# Air Handler Condensate Recovery at the Environmental Protection Agency's Science and Ecosystem Support Division

Best Management Practice Case Study #14: Alternate Water Sources

Severe drought in the southeastern United States caused the U.S. Environmental Protection Agency (EPA) to address the need for water conservation and develop a water management plan for their Science and Ecosystem Support Division (SESD). The water management plan aimed to reduce SESD's potable water usage (more than 2.4 million gallons in fiscal year 2008) through an air handler condensate recovery project.

The EPA SESD encompasses 12 acres in Athens, Georgia. A single laboratory building was constructed in 1996 consisting of 66,200 square feet configured for a mix use of laboratory and office activities.

In May 2008, SESD completed an air handler condensate recovery system. The system routes condensate from rooftop air handler units to the facility's cooling tower, reducing potable water usage and improving cooling tower water chemistry.

## Project Summary

The EPA Science and Ecosystem Support Division's heating and cooling air handler units are located on the roof of the facility. During cooling, air passes through the chilled cooling coils in the three air handler units prior to entering the facility. Summer in Athens is hot and humid, causing condensate to form rapidly as air passes over the cooled coils. This condensate then drips into a collection pan below the unit.

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FEMP acknowledges the following EPA employees for supporting this program and case study: Betty Kinney, Dexter Johnson, Bucky Green, and Karen Murray; and Holly Cannon of Eastern Research Group.

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Initial piping and the condensate collector next to one air handler unit

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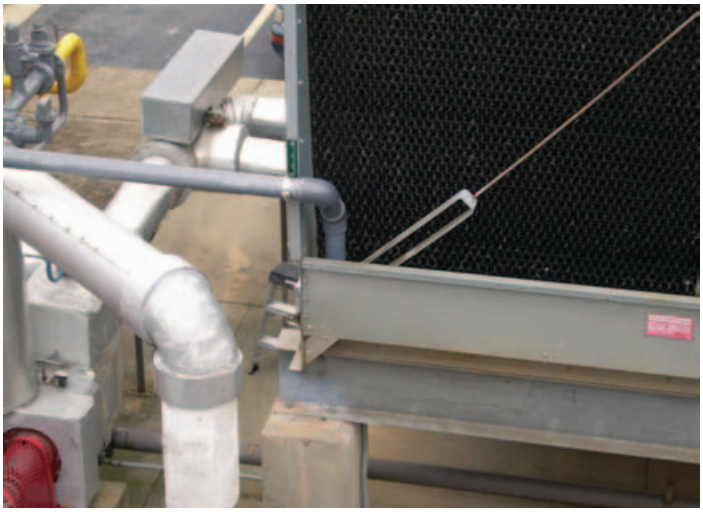
The collection manifold from each of the three units as the condensate is joined together



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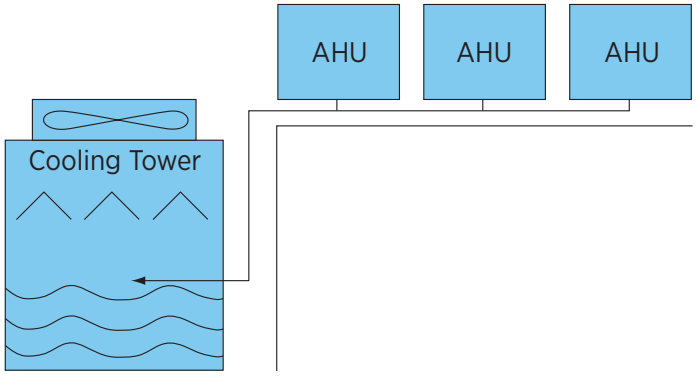
The cooling tower discharge point

At the same time, the cooling tower at SESD requires a generous amount of make-up water to replace water lost to evaporation. In its original design, the system allowed condensate to collect on the roof and drain with the other rooftop storm water, effectively wasting the nearly distilled-quality condensate.

EPA decided to let waste meet need. Pumping equipment and piping was installed from the air handler units to the nearby cooling tower. The piping directs water from the bottom of each air handler unit into a collection basin located next to each unit. When the collection basin fills to a specified level, pumping equipment moves recovered condensate from each unit over a brick dividing wall to join recovered condensate from the other two units. The recovered water then flows directly into the cooling tower located adjacent to the building, reducing the amount of potable water needed for cooling tower processes.




Schematic of the air handler condensate recovery system

Since the project came online in May 2008, water condensate recovery rates during hot and humid conditions averaged approximately 120,000 gallons per month.

SESD recovered approximately 540,000 gallons of water from May through December 2008, representing 16 percent of the facility's total water use due to the air handler condensate recovery system.

## Cost and Savings Summary

EPA spent $24,500 on the air handler condensate recovery project. This cost included installation of a flow meter to measure total gallons recovered and directed to the cooling tower. From May through December 2008, the project saved EPA more than 540,000 gallons of water resulting in a 16 percent total reduction in SESD's overall water use. This water savings is valued at $3,500 at a rate of $6.52 per thousand gallons of water. The system also improved cooling tower water chemistry and is expected to reduce overall chemical treatment costs due to the nearly-pure recovered water. EPA estimates a simple payback of less than six years based on savings recorded in the first year of operation.

Additionally, SESD significantly reduced water consumption from fiscal years 2007 to 2008. In 2007, the water consumption baseline measured 3.4 million gallons. In 2008, that number measured 2.4 million gallons, marking a 25 percent reduction in water consumption.

Due to the success of the air handler condensate recovery project, EPA intends to implement the project at all facilities that fall under the same climate conditions. An additional EPA facility in Athens, Georgia, and facilities in Edison, New Jersey; Kansas City, Kansas; Houston, Texas; and Fort Meade, Maryland have already implemented similar projects. These combined projects save approximately 3.3 million gallons of water each year.

Furthermore, EPA has identified similar opportunities at seven additional EPA facilities, where they expect to save 10 million gallons of water annually. In fiscal year 2008, EPA reporting laboratories used approximately 157 million gallons of water. By implementing condensate recovery projects, EPA could reduce potable water consumption by nine percent.

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Prepared by Pacific Northwest National Laboratory (PNNL) and produced by the National Renewable Energy Laboratory (NREL), both national laboratories of the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy. NREL is operated by the Alliance for Sustainable Energy, LLC.

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DOE/GO-102010-2930 • February 2010