



LIBRARY OF CONGRESS

**NATIONAL AUDIO VISUAL CONSERVATION CENTER**

**MALORY J. FAUST**  
MECHANICAL OPTION  
SENIOR THESIS 2006-2007

## **EXECUTIVE SUMMARY**

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The National Audio Visual Conservation Center is a restoration and storage facility used by the Library of Congress to house all types of media it receives. Due to the nature of the materials within the building, a very sensitive system has been designed. This 400,000 square foot facility is designed to ensure the protection of the all media to pass through and reside in within its walls. This includes very intense cooling and dehumidification systems, 100 % outdoor air systems, many levels of redundancy, and a vast range of controls and monitoring devices. To accomplish all of these tasks, the NAVCC is zoned into three buildings. The Conservation building is the fraction of the building open to the public. It houses one large theater and multiple smaller facilities for film enjoyment as well as listening rooms for audio enjoyment. All public areas are supplied by a typical VAV system. Also in the Conservation building are the labs and offices used to restore the media so it can be viewed or listened to. Many of these lab spaces must be 100% outdoor air due to the nature of the materials utilized in the spaces. The remaining buildings, the Nitrate Vaults and Collections building are storage facilities, both of which are entirely below grade to minimize envelope load. The Nitrate Vaults store all nitrate emitting media and require a room temperature of 39 F. To facilitate this, each vault is equipped with a chilled water coil on the supply airstream. They are attached to individual sensors and are immediately activated should a latent load be sensed. The Collections vaults house both the high and low temperature vaults. The high temperature vaults are maintained at 50 F and the low temperature vaults must be at 25 F. To accomplish this, these vaults are also equipped with airside cooling coils.

If further analysis on the NAVCC were permitted, there were two primary areas of interest to evaluate. First, the overall energy consumption of the building would have been evaluated to determine whether direct expansion coils may have been an option to replace the coils in each vault. Secondly, many of the systems in the building are already equipped with enthalpy wheels and much of the Conservation building is compromised of lab space. This facility could be converted to a dedicated outdoor air system paralleled with either chilled beams or a radiant ceiling system.