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Abstracts

Václav Petr, Michal Kolovratník, and Vilém Hanzal
Instrumentation and Tests on Droplet Nucleation in LP Steam Turbines

The aim of this paper is to provide a contribution to the droplet nucleation discussion by presenting the results obtained from new tests on 1 000 MW nuclear and 210 MW fossil steam turbines. The turbine tests consisted of prediction of the droplet size spectra and electrostatic charge of droplets in the steam. Measurement was carried out by means of a combined extinction–charge probe.

An additional aim of this paper is to provide information on the expansion chamber, which can be used for experimental prediction of the initial size and number of impurities present in expanding steam.

Richard R. Harries and Paul G. McCann
The Degradation and Distribution of Organics in Steam/Water Cycles of Drum Boilers

An investigation was undertaken into the distribution of total organic carbon, acetate and formate between the steam and water phases of a number of power plants with drum boilers. The boiler types included high pressure coal-fired and multi-pressure heat recovery systems. The key conclusions are:

- A high percentage of the organic matter in the steam/water cycle remains as non-reactive organic carbon and does not degrade to acetate, formate or carbon dioxide.
- Acetate is normally the dominant organic acid anion in the steam/water cycle.
- Retrofitting of reverse osmosis to a makeup water treatment plant changed the dominant organic anion in the steam/water cycle to formate.
- Boiler water with solid alkali dosing has a lower partition coefficient for acetate, formate and non-reactive organic carbon into the steam phase compared with AVT chemistry.
- In multi-pressure heat recovery boilers, the most effective way to reduce organic contaminants from the steam/water cycle is to preferentially blow down from solid alkali dosed LP drum water.

Eric Maughan and Hans-Dieter Pflug
Design and Operation of a Sampling and Analysis System to Meet the Needs of On-Line Monitoring of Cycle Chemistry in Modern Power Plants

The face of sampling and on-line monitoring has changed considerably since the 1970s. Initially the power plant was overpopulated with on-line analysers for the monitoring of the cycle chemistry. As the power industry began to economise, especially with respect to the labour force, many of these analysers fell into disuse and today only the minimum equipment is installed. However, standards and specifications with respect to the sampling and on-line monitoring of chemical variables have been compiled and are of great assistance to the end user in the selection of equipment. Additional criteria for selection include

- ease of operation
- reliability
- minimum maintenance

This presentation explores the dilemma of maintaining steam purity specifications whilst taking into account the economic operation of the plant versus the financial implications of poor cycle chemistry monitoring. The value of quality assurance and control as well as data logging and on-line diagnostics is also presented.

Ulrich Schirmer, Wolfgang Spiegel, and Wolfgang Müller
Phosphine Formation in Grate-Firing Systems

Last year, in several German waste incineration plants phosphine was occasionally detected in slag-handling areas (e.g., at slag extraction, transport, and storage sites). In some cases, the phosphine concentrations determined were higher than the maximum allowable workplace concentration.

For this reason, VGB PowerTech e.V. has initiated a VGB research project "Investigations into the Formation of Phosphides/Phosphine in Various German Waste-to-Energy Plants." This paper reports on the most important results of this research project. It focuses, among other things, on phosphine formation and properties, the half-life of phosphine, and the dynamics of phosphine release.

Consequences for the operator from the industrial safety point of view are discussed and adequate measures are proposed.

Brad Buecker and Paul Dyer
Flue Gas Desulfurization Systems for the Future

In large fossil-fired power plants worldwide, flue gas desulfurization (FGD) systems are becoming more and more a standard. The limestone-based and lime-based technologies are used in the majority of units in operation and are intended even for many new power plant sites. This paper gives an overview of the typical limestone-based wet and lime-based dry FGD systems.

Since sulfur dioxide control is not the only power plant air pollution issue, the development of multi-pollutant control technologies capable of simultaneous removal of SO_2, NO_x and mercury is very attractive. Two recently developed technologies, which are in large-scale testing, Powerspan's Electro-Catalytic Oxidation (ECO®) process and the BOC Group's LoTOx™ process using ozone are briefly introduced.

BIAPWS Symposium on Current Issues in Chemistry and Materials Science for Steam/Water Circuits in Power and Related Industries
May 7, 2003
Birmingham, England

This contribution contains the abstracts of all papers presented at this important symposium.

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