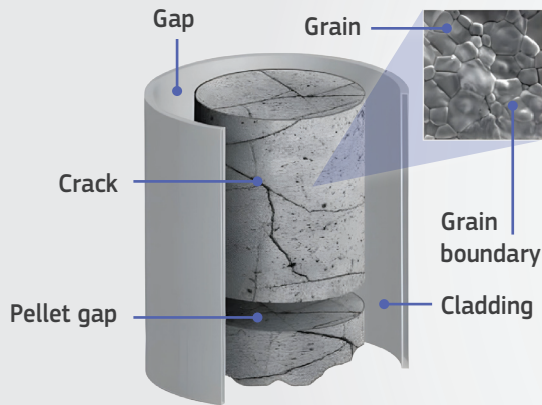




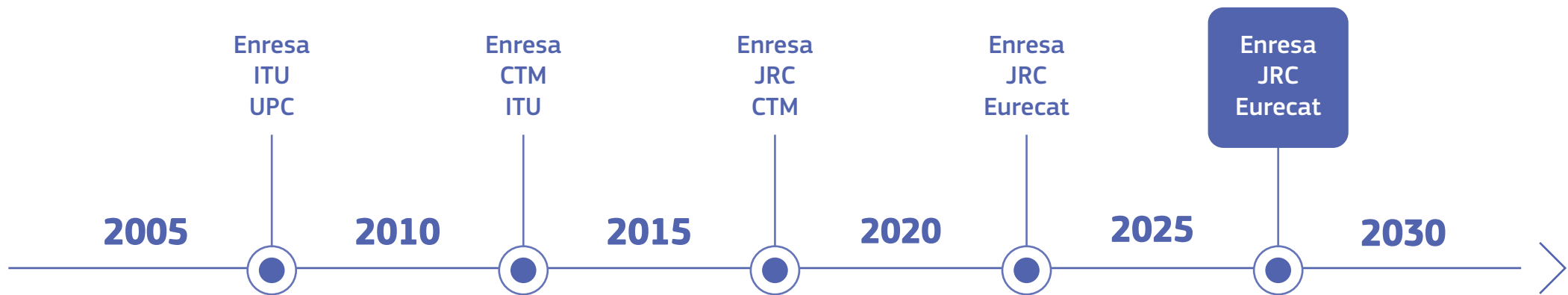
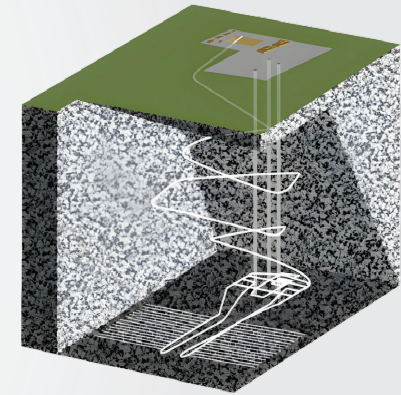
European  
Commission

# 20 YEARS OF SUCCESSFUL COLLABORATION BETWEEN THE JRC AND SPAIN

# 20 years providing scientific evidence and knowledge to improve the development of Spanish spent fuel program for geological disposal



From **fundamental studies**  
to **policy implementation support**



# 20 YEARS OF COLLABORATION

Access to JRC laboratories and **hot cells** that are unique in Europe

10 researchers **trained**, 7 continued their career in the radioactive waste sector

Participation in the **Euratom** Research on Spent Fuel

**Scientific excellence** through >10 papers and >20 conferences





## RESEARCH TOPICS

2005



### Matrix Studies

Dissolution of fuel matrices under dynamic and static conditions.

### IRF Studies

Instant Release Fraction (IRF) in final repository conditions.



### Irradiation Effects

Influence of fuel burn-up and linear power density on Spent Nuclear Fuel (SNF) aqueous stability.

### Reactor Type

Comparison of fuel behaviour after disposal of Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR).



### Sample Representativeness

Ensuring accurate sampling accounting for heterogeneities within a Spent Fuel pin for BWR and PWR.

2025 and beyond



## SCIENTIFIC HIGHLIGHTS

- ✓ **Long-term Experiments:** Over 35 long-term experiments involving seven actual **spent nuclear fuel** samples have generated critical data that improves confidence in assessing the safe performance of deep geological repositories in Spain.
- ✓ **High Burn-up structure:** The **protective** qualities of the High Burn-up structure in preventing radionuclide release have been established.
- ✓ **Strontium:** Experimental studies showed that strontium plays a key role in the **Instant Release Fraction**, challenging the previous notion that it was merely a matrix indicator.
- ✓ **Cement dissolution effect:** High-pH solutions, result of the interaction of groundwater and cement, demonstrated an **increased** dissolution rate of **molybdenum** and **technetium**, important for evaluating long-term disposal safety.
- ✓ **Calcium:** Scientific findings confirmed that calcium **inhibits** the release of uranium from spent fuel.
- ✓ **Instant Release Fraction Insights:** Research indicates a correlation between the instant release fraction and **linear power density**, rather than with burn-up levels.
- ✓ **Data Analysis Model:** The SERNIM model has been developed to improve data analysis and provide **forecasts** for essential aspects of Performance Assessment studies.

# Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society



**EU Science Hub**

[joint-research-centre.ec.europa.eu](http://joint-research-centre.ec.europa.eu)



Publications Office  
of the European Union

doi:10.2760/8611478

ISBN: 978-92-68-25787-6