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Abstracts

An Overview of Condenser Cooling Water Leak Detection

K. Anthony Selby

High pressure electric utility cycles require high quality feedwater. The steam surface condenser is a potential major source of contamination. Once the condenser has been confirmed as the source of the contamination, there are several chemical and physical techniques available to pinpoint the source of the contamination so that it can be eliminated. This paper reviews those techniques and discusses their applicability in various situations.

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Report on the BIAPWS 2009 Symposium on Power Plant Chemistry

Geoff Bignold

The British and Irish Association for the Properties of Water and Steam held a Workshop on Chemical Aspects of Flexible Operation of Plant and a Symposium on Environmental and Operational Issues on 21–22 April 2009 at Beeston, Nottingham. Summaries of the eight papers presented at the symposium are provided.

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Optimizing a Tail-End DeNOx System by Installing a Static Mixer

Norbert Eimer and Martin Werner

Units 3 and 4 of the Grosskraftwerk Mannheim AG (GKM) power plant in Germany are supercritical units with hard-coal-fired slag-tap steam generators with double flue-gas reheat which were originally built in 1966 and 1970. The joint DeNOx system based on the SCR (selective catalytic reduction) procedure was commissioned in November 1988. For structural reasons as well as in order to prevent catalyst poisoning caused by complete ash recirculation, the DeNOx reactor was installed in a tail-end configuration, i.e., downstream of the flue-gas desulfurization plant (FGD). In order to obtain an optimal operating temperature for the catalytic conversion process, the flue gas is reheated by means of natural gas multiport burners.

Especially in plants where SCR systems are installed in a tail-end configuration, it is important that the ammonia is mixed with the flue-gas mass flow as homogeneously as possible before it enters the catalyst and that any existing temperature streaming is eliminated. After Unit 6 was modified for hard-coal firing, this precondition was no longer fulfilled. Owing to the given approval requirements, usually only one boiler is in service at a time – Unit 3 or Unit 4. For the DeNOx system, this results in partial-load operation with the flue gas velocities being accordingly low.

The following report describes the integration of a static mixer in the DeNOx system of Units 3 and 4. This measure was taken to level out both the temperature distribution downstream of the natural gas multiport burners and the NO_x concentration profile below the last catalyst layer – especially during partial-load operation – to such an extent that it was possible to substantially lower the flue-gas temperature upstream of the DeNOx reactor and reduce the natural gas consumption.

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Flow-Accelerated Corrosion (FAC) in Conventional Fossil Units: Cycle Chemistry Influences and Management Approach

R. Barry Dooley, Kevin J. Shields, and Steve J. Shulder

The authors have reviewed flow-accelerated corrosion (FAC) programs used at various types of conventional fossil plants. The results and findings of the assessments are presented and discussed. A number of emergent areas of FAC damage have been added to the previous suite of recognized susceptible locations with a concentration on damage due to two-phase FAC. Several deficiencies related to feedwater chemistry and FAC management approaches were noted to be common among the plants. These characteristics may influence the FAC susceptibility and awareness at other plants.

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Moss Animals: A Growing Nuisance in Industrial Cooling Systems

Timothy S. Wood and Michael Lore

Bryozoans are a common and natural part of biological communities in lakes and rivers. Sometimes called moss animals, they can also thrive in industrial pipelines, channels, and filters, where they become a serious nuisance. Total elimination of these pests is seldom an option. Management usually involves mechanical or chemical treatments, although other creative solutions are often possible. Effective control strategies require knowledge of the species involved and a grasp of life cycle timing for the geographic region.

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EDI Modules Perform Well at Bioenergy Combine in Scandinavia

M. López García and M. Lehtinen

A case study is presented of the installation and operation of a water treatment system at a Swedish bioenergy combine power plant. Pretreatment (softening), reverse osmosis and electrodeionization (EDI) modules have been integrated into a single design. The environmental, operational and economical advantages of the use of EDI over that of mixed bed deionizers are discussed. After 15 months of operation, the water treatment system with EDI has been shown to optimize performance, maintain continuous product quality and to produce a sufficient amount of high purity product water while using low energy consumption.

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