

Meeting EPA “Fish-Friendly” Requirements With Siemens Modified Ristroph Traveling Water Screens

The Challenge: Complying with Safe Fish Handling Requirements

The Environmental Protection Agency (EPA) has established regulation 316(b) of the Clean Water Act. Phase I is for new cooling water intake structures that have a design flow greater than 2 MGD and that use 25% of water withdrawn for cooling purposes. Track I of this regulation allows a through-screen velocity of 0.5 ft/sec as a component of the best technology available (BTA) minimizing adverse environmental impact. Under Track II the EPA allows the site to conduct site specific studies and demonstrate comparable reduction of impingement mortality and entrainment through alternate means.



Phase II of regulation 316(b) addresses existing water intake flows exceeding 50 MGD. The EPA retains the authority to set reasonable national performance standards, while allowing variances based on cost-benefit considerations. Consequently, a viable solution is for plants to replace or retrofit their existing screens with the Siemens Modified Ristroph design recognized by the EPA as the best performing technology for impingement mortality.

Retrofitting and overhauling equipment in existing plants is often difficult, complex and risky, as the

exact condition of the equipment and structures is hard to define. It can also be expensive in terms of downtime and capital costs. And, depending on the age of the screens, finding compatible retrofit parts may be nearly impossible.

The Solution: Siemens Water Technologies can Economically Retrofit or Upgrade Existing Traveling Water Screens into BTA Fish Handling Screens

When it comes to safe fish-handling screens and existing screen modifications, we’re the experts. Siemens Water Technologies can supply everything from a complete intake design to a replacement component for a 100-year-old traveling water screen.

More than 30 years ago, we developed a capture and release method of handling fish, in conjunction with Dr. Joseph D. Ristroph. This Ristroph design fish screen led to substantial modifications to the standard traveling water screen. A decade later, we developed an improved system with help from Dr. Ian Fletcher known as the Fletcher Modified system or the Modified Ristroph design resulting in Siemens BTA.

Putting our Expertise to Work for You

Today, we continue our research programs, working to refine and modify our BTA fish-handling screens so they are safer for all aquatic life. We can economically retrofit your standard screen into an efficient fish screen, with special baskets that have smooth meshes, flow spoilers and fish catchers. We can install deeper baskets, lower pressure spray systems and a separate trough for fish discharge. Our fish-friendly diversion screens feature extremely low approach velocity flows, allowing the smallest, most fragile species to avoid impingement. Smooth-tex® flat wire screen surfaces minimize fish injury, and slots sized to the nearest 0.04” (0.1016 cm) exclude even very small fish.

Application Note

At Siemens Water Technologies, we can also upgrade an existing, inefficient screen to better-than-original condition. We're continually developing new component and screen designs for older installations to accommodate changed intake conditions, extend equipment life or reduce operating costs.

We can provide a complete turnkey retrofit, on-site or in our factory. Our dive crews are qualified to minimize down time for your plant.

Offering You the Best in Service and Support

Our engineering support services include hydraulic flow analysis using computer models to analyze water flow patterns and velocity ranges in order to accurately predict system demands and sizing requirements. We provide OEM replacement parts for all Rex® and Link-Belt® equipment ever made and for other manufacturers' equipment. Our factory trained service personnel are available worldwide to assist with emergencies or scheduled maintenance.



A Case Study: Modifications to Circulating Water Traveling Screens Save Fish at Salem Generating Station

When Public Service Electric & Gas Company's Salem Generating Station came up for license renewal, they were required by the state of New Jersey to modify their circulating water traveling screens (CWTS) for safer fish handling. Located on the shores of the Delaware River, Salem Generating Station is situated in an environmentally sensitive area. The Delaware Estuary contains approximately 200,000 acres of salt-water marshes fed by numerous rivers and streams.

PSE&G contacted Siemens Water Technologies about modifying their existing intake screens, originally manufactured by Envirex Incorporated (now part of Siemens Water Technologies). The main goals were to improve the survival of impinged fish and increase debris handling capability during peak loads.

We had worked with Dr. Ian Fletcher to develop fish-handling features used at power generation plants such as Entergy Nuclear Generation Company, Indian Point Energy Center Unit Two and Unit Three; Millstone Dominion Nuclear Unit Three Generating Station, Millstone, Connecticut Three Nuclear Power Station; as well as the original equipment installed at Public Service Electric & Gas Nuclear, LLC, Salem Nuclear Generating Station.

Siemens Water Technologies drew on its experience from these projects, along with ongoing development work, to design the most efficient and economical upgrade for Salem Station.

Siemens Water Technologies removed Salem Station's screens and sent them to its Madison, IN manufacturing facility, where they were disassembled, inspected, modified, and upgraded to better than new condition, then returned to the site. The upgrade included replacing the original stainless fish-handling baskets with lightweight, non-metallic baskets. The new baskets provide a refined hydrodynamic flow pattern, thus increasing the fish survival rate. Siemens Water Technologies also installed new drive units to increase travel speeds from 17.5 to 35 feet (5.3 to 10.7 meters) per minute, improving debris removal. The spray units were upgraded, improving both fish transfer and debris removal.

According to a technical paper presented by PSE&G at the 1999 EPRI Aquatic Impact Conference, "Biological operability testing data indicates that the modified CWTS units will significantly reduce overall fish losses when compared with the original Ristroph-type unmodified CWTS units."

The Conclusion: Siemens Water Technologies Intake Screen Modifications and Upgrades are the Best Solution for Meeting EPA "Fish-Friendly" Requirements

With over 30 years of experience researching and developing traveling water screens for safe fish handling, Siemens Water Technologies can economically retrofit your standard screens so they comply with the Best Technology Available requirement. We can also upgrade your screens for more efficient debris handling. Our engineering support services ensure that you get the best solution for your specific application; while our OEM replacement parts and factory trained service personnel keep your intake screens on-line.

Call today! 800-207-9490

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