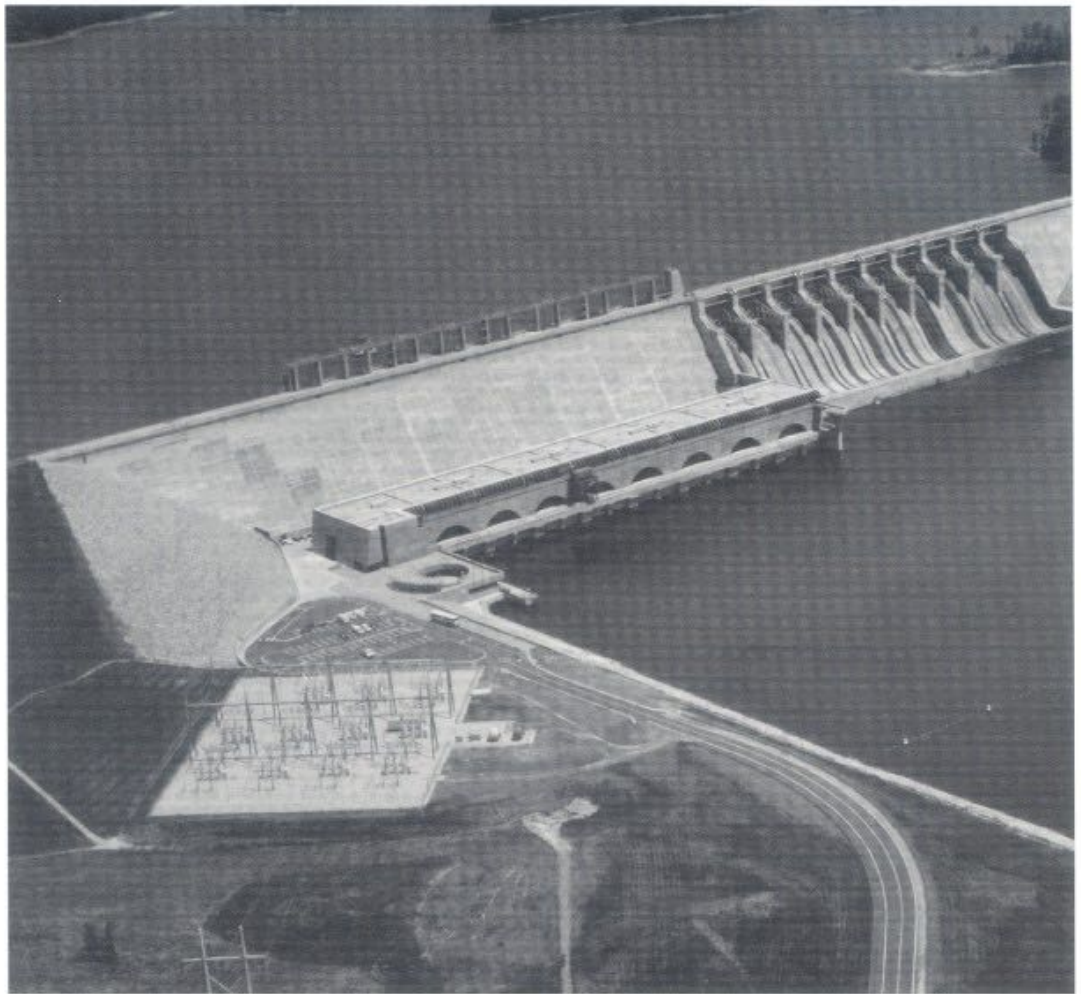


Using pure oxygen to increase dissolved oxygen levels can eliminate an environmental hazard in rivers, lakes and other waterways.



PURE OXYGEN BOOSTS WATER QUALITY IN LAKES, RIVERS AND RESERVOIRS

Federal and state clean water regulations require lakes, rivers and streams to have high enough levels of dissolved oxygen (DO) to sustain marine life. Although the minimum acceptable DO level varies by location and use, a concentration of at least 5 mg/L of water is the usual standard.

Low DO occurs most frequently as a result

of discharges from industrial processes. Plants that use large volumes of water often discharge their wastewater directly into local streams or rivers. These plants are required by permit to remove oxygen-demanding pollutants through wastewater treatment; sometimes, they must also increase the DO content of the plant effluent.

DO levels can also be depressed, in part, by natural causes. Lakes, reservoirs and rivers impounded by dams to generate hydroelectric power often experience seasonal drops in DO levels during warm weather periods, as a result of thermal stratification. At these times, warm water overlying cooler, denser water reduces oxygen levels in the lower layers, strangling fish and other aquatic life. Compounding the problem, hydroelectric dams locate their intake pipes low on the dam face, withdrawing the coldest, most oxygen-deficient water then discharging it downstream. This can create DO-deficient rivers, and lead to fish kills.

Airco Gases, a leading supplier of gases and gas handling technology, provides pure-oxygen dissolution systems for river and lake aeration.

O₂ ABSORBS FASTER THAN AIR

Several methods are used to infuse water with oxygen. Hydrogen peroxide can be quite effective in increasing effluent DO content, but the high cost of this chemical limits its use. Air, because it contains only 21% oxygen, is limited in its effectiveness by the rate at which it can raise DO level. Air systems are also often impractical, due to physical size constraints and associated capital and power costs.

Pure oxygen, because it is absorbed in water almost five times faster than air, is much more effective and efficient than air in raising DO levels, especially in large volumes of water.

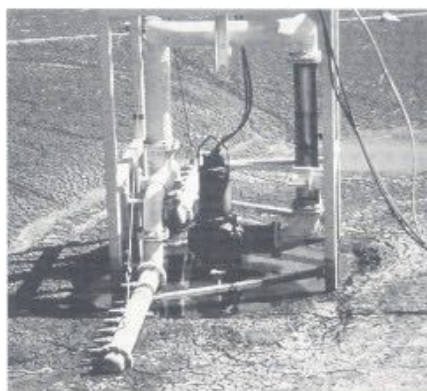
O₂ DISSOLUTION SYSTEMS

A number of systems — U-tube, packed column, downflow bubble contactor, low pressure diffusion, and pressurized sidestream — can be used to dissolve pure oxygen in water. The choice depends on a variety of factors, including efficiency, pumping requirements, facility layout and capital costs.

The Vitox[®] sidestream system is an efficient, cost-effective and low-capital means by which to dissolve oxygen in water. The system was developed and patented by The BOC Group, of which Airco, BOC's U.S. gases business, is an integral member.

HOW THE VITOX[®] SYSTEM WORKS

A sidestream of water is pumped at elevated pressure through a venturi where oxygen is injected. This oxygen-



The Vitox[®] drop-in unit is designed for easy installation and quick start-up.

super-saturated water is then rapidly dispersed into the plant's effluent or directly into a river, lake or reservoir through high velocity mixing nozzles. Oxygen flow rates can either be manually regulated or automatically controlled, using a DO analyzer and probe.

AIRCO PROVIDES DESIGN EXPERTISE

Airco has a great deal of experience in supplying pure oxygen for water treatment. Our application engineers will assess your facility's operating needs and design the best oxygen system for you. When the Vitox system is not appropriate, we can recommend alternative oxygen dissolution systems.

As a leading, full-service supplier of gases and gas handling technology, Airco will provide: application expertise and know-how; liquid oxygen and associated storage equipment; installation and start-up support; and operations and safety training.

If you would like more information about adding pure oxygen to boost the DO level in your effluent, lake, river or reservoir, contact the Airco Gases regional sales office nearest you. Or, telephone Airco's Commercial Development department, Water Treatment group, in Murray Hill, NJ: (908) 771-1744.



Airco Gases, 575 Mountain Avenue, Murray Hill, NJ 07974 (908) 464-8100 A Division of The BOC Group, Inc.