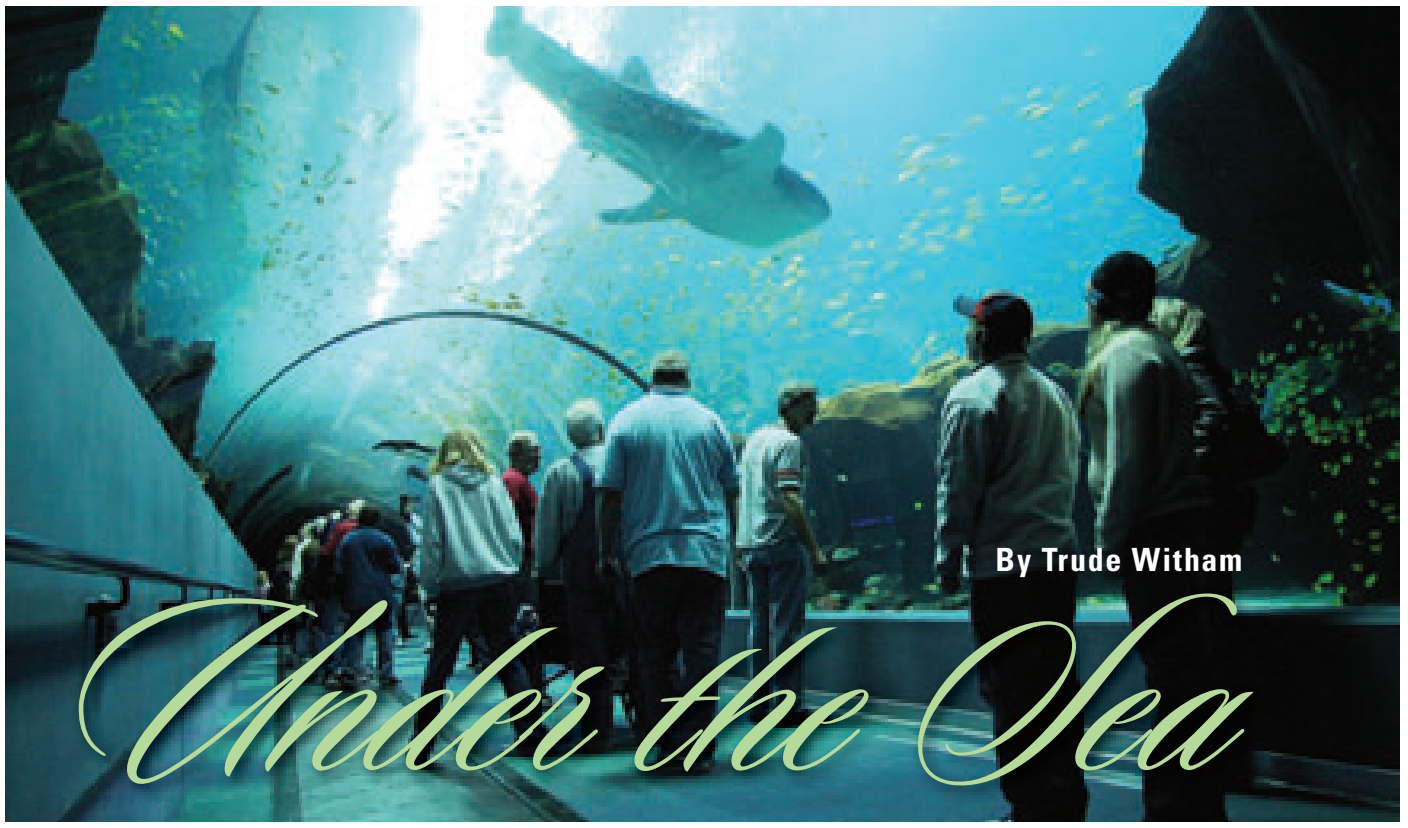

By Trude Witham

Under the Sea

Opened in November 2005, the Georgia Aquarium in Atlanta is one of the largest in the world, with more than 100,000 animals and fish in five different galleries, each corresponding to a particular environment—cold water oceans, the coast of Georgia, barrier reefs, rivers and a tropical Pacific coral reef.

Keeping aquarium water clean is vital to the survival of its inhabitants, and incoming city water must be treated before it can be used in the aquarium's exhibits. To do so, high-purity water treatment equipment is used to remove chlorine, dissolved minerals and organics from the facility's incoming water supply and the makeup water for all of the freshwater exhibits.

Aquarium personnel create saltwater by taking the filtered city water and adding a mixture made mostly of salt, which is carefully monitored by laboratory personnel and technicians.

In order to keep the treated water clean once it is added to the exhibits, a massive filtration system—consisting of 218 pumps—cleans and recirculates the facility's 8 million gal of water. The treatment system was supplied by a company that specializes in aquarium filtration systems and consists of mechanical filtration with sand filters that remove fine particles, fractionation that removes dissolved organic materials and ozone that kills bacteria.

The overall responsibility for the water at the aquarium falls on the shoulders of the aquarium's engineering team.

"Maintaining the aquarium's life-support system is a tremendous responsibility," said Eric Hall, assistant manager at the Georgia Aquarium. "We not only have to know how to operate and maintain all the equipment associated with our exhibits, but we must also be constantly aware of the state of our exhibit's water quality parameters. Water quality for the animals is much like air quality for us. Inconsistency in water quality parameters is not acceptable, as changes can adversely affect our living collection. We have to be perfect."

Aquarium Treatment

"We became involved in the project during the equipment layout phase," said Tom Sheffield, branch manager for Siemens Water Technologies, Roswell, Ga. "Mike Hurst, director of plant engineering at the aquarium, asked us to provide temporary water systems in a secure location that could be used for research and housing for animals and fish while the main aquarium was still being built. We then worked closely with Mike, the building's architect and the mechanical contractor on the permanent equipment for the main facility."

The aquarium purchased two large carbon towers to treat the city water coming into the building. The towers were specifically sized to meet the stringent water chemistry requirements of the facility because that water would be used to supply the tanks inside the building and eventually the 5-million-gal saltwater tank.

The Georgia Aquarium also purchased reverse osmosis (RO) systems for treating water used in some freshwater tanks and for the saltwater make up. The RO system includes water storage capability and several recirculating loops to keep the water at optimum quality regardless of the demand on the makeup water.

RO system effectively maintains Atlanta's massive aquarium

12_App_Siemens_0209.indd 12 1/19/09 10:32:50 AM

Several smaller filter housings are located on the platform overlooking the reef exhibit and help to maintain the recreation of a tropical Pacific coral reef by preserving the clarity and removing organics.

A service agreement for the water treatment equipment ensures optimal performance, and a technician visits the site quarterly to verify the RO and carbon towers are operating at peak performance.

When Siemens began specifying the equipment, most of the mechanical equipment was fully specified and some was already in the manufacturing stage. These specifications included basic design and specific size requirements. When the aquarium requested a design review of the inlet water filtration specification, it was recognized that the specification for reducing trihalomethanes (THMs) in the water was too tight for the carbon tower size.

Siemens worked closely with the architect and mechanical contractor to respecify carbon tanks that were large enough while making sure they fit into the space allocated within the building. One of the support beams inside the aquarium was relocated to accommodate the larger carbon towers.

"We were able to meet the challenge and the system is performing well within the THM specification," said Sheffield. "Fortunately we expressed concerns early enough in the project so this could be corrected."

When the building was completed and the equipment installed, Sheffield said they were called upon to help meet a deadline.

"During the initial tank fill at the aquarium, it became apparent that the fill rate needed to be increased so that the aquarium would be ready to accommodate the fish by a fast-approaching date. So the aquarium staff contacted us to see if we could design a second fill stream at the required purity. We were able to do that by using service deionization tanks to complete the aquarium fill on schedule."

Service deionization is a high-purity water treatment technology that uses ion exchange resins in a vessel, which is delivered and installed by the water treatment vendor. When the resins in the vessel are no longer capable of removing the contaminants—and the resins are exhausted—the vendor removes the vessels and replaces them with ones containing freshly regenerated resins. The spent resins are then regenerated offsite at the vendor's resin regeneration facilities.

Treatment Results

The Georgia Aquarium broke all forecasted attendance records during its first year of operation, and the high-purity water treatment equipment has continuously met the water quality requirements. The RO has exceeded expectations in removing phosphate, resulting in water clarity and overall health of the animals and fish. This has saved the aquarium money in maintenance costs with fewer gallons of new water required for processing, and the temporary water treatment equipment is still in service as an additional nursery and quarantine area for new fish. *wqp*

Trude Witham is senior technical writer for Siemens Water Technologies. Witham can be reached at 978.614.7198 or by e-mail at trude.witham@siemens.com.

For more information on this subject write in 1014 on the reader service card.

WEBresources ➤➤➤

Related search terms from www.waterinfolink.com: reverse osmosis, membranes, resin

For more information related to this article, visit www.wqpmag.com/lm.cfm/wq020904

write in 762

12_App_Siemens_0209.indd 13 1/19/09 10:32:59 AM