

## CASE STUDY :



# DUKE UNIVERSITY

|                                   |                                    |
|-----------------------------------|------------------------------------|
| Location:                         | Durham, N.C. (Orange County)       |
| Industry:                         | Private University (SIC Code 8221) |
| Pollution Prevention Application: | Water Conservation                 |
| Waste Reduction:                  | 9 million gallons of water saved   |
| Annual Savings:                   | \$24,700                           |
| Contact:                          | Bob Friedman, (919) 660-4257       |

## BACKGROUND

Duke University is a private university with almost 12,000 graduate and undergraduate students. Including the Duke University Health System, the institution employs more than 26,700. Located primarily in Durham, N.C., (with satellite locations in Beaufort and other places around the state) the university owns more than 9,700 acres.

The Paul M. Gross Chemistry Building, constructed on Duke's campus in 1996, is a 139,000 square foot facility housing faculty offices, classrooms and lab space for both undergraduate and graduate chemistry research. The Levine Science Resources Center is a 296,000 square foot facility build in 1995, and houses both students and researchers from both science and medical disciplines.

In 1998 the Duke University Facilities Department inspected the Gross Chemical Building for water leaks and discovered a vast amount of water collecting and draining from the site. Careful examination revealed that the excess water was not coming from a leak, but rather was condensation that was accumulating on the chilled water coils of the facility's air-handling unit. This discovery initiated the water conservation project at Duke discussed in this report.

## WATER CONSERVATION MEASURES

In the Gross Chemistry Building, where the condensate was discovered, and in the Levine Science Resource Center, the facilities maintenance personnel installed systems to collect

and pump condensed water from the building cooling systems to existing cooling towers. Investments were only two sump pumps (one for each building, purchased from the Grainger Equipment Company) and piping. Condensate water replaced evaporated water in the cooling tower system that was previously replaced directly with city water.

Facility management calculated that the Gross Chemistry Building project saved more than two million gallons of water in its first year of operation. More recently, the Gross Chemistry Building has been connected to Duke's central chilled water plant, and the cooling tower is no longer required. Facilities maintenance personnel rerouted the condensate collected to the steam condensate return line, reducing the amount of water the steam plant required from the city for its boiler makeup.

The Levine Science Resource Center (LSRC) project saves 7 million gallons of water each year. This project required the purchase of a new pump and more extensive piping, but the system is still in place and working efficiently.

It is important to note that condensate reclaim systems work most efficiently in buildings that require large volumes of outdoor air to meet ventilation requirements. In this case, projected costs were well justified by actual savings. The combined cost for both projects was approximately \$51,000. Together the projects saved 9 million gallons of water a year, at a value of \$24,700.

