



Hurricanes Irma and Harvey have served notice... and we muscle through.

Dear Friends:

Hurricanes Irma and Harvey served notice of Mother Nature's overwhelming force, each in its own way. High winds and flooding have had serious consequences for many who live on or near the Gulf of Mexico.

The most valuable resource Curran has is our people – who make it all happen. For some, lives have been disrupted, and temporary remedies have been found. Home or car flooding claims now wait for the repair and replacement process to gain momentum.

Thankfully, all are accounted for.

Curran International survived Harvey, as it deluged the Texas Gulf Coast. Our Houston-area shop returned to normal operations within days of the hurricane. The severity of property damage inflicted by tropical storms is somewhat the result of its path. The chance of a direct hit is a factor we all live with on the Gulf Coast.

Gulf Coast industrial plant maintenance and turnaround plans for the coming months promise to change as a result of hurricane forced shutdowns. But, Curran has been groomed to adapt to industry demands, and respond to the expectations of a 24/7 industry.

The essential activities of rebuilding homes and communities will likely go on for years. We live, work and recreate on the Gulf Coast by choice. We will muscle through the challenges left by Harvey and Irma!

Gratefully,

Ed Curran

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A Once in-a-Generation Restoration

Power plant steam condenser tube replacement is a major, once-in-a-generation maintenance event. These can be large systems, each with a wide range of designed-capacities, depending on thermal demands.

A Turnkey Solution

Curran International offers a turnkey solution for condenser tube replacement projects.

Curran becomes the single point of responsibility for performing re-tube, and application of epoxy coating systems. Curran's qualified, multi-trade specialists have consistently demonstrated the craft-level competence required to lead these turnkey jobs.

The re-tube event also facilitates the restoration of condenser components. Waterboxes can be removed before the re-tube event, so a coating application can be scheduled during the tube replacement. The tubesheet coating work, however, must be completed after tube replacement.

The added-value of high-functionality epoxy coatings protects mild steel condenser components from galvanic and velocity/erosion corrosion, and maintains tube-to-tubesheet sealing integrity. Tightly coupling the re-tube, and tubesheet epoxy coating is essential.

A Recent International Project – Reviewed

Let's review a recent project in which an international client contracted Curran for turnkey condenser restoration.

Curran performed three condenser re-tube and cladding projects for this client. In the most recent project completed, the condenser made a 50+ year-run using copper alloy tubes.

Curran's project scope involved:

- Removing the existing tubes
- Installing and roller expanding new tubing, and
- Restoring and protecting the tubesheet using Curran epoxy cladding system.

The plant purchased tubes direct from mill. Further, the plant provided experienced manpower from a local plant mechanical contractor.

Single-Point Responsibility

Curran supervised and was responsible for the entire job scope – directing all aspects of the re-tube and tubesheet coating. Additionally, Curran provided all tooling, equipment, and materials.

There was no cooling water cathodic protection system in place and, as a result, tubesheets were heavily pitted from ongoing galvanic attack.

The overall diameter of the tubesheet was about 16' – the condenser shell had two tube bundles, each bundle had 4853 tubes. Tubes 90/10 CuNi, were 23mm diameter and approximately 26' L. The condenser cooling water was from a nearby fresh water source.

Tubesheets and waterboxes were carbon steel. The waterbox design enabled access to tubes through end covers that opened on hinges. At some sections of the tubesheet, the area outside the waterbox marginally compromised access to the length of tube. However, this was of minimal impact to the job compared to the option of removing and re-installing the waterboxes.

The plant collected the used tubes removed from the condenser and reaped the benefit from sale of the scrap tubes.

When tube installation was complete, the plant performed a hydro-static test to prove tube expansion into tubesheets met sealing specifications.

Immediately following the re-tube, Curran prepared the inside of the waterboxes for tubesheet coating application. Butyl plugs protected the new tubes during the grit blast surface prep of the tubesheets to NACE 1 "white metal" cleanliness. A forming plug was then used to set thickness of the polymeric epoxy cladding system.

Completing the Job

Curran used its 100% solids, two-part polymeric epoxy coating system, which is suitable for all cooling water systems. This coating system protects against cathodic disbondment, and has superior adhesive strength.

Firstly, a liquid grade epoxy "prime" coat wetted-in corroded pits at tube/tubesheet joint crevices. Then, a compatible high-build polymeric cladding was troweled across tubesheets. A top coat liquid epoxy left a glossy finish completing the coating work. The epoxy filled pitted areas, protects and inhibits new corrosion at a uniform finish of about 180 mils across the tubesheet.

The entire project required about 30 days to complete, including two required days off for local holidays. Nearly 6500 labor-manhours were expended.

Curran's execution of the project on-budget, and the use of local labor resources provided proven results for this power generation facility.

Contact Curran International at 281.339.9993, or edeely@curranintl.com for more information about field and turnkey services.



Tubesheets suffered severe corrosion, there was no cathodic protection system



Tubesheet cleaned to "white metal," forming plugs set to gauge coating thickness.



Tubesheet restoration complete using Curran International's polymeric epoxy cladding system.

PFA Coatings Improve Valve Reliability in Corrosive Service

Curran is Well-Known for Specialty Protective Coating Services

One coating service is the application of PFA fluoropolymer coatings, which are known to have superior resistance in many service applications corrosive to mild steel. Curran has been applying these coatings for more than 14 years. These coatings achieve a homogenous protective and cured film, which serves as a corrosion-resistant barrier.

A Recent Project

A recent project completed at Curran International offers an opportunity to explore this application.

A refinery client had specified a PFA coating application for a series of gate valves used in corrosive fluid service (see Fig 1). The material of construction for the valves was carbon steel, and the PFA coating was added to the design specification to improve service life. Stainless steel pipe will be connected to the coated valves.

The valves were shipped, unassembled, to Curran from the OEM. The initial task was to visually inspect the new fabrication components' weld-uniformity and excess splatter; and to test the substrate for machining lubricants. A separate test for soluble chlorides on substrate was also performed.

As part of the coating specification, the gasket seating areas at the flanges were masked and protected (see Fig 2) at the direction of the client. All surfaces to be coated were grit-blasted to NACE 1 "white metal" cleanliness. The grit blasting created an anchor-profile for the coating application.

The Work of Curran's Skilled Technicians

In figure 3 a prime coat application at a precise thickness is essential to coating system success. In figure 4, please note a coating technician using a fine spray to apply the coating.

The coating system is delicate and can be easily done incorrectly. Several coats are applied to reach the desired thickness, as well as ensure a pinhole-free surface. Holiday testing is performed to check for pinholes.

Curing the Coating

The PFA system requires a heat cure at 650°F with each coat; Curran has a convection oven large enough for batched loads of components. The cure cycle can require more than 24 hours of controlled heat up and cool down. Yet, the curing process cannot be hurried. If the coating is heated too quickly, it can delaminate and the coating process will need to be started over. (See figures 5 & 6 for finished products.)

After several applications, and only after the dry film thickness and coating holiday tests are accepted to meet the specification, a "release" top coat is applied. This final film reduces the adhesion of corrosive scales and deposits onto the surface-coated.

Contact Curran International at 281.339.9993 for more information about PFA and the other fluoropolymer coating applications for industry.



Fig 1



Fig 3



Fig 5



Fig 2



Fig 4



Fig 6

Catch Curran

NACE Corrosion 2018 Conference and Expo

April 15 – 19, 2018

Phoenix Convention Center, Phoenix, Arizona.



AFPM Reliability and Maintenance Conference

May 22 – 25, 2018

Convention Center, San Antonio, Texas.



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