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A dynamic corrosion stress management in power systems to maximize lifetime and reduce Flow Assisted Corrosion (FAC)

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ABSTRACT

The high efficiency combined cycle plant's heat recovery steam generator (HRSG) is a complex multi pressure system; therefore the control can be more challenging, particularly where load change or unit cycling makes it difficult. Mechanical, chemical and operational stresses directly impacts lifetime, operating availability, and maintenance costs.

This challenge also affects water treatment control and to keep steam-water chemistry reliable and safe. The plant flexibility is also forecast a need for a flexible/demand following steam-water cycle chemistry.

The corrosion of metals in high pressure and high temperature feedwater systems can be minimized by developing a thin, dense and elastic – passive – corrosion protection oxide layer.

Major advancements have been made in corrosion control through implementation of improved cycle chemistry management guidelines from EPRI and VGB. Yet general and flow assisted corrosion (FAC) control remains a challenge for many plant operators, particularly where load cycling makes it difficult to maintain a good passive protection layer of the condensate and feedwater systems, and when conditions favor FAC.

In this paper a technical solution in introduced to handle the variable HRSG water related stresses through more case histories.

With the combination of measurement and controlling of the water parameters by high temperature oxidation-reduction potential (ORP) and corrosion product transport measurements can be achieve an online HRSG water management. This minimizes stresses on HRSG systems therefore that able to follow on a smooth way the demand driven operation.

The case histories show that this innovative water chemistry management directly affects the plant total cost of operation and lifetime.

Keywords: Flow Assisted Corrosion (FAC), flexibility, lifetime extension, AT ORP