R2CA

Reduction of Radiological Consequences of Design Basis and Design Extension Accidents

IRSN INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE

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Evaluation of more realistic safety margins through the Radiological Consequences (RC) of bounding accidental scenarios & development of innovative accident management approaches and safety devices

R2CA Members
17 Organizations (11 Countries)

Duration
01.09.2019 – 31.08.2023

Commitment
522 personmonths

Overall Budget
€ 4.2 M€ (~ ¾ funded by EU)

Consortium

IRSN INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE
TRACTEBEL ENGIE
mta EK
EDF
ENEA
BOKU
ÚJV
NUCLEAR AND INDUSTRIAL ENGINEERING
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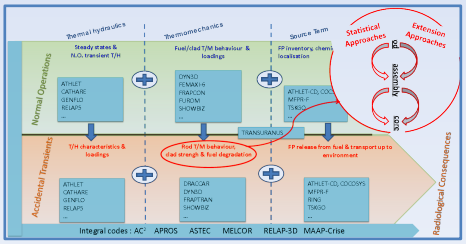
HZDR
HELMHOLTZ ZENTRUM DRESDEN ROSSENDORF
POLITECNICO MILANO 1863
ÚJV
SSTC NRS STATE SCIENTIFIC AND TECHNICAL CENTER FOR NUCLEAR AND RADIATION SAFETY
Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas

Challenges & Scope

1. **R**educe the degree of conservatism in release evaluations of selected bounding scenarios by improving the simulation tools and the calculation methodologies
2. **I**ncrease the safety level of NPP by development of innovative devices and smart tools for early diagnosis of accidents

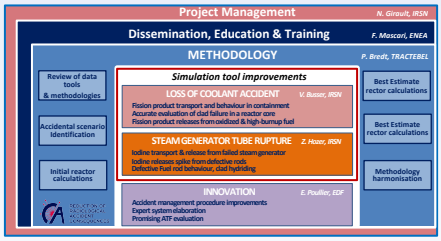


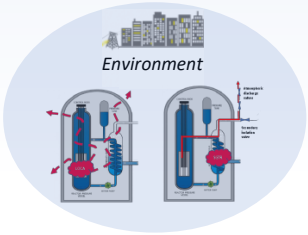
Objectives & Means

- **E**laborate updated and harmonized methodologies for release evaluations applicable to operating/future reactors (PWR, BWR, EPR & VVER) and for optimization of EP&R actions
- **P**rovide analytical rationales for the development of innovative systems (ATF, safety devices or measures)
- **S**upply the analytical basis and develop a prototype advanced tool based on Artificial Intelligence (AI) for anticipating reactor accident diagnosis

Structure

- **WP2-METHOD:** Proposals of harmonized methods of evaluation of the RC as a marker of safety margins for LOCA and SGTR categories of DBA and DEC-A accidents
- **WP3-LOCA:** Development of knowledge and of accurate evaluation tools for the assessment of the RCs for LOCA bounding scenarios of both DBA and DEC-A domains
- **WP4-SGTR:** Development of knowledge and of accurate evaluation tools for the assessment of RCs in SGTR bounding scenarios of both DBA and DEC-A domains
- **WP5-INNOV:** Evaluation of gains of new accident management actions and instrumentation, of promising ATF and exploration of the capabilities of prognosis evaluation tools using AI functionalities





Impact & Innovation

- **R**einforcing reactor safety cooperation in Europe by bringing together Research Organizations, TSOs, Utilities and Designers from different countries and connecting the fuel safety and source term research communities
- **P**ooling knowledge and means by sharing the upgraded models for best estimate reactor calculations of foreseen scenarios and harmonizing the methodology for releases evaluation in various European reactors
- **I**nnovating by use of AI to turn the prognosis tools into diagnosis ones and by evaluating the most promising ATF concepts

Communication, Education & Training

- **P**ublications in scientific journals and international conferences
- **P**ublic project website & **A**nnual newsletter with main highlights of the project, **C**reations of Social Networks accounts
- **C**ommunication with international organizations, networks, associations (e.g. IAEA, OECD/NEA, ETSON, SNETP, NUGENIA, etc.) in order to update periodically about the project status and the main achievements
- **S**et-up of an End-Users Group (researchers from institutions not participating to the project, stakeholders, etc.)
- **T**wo International Open Workshops to disseminate the main achievements and results of the project
- **T**raining Sessions on simulation tools to involve effectively students and young researchers in the R2CA community
- **S**ummer School for knowledge dissemination and education and training of young researchers
- **M**obility program for supporting doctoral dissertations, PhD students, post-docs and/or young researchers on the R2CA themes

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