



JRC activities in Nuclear Safety



G.F. De Santi
Director

**Joint Research Centre – European Commission
Institute for Energy and Transport (IET)**



The mission of the Joint Research Centre (JRC)

...is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies.

As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union.

Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.



JRC current Structure

7 Institutes in
5 Member States



IET - Petten The Netherlands
Institute for Energy and Transport



IRMM - Geel Belgium
Institute for Reference Materials and Measurements



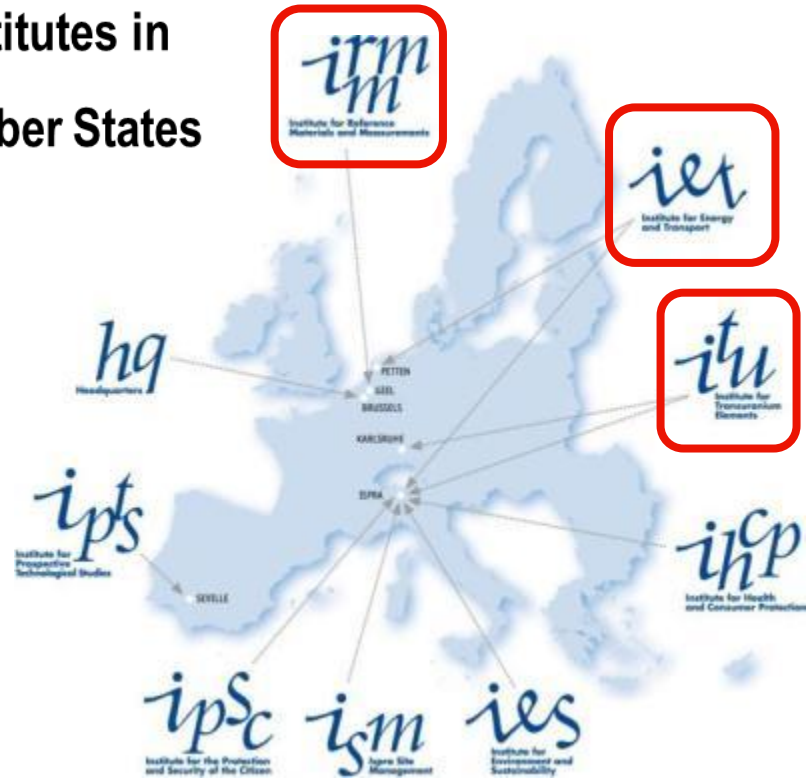
ITU - Karlsruhe Germany
Institute for Transuranium Elements

IPSC - Ispra Italy
Institute for the Protection and Security of the Citizen

IHCP - Ispra Italy
Institute for Health and Consumer Protection

IES - Ispra Italy
Institute for Environment and Sustainability

IPTS - Seville Spain
Institute for Prospective Technological Studies



Approx 2000 Staff

 JRC site contributing to EURATOM

Strong policy support to our main customer DGs:

- ENER
- RTD
- DEVCO
- ELARG

...

Some of JRC collaborations



European/International Organisations

IAEA
OECD - NEA
CEN/CENELEC/ISO
GIF

EU MS nuclear Safety Authorities (incl. CSN)
EDF - FR
GRS - DE
IRSN - FR
CIEMAT - ES
ENRESA - ES
TECNATOM - ES
VTT - FI
KIT - DE
Universities (incl. Madrid Polytechnic University, ...)
...

Our partners

International collaborations

USA: US-DoE (I-NERI)

Platforms, Initiatives, Networks

SNETP: NUGENIA, ESNII
SET-Plan
EERA-JPNM

JRC Euratom Programme 2014-2020

Safety of Nuclear Reactors



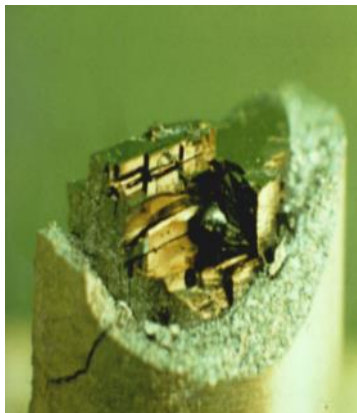
Emergency Preparedness and accident modelling



Knowledge Management, Training and Education



Basic Research and Applications



Safety of Nuclear Fuels and Fuel Cycles



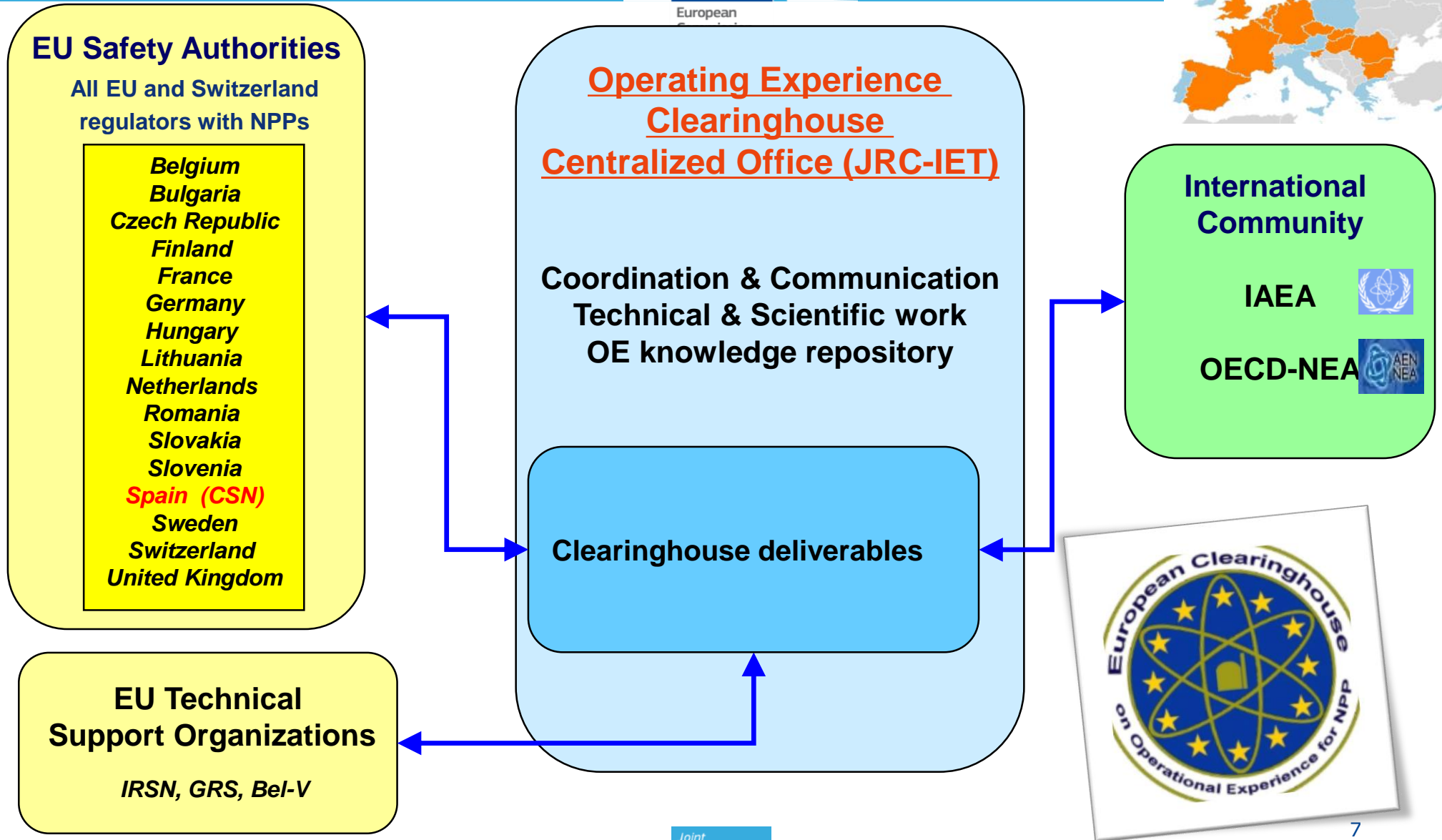
Waste management and decommissioning



Nuclear Safeguards and Security



Some examples of successful collaborations with EU Member States



Some topical studies of the Clearinghouse



JRC Scientific and Technical Reports

EU Clearinghouse on NPP OEF Summary Report on Fuel Related Events

Manuel Martin Ramos



EUR24570 EN - 2010



JRC SCIENTIFIC AND POLICY REPORTS

European Clearinghouse: Analysis of Events related to Modifications of Nuclear Power Plants

*Summary Report of an
European Clearinghouse
Topical Study*

Benoit Zenger

2012



JRC
European Commission

JRC Scientific and Technical Reports

Summary Report on Nuclear Power Plants Construction, Commissioning and Manufacturing Events

Benoit ZERGER



EUR24074 EN - 2011

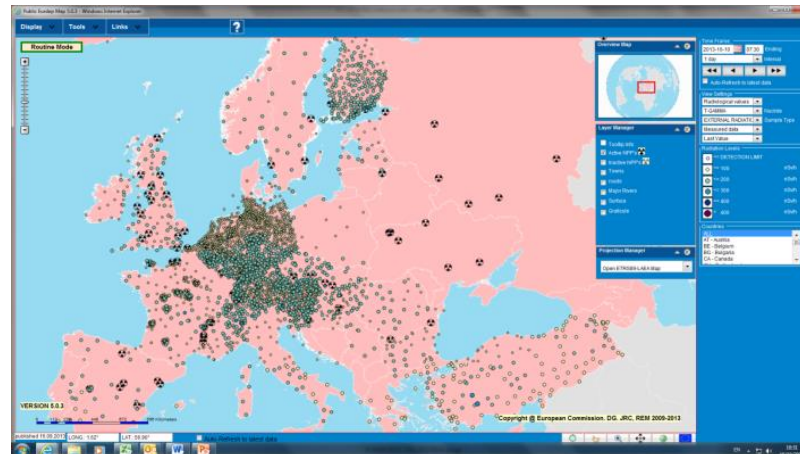


Some examples of successful collaborations with EU Member States



Emergency preparedness & modelling

- ❖ JRC has a tradition of support to EP&R, notably through:
 - ❖ **ECURIE** (European Community Urgent Radiological Information Exchange), the official European early notification system through which EU Member States are obliged to notify and send relevant information in case of radiological/nuclear accident *.
 - ❖ **EURDEP**: platform by which automatic radiological monitoring data are continuously exchanged between the Commission and European countries. Data (currently mainly from 4400 gamma dose rate monitors) can be viewed and downloaded by experts as well as the general public.
 - ❖ Dispersion forecast by modelling in case of nuclear emergencies.



* Council Decision of 14 December 1987 on Community arrangements for the early exchange of information in the event of a radiological emergency.

Example of ongoing project with JRC strong involvement



European Commission



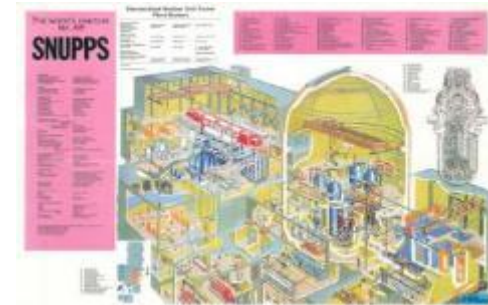
cesam

CODE FOR EUROPEAN SEVERE ACCIDENT MANAGEMENT

(2013 – 2017)

Main Targets:

- 1) Enhancement of ASTEC models for Severe Accident Management strategies relevant to Fukushima accidents, and associated validation
- 2) Development of "Reference Input decks" for the main generic types of EU NPPs



Canadian CANDU Reactor

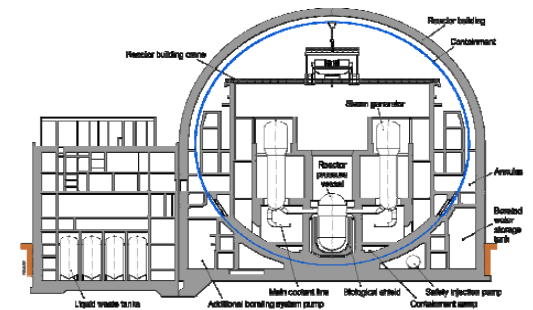
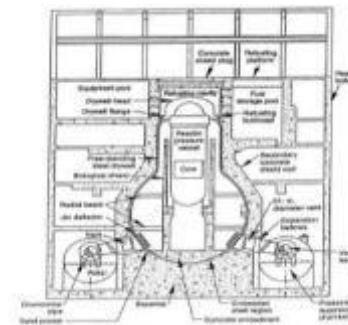
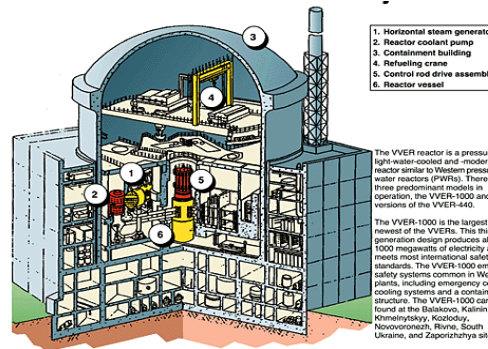
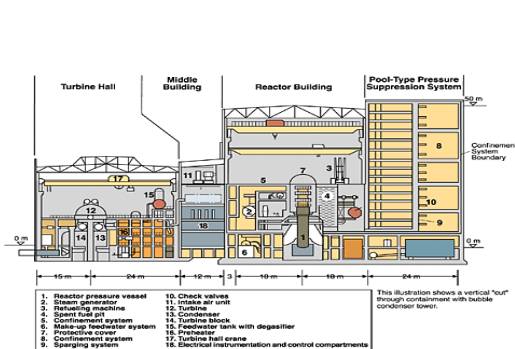


Figure 1-1: Cross-section of a PWR

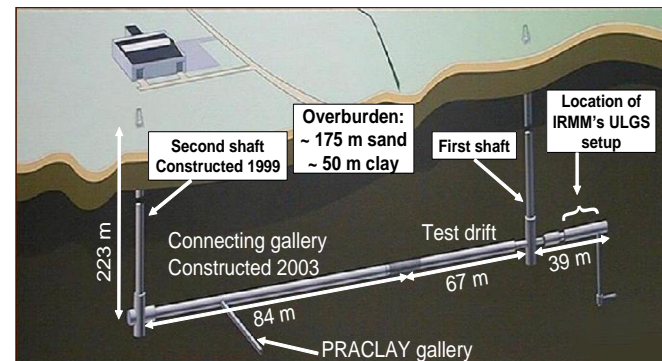
The IRMM is mainly active in nuclear data (for safety of reactors and radioactive waste management) and radionuclide metrology for standardisation and for nuclear safeguards activities



GELINA

- **Two accelerator-based neutron data facilities**
- **Laboratories for the preparation of nuclear reference materials**
- **Radionuclide measurement laboratories**
- **Underground low-level radioactivity laboratory**

Van de Graaff





AMALIA Lab for research on structural materials

Environmental assisted degradation in nuclear components.



High Flux Reactor

**Irradiation experiments for materials and fuels
(Gen II-III-IV)**



Transmission Electron
Microscopy



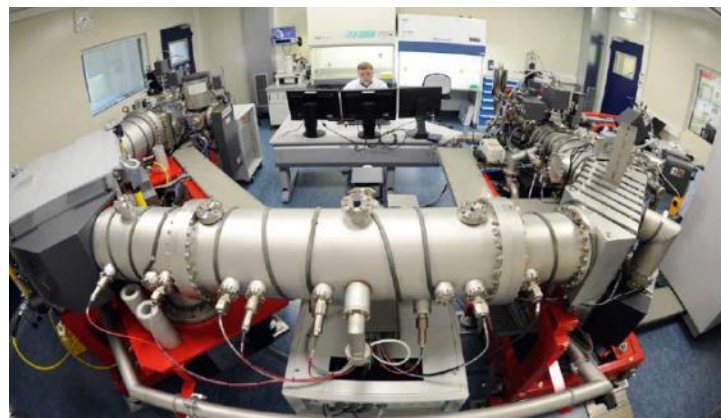
Hot Cells (24)



Minor Actinide
Laboratory



Surface Science

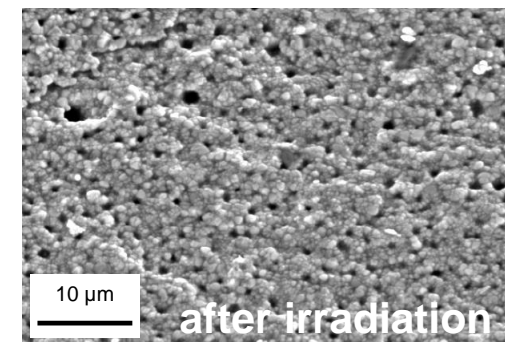
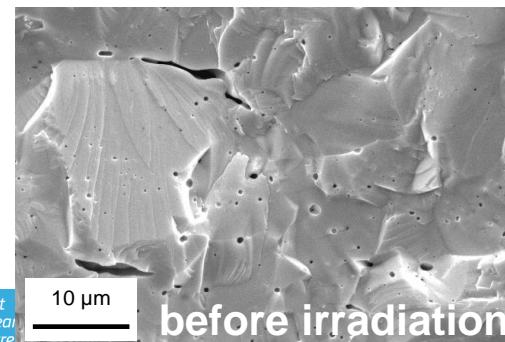


Large Geometry Secondary Ion
Mass Spectrometry (SIMS)



ITU activities focus mainly on :

- **Safety of nuclear fuels and fuel cycles:** analysis of properties and behaviour of conventional and advanced fuels, development of Modelling (Transuranus)
- **Nuclear waste management and decommissioning:** Safety and feasibility of “closing the fuel cycle”, long-term behaviour of spent fuels under storage conditions (relevant for final repository). **Safeguards**





Long history of collaboration on nuclear safety, that could be continued and further expanded. Examples:

- **Emergency Preparedness & Response**
- **Accident & Severe Accident Modelling**
- **Long Term Operation of NPPs**
- **European Clearinghouse on Operating Experience**
- **Spent fuel management/storage, optimization of fuel safety**
- **Access to JRC research infrastructure**
- **Training & education**

Thank you for your attention.



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