Reinforced Epoxy System Remedies
Fuel Tank Corrosion
by Lori Huffman, JPCL

The application of a glass flake-reinforced epoxy system to the tank bottom and lower internal shell surfaces of a 10,000-barrel fuel oil storage tank at a Pennsylvania petroleum storage terminal provided the owner with three benefits: the maximum inspection interval allowed by the American Petroleum Institute (API) for an above-ground storage tank, reduced topside repairs, and quick turnaround, says the senior project engineer.

The 1999 lining project was precipitated by the results of a routine API 653 inspection, which identified underside and topside corrosion of the tank bottom.

Based on these results, the owner had three maintenance options. The tank bottom could undergo extensive welding repairs or replacement of the tank bottom, which might qualify it for a ten-year inspection interval based on the minimum bottom thickness remaining after repairs.

Another option would be to install a reinforced fiberglass lining, which would permit a 20-year inspection interval but would also entail a five-step application process and a five- to seven-day cure.

The third choice, lining with a fast curing, 100% solids glass flake-reinforced epoxy system, would provide the same inspection interval as the reinforced fiberglass lining, allow a lower permissible bottom thickness than a thin-film system (0.05 in. as compared to 0.1 in.), and have an applied cost lower than that of the reinforced fiberglass lining. The application costs would be similar to that of a thin-film lining system. In addition, says the project engineer, the reinforced epoxy’s one-coat application and fast cure of less than 24 hours would reduce downtime and return the tank to service, saving the owner weeks of lost revenue.

Preparing and Lining the Tank
Following the emptying and cleaning of the carbon steel storage tank by the owner, the contractor performed an
“inspection blast,” which is between an SSPC-SP 7, Brush-off blast and an SSPC-SP 6, Commercial blast (~Sa 1, Light, and Sa 2, Thorough). The inspection blast removes scale and exposes pitting for the purposes of magnetic flux evaluation, which is used to determine the extent of underside corrosion.

The inspection took place on June 1, 1999, and the lining project was carried out over four days, says David Cushman, general manager for the contractor.

The owner specified abrasive blasting to an SSPC-SP 10, Near White finish (~Sa 2.5, Very Thorough) and a profile of two to three mils (50 to 75 micrometers). After blasting, the contractor applied an epoxy holding primer by spray to a thickness of one mil (25 micrometers). The next day, the contractor applied the glass-flake-reinforced epoxy in one coat to the interior floor and to a distance of two ft (0.6 m) up the sidewalls, says Cushman. Heated plural-component equipment was used to apply the reinforced epoxy to a thickness greater than 50 mils (1,250 micrometers).

The project was inspected by the lining distributor’s representative, Tony Morkun, says the project engineer. The representative monitored the surface cleanliness and profile of the steel and checked for proper application of the system. Following a one-day cure, the contractor performed holiday testing with a high voltage spark tester, says Cushman. The tank passed inspection and was put back into service five days after the project began.

West Virginia Paint (Clifton, NJ) prepared and lined the storage tank. Industrial Environmental Coatings Corporation (Pompano Beach, FL) manufactures the epoxy primer and glass flake-reinforced epoxy. The lining distributor is Avilion Inc. (Downingtown, PA).