

ABSTRACTS

Distribution Ratio and Average Surface Coverage of Film-Forming Amines

Niels Voges and Wolfgang Hater

Film-forming amines have been successfully used as feedwater treatment additives for many years, particularly in industrial power plants. The results of systematic studies into their properties are intended to fill gaps in our knowledge of film-forming amines, so that this technology can be included in the appropriate guidelines for the treatment of steam generators.

Systematic experiments for determining the distribution ratio were therefore carried out in an operating pressure range from 20 to 100 bar using a steam generator pilot plant. Different film-forming amines were used at various initial concentrations. The distribution ratio was calculated by measuring the concentrations of the free film-forming amines in the condensate and in the steam generator (autoclave). The average surface coverage was also estimated by mass balance.

Based on the obtained results and on data from literature on the corrosive properties of chemicals, the film-forming amines were evaluated qualitatively with regard to their application in steam generators. It was found that oleyl propylenediamine has advantageous properties when compared with film-forming amines with different chemical structures.

PowerPlant Chemistry 2010, 12(3)

Oil-in-Water Fluorescence Sensor in Wastewater and Other Industrial Applications

Vadim Malkov und Dietmar Sievert

In order to simplify and accelerate the analyses of oil and grease in industrial wastewaters, particularly those discharged from various parts of the oil-refining process, an ultraviolet fluorescent sensor sensitive to polycyclic aromatic hydrocarbons (PAH) was tested. The correlation between total oil-in-water concentration and the concentration of the model PAH compound was found to be attainable in samples containing stable contents of oils.

PowerPlant Chemistry 2010, 12(3)

Flue Gas Desulfurization in the Czech Republic – Lessons Learned

Zbyněk Kraus

This paper presents experience with various flue gas desulfurization (FGD) systems at the power plants of the ČEZ Group, one of the ten largest energy companies in Europe. Lessons learned through the operation and maintenance of the first generation of FGD units, built and commissioned between 1994 and 1998, have been used to select appropriate design features for the reconstruction of old installations and the erection of new units, to enable compliance with even stricter legal regulations on emissions in the future.

PowerPlant Chemistry 2010, 12 (3)

A Discussion of the Use of Condensate Polishing on Ultra-supercritical Boilers

Michael A. Sadler

The ultra-supercritical (USC) boilers now entering service will probably utilize employ condensate polishing to protect their steam/water circuits against corrosion and deposition. It is expected that designs of these advanced boilers will continue to evolve with operating temperatures up to 760 °C (1 400 °F) eventually being used. This paper reviews the types of deep-bed polishers that are currently available and suggests designs that could meet the requirements of future USC plants. If the target for common inorganic impurities is set at $< 1 \mu\text{g} \cdot \text{kg}^{-1}$ (ppb), then any of the well-known systems will be suitable when used either in the conventional H-OH mode or in the economical ammonium form. These systems include naked mixed beds, cation-mixed beds, designs using separate beds in separate vessels and a proprietary layered separate bed process. There is a possibility that targets could eventually be set even lower, i.e., at $< 0.1 \mu\text{g} \cdot \text{kg}^{-1}$ (ppb). Even this lower target can be met by some naked mixed bed and separate bed polishers and is certainly achievable by cation-mixed bed polishing plants.

Deep-bed polishers remove particulate matter with a reasonable but variable efficiency, so it may be considered necessary to use a prior filtration stage. A number of successful designs of filters are known and considerable plant experience has been gained in the nuclear power field.

PowerPlant Chemistry 2010, 12 (3)

Real-Time Corrosion Product Transport Monitoring Using Online Particle Monitors

Joseph R. Zimmerman

This paper introduces the particle monitor as an effective means for continuously sensing and tracking the corrosion product transport. Transient metal oxides, in their insoluble particulate form, can be detected with the particle monitor. When such corrosion product transport monitoring methods are utilized, real-time particulate measurement can be implemented as an additional core parameter for operating and controlling the power plant cycle.

PowerPlant Chemistry 2010, 12 (3)

PPChem 101 – Boiler and HRSG Tube Failures**Lesson 5: Caustic Gouging**

R. Barry Dooley and Albert Bursik

University 101 courses are typically designed to help incoming first-year undergraduate students to adjust to the university, develop a better understanding of the college environment, and acquire essential academic success skills. Why are we offering a special *Boiler and HRSG Tube Failures PPChem 101*? The answer is simple, yet very conclusive:

- There is a lack of knowledge on the identification of tube failure mechanisms and for the implementation of adequate counteractions in many power plants, particularly at industrial power and steam generators.
- There is a lack of knowledge to prevent repeat tube failures.

The vast majority of BTF/HTF have been, and continue to be, repeat failures. It is hoped that the information about the failure mechanisms of BTF supplied in this course will help to put plant engineers and chemists on the right track. The major goal of this course is the avoidance of repeat BTF. This fifth lesson is focused on caustic gouging of water-touched tubes in conventional boilers and in the high-pressure evaporators of heat recovery steam generators.

PowerPlant Chemistry 2010, 12(3)