**Facility:**

**Commissioning Provider: Date:**

DIRECTIONS: Address each item listed or note why it was not tested/investigated. Add other items that were tested/investigated. Note what testing/investigation was done, how these were conducted and results of the testing/investigation. Indicate any operating parameters found. Put in EEI# for improvements to resolve items that are not optimal or explain why no improvements are recommended. Complete full EEI description and information in PSE NC Post Occ EEI Details form. Include other capital improvements that may be cost effective. Expand to fit information or note specific location of information. (Handwritten legible notes are acceptable.)

**SYSTEM TYPE: DHW Plant (ID # or plant name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)**

**EQUIPMENT & SEQUENCES INVESTIGATED** *(be specific)***:**

**Equip ID#s:** *Example: DHW-1, P-1, etc.*

**Area Serves/occupancy type:** *Example: north tower, out-patient services*

**Describe System:** *Example: 1 gas DHW heater (condensing)*

**Sequences:** *Example: On/Off Schedule, Temperature control, pump control*

**FINDINGS, TESTS and INVESTIGATION RESULTS:**

**Working Optimally?**

**Yes No N/A EEI# \_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**GENERAL SYSTEM CONDITION**: Equipment is generally in good shape and does not exhibit any abnormal nose or vibration. System is not in need of over-all replacement in the near future. Safety guards are in place. Working on and around equipment can be done safely.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SENSOR CALIBRATION & PT-to-PT**: Key controlling sensors are calibrated and in appropriate locations. Points are mapped correctly to the DDC front-end and DHW panel. Other sensor outputs seem reasonable. Key sensors include: HWS/HWR (hot water supply/return) temperatures, flow meters, and heat exchanger inlet and outlet temperatures.

Sensors checked: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**PT-to-PT** **OTHER**: Other critical points (DHW boiler, pump etc.) are mapped correctly to the DDC front-end and reflect actual system condition. Points checked:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SCHEDULING**: Operating schedule matches occupancy schedule including holiday scheduling. DHW heaters and pumps and all parts of plant are off in unoccupied mode. Night walkthrough and early morning reveals nothing on unless needed.

Schedule: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WATER FLOW**: Flow is as low are possible. Wash basin faucets are low flow (have aerators). Showers have low-flow showerheads. Kitchen faucets have low-flow spray heads.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WATER LEAKS:** Faucets/showers are not leaking. PRVs are not leaking.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**INSULATION**: DHW heater, storage, pipes and valves are insulated. Insulation is around valves but with removable covers so it can be replaced easily after accessing valves.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**DHW TEMPERATURES**: Hot water temperatures are controlled and optimized to minimize energy use. Setpoints are appropriate and as low as possible (120 ° F for most, 140° F for kitchens).

DHW temperature setpoint(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BOILER STAGING**: Boilers stage to use the most energy efficient boilers or run the boilers in most efficient mode and match actual load. Standard boilers stage to run at full load as much as possible. Condensing boilers stage to have as many boilers on at as low a load as possible (typically all boilers staged on and all ramp up together). Configuration minimizes excessive cycling. Turn-down is as low as possible.

Boiler Staging Scheme:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WATER CIRCULATION**: Pumps are only one during occupied hours and only when needed. Pump on and off is controlled by time clock, return temperature or a combination of the two. Cycling is not excessive.

Return Temperature control setpoint: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**LOCATION:** Heat pump water heater is located in unheated space.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**STEAM TRAPS**: Steam Traps are not leaking/plugged.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**HEAT EXCHANGERS**: Heat exchangers are clean with expected temperature difference (delta T) across them. Regular checks of tubes are in place. Appropriate Delta T: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**OVERRIDES**: Controls, setpoints and equipment that can be easily overridden or circumvented are in normal/automatic operating mode. Examples – pump enable, DHW enable.

Tests Conducted /Results/Findings:

**Yes No N/A EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**LOOP TUNING**: Loops are adequately tuned to prevent equipment breakdown and poor control.

Tests Conducted /Results/Findings:

**Yes No EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***OTHER****: Describe other things tested/investigated.*

Tests Conducted /Results/Findings:

**Yes No EEI#\_\_\_\_\_\_\_ Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***OTHER****: Describe other things tested/investigated.*

Tests Conducted /Results/Findings:

**CAPITAL EE IMPROVEMENTS**

**EEI# \_\_\_\_\_\_** *Brief Description of Capital Improvement* (E.G. Installation of a hot water booster heater.)

Notes/Comments:

**EEI# \_\_\_\_\_\_** *Brief Description of Capital Improvement*

Notes/Comments:

**TRAINING**

**Yes No Date(s)/time(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Staff (occupants and O&M) fully understands how the system works.**

**Staff (occupants and O&M) fully understands how to run the systems efficiently.**

Specific Staff evaluated:

Comments:

**Specific Training needs of staff (occupants and O&M):**

**Ideas for Facility Guide/Operational Aides/Persistence:** What needs to be added (for example: sensors or specific trends, explanation on DDC graphic, or signage), provided (for example: minimum flow rate) or done (for example: putting check in maintenance schedule) to help the operators keep the systems operating efficiently over time?