

PART II - PRIMARY SYSTEMS INFORMATION

I. HVAC System

1. Operation

b. Start-Up and Shutdown Procedures:

(1) Static Start-Up Preparations: To start the systems from a static state (no water in the system), several procedures must occur before the equipment is energized. Those procedures are as listed below:

(a) Cooling System: The chilled water cooling system must first be filled with water. All valves in the chilled water lines to the equipment to be started should be in the position indicated in the valve schedule in Page 2-1-1j. The chilled water system shall be tested by a water treatment supplier, and the recommended chemicals should be put into the chemical treatment one shot feeder. To fill the chilled water system, the make up water valve in Room 1E15 shall be opened. When the system is full of water, the chilled water zone pumps should be manually started by placing the “hand-off-auto” switch in the “hand” position. The air vents at each piece of chilled water equipment (including chillers), each chilled water coil and at all high points in the chilled water piping system should be opened individually until all air is bled from the system. The chemical feeder valves should be opened and water circulated for a period of at least 10 minutes to insure that all chemicals have been distributed into the system. At this time, close the chemical feeder valves and drain the chemical feeder tank. When all air has been bled from the system, the chilled water zone pump will be de-energized.

(b) Heating System (water side): The heating system must first be filled with water. All valves in the hot water lines to the equipment to be started should be in the position indicated in the valve schedule in Page 2-1-1j. The hot water system shall be tested by a water treatment supplier, and the recommended chemicals should be put into the chemical treatment one shot feeder. To fill the hot water heating system, the make up water valve in Room 2D05 shall be opened. When the system is full of water, two hot water pumps should be manually started by placing the “hand-off-auto” switch in the “hand” position. The air vents at each piece of hot water equipment (including boiler), each hot water heating coil, and at all high points in the hot water piping system should be opened individually until all air is bled from the system. The chemical feeder valves should be opened and water circulated for a period of at least 10 minutes to insure that all chemicals have been distributed into the system. At this time, close the chemical feeder valves and drain the chemical feeder tank. When all air has been bled from the system, refer to paragraph (c) below for initiating the steam side equipment startup.

(2) Equipment Start-Up for Systems Controlled Through the DDC System: The normal start sequence of the following HVAC systems, after the systems have been charged with water, shall be initiated through the DDC system when the components “hand-off-auto” switch is in the “auto” position. See Volume 3_Chapter 2 for DDC system operation procedures. |

In the “hand” position the equipment shall operate independent of the DDC system. In the “off” position the equipment shall be “off” independent of the DDC system. When equipment is started manually with the selector switch in the “hand” position, the following sequences shall occur:

(a) Air Handling Units (AHU’s 1 & 2): The minimum outside air dampers shall open to their full open positions, the relief air dampers shall open to their minimum open position and the return air dampers shall open to their full open position. After a time delay, the air handling unit supply fans and their interlocked return and exhaust fans shall start.

(b) Hot Water System (HWP’s 1 & 2): When in the auto position, both hot water pumps shall start. When flow from the pumps is proven through flow switch at the boiler (B-1) will start to maintain the hot water temperature set point. The hot water set point is determined in accordance with the hot water temperature reset schedule and the outside air temperature.

(c) Chilled Water System (ACC-1, CWP-1 & 2): An outdoor thermostat will place the chilled water cooling system in operation when the outside temperature rises to 12°C (54°F). The chilled water pumps CWP-1 & CWP-2 shall start when the “Hand-Off-Auto” switch is in the “Auto” position, when flow is proven through a flow switch at the chiller, the water chilling unit (ACC-1) will start.

(d) ACU-5 & ACCU-5 shall be started through the DDC system. When the DDC system has activated the system, the unit controls will operate cooling, heating and dehumidification to satisfy the room load.

(3) Shutdown for Systems Controlled Through the DDC System: The normal shutdown procedure of the following HVAC systems shall be initiated through the DDC control system when the “hand-off-auto” switch is in the “auto” position.

(a) Air Handling Units (AHU 1 & AHU-2): The reverse of the start-up procedures listed above for AHU 1 & AHU-2 shall be used for the shutdown procedure.

(b) Hot Water System (HWP’s 1 & 2): The reverse of the start-up procedures listed above for HWP’s 1 and 2 shall be used for the shutdown procedure.

(c) Chilled Water System (ACC-1, HWP-1 & HWP-2): The reverse of the start-up procedures listed above for ACC-1, HWP-1 & HWP-2 shall be used for the shutdown procedure.

(d) ACU-5 & ACCU-5: The reverse of the start-up procedures listed above for ACU-5 & ACCU-5 shall be used for the shutdown procedure.

(4) Start-Up Procedures for Systems Not Connected Through the DDC

System:

(a) Fans (SF-1, EF-3 through EF-7): The fans shall be started by space mounted, adjustable thermostats. When the space temperature is above the thermostat set point temperature, the fan shall energize. When the space temperature is below the thermostat set point temperature, the fans shall be de-energized.