NALCO

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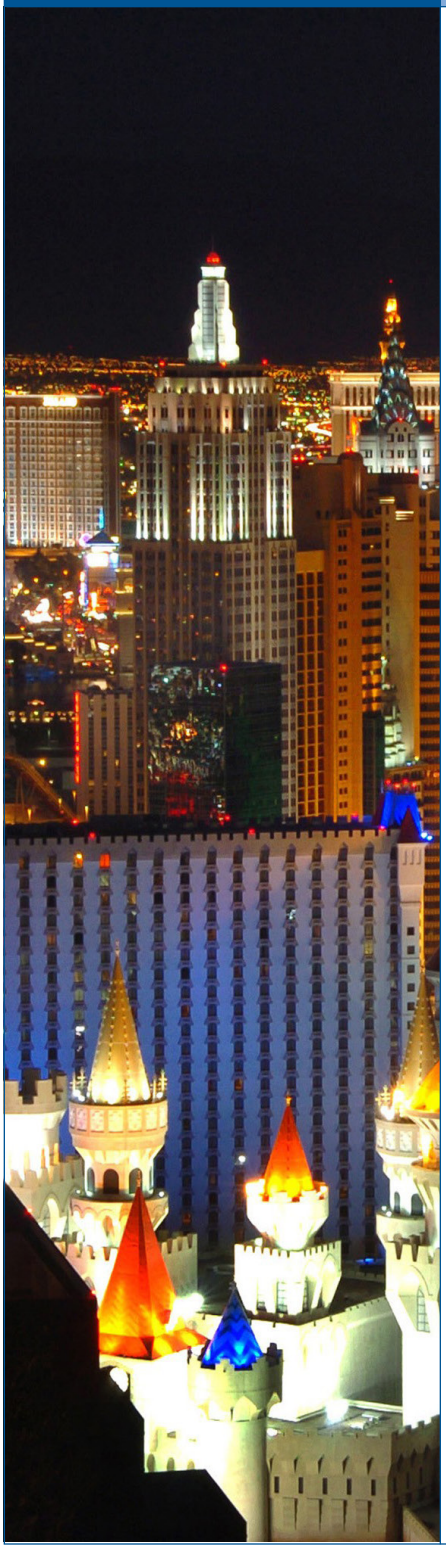
for Water, Energy and Air

A Las Vegas Hotel and Casino Taking Proactive Steps to Conserve Water and Reduce Surface (Colorado River) Water Use from Lake Mead

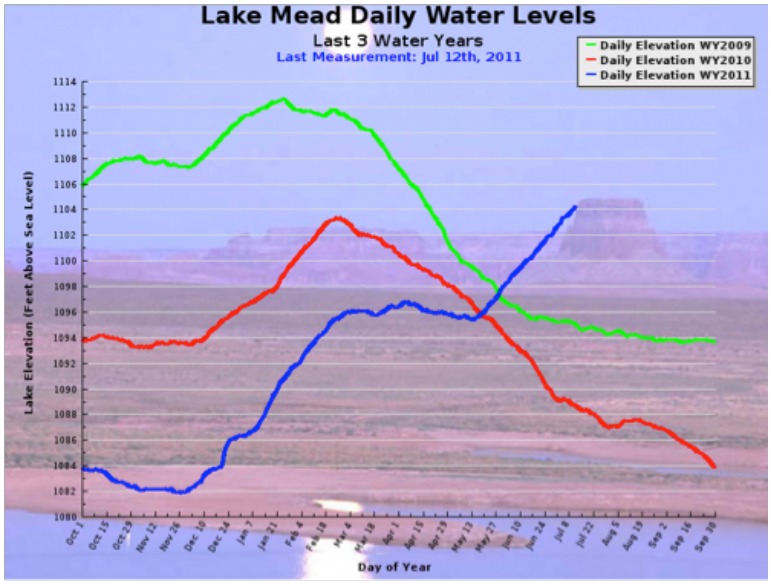


Background

Lake Mead supplies the city of Las Vegas with more than 90 percent of its water. The Lake Mead watershed has been under severe stress for more than a decade as snowpack from the Colorado Rockies – the primary water source for Lake Mead water – has not been heavy enough to replenish and maintain lake levels. Since the year 2000, Lake Mead water levels have fallen 115 feet.

In 2011, heavy snow melt from the Rockies has raised lake levels by 30 feet. This resulted in delaying implementation of the shortage declaration that will require Nevada and Arizona businesses and residents to reduce Colorado River water use. (See graph below).

Water use reduction efforts in the Las Vegas Valley have driven water use per resident per day down by more than 30 percent



Lake Mead Water Database 2011: lakemead.water-data.com

Environmental Results	eROI	Economic Results
Reduction of water use of more than 57,444,000 gallons	water	Enough water saved to do 1,436,000 average washing machine loads

since 1990, from 347 gallons per day per resident to 248 gallons in 2008, and an estimated 223 gallons in 2011. Landscape irrigation accounts for 65 percent of total water use.

Part of the Las Vegas Valley sits atop an underground aquifer. Sites with existing wells are encouraged to use specific allotments of ground water to reduce the volume of surface water used.

Well Tanks Close Up

Situation

The hotel and casino well has used aquifer water (allocation: 233.87 acre feet per year) for landscape irrigation for several years.

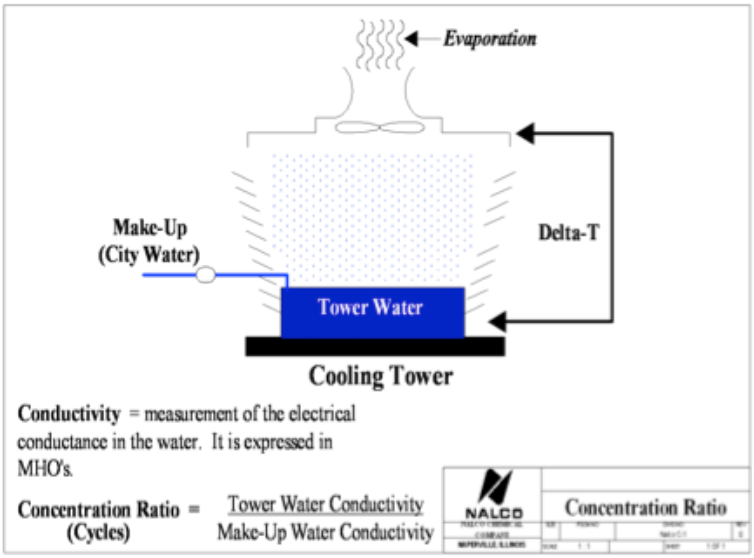
The hotel has an aggressive sustainability strategy in place, and site personnel actively seek new ideas to reduce water and energy consumption and solid waste volume in an effort to reduce the total carbon footprint of the site.

Program

The hotel and casino engineering and Nalco developed a strategy to utilize aquifer water as makeup water for the cooling towers. This would in effect use the aquifer water multiple times versus a single use for landscape irrigation. The cooling towers at the site are part of the facilities air conditioning system and as such are a karge consumer of process water.

Based on the analytical data, the well water allowed significantly higher cycles of concentration to be run in the towers, due to lower amounts of dissolved solids. A cycle of concentration is a measure of how many times water is concentrated before discharge – the higher the cycles, the less water used. Cycle control yields the most savings at 5-8 cycles. Running higher cycles in most waters yields little measureable water reduction and can subject systems equipment to corrosion stress.

Nalco patented 3D TRASAR® technology was instrumental in monitoring and controlling the cycles of concentration in the cooling tower to help the site gain maximum water savings payback from the project. 3D TRASAR cooling water management delivers on-demand control and optimization of cooling water chemistry and microbiology, continuously protecting the system from corrosion, scale formation, and microbial infection.



Environmental/Economic Results

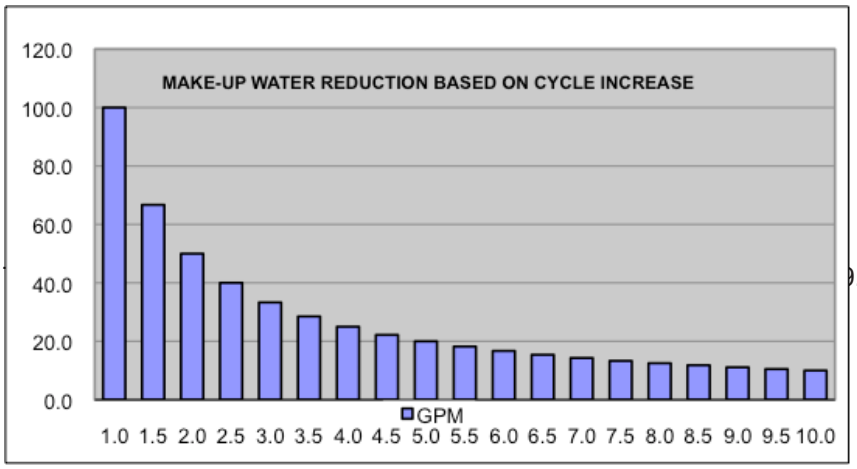
This change resulted in reduced water use of more than 57,444,000 gallons used in the towers since 2008. This is enough water saved to do 1,436,000 average washing machine loads.

The project required some innovative solutions, as the wells' maximum output volume was less than the cooling towers peak demand. Increasing the well bore to increase flow was not an option, so the solution proposed was to install four 20,000-gallon storage tanks to store well water for peak demand use. This solution allowed the site to stay within State of Nevada well water extraction volume limits.

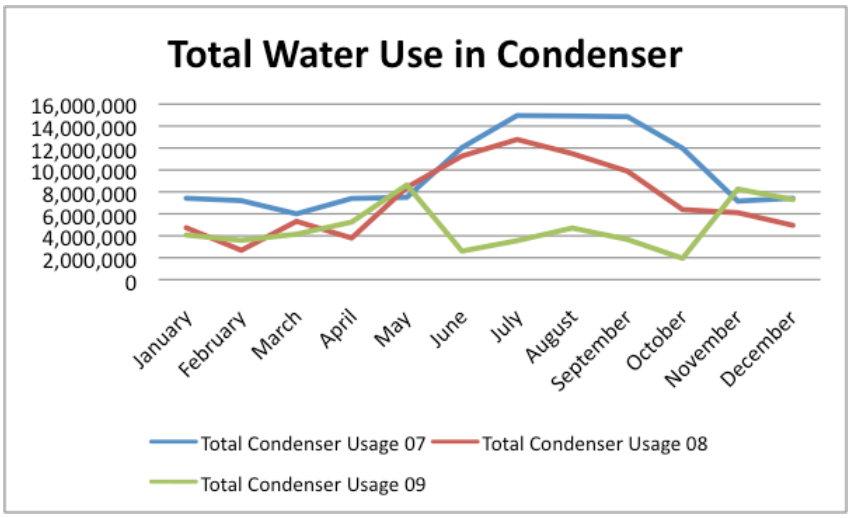
This project helps the hotel and casino meet their environmental sustainability goals.

Supporting Data

The chart below defines the concept of cycles of concentration in cooling towers.

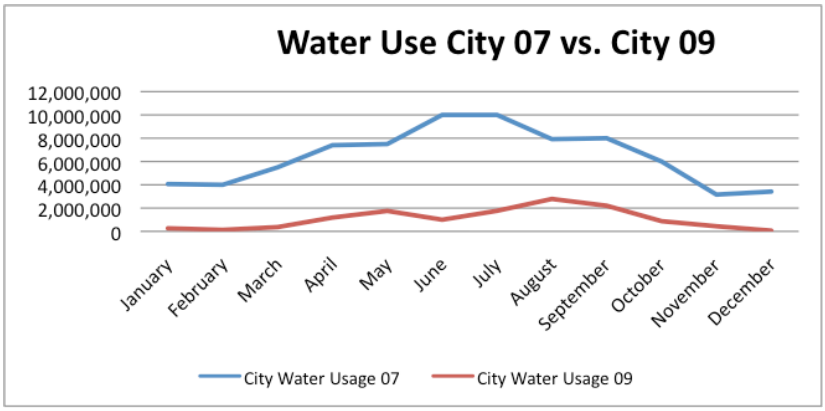


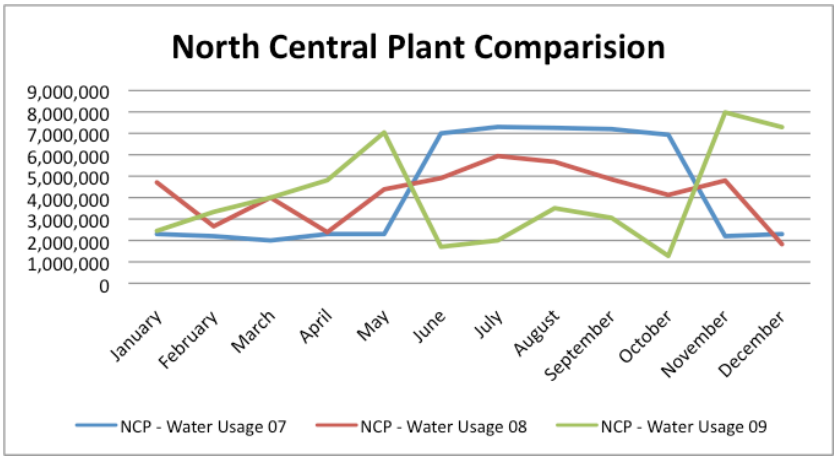
The chart below shows the relationship of increased cycles of concentration (COC) and tower makeup from blowdown loss. The largest gains in water conservation are made up to 7 cycles.

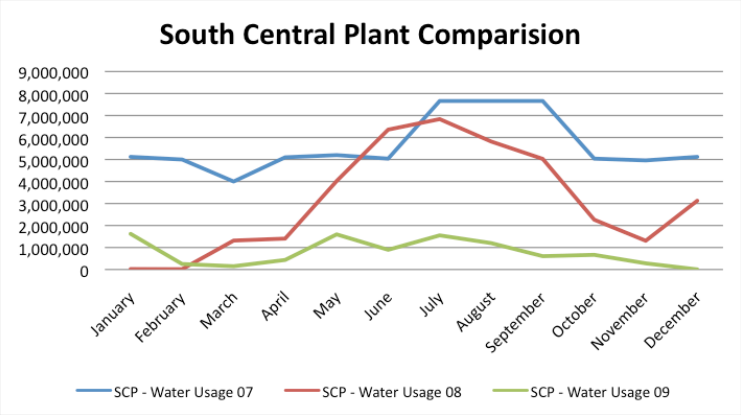


Well water was used in late 2008 and in all of 2009.

Surface water used in cooling towers is shown below. The reduction is due to the switch to well water for the towers.







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