Power Generation

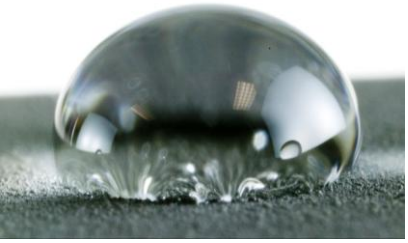
Case Study

FilmPro™ Corrosion Control

Mitigating Iron and Copper Transport During Power Plant Startup

In the power industry, addressing iron and copper transport during startup is critical for maintaining reliable operations and minimizing corrosion-related risks. One effective approach involves the use of Film Forming Products (FFPs). These chemicals serve as corrosion inhibitors, reduce corrosion product transport, provide smooth heat transfer surfaces, and protect equipment during shutdown or layups. In this case study, we explore the successful implementation of FFPs in a gas-fired power plant.

Benefits



- **Reduced Costs**
- **Protected Asset**
- **Minimized Risk**
- **Enhanced Reliability & Sustainability**

Background

- **Iron and Copper Transport:** Iron and copper are added to the feedwater through several different corrosion mechanisms. These metal oxides deposit on boiler tubes, leading to tube failures, increased maintenance costs and increased heat rate. These oxides also impinge on turbine blades, resulting in lost production and increased maintenance costs.
- **Cycling Operations:** Many plants are tasked these days with frequent cycling. The transport of metal oxides is particularly problematic for many plants for 2-3 days following a start-up.
- **FFPs:** FFPs form an impermeable layer on metal surfaces, inhibiting the direct contact of water with the metal, and thus minimizing corrosion. They consist of a dipole molecule with a hydrophobic and a hydrophilic end.

1 (844) 603-4077 Info@teamapex.com TeamApex.com

© 2025 Apex water and process Inc. All rights reserved.

FilmPro™ Nexus BC-1452

Case Study

Challenges

A 180 MW natural gas fired plant in Texas operates at 1900 psi and utilizes AVT(O) program. The plant has experienced **frequent cycling operations** over the past several years. They tried a popular FFP but had to stop due to **inconclusive results** and **prohibitive costs**. The plant was experiencing **iron and copper deposits** in their drums and sample basins. The plant utilizes millipore testing procedure (ASTM 03701) to monitor for metals, seeing significantly high levels during start-up. If allowed to operate for more than 2 days however, the levels would quickly reduce. The plant operators were **concerned about the negative impact of these contaminants on their tubes and turbine**.

Solutions

Team Apex recommended the FilmPro™ program with our proprietary product BC-1452. We believe the feed of the product would reduce iron and copper transport during start-ups.

The plant and chemical team worked together to develop a feed and monitoring plan to look at the effects over a period of 3 months during which the plant expected to have 5-6 start-ups.

The transport of iron and copper would be primarily quantified using milipore filter testing, but ICP testing and inspections during outages would also be performed.

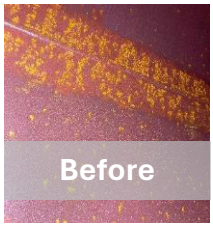
The plant wanted to be able to operate within EPRI limits within 8 hours of start-up.

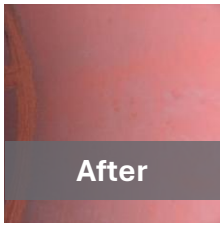
Results

Apex's BC-1452 was fed to the feedwater pump discharge in approximate proportion with feedwater flow. The unit only ran for 20 days, and the results were already exceptional for the four startups during this period. The plant now feeds this product continuously during operations, and the plant can **meet EPRI specs within 8 hours of start-up**.

START-UP (HOURS)	1	2	3	4	5
IRON READING / HOURS AFTER START-UP	450 ppb	200 ppb	150 ppb	50 ppb	<10 ppb

DA





Condensate Storage