

CoreSOAR

In-Vessel Core Degradation State-of-the Art Report Update

OBJECTIVES

In 1991 the OECD published the first State-of-the-Art Report (SOAR) on In-Vessel Core Degradation, NEA/CSNI/R(91)12, updated to June 1995 under the Euratom 3rd FWP, EUR 16695 EN, 1996. This report covered phenomena, experimental programmes, material data, main modelling codes, code assessments, identification of modelling needs, and conclusions/recommendations, including the needs for further research. This knowledge is relevant to safety issues, such as in-vessel retention of the core, recovery of the core by water reflood, hydrogen generation and fission product release.

The aim of CoreSOAR is to update these reports considering the relevant work done in the last 20 years, producing a new detailed SOAR and publishing the results in the open literature.

DESCRIPTION OF WORK

With the previous EC review of 1996 as a starting point, the state-of-the art will be reviewed taking into account open published material as much as possible.

- The technical issues are those covered in the previous CSNI SOAR and its EC update, and in the OECD/CSNI Validation Matrix of 2000. Particular attention will be paid to the results of Phébus FP and relevant ISTC Russian collaboration), OECD and national projects, code benchmarks, and the concluding reports of the two SARNET EC projects, including consideration of research priorities.
- It also considers the experimental database and the major severe accident analysis codes used in Europe for severe accident analysis in operating water-cooled reactors. The work carried out is consistent with the 2015 NUGENIA global vision roadmap.
- Therefore particular attention will be paid to in-vessel melt retention, including BWR-specific aspects (with respect to Fukushima), and links with the H2020 IVMR project on in-vessel melt retention, a high priority research issue within NUGENIA/SARNET Technical Area 2 (severe accidents).
- Thermophysical databases will be specifically treated.
- Other features treated for the first time are CANDU-specific matters, VVER-specific matters, and the important industry severe accident analysis code MAAP, used widely for PSA level 2 studies.

MAIN RESULTS / HIGHLIGHTS

The project kicked off on the basis of a technical project plan approved by all partners, and which indicates who is responsible for each part of the report. It includes a detailed review to ensure a consistent level of detail. The chapter on the need for further research on in-vessel core degradation will receive particular attention.

DURATION

1 July 2016 – 30 June 2018
2 years

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PARTNERS

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