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Abstracts

Eighth International Conference on Cycle Chemistry in Fossil and Combined Cycle Plants with Heat Recovery Steam Generators
June 20–22, 2006
Calgary, Alberta, Canada

The EPRI International Conferences on Cycle Chemistry in Fossil and Combined Cycle Plants with Heat Recovery Steam Generators are the most important conferences dealing exclusively with fossil plant cycle-related topics worldwide. This contribution is a compilation of the abstracts of all the papers presented at this year's conference in Calgary, Alberta, Canada.

PowerPlant Chemistry 2006, 8 (8)

Critical Aspects of Ion Exchange Resin Performance in High Temperature Condensate Polishing Applications
Brian Hoffman and J. Denis Aspden

As more fossil-fired power stations are constructed in hot and dry regions, there is an increasing desire to practice condensate polishing at temperatures which approach and exceed 60 °C. In some cases, the condensate temperatures are even reaching the limits which are set by allowable back pressure on the steam turbine. This paper discusses the fundamental behavior of ion exchange resins in condensate polishers at high temperatures. The critical degradation mechanisms for both anion and cation exchangers are examined in terms of both resin life and, more importantly, their effect on overall process performance. The critical issues of silica, sulfate, and resin kinetic performance are discussed. Although routine operation of ion exchange resins above 60 °C is very stressful, suggestions are made for optimizing polisher performance and minimizing risks. By selecting the correct resins and applying good process design and operating practices, deep bed condensate polishing has been successfully practiced for many years at elevated condensate temperatures in fossil-fired generating plants.

PowerPlant Chemistry 2006, 8 (8)

A Multiparameter Instrumentation Approach to Makeup and Cycle Chemistry Measurements

David M. Gray

With fewer personnel to operate today's generating stations, on-line chemistry instrumentation becomes more critical. A practical approach to improving installed reliability and accuracy is the use of a high-performance multiparameter instrument platform. Its commonality of installation, functions, calibration and maintenance plus the availability of on-line computed parameters can have far-reaching benefits. Parameters of specific, cation and degassed cation conductivity, pH, dissolved oxygen, oxidation reduction potential and total organic carbon as well as the benefits of having them available within a common instrument platform are discussed. Also addressed are good sampling practices and appropriate sensor design, installation and maintenance.

PowerPlant Chemistry 2006, 8 (8)

Short Bed Ion Exchange Technology Produces Ultrapure Water without Using a Mixed Bed

Michael Sheedy

Conventional practice when producing water with a conductivity of less than 0.1 $\mu S \cdot cm^{-1}$ is to use a mixed bed ion exchange unit. This paper describes a novel short bed ion exchange technology that produces water of this quality using separate columns of cation and anion resin. The principle features of this technology include the use of compressively packed beds only 7.6 cm to 15.2 cm (3 in to 6 in) in depth, fine mesh resins that improve exchange kinetics, countercurrent regeneration, and low exchanger loadings. This results in a system that is much smaller and less complex than an installation with a regenerated mixed bed unit. Case studies are presented that describe operation of this technology for the treatment of a surface water source, a municipally treated water source, and reverse osmosis permeate.

PowerPlant Chemistry 2006, 8 (8)

Life without Mud – The Installation of Clarification Pre-treatment for Fitzroy River Water Make-up to Stanwell Power Station Cooling Water Systems
Stephen Kerr and Brett Connor

The design and operation of a new clarified raw water plant at an Australian power station using a proprietary Actiflo clarification arrangement are discussed with respect to plant priorities of water conservation, cooling efficiency, microbiological control efficacy and operational costs. Plant experiences with achieving a low suspended solids regime and new challenges and opportunities for this plant are presented.

PowerPlant Chemistry 2006, 8 (8)

Organic Impurities and Organic Conditioning Agents in the Steam/Water Cycle: A Power Plant Manufacturer's Point of View
Robert Svoboda, Frank Gabrielli, Herbert Hehs, Hans-Günter Seipp, Frank-Udo Leidich, and Bruce Roberts

Power plants are designed to run with pure water and steam. For simple cycles (no export steam) no other products should be necessary. If organic additives are used, the possible side effects have to be carefully addressed.

Possible side effects include corrosive degradation products, interference with monitoring cation conductivity, influence on boiling and on condensation, and fouling. Examples from boiler and turbine operation are given.

Organic amines produce volatile acidic degradation products, but the amine provides cations for pH counterbalance.

In contrast, organic oxygen scavengers, dispersants, chelants as well as organic impurities generally produce volatile acidic degradation products, but with no cation for counterbalance. For this reason, such products must be considered as potentially corrosive.

From a power plant manufacturer's point of view, any organic matter in the steam/water cycle brings the risk of detrimental side effects. The general use of organic additives should thus be avoided and restricted to specific needs and situations, as for example in certain process steam systems.

PowerPlant Chemistry 2006, 8 (8)