

One Billion Gallon Water Challenge Update



ILLINOIS SUSTAINABLE
TECHNOLOGY CENTER
PRAIRIE RESEARCH INSTITUTE

REDUCING WATER CONSUMPTION BY RE-USE



ISTC launched its One Billion Gallon Water Challenge in 2014 to promote water conservation measures by businesses, industries, communities, and the general public in Illinois.

ISTC has made a commitment to fund projects and conduct field-based research with industries, municipalities and universities that result in measurable and meaningful water savings. We are currently funding projects with the following partners: Carus Corporation, American Water, Loyola University, City of Urbana, Illinois State Water Survey, and the Illinois Green Economy Network.

CARUS CORPORATION



Carus Corporation is an environmental services company providing materials to the water, industrial, air and soil remediation markets, operating six sites globally. Carus Corporation has reduced the energy and carbon footprint of its flagship product, potassium permanganate, by 25% since 2009 in response to competitive threats. Carus Corporation is now expanding these efforts to water conservation as well. The current project aims to reuse non-contact cooling water at their LaSalle Facility (Figure 1) as a replacement to the raw city water currently feeding into operations such as boilers requiring purified water.

WATER USE AT CARUS

The LaSalle site currently uses approximately 1,360 gallons of water per minute daily which is equivalent to 1,958,400 gallons a day or 675 million gallons a year (based on a 345 day operating year). In 2015 they will pay \$1.145 per 100 ft³, a 43% increase over their 2014 rate of \$0.798 per 100 ft³. Without strategies for reducing their water consumption, this increase had the potential of costing the company an additional \$312,000 this year. Reuse of non-contact water from their crystallization condenser to the water softeners (Figure 2) allows the company to reduce the amount they draw from the municipal water supply while maintaining water quality and saving money.

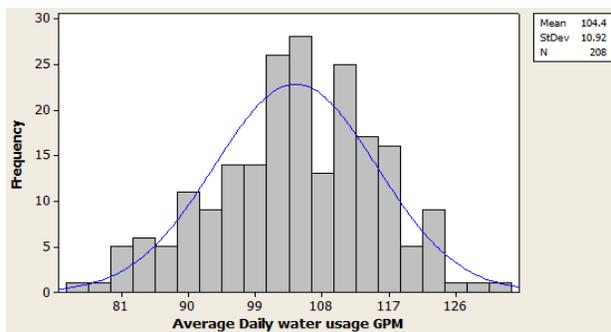


Figure 2 Average water use by the water softeners at the LaSalle facility before the water reuse project. Data was collected from May 1, 2014 to Dec 4, 2014.

CASE STUDY HIGHLIGHTS

Anticipated Savings as of January 2015



\$92,000 per year savings
by water reuse



60.6 Million gallons water
per year



Figure 1 Location of Carus Corporation LaSalle Facility

Benefits to the Community

The City of LaSalle, Illinois, is situated beside the Illinois River and sources their water from seven groundwater wells. This location makes their water vulnerable to agricultural runoff. In addition, the Illinois EPA identified five potential industrial sources of contamination affecting five of these wells in their 2013 water quality report. Conservation efforts at industrial facilities, like Carus Corp., help communities prepare for increased future demands at a lower cost to the utility and all users in the community.

HOW THE SYSTEM WORKS

Where is the water coming from?

Water is used as a heat sink in the condenser to bring down the product temperature without making contact with any part of the product stream. This water is then taken to a hotwell (weir) for it to cool down before discharge. There is no treatment required before discharge of the water because it has remained chemically unchanged; it has only been used to extract heat from the process.

This hotwell water is the target source of the reuse project.

Where is the water going?

Before the project, the facility purchased raw city water to feed the water softeners and reverse osmosis (RO) system to meet boiler water requirements.

The reuse project was designed to pump the water from the hotwell to replace the raw city water feed to the softeners.

A pump was added between the hotwell and water softeners along with water level and conductivity monitoring. This ensures that the hotwell water meets the feed quality standards required of the softeners and RO system.

In the event that the hotwell water level or quality does not meet requirements, raw city water will automatically be fed into the softeners.



SYSTEM SCHEMATIC

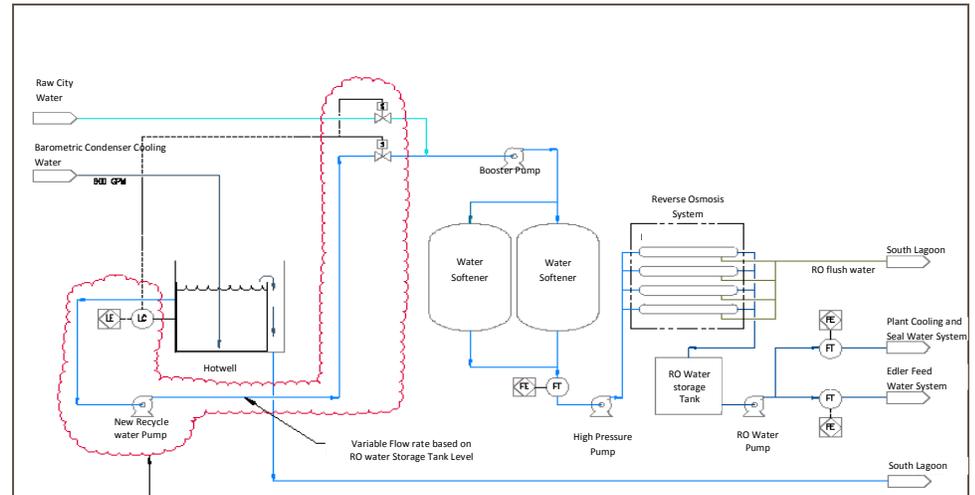


Figure 3 The piping contained within the red bubble indicates the new piping and pump for recycling water from the condenser hotwell to the water softeners.

PROJECT STARTUP

In January 2015, the infrastructure and Standard Operating Procedures were in place and water recycling from the condenser to the softeners was initiated. Initial measurements indicate that they will save an additional 8.7 million gallons of water beyond the initial estimate of 51.9 million gallons. This would mean a reduction in their expected ROI with cost-sharing from about 11 months to 8 months.

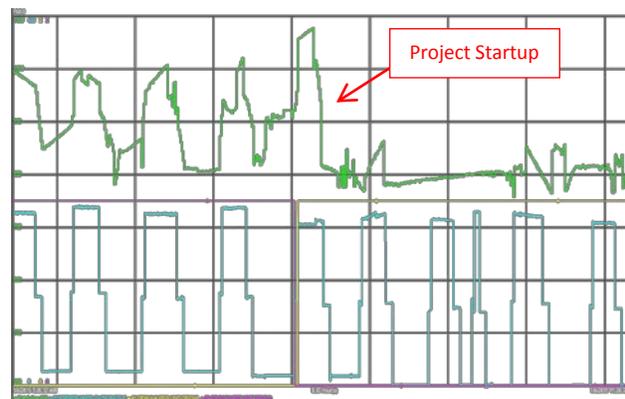


Figure 4 The aqua line is water flow exiting the softeners. The green line indicates total water being used at the plant.

In Figure 4, you can see how the water use at the facility would sharply increase in coordination with water demand at the softeners.

After the water recycling project began, the total water use in the plant reduced dramatically and has stopped showing softener-related spikes.

The study will continue to

collect data through June 2015 to confirm ongoing water savings and smooth system operation.

For other case studies visit: <http://www.istc.illinois.edu/water.cfm>

For additional project details or on how you can participate in the One Billion Gallon Water Challenge contact:

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