

## FEATURED PROJECT

# Circulating Water Line Internal Repair

**CUSTOMER**  
NRG

**APPLICATION TEAM**  
A & G Industrial Services, Inc

**SYSTEM**  
Carbon Fiber Pipe Reinforcement

**LOCATION**  
North East USA

**DATE OF APPLICATION**  
Feb 2016

**SUBSTRATE**  
Carbon Steel

PROBLEM

A significant leak on a circulating water line caused a forced outage at a power generation facility in the northeastern US. The piping system circulated 250,000 gallons of water per minute and was a critical component for the operation of the facility. The leak occurred on a 60" carbon steel pipe section of the circulating water line with an internal gunite liner. Once the gunite liner was removed and the steel was grit blasted, the full scope of the corrosion was revealed: several through-wall failures and many areas of deep pitting throughout the pipe (See Figure 1). A quick return to service and long-term reliability were critical factors when choosing the best pipe repair solution.



Figure 1 Deep Pitting in Host Pipe

After exploring a wide variety of pipe repair options, Advanced FRP Systems' composite carbon fiber reinforcement system was chosen. The composite system was engineered to fully restore the pressure capacity of this badly corroded pipe section, restoring the reliability of the circulating water system.

SOLUTION

### STEPS:

1. We removed the gunite liner from the leak area and grit blasted the steel to an SSPC SP-10 surface finish.
2. Deep pits and through-wall failures were filled with FRP Repair Putty to provide a smooth surface.
3. Two layers of high-strength, aerospace-grade carbon fiber were applied internally over the entire pipe segment, with an extra layer over any through-wall failures.
4. An immersion-grade, zero VOC epoxy topcoat was installed at 15 - 20 mils DFT.



Figure 2 Application of Carbon Fiber

- The composite carbon fiber pipe repair system provides a 20-year, maintenance-free service life.
- The system was quick and easy to install during a hectic forced outage.
- The system was engineered to meet the requirements of ASME PCC-2 (2015) Non-Metallic Composite Repair Systems: Low-Risk Applications.
- An internal carbon fiber wrap acts as a protective coating to prevent further steel degradation.



Figure 3 Application of HP-300 Epoxy

BENEFITS