Program of in-pile IASCC testing under the simulated actual plant condition - Overview -

Hideki. TAKIGUCHI, Koji. DOZAKI, Nobuaki. NAGATA  
*Japan Atomic Power Company (JAPCO), Tokyo, Japan*

Hirokazu TSUJI, Takashi TSUKADA, Yoshihiro KOMORI  
*Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan*

In relation to the aging of Nuclear Power Plants, Irradiation Assisted Stress Corrosion Cracking (IASCC) has been regarded as one of the most important damage modes of core internals. IASCC is a kind of Stress Corrosion Cracking (SCC) of irradiated structural materials due to synergies of in-core environment and applied stress. In-pile testing under the simulated actual plant condition will be useful to understand IASCC initiation and propagation behavior. From this view, in-pile IASCC testing was planned using an irradiation testing facility, Japan Materials Testing Reactor (JMTR) in this program.

The goal of this study is to understand the correlation between IASCC behavior of stainless steels in actual reactor environment and results of Post Irradiation Examination (PIE). To reach the goal of this study, we had to develop key techniques for the in-pile test at JMTR at first, because we had no experience of in-pile IASCC test in Japan. In addition to the development of test techniques, we put forward two study items. The first is to compare the results of in-pile testing with those of PIE in order to check the influence of radiation field on IASCC. The second is to conduct PIE tests using irradiated specimens with different levels of neutron flux for the purpose of checking the influence of neutron flux level on IASCC behavior.

The schedule for this program is as follows,

   1) Development of key techniques for In-pile IASCC testing  
   2) Pre-irradiation of specimens
   1) In-pile IASCC testing  
   2) PIE (For comparison with in-pile testing)

The reports in relation to this study are composed of four papers. This paper summarizes the result of Phase-1, development of techniques for In-pile IASCC testing and pre-irradiation of specimens, and introduces the plan of Phase-2 study. Details of each study item are described in the following three papers.