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Abstracts

Luminescent Oxygen Sensor for Monitoring of Nuclear Primary Water Cycles

Frank A. Dunand, Nicolas Ledermann, Serge Hediger, Max Haller, and Christoph Weber

When we introduced a luminescent sensor to measure dissolved oxygen in water and steam cycles at the end of last year, a number of questions regarding its use in nuclear power plant applications remained open. The issues to be investigated were the behavior in the presence of hydrogen and the effect of radiation on the luminescent sensor. In collaboration with the Mühleberg Nuclear Power Plant in Switzerland a series of tests on the reactor water and the feedwater were performed to demonstrate the performance of the sensor in typical nuclear applications. In addition the system was exposed to high radiation intensities to validate the robustness of the sensor in a nuclear power plant environment.

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Press Release for IAPWS Annual Meeting at Lucerne, Switzerland, August 26–31, 2007

The official IAPWS announcement informs in detail about the Annual 2007 Meeting and contains information about the modified IAPWS Industrial Formulation 1997, the new "Release on the Ionization Constants of H_2O," and "Revised Releases on the Viscosity and Thermal Conductivity of Heavy Water." Several new ICRNs have been approved in the last year and appear on the IAPWS website. The next IAPWS meeting will be at the 15th International Conference on Properties of Water and Steam, to be held in Berlin, September 8–11, 2008.

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The Annual Meeting of the International Association for the Properties of Water and Steam (IAPWS), Lucerne, Switzerland, August 26–31, 2007

Eric V. Maughan

Each year the International Association for the Properties of Water and Steam (IAPWS) organizes a meeting of the Executive Committee and the four Working Groups (WG), viz. Thermophysical Properties of Water and Steam (TPWS), Industrial Requirements and Solutions (IRS), Physical Chemistry of Aqueous Solutions (PCAS) and Power Cycle Chemistry (PCC). The 2007 meeting was held in Lucerne, Switzerland, August 26–31. The IAPWS is an international association of scientists and engineers and serves as a forum where persons from the power industry and academics may share problems and formulate solutions. This paper presents a brief overview of the activities of the Power Plant Chemistry Working Group at the 2007 meeting.

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Implementation of Oxygenated Treatment in Drum Boiler Units at the Israel Electrical Corporation

Victor Marcu, Alexander Averbach, Daniel Zinemanas, and Shmuel Lev

Two drum boiler units at the Israel Electric Corporation's Orot Rabin power plant were recently converted to oxygenated treatment after having been operated on an equilibrium phosphate treatment for about 10 years. The decision followed some concerns regarding boiler phosphate carryover and early signs of flow-accelerated corrosion in the tubes of an economizer header. After more than one year in operation, the basic goal of feedwater iron concentration reduction has clearly been achieved. In this contribution the conversion process and its results are described and discussed.

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Iron Turbidity Removal from the Active Process Water System of the Kaiga Generating Station Unit #1 Using an Electrochemical Filter

Gopala Venkateswaran, Ashok Ganpati Kumbhar, Bushan Kishor Gokhale, Vadivelu Balaji, Nirmal Kumar Sarangi, Anil Kumar Sinha, M. D. P. Gupta, Suresh Bhaskar Jawale, Kasalanati Harikrishna, Nagaraj Nayak, Venkata Rao, Thachattu Sunil Kumar, and Anjali Choudhari

Iron turbidity is observed in the intermediate cooling circuit of the active process water system (APWS) of Kaiga Generating Station (KGS). Deposition of hydrous/hydrated oxides of iron on the plate type heat exchanger, which is employed to transfer heat from the APWS to the active process cooling water system (APCWS), can in turn result in higher moderator D_2O temperatures due to reduced heat transfer. Characterization of turbidity showed that the major component is γ-FeOOH. An in-house designed and fabricated electrochemical filter (ECF) containing an alternate array of 33 pairs of cathode and anode graphite felts was successfully tested for the removal of iron turbidity from the APWS of Kaiga Generating Station Unit #1 (KGS #1). A total volume of 52.5 m^3 water was processed using the filter. At an average inlet turbidity of 5.6 nephelometric turbidity units (NTU), the outlet turbidity observed from the ECF was 1.6 NTU. A maximum flow rate (10 $L \cdot min^{-1}$) and applied potential of 18.0–20.0 V was found to yield an average turbidity-removal efficiency of ~75 %. When the experiment was terminated, a throughput of $> 2.08 \cdot 10^5$ NTU-liters was realized without any reduction in the removal efficiency. Removal of the internals of the filter showed that only the bottom 11 pairs of felts had brownish deposits, while the remaining felts looked clean and unused.

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Condenser Tube Failures in Water-Cooled Condensers with Copper-Based Alloys

Albert Bursik and Hans-Günter Seipp

Integrity of the condenser is one of the most important prerequisites for optimum availability, reliability and performance of fossil and nuclear units. For many decades, copper-based alloys exclusively were used for condenser tubing. Recently, generic 300 Series stainless steels, proprietary austenitic and ferritic stainless steels, and titanium seem to have completely displaced the traditional copper-based alloys. However, arsenical admiralty brass, arsenical aluminum brass, and 70-30 copper-nickel alloy have been successfully applied in countless applications in units with once-through and circulating cooling tower systems. It is believed that also in the future copper-based alloys will maintain their important position among the condenser tube materials. This contribution focuses on operation experience and the most important types of tube failures in water-cooled condensers with copper-based alloys.

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Optimized Shutdown Chemistry Instead of Decontamination to Reduce the Dose Rate during Outages

Irene Mailand and Hartmut Venz

Integrity of the condenser is one of the most important prerequisites for optimum availability, reliability and performance of fossil and nuclear units. For many decades, copper-based alloys exclusively were used for condenser tubing. Recently, generic 300 Series stainless steels, proprietary austenitic and ferritic stainless steels, and titanium seem to have completely displaced the traditional copper-based alloys. However, arsenical admiralty brass, arsenical aluminum brass, and 70-30 copper-nickel alloy have been successfully applied in countless applications in units with once-through and circulating cooling tower systems. It is believed that also in the future copper-based alloys will maintain their important position among the condenser tube materials. This contribution focuses on operation experience and the most important types of tube failures in water-cooled condensers with copper-based alloys.

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