

Abstracts**Valérie Larbalestrier and Simon Gare****Combined Chemical and Physical Oxygen Removal Strategies for the Power Industry**

Over the last 25 years Ecolochem has gained knowledge and experience providing short term and emergency solutions to power industries worldwide. In 2001, the organisation began providing both short term and emergency services in Australia. This paper describes two techniques used for the removal of oxygen to meet the requirements of power stations, and finally reviews the combination of these two techniques.

Garry Craig and Steve Wheeler**Low Load Operation – Effect on Cycle Corrosion**

Market forces require intermediate loaded power stations (such as Eraring) to operate at low loads at times when prices are low. Lack of operational experience at these low loads has led to some operational problems, such as control of dissolved oxygen in the condensate. At lower loads dissolved oxygen levels are elevated due to both dilution effects (less flow) and the fact that equipment normally under pressure is placed under vacuum.

These higher dissolved oxygen levels in conjunction with sub-cooling of the condenser at these low loads leads to high levels of ammonia in areas outside the air extraction zone. The air extraction zone is protected by the use of 90/10 copper/nickel tubes. Tubes outside the air extraction zone are aluminium brass. Grooving of the condenser tubes can then occur when the condensate pools at a tube support plate (or sag plate) with these high levels of ammonia and dissolved oxygen.

Eraring Power Station has experienced many more condenser tube failures whilst operating at loads below 230 MW (below 35 % of unit capacity). Minimum load for units has now been pegged to this load following trials at 210 MW and as low as 180 MW.

This paper explores the failures experienced at Eraring and suggests some methods that may improve the situation at loads lower than 230 MW.

David J. Knights**Water Reform, Droughts, Fish and the Community: Tarong's Approach to Water Supply Issues and Risks**

Tarong Energy operates and maintains the 1 400 MW Tarong Power Station in Queensland's South Burnett region. The station is a major water user, drawing water from two major catchments in southeast Queensland.

Council of Australian Governments water reforms and Queensland's Water Resource Plans will leave a lasting impression on water users. The reforms and the resulting operating rules for water resources are important issues for large water users like Tarong Energy.

Droughts, the reliability of water supply, community and environmental concerns are some of the major issues confronting Tarong's past and future operations. This paper describes Tarong's approach to and options for dealing with the water supply risks, which have been numerous and complex.

Mirosław Gruskiewicz and Albert Bursik

Degassed Conductivity – Comments on an Interesting and Reasonable Plant Cycle Chemistry Monitoring Technique

Part 2: Degassing of Carbon Dioxide in Technical Degassed Cation Conductivity Monitors and Temperature Conversion of the Cation Conductivity Measured at Nearly 100 °C to 25 °C

The efficiency of degassing carbon dioxide in vented reboiling systems is discussed on the basis of thermodynamic equilibrium calculations. Even though the vapor containing carbon dioxide is continuously removed instead of remaining in contact with the liquid, it is believed that the thermodynamic model provides a realistic approximation of the actual process. The essential parameter of the model, the fraction of the solution evaporated, corresponds to the actual rate of evaporation before any possible reflux. The analysis of a number of examples indicates that the efficiency of carbon dioxide removal depends strongly on the rate of evaporation, and therefore, taking into account the construction and operation of typical degassed conductivity monitors, is expected to often be far from complete. The presence of impurity anions lowers the pH of the solution leaving the cation exchange column, suppressing the dissociation of carbon dioxide, and thus increasing its volatility. However, this effect is small at the levels of impurities that meet the usual requirements for high-pressure power plant cycles, and, additionally, the resultant decrease in conductivity can be at least partially masked by the increased concentration of non-volatile impurities. The problem of conversion of the conductivities of mixtures of unknown composition measured near the normal boiling point of water to ambient temperature (25 °C) cannot be solved due to non-trivial variations in ionic association and equivalent conductances between different electrolytes. The conversion equation proposed here is based on an empirical approach minimizing the probable error. The necessary ionic mobility data are based on a semi-empirical predictive method for the estimation of ionic mobilities as a function of temperature.

Richard T. Wilburn and Thomas L. Wright

SCR Ammonia Slip Distribution in Coal Plant Effluents and Dependence upon SO₃

The selective catalytic reduction (SCR) of nitrogen oxides by ammonia has become a common control technology for European and Japanese stationary combustion sources. It is becoming an increasingly more prevalent technology in the United States, yet has not reached the level of maturity as in overseas applications. As such, there are many differences in the fuel quality and other plant operating conditions that require special consideration, such as high sulfur bituminous coal and the effect of sulfur trioxide (SO₃) evolution and mitigation at the SCR catalyst. This paper addresses the formation of the ammonium deposits and the distribution of ammonia slip in plant waste streams as a function of SO₃ concentrations and other parameters. Many plant situations can expect some ammonia related plugging of air heaters and contamination of wastewater streams; however, in the case of burning high sulfur coal and the implementation of a SO₃ removal process, expected ammonia distributions can shift dramatically from air heater and electrostatic precipitator deposits to the absorption of ammonia directly into flue gas desulfurization process water.

Anthony C. Bevilacqua, Eric Maughan, and Marc St. Germain

Is the Measurement of TOC in the Steam-Water Circuit of Power Plants Really Necessary?

(German translation; this paper was published in our journal in English in January 2004.)

Total organic carbon (TOC) has evolved as an important measurement in power/steam generation over the past decade. Different measurement technologies are required as compared to the monitoring of TOC in wastewaters. The significance of TOC measurement in the pure water circuits such as found in power/steam generation is discussed. Different technologies are described which are available for the monitoring of TOC in pure water circuits. The advantages and shortcomings of each method are presented. An alternative technology to those currently in use is described.

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