

N277. Service Water Restoration at North Anna

Most of the pipes of North Anna's service water system (SWS) are corroding, but they are encased in concrete or buried, making access difficult. Virginia Power has had to devise a way of remediating the piping before wall thickness falls below allowable limits.

Since the plant was built in the 1970s, the carbon steel piping of the SWS has corroded and suffered wall loss because the bacteria in the water promote aggressive corrosion of carbon steel materials. From 1982 to 1992, much of this piping was replaced with stainless steel, with good operational performance. However, the large-diameter uncoated piping continues to corrode. Compared different kinds of solution from both technical and cost standpoints, in-situ pipe refurbishment emerged as the only way.

The solution consisted of three measures:

- 1) Enhanced chemical treatment of the service water reservoir to control the bacteria in the system.
- 2) A comprehensive cleaning, repair, and coating program for 550m of concrete-encased 0.61m piping.
- 3) A replacement program for 91m of direct buried 0.61m piping.

The repair process for the concrete-encased sections consisted of four steps:

- 1) Initial grit blast cleaning of the pipe interior to remove corrosion products.
- 2) Engineering inspection of the cleaned surface to identify any areas required weld repair.
- 3) Weld repair.
- 4) Application of a two-coat 100% solids epoxy coating system. Approximately 240m of concrete-encased piping were restored in this manner.

When the project is completed in 1996, more than 640m of 0.61m diameter piping will have been coated internally.

Taken from, "Service Water System Restoration at North Anna," by Mark D. Sartain, Nuclear Engineering International, October 1993, pp. 34-36. The author is with Virginia Power, P.O. Box 2666, One James River Plaza, Richmond, VA 23261, USA.