

Waste Water Reduction Activities at the Oak Ridge National Laboratory

In 2003, the Oak Ridge National Laboratory (ORNL) implemented two waste water reducing initiatives associated with solvent distillation operations and with nanoparticle and solgel synthesis.

The waste water reduction associated with two solvent distillation operations located in hoods in two separate rooms was implemented in Building 4500N. These stills are utilized to purify and dry solvents used in organic chemistry research programs. Historically both distillation units used once-through cooling water for the condensers, which generated approximately 63,400 gallons of waste water per year. This initiative combined the distillation apparatus in a single hood and uses a recirculating chiller to run both condensers, eliminating the use of once-through cooling water. The chiller unit also provides more flexibility because it can be operated over a tuneable temperature range of 0 to 40° C.



Waste Water Reduction for Solvent Distillation

In summary, these two waste water-reducing initiatives:

- eliminated the generation of more than 190,000 gallons of waste water per year
- required a one-time cost of approximately \$7,400
- resulted in a cost avoidance of more than \$4,000 per year
- increased operational flexibility and reproducibility of chemical processes
- decreased the potential from damage from leaks associated with once-through cooling water systems.

The waste water reduction associated with nanoparticle and solgel synthesis was implemented in two rooms in Building 4500S. These chemical processes required cooling using a condenser with once-through cooling water that generated approximately 126,800 gallons of waste water per year. This initiative uses two circulating cooling baths to replace the once-through cooling water. The circulating coolers can also be used to regulate temperatures for cooling baths reducing the use of ice and increasing the reproducibility of chemical processes.



Waste Water Reduction for Nanoparticle and Solgel Synthesis