

Using Valves to Manage Water Flows

Editor's Note: This article is an excerpt from a broader article featuring applications at specific hydro projects of some of the products on display in the HydroVision 2006 conference exhibit hall. — MB

Saluda Dam, on the Saluda River in South Carolina, forms 48,000-acre Lake Murray. This reservoir provides water for the 206-MW Saluda hydro facility and the adjacent 252-MW McMeekin coal-fired generating plant. Both plants are owned by South Carolina Electric & Gas Company (SCE&G).

Normally, the cooling water for McMeekin is supplied from the hydro plant's Unit 4 penstock and returned to the penstock of Unit 2, says Ray Ammarell, senior engineer in fossil and hydro technical services for SCE&G. But when Unit 2's penstock is dewatered for maintenance or inspection, the McMeekin cooling water is discharged — at 113,000 gallons per minute — to the Saluda tailrace via a 30-inch-diameter fixed cone valve supplied by Henry Pratt Company of Aurora, Ill.

The valve was installed in 2003, when SCE&G relocated McMeekin's cooling water piping to accommodate construction of a new dam downstream from the existing Saluda Dam. The relocation gave SCE&G the opportunity to replace the 45-year-old Howell Bunger valve at McMeekin.

The new fixed cone valve is located at the free discharge end of a 60-inch bypass line, in a 6.5-foot-wide, 13.5-foot-long, and 10-foot-deep concrete pit in the Saluda plant's tailrace. The valve is operated by an electro-hydraulic unit, designed and built by Virginia Valve Company, a subsidiary of Henry Pratt. This unit automatically controls the amount of water discharged. Water discharges horizontally into the atmosphere, then falls into the Saluda tailrace.

Although the valve is used infrequently — only once or twice in several years — it allows McMeekin to stay on line when Saluda's Unit 2 pen-

stock is out of service, Ammarell says. "The Pratt valve has worked as expected when required," he says. "We used it in October 2005 for nine days of continuous operation and encountered no problems."

Pratt fixed cone valves come in a range of sizes, from 8 to 72 inches, and can be designed with or without a hood, depending on the application, says Mac Dixon, product manager with Henry Pratt.

A Pratt valve also is in operation at the 12-MW Santa Ana hydropower plant in the northeastern section of Bogotá, Colombia. The hydro plant operates in connection with the city's water supply. Potable water flows at 14 cubic meters per second from the largest water treatment plant in the country through the 2.5-kilometer-long Usaquen Alternate Tunnel and then through a 2-meter-diameter steel pipeline for 500 meters until it reaches the hydro plant.

When the hydro plant's turbine-generator needs to be shut down, a 54-inch-diameter Pratt in-line Model 711 sleeve valve serves as a turbine bypass to guarantee the continuous flow of potable water to the city.

"Our sleeve valve is unique in the world, taking into account the operating conditions and the fact that its operation must be extremely reliable to guarantee the potable water supply to 4 million people (nearly 60 percent of Colombia's population) without putting the operation of the electrical generation system in danger," says Oscar Garcia, project manager for The Water Company of Bogotá.

First conceived by the U.S. Department of the Interior Bureau of Reclama-



In October 2005, the new Pratt fixed cone valve at South Carolina Electric & Gas Company's Saluda hydro facility/McMeekin coal-fired generating station complex released 113,000 gallons per minute for nine continuous days.

tion's Engineering and Research Center in Denver, Colo., around 1972, Pratt sleeve valves are currently used in turbine bypass, flow control, free discharge, and pressure-reducing applications. The sleeve valve product line ranges in diameter from 8 to 54 inches. ■



A 54-inch-diameter Pratt in-line Model 711 sleeve valve serves as a turbine bypass at the 12-MW Santa Ana hydropower plant in Bogotá, Colombia, part of an overall water supply project.