

ASATAR

Development and Analysis of the Suitability of Accelerated Testing methods for Assessing the long term Reliability of environmentally assisted cracking of nuclear components

OBJECTIVES

The project ASATAR aims to collect and analyse selective data of environmentally assisted cracking (EAC), long-term laboratory tests and field cases, for development of a new procedure for assessing the long-term reliability of nuclear components of LWR primary circuits including fuel assemblies. The effort will focus to stress corrosion cracking (SCC), i.e. EAC under constant loading. Respecting that a substantial part of time before SCC damage of components is spent to the crack initiation, the new procedure addresses mainly the crack initiation and will be based on a new idea of matrix of accelerated SCC tests (see Figure 1) and fracture mechanics methodologies for their assessment. ASATAR will analyse suitability of the accelerated tests with high total accelerating factor, the combination of several sub-factors, for prediction of the crack initiation time. Then, results of the analysis will be applied to consolidate and draft a large project - wider experimental program, within the proposed procedure could be verified.

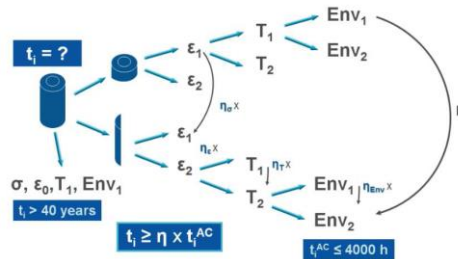


Fig.1: Idea of acceleration test matrix. From one component two different test specimens are made (stress factor), different local strain is applied (strain factor), test in two different temperatures (temperature factor) and two water environments (environmental factor).

DESCRIPTION OF WORK

The project is divided into the following work packages (WPs):

- WP1 "Multiple acceleration factors": Analysis of operational and laboratory test data for primary circuit components, acceleration factors of test specimens (CVR, Imp. Col., CIEMAT);
- WP2 "Accelerated cracking of fuel assemblies materials": Analysis of operational and laboratory test data for fuel assemblies' behavior and identification of proper acceleration factors and NDT (STUBA, CVR);
- WP3 Selection of materials, laboratory test methods and NDT (CIEMAT, CVR, STUBA);
- WP4 Outline of collaborative follow-up project.

MAIN RESULTS / HIGHLIGHTS

- Report on analysis of available lab and field data and identification of gaps and the cracking acceleration factors (consortium only),
- Report on suitability of SCC accelerated testing for assessing the reliability of Components (consortium only)
- Final public report with outline for building future collaborative project

DURATION

1 March 2015 – 31 August 2016
18 months

PARTNERS

CVR / CIEMAT / Imperial College / STUBA

CONTACT

Technical Project Leader:
Anna Hojna (Centrum Vyzkumu Rez, CVR)
anna.hojna@cvrez.cz