

A vertical photograph showing water flowing through a pipe, creating a blurred, dynamic effect. The water is a deep blue color, and the motion is captured from a low angle, looking down the length of the pipe.

Filming corrosion inhibitor improves RWE gas fired power plant availability and reduces operating costs

SITUATION AND BACKGROUND

RWE is a large European utility company, seeking to optimize the operational flexibility of a 450 MWe combined cycle gas turbine (CCGT) unit in the UK. It also wanted to ensure that the regular start-ups and shut-downs could be conducted as quickly and as safely as possible to take advantage of profitable market conditions. Key requirements were to minimize harmful corrosion and iron transport during these transient periods and ensure that there was minimal impact on operational parameters such as steam purity and fouling of online monitoring and control equipment

The use of filming corrosion inhibitors is gaining in popularity as a result of the shift to intermittent operating regimes and Nalco Water has developed a new product which provides enhanced plant protection at low dose rates.

Nalco Water's novel POWERFILM™ 10000 Technology was used in conjunction with existing power industry best practice chemical treatment to allow the plant to respond flexibly to market demands and optimize plant availability and profitability

SOLUTION

Nalco Water proposed a comprehensive technical solution which included POWERFILM 10000, online corrosion product monitoring and on-site expertise to minimize corrosion rates during plant upsets and quantify the benefits delivered by the improved control.

The existing chemical treatment program of ammonia dosing was retained to ensure iron corrosion rates were minimized during normal operation. POWERFILM 10000 was applied to the condensate return pipework to generate a protective water repellent layer within the feedwater, boiler and condensate systems which provided enhanced protection during the plant load shifts.

Iron levels were monitored by grab sampling as well as by an online particle counter to measure the timing and extent of iron production. This allowed us to optimize POWERFILM 10000 dosing once a stable film had been created - thereby ensuring minimal impact on steam purity; an important requirement of power production from a steam turbine

RESULTS

A stable hydrophobic film (fig1) was initially generated by dosing at slightly elevated levels after which the dosing was gradually reduced. At each stage the particulate iron levels following start-up and shutdown were measured and compared to the baseline (no dosing) to evaluate the duration and extent of iron production from corrosion. Steam conductivity was also monitored to ensure that there was minimal impact on steam quality.

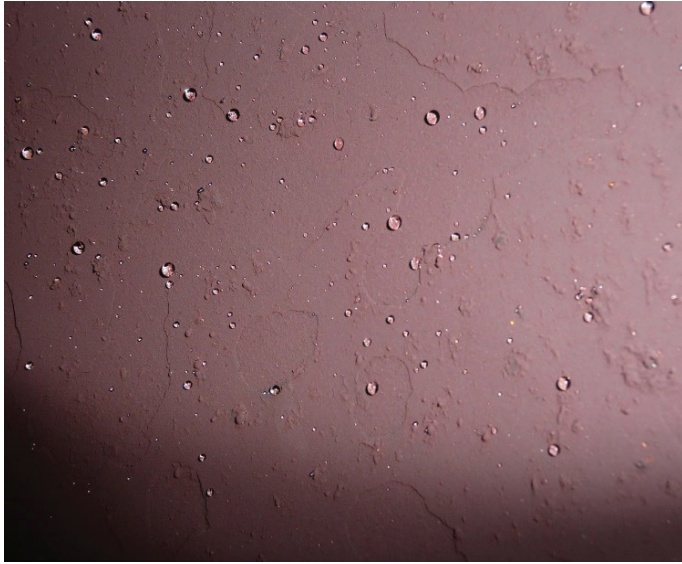


Fig1 - Hydrophobic surface in deaerator generated with Powerfilm

Extensive analysis of the online particle count data (fig 2) clearly showed a reduction in the level of iron produced during transient operation which would indicate lower corrosion rates during start up and shutdown.

Improved system protection allows the plant to operate more flexibly and take advantage of market conditions with less stress and damage caused to critical plant items. This will work to extend plant life and minimize routine maintenance and cleaning costs

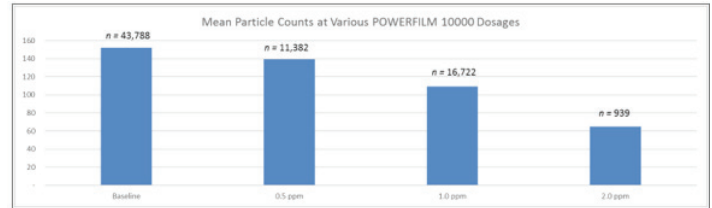


Fig2 - Mean particle counts from low pressure drum blowdown

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