**SEQUENCE OF OPERATION**

**HOT WATER HEATING SYSTEM WITH SINGLE HX AND CONSTANT VOLUME PUMPS**

**NOTE:** ALL SETPOINTS AND TIME INTERVALS SHOWN IN THE DIAGRAM ARE VIRTUAL POINTS.

1. **HOT WATER HEATING SYSTEM:**
   - Pumps P41 and P42 shall have start/stop capability from the DCC system.
   - Both pumps shall be activated by the DCC to operate based on outdoor air temperature.
   - The pump that serves as standby.

2. **DCC SHALL ALTERNATE PUMP OPERATION:**
   - On a monthly basis, the even-numbered pump shall run on odd months.
   - The odd-numbered pump shall run on even months.

3. **DCC SHALL MONITOR OPERATING STATUS:**
   - Each pump shall be monitored through current switches to confirm the pumps are in the desired state.

4. **UPON PUMP PROOF:**
   - DCC shall modulate the HX 10 and 20 control valves in sequence to maintain terminal heating supply (THS) setpoint.
   - When the outdoor air temperature is 80 degrees F, the setpoint is 180 degrees F.
   - When the outdoor air temperature is 85 degrees F, the setpoint is 120 degrees F.

5. **WHEN PUMP P41 AND/OR P42 ARE OFF:**
   - The HX STEAM VALVES SHALL REMAIN CLOSED.

**ALARMING:**

**NORMAL:**
- SUPPLY WATER TEMPERATURE (10-5 DEGREES FROM SETPOINT) MAY BE ENHANCED-ACTIVATION (EACH)

**ENHANCED 24h:**
- PUMP FAILURE
- HIGH TEMPERATURE LIMIT

**Safeties:**
- Upon a controls failure, the pumps will fail on the standby.
- The control valves will fail closed and hardwired high temperature sensors (HTS) will be used to close the steam valves.
- When 200 deg F and above, there shall be a control point for remote alarming and messaging.
- Local pilot light (PHOTOELECTRIC) panel for alarm shall also be used.
- SHH alarms and messages shall be used to indicate pump and system failure.
- DCC TO MONITOR SUPPLY WATER TEMP.
- Sensor and alarm above 200 deg F and at 48 deg F lower than current setpoint.
- After a sustained 30 minutes alarm condition, a heating system failure to be sent to control.
- (MUY TO DEFINE MESSAGE STATEMENT)