

FEATURED PROJECT

Circulating Water Lines External Repair

CUSTOMER
NRG Energy

APPLICATION TEAM
A & G Industrial Services, Inc

SYSTEM
Carbon Fiber Composite Pipe Reinforcement

LOCATION
Staten Island, NY

DATE OF APPLICATION
Feb 2015

SUBSTRATE
Carbon Steel

PROBLEM

NRG Energy was experiencing systemic corrosion on its aging circulating water lines, including in areas that had previously been repaired by using a fiberglass tape coating. The most affected section consisted of a 60-inch diameter pipe that had multiple visible leaks, which if left uncorrected could have led to a major leak and potentially a shutdown.

During a planned outage, the unit was drained and inspected. It was found that the fiberglass tape had not properly adhered to the host pipe, allowing moisture to build up and accelerating the rate of corrosion leading to the formation of several large holes.

The plant opted for a high-strength, structurally independent composite carbon-fiber reinforcement system as a repair solution. In order to install this solution, the pipe surface had to be grit blasted for proper adhesion and relatively smooth for fabric lay-up.

STEPS:

1. Pits, weld seams and large through-wall failures were prepared for composite wrapping by using fabric tape and our Ceramic Repair Putty.
2. Three layers of a high-strength, aerospace-grade carbon fiber composite was wrapped around the pipe exterior.
3. The carbon fiber was saturated with a specialty, zero VOC epoxy resin that provides outstanding adhesion to blasted steel.
4. After wrapping the pipe was coated with an immersion-grade epoxy coating.

The system was installed and cured during the planned outage. The installation was completed without significant delay, despite the unexpected size of the through-wall failures. The unit came back online without any leaks and this section continues to operate without issue.

SOLUTION

BENEFITS

- The plant has a new, corrosion-resistant composite pipe which will provide a 20-year plus, maintenance-free, life extension.
- The composite repair provides greater than 3,000 psi adhesion to blasted steel, ensuring that water will not undercut the system.
- The carbon fiber can withstand 100% of the hoop stress of the piping system so leaks will not occur even if new, through-wall failures occur from internal corrosion.



Figure 1 Pipe Before Repair



Figure 2 Carbon Fiber Wrapping



Figure 3 Application of HP-300 After Repair