



EURAD - PREDIS Achievements and challenges

Hans Forsström

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The safe management of spent fuel and radioactive
waste in the small inventory Member States
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Status of spent fuel and radioactive waste disposal in Europe

- **Radioactive waste is generated in all Member States (MS) and spent fuel in many.**
- **Each MS have to develop and implement a plan for the safe and efficient management and disposal in accordance with Euratom 2011/70 waste directive.**
- **Several MSs have operating disposal facilities for low level radioactive waste, or are in the process of developing them, especially countries with nuclear power plants.**
- **No disposal facility for high level waste or spent fuel is still in operation, but good progress is being made in Finland (construction) , France and Sweden (licensing). In other countries siting and design activities are going on.**
- **For MS with small inventories (SIMS) less progress has been made.**
- **Discussions about possible cooperation between MSs are ongoing, but so far no agreement on common facilities.**
- **Important for each MS to build knowledge and capacity for implementing safe waste management and disposal.**
- **Cooperation across MSs in R&D is important to build national knowledge .**

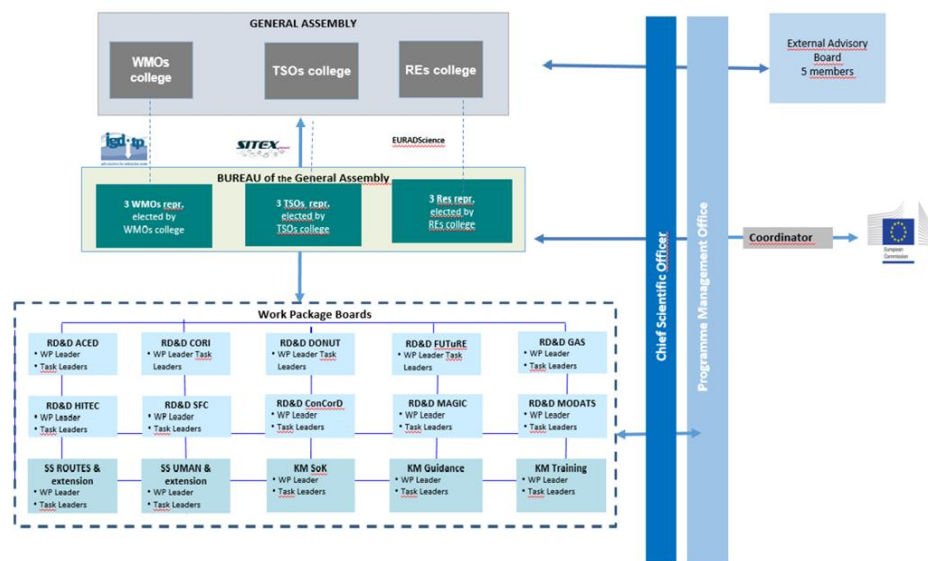
Developments in the Euratom sponsored research programme on safe management of spent fuel and radioactive waste

Until 1995	R&D driven projects – Limited involvement of the end users – the WMOs
Around 2000	WMOs interest in Euratom R&D increases – Projects initiated to define WMO needs and to better involve WMOs and TSOs in Euratom R&D.
Around 2005	Platforms and networks like the IGD-TP for the WMOs, SITEX for TSOs developed to help guide Euratom R&D planning
Around 2015	Needs of countries with less advanced programs or with small inventories also identified
2018	EURAD was started and in 2020 also PREDIS to include R&D and other studies of importance both for advanced programmes and for smaller programmes.
2024	EURAD/PREDIS merged into EURAD-2

In EURAD and PREDIS advanced programmes are able to address specific cutting-edge science, while less advanced programmes are able to plan, structure and implement R&D, with guidance, training and transfer of competence and know how from advanced programmes.

Structure of EURAD

- General assembly with 51 mandated actors from 23 countries
- Bureau providing input from Waste Management Organizations, Technical Support Organizations and Research Entities to Strategic Research Agenda etc
- Work Package Boards
- Programme Management Office supported by a Chief Scientific Officer and an External Advisory Board



Work packages in EURAD

A Strategic Research Agenda and a Roadmap for implementation of disposal facilities have been developed and updated to guide the selection of studies and R&D to be performed within EURAD.

Three types of work packages:

- **R&D projects, e.g.**
 - **Long term chemical behaviour and aging of repository components**
 - **Transport of radionuclides and gas through the geosphere**
 - **Development of numerical modelling tools**
 - **Monitoring equipment**

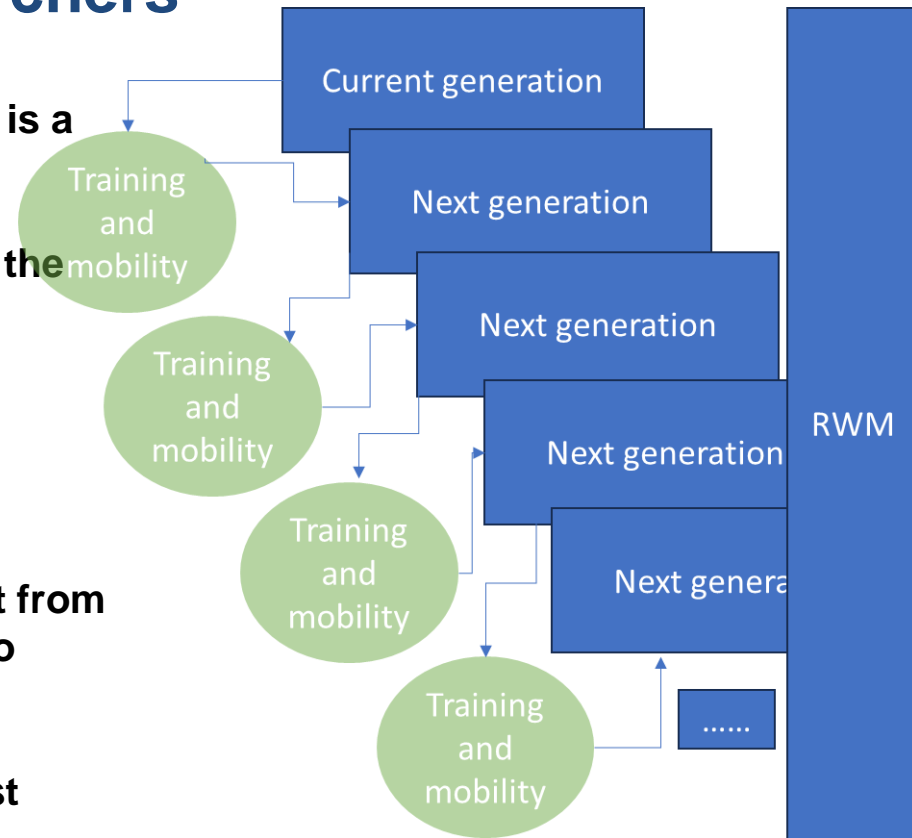
- **Strategic studies**
 - **Management routes for different types of RW**
 - **Sharing of solutions**
 - **Involvement of the civil society and understanding of different uncertainties**

- **Knowledge management**
 - **State of knowledge compilations**
 - **Guidance documents**
 - **Training and mobility**

Dissemination of information and results important. Different new approaches for dissemination tested, e.g. a radioactive waste school and lunch and learn webinars.

Involvement of young researchers

- Spent fuel and radioactive waste management is a long term engagement.
- Important to ensure interest and capacities in the field to perform R&D for innovations and improvements.
- Engage and inspire young researchers is one objective of the Knowledge Management.
- PhD students and young scientists can benefit from being part of a large programme with access to many types of competencies.
- Good results with many PhD students and Post Docs supported by the programs.
- Training courses.
- Mobility program.



Work packages in PREDIS

PREDIS complements EURAD by covering pre-disposal areas, including characterisation, treatment, conditioning and storage of different types of radioactive waste.

PREDIS is similar in structure to EURAD, but with a simplified administration.

PREDIS was ended this autumn and pre-disposal will be part of EURAD-2. Input was provided to the EURAD SRA and roadmap.

Three types of work packages, R&D projects, strategic studies and knowledge management.

R&D projects included:

- Management of metallic waste**
- Management of liquid organic waste**
- Management of solid organic waste**
- Management of cemented waste and packages.**

More technology oriented than EURAD, but also providing characterization information to disposal projects.

Value of participation in EURAD/PREDIS/EURAD-2 for Member States with small inventories (SIMS)

The participation in EURAD-2 will provide a number of opportunities for SIMS.

- Contacts with experienced MSs.**
- Involvement in activities at different stages of implementation of disposal programmes – understanding the needs and plans for national implementation.**
- Transfer of knowledge from advanced programmes to early phase programmes.**
- Meeting place for countries with similar problems.**
- Possibility to build knowledge and capacity in areas of importance for the implementation of national program through participation in advanced R&D projects – participation of young researchers.**
- Guidance for development of strategy for the national program including possible cooperation with other countries.**

Challenges for the success of EURAD-2

EURAD-2 is a large project. The success of th EURAD-2 will heavily depend on the active participation of all interested members.

Some important challenges for EURAD-2 are:

- The large project will require continued vigilance in the effective management.
- Advanced countries will be busy with the implementation of disposal facilities. Important for EURAD-2 to continue to be attractive.
- Lots of information and know how will be generated now. Effective methods for dissemination and preservation will be needed to ensure availability in far future.
- Some information might become commercial.

Summing up

- **EURAD and PREDIS has been very successful in generating new information and knowledge and in providing a platform for contacts between experienced scientists and waste managers and newcomers and between generations.**
- **The Roadmap and the SRA have been important, not only to decide on common R&D topics, but also as an educational tool for MSs in the early programme phase.**
- **The important financial contribution from Euratom has been instrumental in ensuring a wide collaboration and the success of the project.**
- **SIMS can benefit substantially by active participation in EURAD-2**

Thank you for your attention.