

INTRODUCTION

Latimer Sommers and Associates PA Engineers (LSA) was asked to assess the probable construction costs of the mechanical and electrical systems for the Docking State Office Building (DSOB) in Topeka, Kansas. The following shall serve as a summary of that assessment.

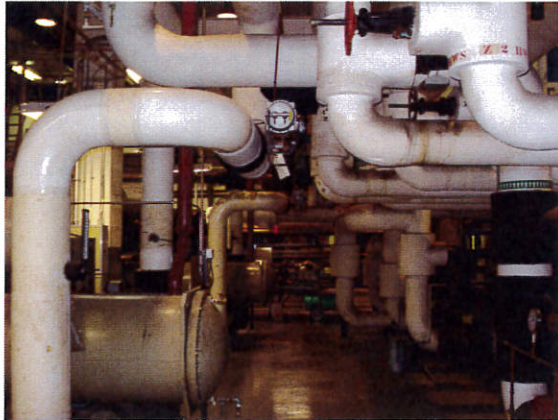
SUMMARY of EXISTING CONDITIONS

The original DSOB was built in 1954. The building was partially renovated in 1979. The original HVAC system, however, is generally unchanged from the original construction. The system has been maintained well by facility's maintenance personnel; however, it is outdated, inefficient and has outlived its expected useful life.

The DSOB currently houses the steam plant and chilled water plant which provide heating and cooling to the core of the Kansas State Capitol Complex. The buildings served by this plant include the DSOB, the Kansas Statehouse, the Landon State Office Building, the Memorial Building, the Curtis State Office Building and the Kansas Judicial Center.

Core Capitol Complex Heating Plant

The existing steam plant consists of four high pressure steam boilers and all required ancillary equipment that are installed in the subbasement of the building. The flue for this boiler plant is contained in a post original construction vertical chase, that was constructed as a part of the main steam plant construction project, at the inside corner on the east side of the building just to the south of the main east entry. This plant was designed in 1984 and installed during late 1984 and early 1985. In the original construction, (3) 300 BHp boilers were installed. A fourth boiler, 400 BHp, was installed when the Curtis State Office Building was constructed in 2000. The plant continues to provide service to the core Capitol complex buildings but, at 30+ years of age, the original boilers have outlived their normally expected useful life. The newest boiler, which has provided 16 years of service, is nearing the normally expected useful life of 25 years.



Core Capitol Complex Cooling Plant

The existing cooling system chiller plant consists of a total of five chillers, three installed in 1987 and two installed as a part of a chiller plant upgrade project that was completed in 2011. The purpose of the 2011 project was to replace the existing chillers that serviced the Kansas Statehouse and to incorporate all chillers located in the DSOB into a combined plant that could service the majority of the buildings in the core Capitol Complex.

The three chillers that were maintained as a part of the 2011 project are each Trane Model CVHE 450 with a nominal cooling capacity of 450 tons. These chillers originally utilized refrigerant R-11; however, they were retrofitted in 1996 to use refrigerant R-123. Refrigerant R-123 has a very low Ozone Depletion Potential and Global Warming Potential and an atmospheric life of less than 5 years. These characteristics make refrigerant R-123 much less damaging to the earth's atmosphere should a leak occur.



Two new heat recovery chillers were installed and incorporated into the central chilling plant as a part of the 2011 project. These chillers are Trane model CVHE 0360. These chillers have a rated capacity of 400 tons of cooling and also utilize refrigerant R-123. These chillers are fitted with a heat recovery condenser to provide heating to the DSOB during winter conditions when the chillers are running. This feature was provided because the original DSOB heating and cooling system was designed such that mechanical cooling is required during normal heating seasons.



The total capacity of the core Capitol complex chilled water system is approximately 2100 tons.

A new cooling tower was constructed in 2008. This tower is located on the west side of the DSOB and was originally sized to accommodate the existing three DSOB chillers as well as the two additional KSH chillers. This cooling tower was utilized to provide cooling of the condenser water for the central core Capitol complex chilled water plant.

District Piping Systems



A project to construct new utility tunnels and district steam, steam condensate return and chilled water supply and return piping was completed during 2009 and 2010. District piping systems connecting the buildings of the core Capitol complex were upgraded as a part of this project.

The district steam piping systems serve all of the buildings within the core Capitol complex.

The district chilled water piping systems serve all of the buildings within the core Capitol complex with the exception of the Kansas Judicial Center. In addition, chillers exist in each the Landon State Office Building and the Memorial Building. These remote chillers have capacity to handle the cooling needs of each of the respective buildings.

Two Trane model CVHE500 chillers with a nominal capacity of 500 tons and an actual capacity of 400 tons were installed in the Landon State Office building during a project that was completed in 2010. These chillers were incorporated into the new district chilled water piping system. Controls were put into place to allow these chillers to contribute to the chilled water cooling system for the core Capitol complex or to serve the total core complex when ambient conditions make it advantageous to do so.

RECOMMENDATIONS

Central Heating Plant

This plant continues to operate effectively; however, it is at the end of its useful life and, in our opinion, should be replaced as a part of a major renovation of the Docking State Office Building.

Capacity of this plant should match that designed for the energy center project which included three 400 HP high pressure steam boilers.

These new boilers should have the ability for a high turndown rate to allow the system to operate without excessive cycling during times of the year when loads are light,

Central Chiller / Cooling Plant

The central chiller plant was renovated in 2011 and thus should continue to provide adequate cooling to the buildings of the core Capitol complex. It is our opinion that the older chillers, that were not replaced as a part of the 2011 project, should be replaced however, total capacity should be revised.

Estimated Cooling Loads (tons of cooling)

Kansas Statehouse (KSH)	700 tons
Landon State Office building (LSOB)	680 tons (not included in the plant due to this building having its own chillers)
Memorial Building (MB)	185 tons (not included in the plant due to this building having its own chillers)
Curtis State Office Building	Not connected to the chilled water system
Kansas Judicial Center (KJC)	Not connected to the chilled water system
Docking State Office Building (DSOB)	480 tons (reduced from original due to reduction in overall building area)
Total Required Cooling Capacity	1,180 tons

It is our opinion that two nominal 400 ton chillers should be installed to replace the three existing chillers. This will meet the needs of the buildings required to be served from this plant plus provide some redundancy should one of the chillers fail. It will also provide adequate cooling

capacity to serve the buildings that are connected to the plant, which have stand alone chilling capacity (LSOB and MB), during the majority of ambient conditions.

The existing cooling towers are in place and operational; however, the equipment is currently approximately 10 years old and will begin to require extensive maintenance. It is our recommendation, as a part of a holistic building upgrade that the pumps, tower fans, tower fill and controls be renovated.

Docking State Office Building Renovation Mechanical and Electrical Systems

Heating, Ventilating and Air Conditioning

Our recommendation for the heating, ventilating and air conditioning of the Docking State Office Building is a variable air volume system with terminal hot water reheat.

Local cooling only air handling units shall be provided. These units should be provided with the ability to introduce up to 100% outside air to satisfy cooling loads during cold ambient conditions. This cooling condition is referred to as "economizer cooling". This configuration will eliminate the need to run the mechanical cooling plant during winter conditions.

Variable air volume (VAV) terminal units with reheat coils shall be provided that will vary the amount of cool air from the central air handling unit that is delivered to a respective control zone to satisfy space cooling requirements. The air delivered by the VAV terminal will be heated by the associated reheat coil and delivered to the zone to satisfy space temperature during times when heating is required.

Chilled water, from the central plant, will be delivered to coils in the air handling units to cool the air delivered by the respective unit during times that cold ambient conditions do not allow for "economizer cooling".

The steam plant will provide steam to hot water converters that will be used to heat the water that is circulated to the reheat coils that are located in the VAV terminals.

The heat recovery system that is incorporated into two of the existing chillers will provide heating for reheat applications when the steam system is off line during warmer ambient conditions.

Plumbing

Toilet facilities within the building are original. New toilet facilities that utilize water conserving plumbing fixtures and are designed to meet the requirements of the American's with Disabilities legislation (ADA) should be provided.

Piping systems should be replaced. Domestic water systems should be insulated and should utilize lead free materials.

Electrical Distribution and Convenience Electrical System

The service entrance and main electrical switchgear in the building was recently replaced as a part of an electrical upgrade project. A new engine driven generator is currently being installed and connected to the building's electrical distribution system to provide stand-by electrical support for the building's critical loads during interruption of the normal utility power system.

The remainder of the existing electrical distribution system and convenience electrical system is original to the building. This equipment has outlived its expected useful life. It is our opinion that the electrical distribution system be replaced as a part of the renovation project; however, distribution equipment recently replaced should be incorporated into the new system design.

New uninterruptable power systems should be designed for the data needs of the renovated building.

Lighting

The existing lighting system is outdated and inefficient in comparison to the current systems that utilize LED lighting systems. A new lighting system with day-lighting and dimming capability is recommended.

Data

The renovation should include infrastructure to provide for the data and telecommunications needs of the building occupants.

Security

A building wide security system should be provided.

Fire Protection

Fire Alarm

A new fully addressable fire alarm with mass notification feature should be provided for the renovated building

Sprinkler System

A new wet sprinkler system should be provided.

Estimates of Probable Cost

Preliminary and conceptual estimates of probable cost for the work defined here in were calculated and included in a spreadsheet that was prepared by HTK Architects.