



Protecting Our Environment

Helping Fish Breathe Easier

(NAPSA)—It's no fish story. Fish breathe oxygen. As water flows over their gills, they take oxygen from that water.

Nature provides oxygen in many ways. Aquatic plants "exhale" oxygen into water, much as land plants do into the air. Water flowing over rocks and other things grabs oxygen from the air. The wind stirs up lakes and ponds to disperse the oxygen throughout the water.

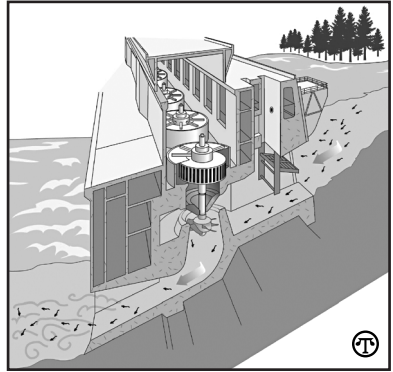
When humans tinker with Nature, though, things can change.

For example, some reservoirs and dams are built in deep, steep-sided river valleys. The water behind the dams can be very deep. Too deep for the natural de-stratification processes to occur. Decaying vegetation, pollution and agricultural runoff also upset the balance. The fish can't get enough oxygen to survive.

Fortunately, one company has been working on the problem for more than 50 years, creating systems that use artificial oxygenation to help clean rivers. It even teamed up with the Tennessee Valley Authority to improve aquatic habitat and help fish breathe by increasing dissolved oxygen in water near hydroelectric dams.

The firm now builds aerating turbines to provide an improved environment for fish. Several challenges, however, had to be met.

For one thing, the aeration couldn't significantly decrease turbine performance. "We have an obligation to the environment," said Richard Fisher, executive vice president of Voith Siemens Hydro Power Generation Inc., York, Pa. "But we also have an obligation to our shareholders and



Cross section of power plant showing conditions encountered by fish passing through a turbine.

the electric utility customers. We can't re-engineer a massive structure like a hydroelectric plant for environmental improvement while simultaneously ignoring the cost and performance parameters."

The good news is clever engineering held aeration-related efficiency losses to less than two percent when the systems were recently installed on power plants in Tennessee. The better news is the new turbines were almost four percent more efficient than the ones they replaced, so there was actually a net efficiency gain.

Another challenge was to keep the system simple and reliable. The aerating turbines take in air from their surroundings without pumps, compressors, blowers or other mechanized components.

"We've met and even exceeded our original goals," said Fisher. "The new designs are simple, effective and efficient. We knew we could do it, but we still breathed a sigh of relief when the final design worked so well." The fish are breathing easier, too.