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Abstracts

The Role of Dissolved Oxygen and ORP Measurements in Power Plant Chemistry

David M. Gray

ORP (oxidation reduction or redox potential) and DO (dissolved oxygen) measurements can provide valuable information in makeup water treatment, cycle chemistry control and stator coolant. Taking the time to understand the principles of operation of these sensors is a worthwhile effort to help specify appropriate equipment and to obtain successful results with it. This discussion describes the various applications for DO and ORP measurements in power plants. It then provides detail on the significance of these measurements and operation of the sensors.

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Reverse Osmosis Performance: Data Collection and Interpretation

Jane Kucera

The importance of properly monitoring and interpreting operating data to the successful and cost-effective operation of a reverse osmosis (RO) system cannot be understated. These data can reveal the health of the RO membranes and hence the health of the system. Knowing the condition of the system allows the optimization of operations and minimization of operating costs. This paper addresses the effective monitoring and accurate interpretation of RO operating data.

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New Econometric Models for Ion Exchange Systems

William E. Bornak

The basic operation of a cation/anion demineralizer is reviewed to identify different ways to end the service cycle and the economic impact of such choices. The regeneration process is then reviewed to develop an economic metric based on cost per standard volume of demineralized water. The impact of resin fouling on the metric is identified, with a focus on natural organic fouling. The effects on the metric of the use of a new procedure for deep cleaning organic fouling from anion resins are illustrated with real plant data. In addition, a new monthly metric is introduced to clearly identify the optimal time to clean or replace resin. A simplified resin sampling device is illustrated in an effort to obtain more frequent resin samples for analysis and tracking of fouling.

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Converting a Supercritical Unit from AVT(O) to OT

Adam Prust

Millmerran Power Station has two once-through supercritical variable pressure boilers that operate with a unit cycle chemistry philosophy to meet the EPRI guidelines for oxygenated treatment (OT). Prior to operating an oxygenated feedwater treatment regime both units had operated an oxidising all volatile treatment (AVT(O)) regime since commissioning.

The change of the feedwater chemistry for Unit 1, and subsequently Unit 2, from an AVT(O) to an OT philosophy was made with the expectation that direct and indirect costs associated with unit operation would be reduced. For Millmerran it is still early days to make quantitative estimates of cost reduction, therefore cost is qualitatively discussed. This report outlines the impact of the change in feedwater chemistry at Millmerran including impacts on cycle chemistry outcomes and plant operation. The plant improvements initiated for improved feedwater treatment and monitoring are also briefly discussed. Specifically the iron corrosion products measured at the condensate pump discharge and economiser inlet during and after Unit 1 and Unit 2 conversion from AVT(O) to OT are reported and demonstrate that both units are currently operating feedwater treatment to EPRI guidelines and are achieving most of the expected beneficial outcomes.

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Condensate Polishing – Discussion

In the March 2008 issue of our journal, the paper *Is Countercurrent Regeneration an Option for Condensate Polishing? Yes, It Is*, authored by Karol Daucik, appeared (PowerPlant Chemistry 2008, 10(3), 149–153).

In the May 2008 issue, a letter from Mr. Roberto De Martino commenting on the abovementioned paper appeared together with a response from the author, Karol Daucik. It was thought that the discussion about this topic would hereby be completed. This expectation has proven false: the editor has received further comments on this paper. To bring the discussion to a close, the editor asked Michael Sadler, a member of the Scientific Advisory Board of this journal, to write concluding remarks on this discussion. By the way, he is a worldwide-acknowledged expert in the field of ion exchange and in particular of condensate polishing. You may read a brief biography of Michael Sadler following his discussion.

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Dissolution Behavior of Nickel and Nickel Oxide Particles in Simulated PWR Reactor Coolant at Temperatures below 100 °C

Andreas Drexler, Alix Schneider, and Bernhard Stellwag

The dissolution behavior of nickel and nickel oxides at 30 °C and 90 °C was investigated by both thermodynamic calculations and experiments in a batch laboratory set-up. The calculations and the experiments were carried out at reducing as well as oxidizing conditions; the presence of B/Li as standard in primary cycles of pressurized water reactors was taken into account. The objective of the investigations was the optimization of shutdown and start-up conditions with the aim of removing nickel and its activated product ^{58}Co from the primary coolant system. As a result of the investigations conducted, two options for the optimization of nuclear power plant operation are presented.

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PPChem 101 – Fossil Cycle Chemistry
Lesson 5:
All-Volatile Treatment

In the February 2008 issue, we introduced our project PPChem 101 "Fossil Cycle Chemistry" with the first lesson (*What Is Plant Cycle Chemistry and Why Is It Important for Steam and Power Generating Plants?*). In March, the second lesson (*Makeup Water Treatment*), in April the third lesson (*Cycle and Component Design, Materials, Operating Mode, and Plant Cycle Chemistry*), and in May the fourth lesson (*Feedwater Treatment*) followed. The focus of this lesson is on the all-volatile treatment, the actual workhorse among the feedwater treatments.

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