

## “Reduction of Radiation at aged BWR plants by Water Chemistry”

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This is a presentation concerning the titanium dioxide (TiO<sub>2</sub>) treatment as an alternative method to Zn injection, which is a measure for stress corrosion cracking (SCC) mitigation and exposure reduction of BWR.

While hydrogen injection and the concomitant use of hydrogen injection and noble metal chemical addition (NMCA) are performed as some of the SCC mitigation measures for BWR, there are reports that an increase in Co-60 concentration in furnace water can be observed as a result of the implementation of these SCC mitigation measures, contributing to an increase of radioactive buildup on the primary cooling piping, and eventually to an increase of dose rate.

Another problem is that there are the cases where the water chemistry environment of the primary system changes from an oxidizing one to a reducing one, causing a change in the oxide configuration of corrosion film on the surface of the primary piping, and in a short period of one year after the implementation of chemical decontamination, the radiation level becomes higher than before the implementation of chemical decontamination. It is known that the rate of recontamination after such decontamination strongly depends on decontamination factor (DF) from the experience of actual units, and especially, the rate of recontamination is high when DF is low. In order to solve such a problem, the presenter is considering the application of TiO<sub>2</sub> treatment as an alternative measure to Zn injection.

According to the results of a Co-60 recontamination test after the implementation of decontamination by test loop (based on a T-OZON method), both Zn injection and TiO<sub>2</sub> treatment under HWC conditions were found to have a suppression effect on recontamination irrespective of DF, and so it was shown that TiO<sub>2</sub> treatment was a promising candidate as a measure for both SCC mitigation and exposure reduction. Moreover, the test results show that a synergistic effect between TiO<sub>2</sub> and Zn can also be expected.

