

## INCEFA-SCALE

# INcreasing safety in NPPs by Covering gaps in Environmental Fatigue Assessment - focusing on gaps between laboratory data and component SCALE

### ● OBJECTIVES

The objective is to continue work, advancing ability to predict lifetimes of Nuclear Plant components when subjected to Environmental Assisted Fatigue loading. EPRI in the USA is leading a series of component scale environmental fatigue tests which are expected to advance data availability significantly; however, ability to address transferability of laboratory scale tests to real component geometries and loadings will still be constrained by limited test data. This is the knowledge gap addressed by this project; it is recognised worldwide as significant.

### ● EXPECTED IMPACTS

INCEFA-SCALE will generate significantly increased understanding of the transferability of laboratory scale test data to component scale. The project strategy will be (1) the development of comprehensive mechanistic understanding developed through detailed examination of test specimens and MatDB data mining, and (2) testing focussed on particular aspects of component scale cyclic loading. The project will begin by “data mining” to extract maximum understanding from the vast amount of test data within JRC’s MatDB database (from the predecessor INCEFAPLUS project, and from other external sources such as USNRC, EPRI, MHI and the AdFaM project). In parallel the test program needs will be agreed. Testing will commence after one year and run for 3 years. Finally, the project will deliver guidance on use of laboratory scale data for component scales.

### ● HIGHLIGHTS

Industrial support, is demonstrated by over €3M matching funds and positive endorsements from EPRI, ENEN and NUGENIA. Close ties will exist between INCEFA-SCALE and the EPRI Component Test project. Furthermore, collaboration with USNRC and NRA will continue for INCEFA-SCALE. As international stakeholders, the opinions of these organisations will be valuable for shaping testing requirements, and for developing appropriate and useful mechanistic understanding. Equally, this high level of international collaboration provides the opportunity for the views of INCEFA-SCALE to influence the course of the Component Scale tests. The combining of INCEFA-SCALE focused testing, with the results of the EPRI Component Scale tests, results in a project outcome that advances from Technology Readiness Level (TRL) 4 (technology validated in lab) to TRL 6 (technology demonstrated in relevant environment).

### ● PARTNERS

Jacobs Clean Energy, PSI, UJV-Rez, VTT, CIEMAT, IRSN, University of Cantabria, CEA, JRC, Framatome, EDF, Inesco Ingenieros, Rolls-Royce, Kaunus University, KAERI & University of Manchester

### ● DURATION & BUDGET

October 2020 to September 2025- 5 years  
€4M

### ● CONTACTS

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### ● EVENTS

Two workshops are anticipated, one approximately 3 years after kickoff, and one at the project conclusion.

