

GLOUCESTER WWTP RESTORATION

After biogenic sulfide corrosion attacked concrete structures at the wastewater treatment plant in Gloucester, Massachusetts, project engineers fought back with a Tnemec lining system specifically designed for severe wastewater headspace environments. "Existing concrete was deteriorating due to hydrogen sulfide (H₂S) gas and sulfuric acid resulting from the wastewater off-gassing," Tnemec coating consultant Larry Mitkus explained. "The engineer for the project specified a Tnemec lining system to protect the concrete from further corrosion attack. The coated structures included clarifiers, influent channels, settling tanks, and a new biofilter structure."

The highly eroded surface of the concrete was prepared in accordance with SSPC-SP13/NACE No. 6, ICRI CSP5 before applying Series 218 MortarClad, an epoxy cementitious resurfacer used for thin-patch repairs of concrete and was applied at 1/16-inch dry film thickness (DFT).

Series 434 Perma-Shield H₂S, a chemical-resistant epoxy mortar, was applied at 125 mils DFT to protect against H₂S and permeation of sewer gasses and sulfuric acid attack. The aggregate reinforcement of the epoxy mortar has properties similar to that of concrete, which prevents the system from cracking if exposed to thermal cycling. Additionally, the aggregate dissipates impact and abrasion that the system may encounter. A topcoat of Series 435 Perma-Glaze, a chemical- and solvent-resistant glaze, was applied at 15-20 mils DFT for added protection against H₂S gas permeation.

"These coatings are designed to resist hydrogen sulfide, which is the main chemical that converts to sulfuric acid when it mixes with water and that's very aggressive to concrete," Mitkus noted. "The coating contractor had used the Tnemec coating system in the past and was very proficient, making sure he had the right equipment. In the demanding field of industrial painting, the John W. Egan Company provided the professional reliability and know-how to successfully complete this challenging project."

The Gloucester Wastewater Treatment Plant processes 4 million gallons of sewage every day, which is pumped to the facility and processed through an aerated grit chamber where sand and stone is removed. From there, it is pumped to two primary clarifier tanks where liquid is diverted to tanks where it is chlorinated and dechlorinated before being released. Solids funneled from the clarifier tanks are dried and trucked to a plant in Maine.

The \$3 million rehabilitation project included installing aluminum covers over previously open tanks and piping corrosive sewer gases from the biological waste to the biofilter where the noxious odors are removed.

FEATURED PRODUCTS

Series 218 MortarClad

Series 434 Perma-Shield H₂S

Series 435 Perma-Glaze



PROJECT INFORMATION

Project Location

Town of Gloucester, Massachusetts

Project Completion Date

September 2005

Owner

Town of Gloucester

Architect / Engineer

Brown and Caldwell - Andover, Massachusetts

Fabricator / Applicator

John W. Egan Company - Newtonville, Massachusetts

A Perma-Shield lining system was used at the WWTP in Gloucester, Massachusetts to protect the concrete from H₂S gas permeation.

