

### **3486. Impact of PWR Primary Chemistry on Corrosion Product Deposition on Fuel Cladding Surfaces**

The results of this evaluation indicate that based on laboratory pH-dependent corrosion data of Inconel 600 at  $\sim 300^{\circ}\text{C}$ , the release rates of corrosion products, Fe and Ni, from the steam generators can increase significantly with decreasing pH for  $\text{pH}(300^{\circ}\text{C}) < \sim 6.5$ . In the pH range of 6.9 to 7.4, the pH-dependent release rate is less significant. The magnitude of the effect of increasing pH on reducing the corrosion product release rate in the PWR primary system cannot be established due to lack of data. Deposition of Fe, Ni oxide is expected at upper regions of the core due to decreases in the solubilities of soluble corrosion products with increasing temperature of the cladding surface. A simplistic model based on corrosion product solubility changes is proposed to illustrate the crud deposition process. In the presence of subcooled boiling, the fuel crud loading is proposed to be controlled by the source term, or the release rate of corrosion product. Estimates of fuel crud loading based on the source term concept were compared favorably with crud loading data taken at several PWRs.

*For more information see: EPRI TR-108783, Final Report, November 1997, 228 pages. Electric Power Research Institute, P.O. Box 10412, Palo Alto, CA 94303.*