

Three Hawaii Marriott sites reduce water and electricity costs using 3D TRASAR™ Technology



SITUATION

Marriott International is one of the largest value-based luxury hoteliers in the world with more than 3,000 properties in 60 countries. The corporation has set an aggressive sustainability goal to reduce hotel electricity and water consumption and waste volume by 25% by 2018.

Marriott operates three full service hotels in Hawaii (Waikiki Beach Marriott, Waikoloa Beach Marriott and the Kauai Marriott) that have embraced the sustainability challenge and are actively working to reduce water and electricity use in their air conditioning cooling water operations.

Marriott Engineering was aware that increasing cooling tower cycles would reduce water use, but were hesitant

because of the challenging water quality in Hawaii. Scale is precipitation of solids in the water, (usually calcium carbonate) that can if not controlled properly stick to the heat transfer tubes in the chiller and reduce efficiency and increase the electrical demand (increased Kw/ton).

Nalco Company has worked in partnership with the Hawaii Marriott Engineering teams to upgrade the water treatment program control using the Nalco patented 3D TRASAR technology. 3D TRASAR technology uses polymer fluorescent tagging technology to respond to variations in system conditions to maintain clean heat transfer in the centrifugal chillers and optimize electricity use. The 3D TRASAR control logic monitors the

CUSTOMER IMPACT



ECONOMIC RESULTS

Reduced water use in cooling towers by 1,648,000 gallons Marriott Hotel Waikiki Beach, and by 818,000 gallons at the Marriott Waikoloa Beach, Hawaii.



\$21,424 annual savings in water/ sewer costs at Marriott Waikiki Beach and total water cost reduction of \$12,270 savings at Marriott Waikoloa Beach

Reduced electricity use by 182,000 kwh



Savings of \$72,000 per year based on electricity rate of \$0.40/kwh due to improved heat transfer in the HVAC chillers at the Marriott Kauai Beach site.

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degradation of the scale/corrosion inhibitor polymer chemistry and maintains the proper level of product at all times.

Another advantage of improved cooling water control is to reduce the amount of tower blowdown by increasing the cycles of concentration maintained in the tower. Cycles of concentration is a measure of the number of times solids in the tower are concentrated over city make up levels. Cooling towers are designed to conserve water by “reusing” water a number of times before it is sent to the sewer as blowdown. The greater the increase in concentration, the less water the system uses. Evaporation in cooling systems consume 80-90% of the water used in a cooling tower, blowdown accounts for the remaining 10-20% of water used.

Increasing the cycles of concentration is a tower from three to five cycles will reduce blowdown requirements by 50%. For a cooling system with an average load of

2,000 tons of refrigeration, running at three cycles of concentration, blowdown volume is approximately 8,600,000 gallons of water per year, costing \$111,800 (Hawaii, water costs are \$13.00-\$15.00 per thousand gallons).

RESULTS

Marriot Waikiki Beach

The new control and treatment program has reduced water use by 1,648,000 gallons of makeup water annually. This reduction in water usage provided the Marriott Waikiki Beach with \$21,424 in annual savings in water/sewer costs based on a rate of \$13/1,000 gallons.

Marriott Waikoloa Beach

Improved control of tower cycles has reduced water use by 818,000 gallons annually. Water/sewer costs at this site are \$15.00 per thousand gallons. Total water cost reduction to date is \$12,270.

Marriott Kauai Beach

Improved control of deposit and microbio in the cooling tower water has resulted in cleaner heat transfer surfaces in the chiller condenser tubes, which has reduced Kw use by 182,000 kWh to date. At a rate of \$0.40/kWh, the site has reduced electrical costs by \$72,000 to date.

The Marriott engineering team is committed to meeting and exceeding corporate sustainability goals and looks for continual improvement in reducing water, electricity and waste volume at their respective luxury properties. The Nalco team is proud to be able to assist in Marriott's success to date.

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