

# Non-chemical Water Treatment

## What is this Technology?

Non-chemical water treatment technologies include electric field, magnetic field, electro-magnetic field, ultra-violet (UV), cavitation, and ozone generation devices. They are all designed to replace all or some conventional chemicals used to treat water circulated through chiller condensers and cooling towers.

## Why is GSA Interested?



**ENERGY EFFICIENCY** Cooling towers dissipate heat through evaporation. As “make-up water” replaces evaporated water, it increases concentrations of minerals in the water and exacerbate the formation of scale crystallizing on heat transfer surfaces. This is partially controlled by “blow-down,” a process of periodically replacing some of the solids-laden recirculating water with additional make-up water. Non-chemical technology promises to increase the period between required blow-down cycles, thus reducing water consumption.



**POLLUTION PREVENTION** To control bacteria, mold, and scale, cooling towers typically rely on biocidal, conditioning, dispersant, and scale-inhibiting chemicals, including chlorine, various brominated compounds, phosphates, molybdenates, acids (including sulfuric acid), and zinc compounds, which are now banned for cooling-tower use in about half of U.S. states. Non-chemical water treatment minimizes associated issues of chemical storage, handling, and disposal, and may permit on-site re-use of cooling-tower “blow-down” water as “grey water”.



**COST EFFECTIVENESS** If this technology proves as effective as chemical treatment for controlling mold and scale, it promises to be life cycle cost effective based solely on the reduction in chemical costs.



**OPERATIONS & MAINTENANCE** Conventional chemical water treatment is typically performed by a contractor or sub-contractor. While application of this technology may reduce or eliminate chemical costs, it may not reduce other contractor costs.



**APPLICABILITY** The technology is applicable to all condenser water systems (e.g., cooling towers). If it achieves the objectives of water conservation and pollution prevention, the technology will have widespread application for GSA.

## Measurement & Verification

The Green Proving Ground program has commissioned Facilities Dynamics Engineering, Inc. to perform measurement and verification (M&V) on non-chemical water treatment at nine test sites across the country. Findings from that investigation will be available in September 2012.