

# FERRIS STATE UNIVERSITY

## PHYSICAL PLANT POLICY

**Effective:** 12/12

## **CHP Steam and Distribution System Start Up**

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### **Policy Objective**

To promote the safe and efficient start up of the Central Heating Plant (CHP) and steam/condensate distribution system.

### **Policy Statement**

Physical Plant departments rely heavily on employees to assist in the proper start up of the CHP and steam distribution system in the most safe, appropriate, and cost-effective manner.

### **Application**

This policy applies to all Physical Plant departments.

### **Policy Requirements**

It is the responsibility of all departments to promote the safe start up of the CHP and/or the steam and condensate distribution systems. The steps outlined in the procedure are provided to guide the appropriate response to events which disrupt the flow of steam from the CHP to the campus steam and condensate distribution piping system.

Potential causes for an event that disrupts the steam system pressure may include but are not limited to: a loss of power, loss of water, loss of natural gas supply, loss of boiler unit control or failure of the distribution piping system. In these cases, the steam boilers may shut down automatically by means of safety devices and controls that are in place to protect the boilers from damage; or in the event that the boiler operator(s) have been alerted to a problem and have elected to initiate a manual shutdown of equipment. In any of the aforementioned circumstances, the boiler operator, whether on duty or on call, will most likely be the first to identify if a problem exists and the action that should be taken to preserve the life, health and safety of the campus community and integrity of campus property. Upon determination that a system disruption condition exists, the Boiler Operator shall take appropriate actions.

The following guidelines are intended to be the designated manner for handling of the CHP steam and distribution system start up based upon the conditions noted under the procedure.

Upon initiation of an event resulting in steam pressure below 40 psig at the boiler, the Boiler Operator shall notify Dispatch at the University's Department of Public Safety (DPS) of the steam distribution system pressure loss. The Boiler Operator shall request Dispatch to notify the Plant Engineer, Plumbing Supervisor, HVACR Supervisor and/or their designee.

Upon notification of an event affecting the steam system pressure loss, the Plumbing Supervisor will attempt to initiate communication with the Boiler Plant Operator to determine steam distribution system status. In the event that direct communication with the Boiler Operator cannot be established, the Plumbing Supervisor shall contact the on call Plumber to act as a first responder to establish contact with the boiler plant operator. The Plumbing Supervisor, as he determines necessary, will contact and dispatch FSU Plumbers to the Boiler Plant.

Upon notification of an event affecting steam system pressure loss, the HVACR Supervisor will attempt to communicate with the FSU Plumbing Supervisor to determine status of the steam system and actions to be taken towards return of the system to normal operating conditions. In the event direct communication cannot be established, the HVACR Supervisor will attempt to contact the Boiler Operator for the same. Following receipt of status information, the HVACR Supervisor will determine whether HVACR department personnel are necessary to assist with the response.

When steam system conditions warrant (i.e., system pressure less than 30 psig), the Plumbing Supervisor or designee shall call in two plumbers (minimum) to assist with monitoring of the system until it has been returned to normal operation. A minimum of two Plumbing Department staff are required for safety and to maintain requirements that personnel will enter the tunnel system as a team and remain in regular communication to address unforeseen issues that may be discovered. Prior to the Boiler Operator increasing steam system pressure, plumbers are expected to walk the distribution tunnels and evaluate the piping and system components. Upon completion of the steam and condensate distribution system review, Plumbing staff will notify the Boiler Operator to commence slowly increasing system pressure to normal operating conditions.

If it is determined that portions of the steam distribution piping are to be off line for a period of time that extends beyond the Boiler Operators shift in which the pressure loss occurred, the affected portion of the system shall be isolated and locked out per established procedures for Lockout/ Tag Out.

## Procedure

The following depicts certain procedures to follow based upon the conditions present:

### **A. System Pressure Loss above 30 PSIG:**

1. If system pressure remains above 30 psig, it is anticipated that the Boiler Operator will work independently to slowly increase steam pressure to normal operating conditions.

### **B. System Pressure Loss below 30 PSIG:**

1. System pressure of approximately 30 psig is required to deliver condensate fluids back to the boiler plant. If the loss of steam results in line pressure below 30 psig, the Boiler Operator will initiate contact with the FSU Department of Public Safety (DPS) and request DPS to contact the Plumbing and HVACR supervisors and the Plant Engineer.
2. The Plumbing Supervisor will contact and coordinate the activity of Plumbing personnel.
3. The Boiler Operator will take steps to monitor boilers to maintain system pressure (if knowledge of conditions allows) until Plumbers arrive and evaluate and validate system conditions within the tunnel.
4. Plumbing personnel will provide notification to the Boiler Operator when to commence increasing steam pressure to allow for a controlled return of the system to normal operating conditions.

### **C. Procedure from a Cold Start:**

1. Under normal operating circumstances, it is anticipated that a “Cold Start” will likely occur once during a calendar year following steam system maintenance in May. The following represents steps to be taken when a “cold start” is initiated.
2. Plumbing Department will open all condensate drip valves to allow liquid to drain from the main steam distribution header.
3. Plumbers will walk the tunnel to observe that all check valves are in working condition.
4. Plumbers will advise the boiler operator when the distribution piping system is prepared for introduction of steam into the system.
5. As steam is introduced to the system, Plumbing Department personnel will monitor expansion joints for proper movement. No shaving of metal surfaces or noise should be present.
6. Plumbing Department personnel will monitor condensate drip points for moisture until dry steam is observed. Once dry steam is observed, the drip point valve shall be closed.
7. Normal system operation is quiet. Plumbing Department personnel will monitor the distribution piping system for unusual noises such as pounding, swishing or water movement.
8. Once steam is delivered to Allied Health (VFS), and dry steam is confirmed at all outlying condensate drip locations, steam pressure at Power Plant is typically at 7 – 10 psig (230F-240F). Plumbing Department personnel will continue to monitor the distribution piping until system pressure has attained approximately 30 psig and /or is sufficient to overcome head pressure in the condensate return piping.
9. Boiler Operators will control induction of steam into the distribution piping; working in close/ direct communication with the Plumbing Department Supervisor and Plumbing Personnel stationed in the tunnel system.

### **D. Partial Distribution System Isolation:**

1. If maintenance or repair work or the isolation of a portion of the steam distribution piping system is required, the Lock Out/Tag Out of the valves necessary to accomplish the repair work or isolation will be initiated. Valves to be isolated within the Central Heat Plant with direct connection to the steam system distribution piping shall be locked and tagged by representatives of both the Boiler Operators and Plumbing Department staff. Boiler Operators will be responsible to close and lock out the valve(s) initially and coordinate with the Plumbing Department Supervisor to have the Plumbing Department staff also lock and tag the affected valve(s).
2. Upon completion of the repair or return of an isolated portion of the distribution system to service, the Plumbing Supervisor will coordinate with the Boiler Operator to remove the Lock Out/Tag Out devices. The Boiler Operator locks shall not be removed until the Plumbing Department Supervisor has confirmed that repair work has been completed and Plumbing Department Lock Out devices have been removed.

### **General Comments:**

All employees are to wear appropriate personal protective equipment (refer to Physical Plant Safety Manual). During normal business hours, assigned personnel will communicate with Physical Plant Work Control Center throughout the process. If tunnel activity occurs after normal business hours, personnel who access the tunnel system will communicate with the Dispatcher at Public Safety to log their time in and out of the tunnel system. It is expected that in the event of insufficient Plumbing department staff availability, those tradespersons who have been appropriately trained in steam system

operations and distribution system monitoring (i.e., FSU HVACR personnel), may be utilized in conjunction with the available Plumbing staff to assist in returning the steam system to normal operating conditions.

## **Monitoring**

In monitoring a department's administration of this policy, the Associate Vice President for Physical Plant will rely on evidence of the extent to which employees and supervisors are effectively managing the start up of the CHP steam and distribution system in a safe, effective manner. Adherence to these guidelines will be expected by everyone involved.

## **Inquiries**

Inquiries about this policy should be referred to the responsible departmental supervisor and/or Director of Physical Plant in each respective department who, in turn, may direct questions regarding policy interpretation to the Associate Vice President for Physical Plant.

## **Reference Documents: Physical Plant Safety Manual**