

# WRAP™ Physical Water Treatment

## The Benefits Whitepaper



By eliminating toxic chemicals for corrosion and scale control in industrial feedwater treatment, Second Earth's WRAP™ system provides a multitude of benefits, including:

- \* Cost savings
- \* Superior water treatment
- \* Increased asset life
- \* Environmental impact
- \* LEED accreditation

### **Cost Savings**

WRAP's magnetic water treatment (MWT) reduces the cost of cooling tower and boiler feedwater control in several ways: through the elimination of chemicals; a reduction in the use of make-up water and sewer discharge fees; lower energy bills and less maintenance, and equipment downtime.

For most applications, the single biggest savings will be in the complete elimination of the toxic and hazardous chemicals used for scale and corrosion control. For many companies, this means a savings of tens of thousands of dollars a year. This cost reduction is compounded by the elimination of indirect costs as well, including:

- \* Handling, storage and regulation
- \* OSHA training requirements
- \* Liability premiums for toxic chemicals on site
- \* Elimination of chemical pump costs (approx. \$600-\$1500 each)
- \* Elimination of constant calibration and adjustments

As noted in the *Second Earth Science Whitepaper* ([www.secondearthinc.com/science](http://www.secondearthinc.com/science)), MWT converts hard scale into soft scale and then holds it in suspension. This allows you to dramatically increase your cycles of concentration, in many cases by three to five times. The result is that you use significantly less make-up water and drain less hazardous chemicals into the sewer system. This can reduce your water usage and sewer discharge costs by 75%.

MWT also removes scale buildup from pipes and keeps them scale-free for decades. According to the US Bureau of Standards, even a thin film of scale can increase the amount of energy required to maintain the same level of water pressure and flow. Their research shows that a buildup of only 1/16<sup>th</sup> of an inch can increase energy consumption by more than 10%, while a buildup of just 1/2 inch can require nearly 70% more power. Typical WRAP installations have been found to reduce power consumption by about 18%.

Power consumption is obviously a more significant issue in major facilities that have separate water treatment equipment to handle all of the chemicals required. In these cases, according to a report from the Department of Energy (DOE), the savings in energy consumption can be the single biggest benefit of MWT. Cost reductions include both electricity and natural gas. In a case study that the DOE created to emulate many actual government applications, they found that the reduction in energy bills dwarfed the savings from elimination of chemicals and less water usage.

A final savings comes from reducing the downtime associated with chemical treatment. There are several cost factors here. First is the time required for feedwater monitoring as you implement your treatment and testing procedures. In applications where your maintenance plan calls for sampling, testing, treating, resampling and testing, this can amount to several hours each time. Next is the time saved by eliminating the periodic acidic flushing of the pipes to remove scale. Equipment must be taken offline during this process, causing further losses in productivity and profit. These costs are not an issue with MWT. According to a study by the US Coast Guard, "once installed, the (MWT) devices are maintenance-free and retain their strength indefinitely"

### ***Superior Water Treatment***

In reality, the chemical treatment of water does not work. This can be seen in the need for acid flushing and periodic cleaning of pipes, as well as the continued corrosion of critical parts. Chemicals are a stop-gap measure at best. Even the best testing and treating procedures have limited impact. As the US Coast Guard study noted, "there is little certainty that the water test could be repeated with good results even as little as an hour later."

MWT, relying on the laws of physics rather than the guesswork of chemistry, is a continuous and consistent water treatment solution. As soon as WRAP™ is in place and the cooling towers or boilers are back online, our rare-earth magnets create a permanent Faraday Generator that allows us to cathodically protect the pipes. The magnetic field, which will last virtually forever, allows us to create a negative charge in the pipes that repels oxygen molecules, eliminating corrosion, and carbonate molecules, eliminating scale.

This is a permanent solution, which provides the same water chemistry every minute of every day. It eliminates the need for ongoing testing and treating, since the WRAP system is actively treating the water continuously.

### ***Increased Asset Life***

The WRAP™ system's continuous water treatment stops corrosion immediately and prevents future corrosion. This will have a significant impact on asset life. As noted, it removes the need for a periodic "acid bath" to remove scale and corrosion from pipes. According to the US Coast Guard, these flushing chemicals "pose a threat to the environment as well as to the internal surfaces of equipment being treated or flushed."

The DOE report notes that with the use of MWT, periodic descaling of the heat exchange equipment is greatly reduced. This means that process downtime, chemical usage, and labor requirements are also reduced. In addition, it requires less heat exchanger tube replacement due to failure. The failure of tubes is typically the result of scale build-up, and the resultant temperature rise across the heat exchange surface; this will be eliminated with MWT.

Further, the eradication of scale from the pipes allows pumps and motors to run more efficiently, drawing on less energy, since less pressure is required for the same results. Typically, in boiler applications, this increased efficiency results in a decrease in stack temperatures, often over 20° F. In addition, WRAP increases pH to higher and less corrosive levels, which means less wear and tear on equipment.

Because WRAP magnets are externally mounted, there is no need to cut into pipes. This means there is no downtime during installation. It also eliminates the potential of leaks and shock hazards that can result from installing in-pipe electrostatic or electromagnetic systems. These other solutions also require the installation of an external power source, which becomes one more system that must be monitored and maintained.

Since the WRAP™ system is virtually maintenance free, this frees operating personnel to focus more time on maintaining the primary cooling tower and boiler equipment.

### ***Environmental Impact***

In terms of the environment, green sustainable physics beats toxic polluting chemicals, hands down.

Currently, there are approximately five million commercial buildings in America, using over *ten billion* gallons of water a day. About half of that water consumption goes to HVAC systems. With WRAP able to reduce water usage by 75%, this could potential save nearly four billion gallons of water every day. Such savings would have a huge impact on a city's municipal water supply; particularly in regions like the Southwest, which already face water shortages that are only expected to grow worse over time.

By removing toxic chemicals from your feedwater treatment, you also remove them from your facility. This result in a safer environment for employees and visitors. You also eliminate the discharge of these toxic wastes during blow-down into the public water system. Many companies actually use blow-down water from their WRAP system for irrigation, providing both an environmental and a cost benefit.

By reducing energy requirements, you reduce the amount of emissions from your facility, which cuts down on toxic gases such as CO<sub>2</sub>, Nitrous oxide and sulfur dioxide. This means a reduced carbon footprint for your buildings and your company, which is becoming a major concern with the introduction of the CRC or Carbon Reduction Commitment program. CRC is causing organizations to devise a carbon abatement strategy, with energy efficient measures, to monitor and manage their carbon emissions or face punitive charges. Clearly, WRAP can play a significant role in this strategy.

Finally, as noted in a DOE report, the waste associated with disposal and management of used chemical containers will also be eliminated.

### ***LEED Accreditation***

Leadership in Energy and Environmental Design (LEED) is a set of rating systems for the design, construction, operation, and maintenance of green buildings. Developed by the U.S. Green Building Council (USGBC), LEED is intended to help building owners and operators be environmentally responsible and use resources efficiently. Many U.S. federal agencies and state and local governments require or reward LEED certification.

Implementing a WRAP™ feedwater treatment system can help you be eligible for six LEED points, which is 10% of the 60 points needed to qualify for LEED Gold. WRAP can provide 1 point in each of the following areas:

- \* Reducing water consumption by 20%, as part of an overall water conservation strategy. (WE Credit 3.1)
- \* Reducing water consumption by 30%, as part of an overall water conservation strategy. (WE Credit 3.2)
- \* Water efficient landscaping (reduction of municipal water in landscaping by 50%), as part of an overall water conservation strategy. (WE Credit 1.1)
- \* Use of recycled water in irrigation. (WE Credit 1.2)
- \* Innovative wastewater technologies (recycled grey water from building sewage). (WE Credit 2)
- \* Chemical and pollutant source control, as part of an overall strategy. (EQ Credit 5)

### ***No-Risk Savings Guarantee***

In the end, however, the scientific research is not important. What matters are results. You want to know if MWT will work in your facility, on your applications. That's why Second Earth has put together a no-risk test and installation agreement, to let you prove it for yourself.

We're so confident that we can save you up to 50% of your monthly costs for chemical feedwater treatment that we're offering a service contract that includes both the technology and support for *half of what you're paying today*. Let us install WRAP™ on one of your cooling towers or boilers for just 30 days and we know you will be convinced.

For more details on our No-Risk Savings Guarantee, go to: [www.secondearthinc.com/agreement.html](http://www.secondearthinc.com/agreement.html). Or call us at 336-912-0957.

## **References**

*The Coast Guard Engineer's Digest*. "Naval Engineers Evaluate Magnetic Boiler Feedwater Treatment as an Alternative to Chemicals." Volume 31. Number 253.

*Federal Technology Alert*. "Non-Chemical Technologies for Scale and Hardness Control." The US Department of Energy.