs open.

3. Check the HWP indications and ensure it is running. If it is not, the Operator will issue a SWO to turn it on.

4. Issue a SWO to override the Chilled Water Pump on and open the Chilled Water Valve to 50%.

5. Ensure the OAD is closed. If the OAD is not closed, issue a SWO to close the Dampers.

6. The Heating Valves, Pre-Heat valves, HWPs, OADs and FABs will stay overridden until either:
   - The AHU starts according to schedule, or
   - If the alarm persists longer than 60 minutes, the Heating Valves, Pre-Heat valves, HWPs, OADs and FABs will stay overridden until next scheduled event. File a work order to repair the AHU.

c. When an AHU trips off due to:

- Freeze Stat
- AHU Low Temperature Limit, or
- Mixed Air Low Temperature Limit

1. Ensure the Heating Valve is 100% open. If not, issue a SWO to open it to 100%.

2. If so equipped, override the Pre-Heat Valves open and the FABs open.

3. Check the HWP indications and ensure it is running. If it is not, the Operator will issue a SWO to turn it on.

4. Issue a SWO to override the Chilled Water Pump on and open the Chilled Water Valve to 50%.

5. Ensure the OAD is closed. If the OAD is not closed, issue a SWO to close the Dampers.

6. The Heating Valves, Pre-Heat valves, HWPs, OADs and FABs will stay overridden. In order to clear the alarm and reset the AHU, contact and inform the on-call BMC Superintendent of the problem.

d. When the AHU is scheduled off for weekends or holidays, and the OAT drops below 30°:

The Operator will start the campus AHUs and run them for two hours during each 12 hour period during which the OAT drops to or remains below 30°. Upon the initial occasion when the temperature drops below 30°, the AHU should be started immediately. During subsequent 12 hour shifts, it can be restarted at the Operator's discretion.

e. Any time the OAT drops below 20°:

1. The Operator will start all campus AHUs and let them run until the OAT rises above 24°.

2. The Operator will contact and notify the on-call Emergency Maintenance Supervisor that this action has been taken.

3. After the OAT rises above 24°, the Operator will return to the normal schedule, or if the AHU is scheduled off for weekends or holidays, to running for two hours during each 12 hour period as described in section 2.d. above.

**3. Documentation and Reporting**

By email, immediately notify the AVP for Operations of each freeze protection action.

**4. Exceptions**

Some specific buildings or AHUs will require unique procedures which are Exceptions to the above. These units must be listed on Appendix A, *Exceptions*, and must be reviewed annually at the same time as this Operating Policy.

**RESPONSIBILITIES**

| POSITION | SECTION | MONTH |
|---|---|---|
| Energy Manager | Energy Committee | October |

Reviewed: _____
Energy Manager

Reviewed: _____
HVAC Superintendent

Reviewed: _____
ELOM Foreman

Reviewed: _____
Systems Maintenance Foreman

Reviewed: _____
Emergency Maintenance Supervisor

Approved: _____
Assistant Vice President for Operations

**APPENDIX A, *Exceptions***

The Air Handlers below require special procedures which cannot be addressed in the Freeze Protection Protocol due to extensive and unique details:

Animal Science AHUs 2, 3, and 5

Do not SWO the OA dampers closed on these units unless the units trip off due to Low Limit Alarm; then ensure the OAD is closed and the HWV and CWV are open per the Freeze Protection Protocol, and call out a technician. Units are 100% OA and will be starved if the dampers become shut.

Animal Science AHUs 1 and 4

Close these dampers per Freeze Protection Protocol.

Art 3D AHUs 1, 2, 3

Close these dampers per Freeze Protection Protocol.

Art 3D AHUs 4 and 5

Do not SWO the OA dampers closed on these units unless the units trip off due to Low Limit Alarm; then ensure the OAD is closed and the HWV and CWV are open per Freeze Protection Protocol, and call out a technician. Units are 100% OA and will be starved if the dampers become shut.

Biology AHUs 1-11 and 16

Do not SWO the OA dampers closed on these units unless the units trip off due to Low Limit Alarm; then ensure the OAD is closed and the CWV is open per Freeze Protection Protocol, and call out a technician.

Do not SWO the steam valves at this location any time because it may damage the controls and create false fire alarms.

Biology AHUs 12-15

Close these dampers per Freeze Protection Protocol.

Do not SWO the steam valves at this location any time because it may damage the controls and create false fire alarms.

Chemistry Building All AHUs

AHUs in the Chemistry building utilize Steam Valves which should not be opened to 100%, as are the Heating Valves above, because this action could overheat and damage components such as temperature sensors and smoke detectors.

For Steam Valves in the Chemistry building, no action should be taken except at the direction of the technician who has been dispatched to troubleshoot the problem. Otherwise, concerning chilled water pumps and valves, the Protocol should be followed.

College of Business Administration

Do not SWO the OA dampers closed on these units unless the units trip off due to Low Limit Alarm; then ensure the OAD is closed and the HWV and CWV are open per Freeze Protection Protocol, and call out a technician. Controls will take care of themselves.

College of Engineering AHU 1

Do not SWO the OA dampers closed on this unit unless the unit trips off due to Low Limit Alarm. If the OA dampers do not automatically close, then override them closed and call out a technician. This AHU supplies fume hoods and can create a hazardous atmosphere in the room if the dampers become closed.

If the HWV and/or CWV do not automatically open, then override them open as per the Freeze Protection Protocol, and call out a technician.

College of Engineering AHUs 2, 3, and 4

Close these dampers per Freeze Protection Protocol.

Experimental Science

Do not SWO the OA dampers closed on these units. Leave the units alone unless they trip off on Low Limit Alarm; then ensure the OA dampers are closed, and the HWV and CWV are open, as per the Freeze protection Protocol. Call out a technician. These AHUs supply fume hoods and can create a hazardous atmosphere in the rooms if the dampers become closed.

IEHH 555 (Reese) All AHUs

Do not SWO the OA dampers closed on these units. Leave the units alone unless they trip off on Low Limit Alarm; then ensure the OA dampers are closed, and the HWV and CWV are open, as per the Freeze protection Protocol. Call out a technician. These AHUs supply fume hoods and can create a hazardous atmosphere in the rooms if the dampers become closed.

Jones Stadium (West) AHU 2

When the OA temperature drops to 40°, issue a SWO of 100% open to the heating valve. Per Jamie (32) and Terry Neal 12/21/12.

Engineering Materials (OLD Mass Communications)

This building is currently mothballed with an asbestos abatement going on. DO NOT start up any air handlers.

Outreach and Extended Studies

This building is currently mothballed. Take no actions.

United Spirit Arena

Do not SWO the steam valves open at this location anytime because it may damage the controls and create false fire alarms.

Do not SWO the dust switch or dampers at this location anytime.

If you receive the MAT in low alarm for any unit, turn the unit on and run the unit until the OAT is above 32°, per email from Eric Newell 12/20/12. Send an email to Eric Newel, Jamie Doggett, Steve Allsup, Lon Mirll and David Bass with all log information.

West Hall AHUs 1 and 3

Close these dampers per freeze protection protocol.

West Hall AHU 2

Do not SWO the OA dampers closed on these units unless the units trip off due to Low Limit Alarm; then ensure the OAD is closed and the HWV and CWV are open per Freeze Protection Protocol, and call out a technician. Units are 100% OA and will be starved if the dampers are shut.