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Abstracts

Operational Flexibility Enhancements of Combined Cycle Power Plants

Stefan Murza and Norbert Henkel

High operational flexibility is an essential precondition to ensure economic success in a liberalized market. It is imperative that a plant has the ability to start and adjust load quickly and predictably to meet market requirements. Plants that were originally built as base load are being forced to operate as peak load or as cycling plants with daily start-ups because of current market conditions and increasing fuel costs. Plants running in this manner can install upgrades designed for combined cycle power plants (CCPP) in order to reduce start-up times and increase operational flexibility.

In order to deal with these issues the following solutions have been developed:

- Final stage HRSG attemperators and associated controls to adjust steam temperatures to steam turbine requirements independent of gas turbine load;
- Stress monitoring systems for the thick-walled components in the steam turbine and the HRSG with different start-up modes for flexible use of component life;
- Optimized main steam piping warm-up systems;
- Condensate polishing systems;
- Flexible steam purity requirements.

In addition to these, an improvement in the steam turbine start-up mode has been installed and tested in an operating unit, whereby the steam turbine is rolled off with the very first "cold" steam produced in the HRSG.

With these enhancements to operational flexibility an existing 400 MW CCPP can achieve a start-up time of less than 30 minutes after an overnight shutdown, which is approximately half the time required by a traditional combined cycle unit.

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Condensate Polishing – Discussion

In the March 2008 issue of our journal, the paper *Is Countercurrent Regeneration an Option for Condensate Polishing? Yes, It Is*, authored by Karol Daucik, appeared (PowerPlant Chemistry 2008, 10(3), 149–153).

As is standard practice in our journal, all comments on our articles worth publishing will appear without any changes (except some necessary format and grammar adjustments). Naturally, we reserve the right to neglect all disrespectful, offensive, or anonymous remarks or those not contributing to the clarification of the issue under discussion.

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Report on the BIAPWS 2008 Symposium on Power Plant Chemistry: Progress in Environmental and Cycle Chemistry

Richard Harries and Andy Rudge

This contribution provides summaries of the seven papers presented at the symposium and two workshops of the 10th Power Plant Chemistry Symposium, organised by the British and Irish Association for the Properties of Water and Steam (BIAPWS), held on 10 April, 2008 in Beeston, Nottingham.

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Thermal Fatigue of Stainless Steel EN 1.4541 in Conditions Simulating Nuclear Energy Circuits

Jaroslav Bystrianský, Petr Haušild, Lubomír Junek, Jan Siegl, Bohumír Strnadel, and Libor Vlček

EN 1.4541 (UNS S32100) grade stainless steel is the steel most frequently used in circuits of WWER type nuclear power stations. In the past a discrepancy was observed between corrosion aggressiveness and the occurrence of transgranular damage when this type of steel was exposed to high temperature water and/or during heat transfer. Transgranular cracking can be created as a consequence of both corrosion and non-corrosion processes. This article describes a study of the initiation stages of thermal fatigue cracks in steel EN 1.4541 subjected to repeated thermal shocks. Thermal fatigue cracks initiated spontaneously under the experimental conditions used. Cracks were fractographically investigated and the mechanism of main crack formation was revealed. Stress-strain analysis proves that stresses around the notch root are sufficient to cause mechanical fatigue damage.

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Reduction of SO_2 in Flue Gas and Applications of Fly Ash: A Review

Ling Li, Maohong Fan, Robert Clinton Brown, Jacek Adam Koziel, J. (Hans) van Leeuwen

Flue gas and fly ash are the two most important wastes from power plants. This review focuses on technologies for SO_2 removal from emissions and on properties and applications of fly ash. Flue gas desulfurization (FGD) technologies are the most commonly used methods in the removal of SO_2 in flue gas. Factors influencing SO_2 removal efficiency and optimal operation conditions are considered. Physical and chemical properties of fly ash make it useable in various fields, such as cement production, concrete admixtures, soil amendment, as a low-cost adsorbent of certain types of contaminants in wastewater, and in the production of effective wastewater coagulants.

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PPChem 101 – Fossil Cycle Chemistry
Lesson 4:
Feedwater Treatment

In the February 2008 issue, we introduced our project PPChem 101 "Fossil Cycle Chemistry" with the first lesson (*What Is Plant Cycle Chemistry and Why Is It Important for Steam and Power Generating Plants?*). In March, the second lesson (*Makeup Water Treatment*) and in April the third lesson (*Cycle and Component Design, Materials, Operating Mode, and Plant Cycle Chemistry*) followed. The goal of this lesson is to help the operator to take an active part in selecting the feedwater treatment and to understand the very complex interrelation between the site-specific conditions and plant cycle chemistry.

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