

Executive Summary

Mechanical systems have become more integrated and complex as more energy efficient buildings have been built. In order to translate design into construction, commissioning is used. Commissioning assures that the quality and performance specified in design carry over into operation through documentation and assessment. This report will examine the existing mechanical system from its design through to its completion and operation. This report will also provide a critique of the system by cost, energy, and environmental issues.

Cannon Design, an architectural engineering firm provided mechanical designs for the HSS River Building. Through a set of goals, the mechanical engineers at Cannon wanted to provide occupant controllability, energy efficiency, space savings, and reduction in the spread of contaminants in their mechanical design. The HSS River Building contains a heat pump system providing air conditioning for the air handling unit and occupants on each floor. The building has an air distribution system that intakes 100% outdoor air and mixes with return air in each serving zone to provide ventilation. All air in toilets, locker rooms, and gym facilities are exhausted.

Through the analysis of the existing system, the mechanical design drawings, mechanical specifications, Technical Assignment 1 – ASHRAE Standard 62.1-2007 Ventilation Report, and Technical Assignment 2 – Building and Plant Energy Analysis Report were used as references for this report. Mechanical equipments were analyzed and put into schedules, and schematic drawings were developed for the heat pump system to show cooling and heating flow cycles. Equipments that were examined were:

- 14,000 CFM 100% outdoor air unit
- (3) 75 GPM water-to-water heat pumps
- (157) terminal water-to-air heat pumps
- 3,000 MBTU tube and shell heat exchanger
- (2) In-line pressure reducing valves (5,500LBS + 3,000LBS)
- 6,000 MBTU closed loop cooling tower
- (2) sets of centrifugal pumps (1,100 GPM + 225 GPM)

In conclusion, the HSS River Building's mechanical system is found to provide a moderate air distribution system and an effective heat pump system for the building. It was discovered that the system has room for improvement in energy reductions and air distribution techniques.