

ProMoss™ Helps Corning Environmental Technologies Diesel Facility Meet ENERGY STAR® Challenge

By: Vance Fiegel, Co-Founder and Chief Scientific Officer.

A U.S. Environmental Protection Agency (EPA) program, the ENERGY STAR Challenge for Industry, is a global call-to-action for manufacturing sites to reduce energy intensity, or the amount of energy used to make a product, by 10 percent within five years. The Diesel facility reduced its energy intensity by more than 25 percent within two years. The use of Creative Water Solutions' **ProMoss™** in their cooling towers was an important part of that accomplishment and has led Corning International to expand their use of **ProMoss™** to other facilities in the U.S. "The products we produce here are the essential components in emission-control systems on diesel trucks, construction, and agricultural vehicles," Hal Nelson, Vice President and General Manager, Environmental Technologies, said during his remarks. "And of course, we've focused on making these products in a much more energy-efficient way."

The Diesel facility, Creative Water Solutions, and WaterWise, Inc. designed and conducted a 3 month trial of **ProMoss™** with very specific objectives and performance criteria. These criteria included achieving desired or acceptable levels of corrosion, scale formation, microbiology populations, conductivity/pH, corrosion products, water use, energy consumption, maintenance time, and down time. The use of **ProMoss™** in the cooling tower met or surpassed all "desired" criteria, other than copper corrosion, which was right at the acceptable level. Specifically, **ProMoss™** use resulted in a 20% increase in cycles of concentration and projected savings of over 200,000 gallons of water. In addition, the LSI improved from "corrosive" to "non-corrosive", the presence of algae disappeared, calcium hardness decreased by 51%, pH remained below 8.7 without the use of acid, and there was no tower down-time or maintenance issues.

Corning International has established a Global Energy Management (GEM) program to accomplish these goals world-wide and their analysis concluded:

- Use of Sphagnum Moss to treat cooling tower water results in cleaner and more efficient system.
- Eliminate use of chemicals:
 - Biocide/Algaecide
 - Acid/base for pH and alkalinity control
 - Corrosion inhibitors
- Minor reduction in electric power usage.
- Fewer blow-downs = less make-up water.

Savings: Facility water use reduced by ~15%, surpassing GEM reduction goal of 3%.

Please visit our website at www.cwsnaturally.com to read the complete Corning case study on the Industrial Resources tab under the Industrial drop down menu.



CONTACT A REPRESENTATIVE TODAY:

13809 Industrial Park Blvd.
Plymouth, MN 55441 USA
(763) 398-0141 (877) 212-6493
(763) 551-2572 fax
www.cwsnaturally.com

PoolMoss® and SpaMoss® Effects Scaling and Heat Exchanger Performance and Lifespan

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We first became interested in Sphagnum moss because of its use in World War I as a wound dressing. Because Sphagnum moss can absorb 20 times its weight in water, it was used as a wound dressing in battlefield wounds where there is a lot of blood and exudate. As we began to investigate the properties of Sphagnum moss we found that it was known that Sphagnum moss was able to absorb positively charged ions, called cations, from water. These cations include iron and calcium; calcium being the cause of scale formation (as calcium carbonate). The moss has a very specific mechanism for doing this, much like ion exchange, which is what occurs in a water softener. To make a long story short, when we first developed our Sphagnum moss products, SpaMoss® and PoolMoss® and started treating pools and spas, we noticed that scale and organic contamination appeared to be gradually removed from pool surfaces. Over years of research in our laboratory and field-testing, we have determined that Sphagnum moss removes and inhibits the formation of organic contamination and scale, and inhibits corrosion.

Figure 1 below demonstrates the effect on scale in a laboratory system. In this system, and as shown in the blue bars, the Sphagnum moss treatment removed 70% of the scale over 7 days of treatment. Combining the laboratory data and our experience in treating water in pools, spas, and cooling towers, we came to the following conclusions: organic contamination plays an integral role in scale formation and microbiologically induced corrosion, and that all surfaces in contact with water are covered with organic contamination.

Scale formation is a crystallization process that requires a nucleation site. We believe that organic contamination is the major nucleation site for scale formation. Sphagnum moss directly affects both the accumulation of organic contamination, thereby reducing sites for scale to form, and the solubility product of the fluid due to the absorption of calcium, inhibiting and reversing the formation of scale.

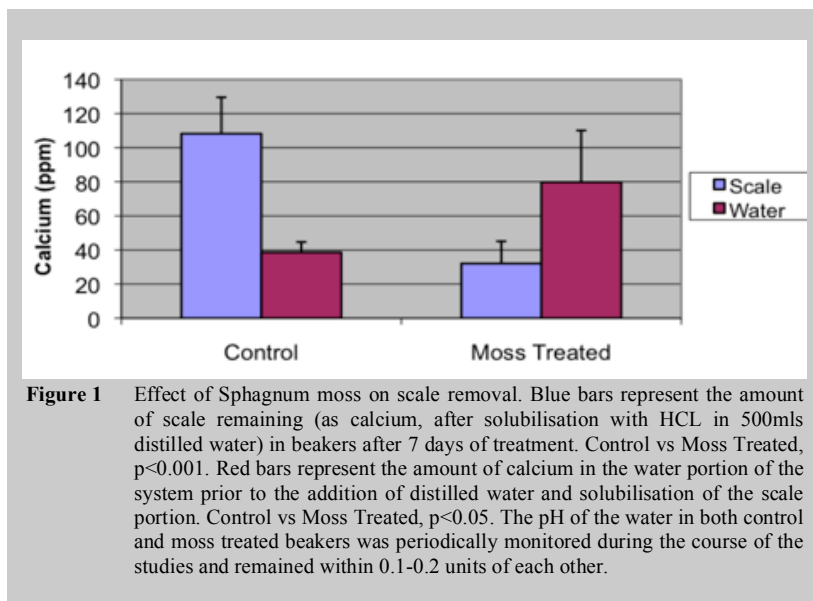


Figure 2 Scale accumulation on a heat exchanger from a pool without Sphagnum moss.



Figure 3 Heat exchanger from a pool on Sphagnum moss for 4 years.

The accumulation of scale and corrosion, as shown in Figure 2 above, causes two main problems.

1. It creates an insulating layer between the exchanger and the water to be heated, drastically affecting the transfer of heat and raising the amount of energy (and dollars) required to heat the pool or spa system.
2. This accumulation ultimately leads to early failure of the system due to extremely reduced flow and heat transfer and failure of the metal in the system due to corrosion.

As shown in Figure 3, there is virtually no scale or corrosion present on a heat exchanger that has been treated with PoolMoss® over a four year period.

The use of SpaMoss® and PoolMoss® in spas and pools has many benefits for the end user and the facility. Better air and water quality and reduced chemical usage are readily apparent and quickly realized. However, the long term benefits of SpaMoss® and PoolMoss® on extending the life of infrastructure and reducing maintenance should not be overlooked.

Where will we be next?

- Gina Chavez will be attending and presenting at the NIRSA Region 1 conference on 10/25/16 at 8:30AM in Lancaster, PA about “Sphagnum moss for Water Treatment? Yes! (AND reduce water and chemical use)”. Main Line Commercial Pools and ChemServe, our commercial pool and industrial dealers in the area, will participate at the Expo with CWS.

- Vance Fiegel will be speaking at the 2017 Southwest Pool and Spa Show on 1/18 at 10:15AM in room 303 C about the “Recreational Aquatic Ecosystem and Sphagnum Moss”