

Effect of Tensile Strain on Microstructure of Irradiated Core Internal Material

Authors : Hygreeva Kiran Namburi, Anna Hojna, Edita Lecianova, FencI Zdenek

Abstract : Irradiation Assisted Stress Corrosion Cracking [IASCC] is one of the most significant environmental degradation in the internal components made from Austenitic stainless steel. This mechanism is still not fully understood and there are no suitable criteria for prediction of the damage during operation. In this work, core basket material 08Ch18N10T austenitic stainless steel acquired from decommissioned NPP Nord / Greifswald Unit 1, VVER 440-230 type, operated for 15 years and irradiated at 5.2 dpa is studied. This material was tensile tested at two different test temperatures and strain rates in air and at the elevated temperature under the water environment. SEM observations of the fracture surface documented ductile fracture of the samples tested in air, but areas of IASCC tested in water. This paper emphasizes on the microscopic examination results from the mechanically tested samples to determine the underlying IASCC physical damage process. TEM observations of thin foils made from the gauge sections that are closer to the fractured surface of the specimen aimed to find variances in interaction of dislocations and grain boundaries owing to different test conditions.

Keywords : irradiation assisted stress corrosion cracking, core basket material, SEM observations of the fracture surface, microscopic examination results

Conference Title : ICNMNF 2016 : International Conference on Nuclear Materials and Nuclear Fuels

Conference Location : Istanbul, Türkiye

Conference Dates : February 15-16, 2016