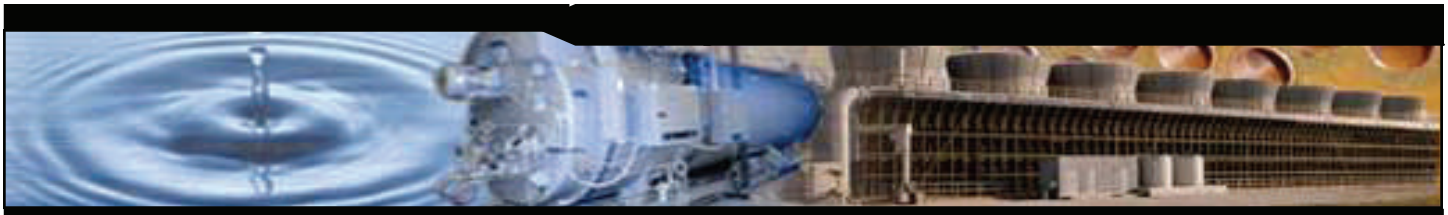

WATER TREATMENT NEWS

# Is Your Water Treatment Program Really Green?

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**"At Work—Green is a Growth Industry". . . . . "Airlines Go Green to Save Green". . . . . HP Joins Other Tech Companies Going Green(er)". . . . . "Companies Turn up the Green" . . . . . "The Red Bullseye Goes Green". . . . . "Europe Seeks New Ways to go 'Green' "**

These and similar headlines from newspapers and broadcast news reports across the country tell of companies, institutions and all levels of government that are stepping up efforts to "go green." Architects are designing "green" buildings, owners of existing buildings are taking steps to achieve LEED certification, and corporations and institutions are searching for and implementing ways of decreasing pollution, saving water and generally developing a more "sustainable" operation.

Frequently these changes in operation are encouraged or even mandated by government regulations, but as corporations make changes to go greener, they often find that resultant reductions in water, energy and other consumables lower their operating costs, improving profitability. Further, as the drive to go green gains momentum, demand for greener products, processes and services creates new markets, providing forward-looking companies with revenue streams that didn't previously exist. Many companies find that "going green makes green." Green, it seems, is becoming the new gold.

Companies that produce products to prevent scale, corrosion and microbiological growth in cooling tower systems are beginning to join in this trend to go green. For some water treatment chemical companies, this effort involves focusing primarily on marketing "green chemistry" cooling water treatments. Many facilities personnel question, however, what makes one chemical greener than another. In the Green Chemistry section of its website, US EPA defines green chemistry as "the design of chemical products and processes to reduce or eliminate the use or generation of hazardous substances."

Based on this broad definition, a facility that switches from using a highly toxic treatment chemical containing hydrazine, for example, to a product using phosphate or molybdenum for corrosion prevention could be considered to be "going green" because they "eliminated the use of a hazardous substance." However, discharge of molybdenum is banned in many parts of the country, and phosphate causes eutrophication, or excessive algae growth, in surface waters. So, at the present time, no quantifiable standard exists by which a facility owner or manager can measure how green a water treatment program actually is.

Further confusing the issue is the fact that water treatment chemicals are applied as part of an overall program for protection of a process or HVAC water-using system. The treatment program has an impact on how green the system being treated is.

Take, for example, a 500-ton system treated with an inhibitor utilizing advanced scale control technology and being operated at six cycles of concentration. The facilities engineer decides to change to a green chemistry inhibitor with only basic scale control technology to improve the plant's environmental profile. However, when the green chemistry inhibitor is put on line, he finds that he needs to reduce cycles to three in order to prevent scale from forming in the system's condenser. If the system is

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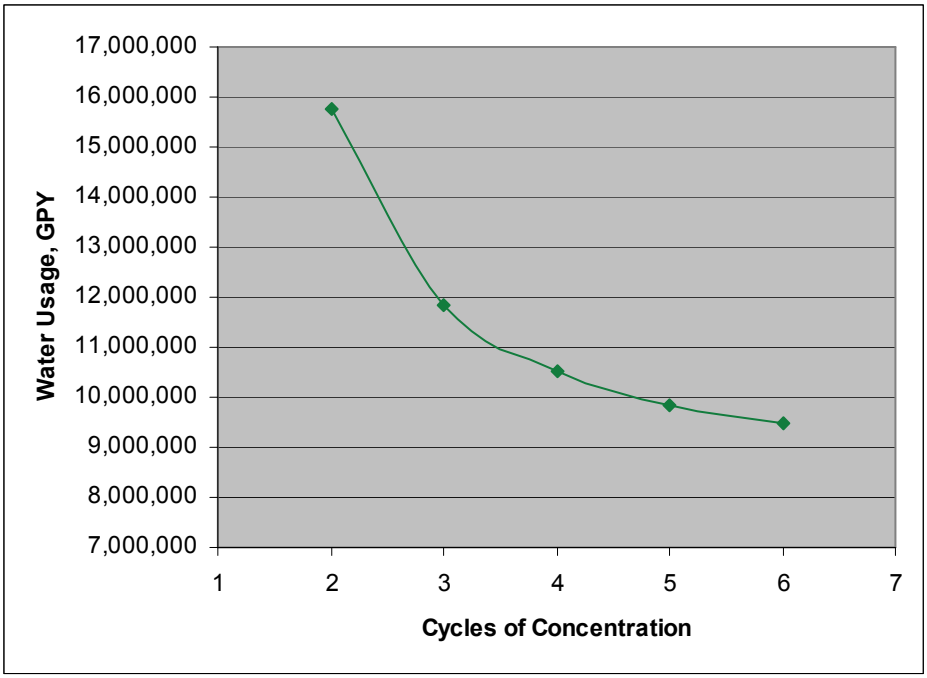
operated 24 hours per day, 365 days per year, the decrease in cycles will result in the system wasting over 2.4 *million* gallons of water per year! In this case, the change to a green chemistry inhibitor resulted in the facility's operation becoming arguably less green.

In the same vein, if the use of a green inhibitor with basic technology results in the deposition of even a thin layer of scale on a system's condenser tubes, the resultant increase in electrical usage would require the burning of a greater amount of fossil fuel, increasing carbon dioxide ($CO_2$) emissions to the atmosphere, not to mention additional pollutants such as mercury and other toxic metals.




***Increasing cycles of concentration from 2 to 4 in a 500-ton system can save as much as 5.25 million gallons of water per year.***

This same conflict, in which the use of a green product has a negative effect on a facility's environmental profile, often occurs when a facility manager or engineer elects to use a mechanical water treatment device. These devices are marketed as green alternatives to chemical programs, but they are usually operated at low cycles of concentration, using far more water than chemically treated systems, and almost invariably scaling up the system, increasing electrical consumption and resulting in increased emissions of $CO_2$ and other pollutants.

The ideal green water treatment program, then, would address all three issues – green chemistry, water conservation and air emission reductions. Green chemistry is important – water treatment chemicals, due to the nature of the systems in which they are used, are routinely discharged to the environment in system blowdown. Green scale and corrosion inhibitors must have low pollution potential *and* be non-toxic to aquatic plants and animals. But a green chemistry product that requires low cycle operation for scale control wastes precious fresh water and fails the green test. Likewise, a green product that doesn't keep heat exchange surfaces completely clean falls short of being completely green. Developing a truly green water treatment program is a big challenge.

International Chemtex Corporation (Chemtex), a Minnesota-based provider of water treatment products and services, has developed a Green Water Treatment Program that the company believes meets this challenge. Lynn Shaw, Chemtex Technical Director, says that the company's *Green Program* addresses all three green criteria: green chemistry, water savings and atmospheric emission reduction.

"When we began development of the *Green Program*, we knew that the *Green* scale and corrosion inhibitors had to handle high cycle operation and still provide completely clean heat transfer surfaces, or they wouldn't be truly green." Shaw stated.

The scale control technology built into the company's High Stress inhibitor line fit the bill perfectly. "Our High Stress series has been hugely successful for us over the past 10 plus years in keeping chillers spotless in high cycle conditions," said Shaw, "so we realized early on that the scale and corrosion control technology used in that series would

be the ideal building block for our *Green Program* inhibitors."

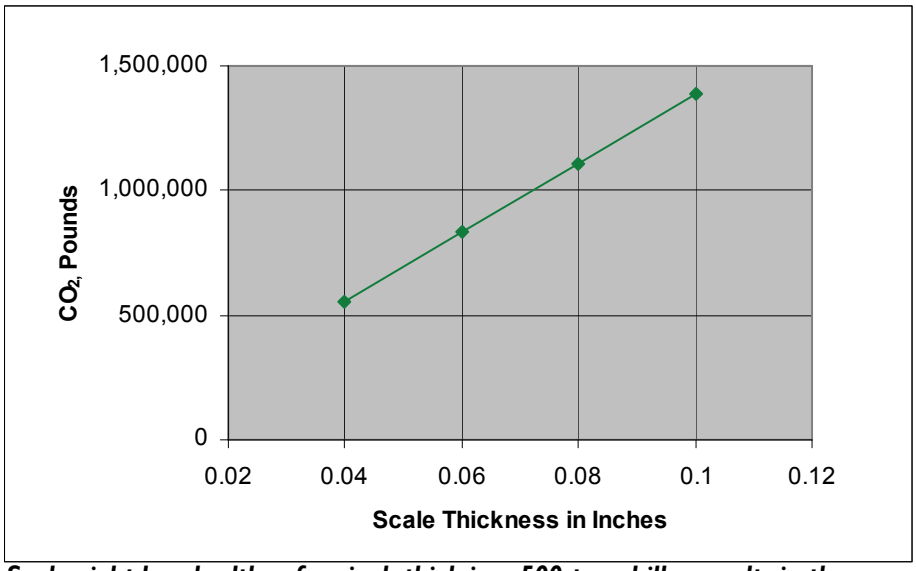
There was one problem, though – most of the High Stress series products contained molybdenum, an ingredient used in the products to track their concentrations in system waters. Molybdenum is a heavy metal whose use in cooling water is facing increased scrutiny as a potential pollutant. Some municipalities ban its use completely.

"No problem," asserted Shaw. "Improved testing methods allow us to accurately track other components in the High Stress scale and corrosion control package, so we just took the molybdenum out to make the formulations greener."

Fortunately, the scale and corrosion control technology in the *Green Program* inhibitors also has a very low phosphorous content – only 5-20% as much as standard inhibitor technology, according to Shaw. "And," he adds, "since these products allow us to operate cooling systems at higher cycles, less chemical is discharged to drain, further lowering the level of phosphorous entering the environment."

"Bottom line – our *Green Program* inhibitors and dispersants represent the greenest technology for scale and corrosion control available on the market today when you consider the chemistry of the products themselves AND the impact the program they're used in has on natural resources and the environment."

Selecting the biocides to be included in Chemtex's *Green Program* presented a different challenge to the company. "We can't alter the formulations or make any other changes to our biocides to make them greener."




***Scale eight hundredths of an inch thick in a 500-ton chiller results in the release to the atmosphere of an additional 1,108,000 pounds of $CO_2$ annually.***

Shaw explained, "because they are all registered with the US EPA. We had to sift through our regular biocide line and choose products for inclusion in the *Green Program* that were effective *and* safe for discharge to the environment."

One of the *Green Program* biocides earned a Presidential Green Chemistry Challenge award in 1997. Another *Green* biocide has long been approved by US FDA for sanitizing potable water. "We were touting these products as green before green was trendy," said Shaw. "But make no mistake – these are really effective biocides. As with our inhibitors and dispersants, we won't compromise on performance and include a product only because it features green chemistry."

Shaw says that all the company's regular biocides are safe to discharge to the environment when used correctly. "They wouldn't be approved by the EPA if they weren't," he said. "We just chose the greenest ones that were also effective to include in the *Green Program*."

Shaw cautions facilities and engineering personnel to carefully consider all aspects of their cooling system water treatment program when "greening up" their operation. "If they make a change based only on green chemistry and don't consider the impact on water usage and electrical consumption, with it's attendant increase in atmospheric emissions, their operation may end up being less green than before," he says.

***"Bottom line – our Green Program inhibitors and dispersants represent the greenest technology for scale and corrosion control available on the market today . . . ."***

***Lynn Shaw, Technical Director, International Chemtex Corporation***

This is particularly true when facilities people look at replacing their cooling water chemical program with a mechanical device, in Shaw's opinion. "If a facilities engineer completely replaces his chemical program with a device, without question he greens up that aspect of his operation," Shaw admitted. "But in case after case, we've seen systems scaled up when using a device. In the rare case where a device appeared to prevent scale, the system was being operated at very low cycles and was wasting a lot of water. In either case, the operation is no greener, or even less green, than before."

Shaw says Chemtex is excited about the prospects for the *Green Program*. "There's been a lot of interest, and we just think it's the right thing to do. Our business has always been about helping our customers operate their systems safely and efficiently. If we do that and help the environment at the same time, so much the better."

Going green is a growing wave. For one water treatment chemical company, it's a wave they intend to ride to success.

# GOING GREEN?

## *Ask your Chemtex representative to help you get there with the Green Program!*