

3452. A NEW WATER CHEMISTRY CONTROL METHOD FOR RADIATION REDUCTION OF BWR

The concentration of the iron crud in feedwater is known as one of the important factors affecting the magnitude of radiation dose rate on the surfaces of pipings and components of BWR primary circuit. Toshiba had proposed Ni/Fe control operation after the detailed analyses of water chemistry data of several middle generation plants. This operation was applied to many plants and was proved very effective (ref.1). Particularly, the radiation level and radiation exposure during the first annual inspection outage of Kashiwazaki-Kariwa Unit-1 are one of epoch-making results of Ni/Fe control effect.

In recent Japanese plants where new type "BJ" fuel was used instead of older type "RJ" fuel, radioactive cobalt concentration in reactor water increased unexpectedly in spite of the adoption of Ni/Fe ratio control operation. By the detailed analyses of water chemistry data of these plants, it was found that the release rate of radioactivities from the BJ type fuels increased than from the conventional fuels and consequently radioactive cobalt concentration in reactor water increased meaningfully compared to conventional plants.

To settle this situation, Toshiba has developed a new concept for the concentration of iron crud in feedwater, "Ultra-low Crud operation". This concept is to keep the amount of crud deposit on the fuel surface as low as possible by making the iron concentration in feedwater at extremely low level, and at the same time to lower the deposition rate of radioactivities on the out-of-core surfaces by keeping relatively high Ni ion concentration in reactor water. This concept and operation was successfully applied to two plants. The ultra low iron concentration in feedwater was realized by dual condensate polishing system, HFF plus deep bed demineralizer system. In this paper, the details of our new concept on iron crud concentration in feedwater including the history of the change of iron crud concentration will be presented.

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