

ABSTRACTS

Nuclear Power Plant Cooling System Performance Improvement through Real-Time Monitoring, Diagnostics and Control

Andrew Kern, Peter Ten Eyck, and George Peabody

The nuclear power industry meets 20 % of the North American electricity demand with a high degree of reliability. The fleet of U.S. nuclear plants works to maximize generation and environmental performance while reducing their total cost of operation. Managing the impact of large open cooling water systems can be a challenge. Factors complicating the successful treatment of recirculating cooling water systems include variable makeup water quality, ever-tightening environmental discharge regulations, inadequate program monitoring capability and poor feed control of water treatment chemicals. Scale, corrosion and microbial growth in cooling water systems adversely effect nuclear plant performance by reducing heat transfer and plant efficiency, limiting plant generating capacity (unit derating), restricting flow in critical safety-related systems and increasing maintenance costs.

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Southport Power Plant Pretreatment Particulate Monitoring Evaluation

William Stroman

After experiencing severe fouling of cartridge filter elements and reverse osmosis (RO) membranes due to problems with the well water pretreatment system, the Primary Energy Southport Power Plant conducted a study on the continuous monitoring of the well supply and the filtrate quality using a particle counter and a particle monitor. The results, which indicate that such devices may certainly be useful for alarming operations personnel to undesirable well water conditions, are discussed in this paper.

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Is Countercurrent Regeneration an Option for Condensate Polishing? Yes, It Is.

Karol Daucik

Steam generating systems all require clean water. The effects of particulate material in the steam/water cycle on metal corrosion, erosion, cracking, and deposition are frequently observed. However, the physical/chemical mechanisms are often difficult to correlate with a specific plant event, since the periodic "grab" samples from various areas of the water/steam process which are generally conducted do not allow real time continuous on-line particulate monitoring and data collection. This paper introduces the concept of using particulate measuring instruments to monitor the steam generation cycle, and presents case histories of real world plant situations where on-line particulate measurement using particle counters and particle monitors has defined the source of a problem, quantified the severity of a problem, and provided a solution to a problem.

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On-Line Multi-parameter Measurements for Water Not Directly Associated with the Steam/Water Cycle of Power Plant

Eric V. Maughan and Karl Heinz Leleux

On-line analysis of chemistry variables enjoys a high priority in the monitoring of modern power plant, particularly in the steam/water cycle. However other water circuits and systems do not appear to enjoy the same status. This paper presents a multi-parameter, multi-channel on-line monitor for a wide range of chemical variables.

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PowerPlant Chemistry Interview

PowerPlant Chemistry talks to Dr. Joachim Fahlke, the senior chemist of the Grosskraftwerk Mannheim Aktiengesellschaft (GKM), Mannheim, Germany, and asks him some questions about the power plant and the chemist's function in this utility.

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Prediction of the Breakdown Voltage of Transformer Oil Based on a Backpropagation Network

Shun'an Cao, Rui Li, and Kai Sheng

Prediction of the breakdown voltage of transformer oil facilitates the early fault diagnosis of transformers, and provides a scientific basis for the prevention of faults in transformer oil. In this paper, based on the correlation between performance parameters of transformer oil, along with the excellent fault-tolerant ability, prominent non-linear approximation capability and self-learning capacity of backpropagation (BP) networks, a BP network with a BP algorithm and a BP network with an improved BP algorithm are developed to simulate the correlation between breakdown voltage and four relevant parameters, using the monitoring data of transformer oil. The results show that the latter algorithm gives more accurate predicted values, which proves to be of high application value.

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Sodium Hydroxide Treatment for Boiler Water – Some Questions and Answers

Albert Bursik

PowerPlant Chemistry has received a multitude of questions regarding currently used feedwater and boiler water treatments. This contribution addresses many of the inquiries about sodium hydroxide treatment, giving general information on the subject and providing references where the inquirers and readers of this paper can find more detailed information on the topics discussed.

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PPChem 101 – Fossil Cycle Chemistry**Lesson 2:****Makeup Water Treatment**

In Lesson 1, we learned that in any plant cycle – for manifold reasons – water and/or steam losses occur and that these losses have to be replaced by adequately treated makeup water. In this lesson, the focus is on makeup quality requirements, makeup water sources, makeup water treatment processes, makeup plant capacity, and makeup or makeup/condensate storage. The major task of the program is to help all non-chemists responsible for chemistry-related tasks, all power industry newcomers, and all engineers, whether chemists or non-chemists, to learn the fossil cycle chemistry basics.

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