

Development of the Material Testing Program Within the DELISA-LTO Project

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DELISA-LTO (DEscription of the extended Lifetime and its influence on the SAFety operation and construction materials performance - Long Term Operation with no compromises in the safety) is an international project with the four years duration under the HORIZON-EURATOM-NRT-01 call (2022-2026). The project is primarily focused on structural materials harvested from decommissioned Jaslovské Bohunice NPP (Slovakia, Unit 1 and 2, operated 28 years, VVER-440 type). Testing of the harvested material, subjected to real operating conditions, is promising opportunity to acquire new information about material degradation in real operated NPPs and to obtain important data for the LTO processes of currently operated reactors. The project is aimed mainly on the experimental evaluation of thermal ageing (components of the primary circuit) and swelling computational benchmark (reactor pressure vessel internals). Combination of the simulation tools and experimental techniques – e.g., mechanical testing and NDT inspection methods will help to understand thermal ageing and swelling phenomena which are significant materials degradation processes of the nuclear power plant components. Harvested materials include mainly the primary circuit components, e.g. main circulation piping and pressurizer surge line (stainless steels). Experimental activities within the projects are planned as complex interlaboratory study for the generated data credibility enhancement. To ensure the harmonization of experimental techniques series of detailed questionnaires have been prepared, distributed to participating laboratories and subsequently evaluated. Paper presents all necessary steps performed within the systematic experimental material matrix development procedure. Collected data and developed experimental matrix provide basis for subsequent planned activities within the DELISA-LTO project.