Executive Summary

The Hearst Tower is an 856,000 square foot office tower designed to consolidate over 2,000 Hearst Corporation employees. The new tower will be constructed along Eighth Avenue between 56th and 57th Street in New York City, which is the site of the original Hearst headquarters built in 1928. The new tower will rise from the center of the original landmark façade and is scheduled for completion by Summer 2006.

Since the Hearst Corporation is a media mogul, the new office tower is designed to accommodate a variety of functions under one roof. The 42 stories of the tower will include office space, an auditorium, a full service television studio, executive dining areas, and Good Housekeeping test kitchens. Because of the size of the building and complexity of the current mechanical system, only eleven floors of the tower portion will be considered for the proposed design.

The current mechanical system includes a central chilled water plant serving a central low temperature variable air volume (VAV) system. The chiller plant currently contains (2)-1200 ton and (1)-400 ton electric chillers. The office tower is served by (4)-110,000 CFM air handling units that are capable of supplying 100% outdoor air. Heating is provided to the building via a steam to hot water heat exchanger, which subsequently distributes hot water to fan powered VAV boxes located throughout each floor.

In accordance with ASHRAE Std. 62-2004, each office floor requires 2326 CFM of outdoor air. The typical cooling load for one floor is 29 tons, while the heating load is 82.7 MBH.

This report examines the use of steam driven absorption cooling with a dedicated outdoor air system (DOAS) paralleled by radiant floors for heating and cooling, in hopes of reducing annual energy costs and improving indoor air quality. It was ultimately determined that the DOAS/radiant system helped reduce the size of major equipment such as chillers and air handling units. The use of steam driven cooling as opposed to electric chillers also helped to save on annual energy costs because of incentives provided by the NYC steam utility, Consolidated Edison. This system is an attractive idea in an area such as NYC where the electricity grid is already overextended. Considering the increased capital cost of the new system and the annual energy savings, a simple payback period of 4.5 years was determined.

Aside from the cost savings, the DOAS system also helps to secure the LEED point for Indoor Air Quality. Since the Hearst Tower is striving for LEED gold, obtaining this point is very important. Overall, the annual energy savings, short payback period, and sustainability of the system make the proposed system a feasible alternative to the original design.