

1.0 EXECUTIVE SUMMARY

The Milton Hershey School New Supply Center is a very wide and long single story 110,000 square foot building. Analyzing the existing mechanical systems proves that the design is very practical and energy conscience for this application. However, there are specific features to the HVAC system that have the potential for improvements.

The goal of the mechanical system redesign is to increase energy efficiency, decrease life cycle cost, and to integrate multiple building systems with the mechanical system. The air side and water side mechanical systems are altered in the redesign. The HVAC systems are integrated with the buildings walk-in freezer's condenser water loop for energy recovery reasons. The redesign also finds potential to save more energy by using the freezer's rejected heat to pre-heat the domestic hot water.

The building's cooling, heating, and domestic hot water load analysis indicates that the supply center is an excellent candidate for simultaneous heating and cooling through the use of a direct fired absorption chiller-heater. The chiller-heater also helps integrate multiple building systems, but drives up the initial cost. The mechanical redesign sees operating cost savings as well as energy consumption savings, which helps to pay itself back in less than 2 years.

The air side portion of the redesign sees the replacement of 10 VAV air handling units with 2 DOAS units. This saves in first cost and operating cost, and also paves the way for structural and construction work. Relocating the remaining 6 AHU's from the now half vacant mezzanine floor to the roof requires an upgrade of the structural system. However, initial cost savings are found since the supply center does not have to construct the 11,000 square foot concrete mezzanine floor.

The replacement of many electric driven pieces of mechanical equipment with direct fired units also has an impact on the electrical system. The power requirements change on each distribution panel, which means the respective feeders need resized. Cost savings are found from eliminating certain wires and decreasing the sizes of others.

The overall redesign and building systems integration process for the Milton Hershey School New Supply Center sees first cost savings, energy and operating cost savings, and has the lowest 20 year life cycle cost compared to the existing system. Therefore, even though the redesign's mechanical work is more expensive than the existing, the project as a whole is less expensive and beneficial for the Milton Hershey School.