

Power case study: FilmPro™ Nexus BC-1452



Mitigating Iron and Copper Transport During Power Plant Startup

OVERVIEW

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.

BACKGROUND

The facility was experiencing elevated iron and copper transport associated with multiple corrosion mechanisms within the feedwater system. Frequent cycling operations further contributed to the issue, with metal oxide transport becoming particularly problematic for several days following startup. These oxides deposited on boiler tubes and impinged on turbine blades, increasing the potential for tube failures, efficiency losses, increased heat rate, lost production, and higher maintenance costs. These conditions created a need for improved corrosion protection and greater control of metal oxide transport throughout the system.



BENEFITS



Reduced Costs



Enhanced Reliability
& Sustainability



Protected Assets



Minimized Risk

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

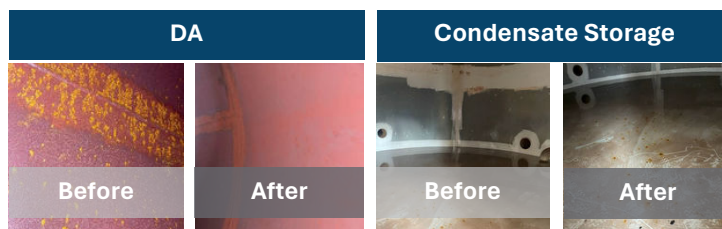
Team Apex recommended the FilmPro™ program with our proprietary product Nexus BC-1452. We believe the feed of the product would reduce iron and copper transport during start-ups. The plant and chemical team worked together to develop a feed and monitoring plan to look at the effects over a period of 3 months

during which the plant expected to have 5-6 start-ups. The transport of iron and copper would be primarily quantified using millipore 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 Nexus 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



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