

JOINT STATEMENT ON KNOWLEDGE MANAGEMENT

Knowledge management is critical to ensure safe and efficient radioactive waste management over the whole lifecycle. When all stakeholders actively contribute to knowledge management, the whole international programme will be more successful.

EURAD being approximately at the mid-term of its Programme while PREDIS is approaching the first year anniversary as a project, both decided to issue a joint statement on Knowledge Management (KM) progress. The goal of this document is to reinforce the common objective that drives the KM work in both projects and to offer to the community an overview of how KM-tasks are approached and share main achievements and plans for the future.

Knowledge management (including knowledge consolidation) is recognized as a key part of the Radioactive Waste (RW) implementation process and has gained increasing interest.

The European Commission is encouraging KM, through the Waste Directive¹, for more progress of EU Member States' implementation of their RW disposal programmes. The main reasons for the importance of KM are the RW disposal implementation times, disposal operation time spanning a number of decades and the complexity and variety of fields. Each individual phase of a RW management program from waste generation through processing, disposal and repository closure, will require continuous RD&D development with improved process understanding (inventory, handling, treatment, geoscience, disposal/material development, chemical and physical interactions, long-term evolution of the environmental ...), that will form the knowledge base needed for waste processing, packaging, storage and then repository construction, operation and closure licenses. These long implementation time-spans (in the range of hundreds of years) require a robust KM programme, which includes the securing of gained knowledge, forecasting the needs to pass it over for several generations. Thus, there is a high motivation for logical and sustainable KM structures populated with publicly available, consistent, transparent and up-to-date evidence-based state of knowledge, which is necessary to evaluate the waste disposability, predict the behaviour of a disposal, with relatively small uncertainties, on time scales of 10⁵ to 10⁶ years.

KM is challenging but with EURAD and PREDIS we have great potential for success through access to experts with many decades of RWM experience and knowledge.

Main achievements

- Development of a [Goals Breakdown Structure EURAD Roadmap](#), complemented by input from PREDIS on Predisposal activities.
- Publication of a wide range of KM-related documents such as Theme Overviews (top level documents of the EURAD Roadmap), State-of-the-Arts reports, glossary compiling most-relevant predisposal terminology (to be released in autumn 2021) and initiation of experts authoring State-of-Knowledge documents.
- Creation of the [School of Radioactive Waste Management](#), elaboration of training catalogues
- Joint engagement and dissemination with stakeholders via webinar events, that also foster knowledge sharing and training (i.e. on waste acceptance criteria topics)
- Implementation of mobility programmes in both [EURAD](#) and [PREDIS](#).

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¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32011L0070>



Why is Knowledge Management important to RWM?

A number of arguments can be put forward answering the question regarding KM importance, with general examples as presented in Figure 1. More specific answers can be sought by surveying the RWM end-users' knowledge management needs and expectations, and how the needs should be prioritised. Both EURAD and PREDIS have successfully proceeded with surveys of targeted end-users and will need to do so, continually, as new requests for KM activities emerge when the R&D front moves due to newly acquired knowledge.



Figure 1 Inter-linkage of knowledge management with stakeholders needs [footnote reference; PREDIS WP3 Kick-off meeting, 3rd September 2020]

What are the objectives of Knowledge Management?

Knowledge Management objectives, as identified in the EURAD founding documents and supported by PREDIS, are dedicated to the enhancement and transfer of knowledge between generations, member states and organisations:

- **Preservation / capitalisation of generated knowledge**
Make sure that the publicly financed knowledge generated over the past, ongoing and future RD&D activities is preserved and made accessible.
- **Transfer of knowledge towards Member-States with early-stage RWM programmes**
Make sure that Member-States with national programmes at an early-stage of implementation can take advantage of existing knowledge and know-how from the Member-States with advanced national programmes, primarily to access state of the art, and second to ease access to knowledge developed during previous EC supported RD&D projects.
- **Transfer of knowledge between generations**
Ensure that the necessary expertise and skills are maintained through generations of experts in view of the long lead-times and operational timespans (several decades) for RWM, including both predisposal and disposal, by providing training and mobility for researchers.
- **Dissemination of knowledge**
Disseminate and demonstrate progress, results and added value of the European Joint Programme to a wider audience.

How is Knowledge Management and Networking practicably implemented?

EURAD and PREDIS approach KM-related tasks in a radically different way compared to past practices, which is best expressed in the EURAD Vision:

“A step change in European collaboration towards safe radioactive waste management (RWM), including disposal, through the development of a **robust and sustained** science, technology and **knowledge management** programme that supports timely **implementation** of RWM activities and serves to foster mutual understanding and trust between Joint Programme participants.”

In EURAD, there are four dedicated knowledge management work package teams focussing on different aspects of KM whilst working closely together and exchanging on the overall KM EURAD approach.

- **WP1 EURAD Roadmap** – activities to orientate people to existing knowledge via a generic roadmap for implementing radioactive waste management, from generation to disposal. This provides an integrated and systemic framework for organising, structuring and sharing available RWM knowledge.
- **WP11 State of Knowledge** - Experts' view of the most relevant knowledge and associated uncertainties in a specific domain applied in the context of a radioactive waste management programme.
- **WP12 Guidance** - Activities consisting of developing a comprehensive suite of instructional guidance documents that can be used by Member-States with RWM programmes.



- **WP13 Training and Mobility** - Activities consisting of developing a diverse portfolio of tailored basic and specialised training courses taking stock of and building upon already existing initiatives and creating new initiatives to bridge the identified gaps. This WP also organise a mobility programme to access dedicated infrastructures.

PREDIS has only one KM WP with four tasks which cover similar objectives to EURAD:

- **WP3.1 Development of Knowledge management programme** – relates to the strategic development of the complete PREDIS KM programme, structuring the KM work and development of the PREDIS roadmap, aligned with the EURAD roadmap. To avoid duplication, a pronounced attention is made to integrate initiatives made by e.g. IAEA, OECD/NEA, SNETP, EURAD, national and international initiatives.
- **WP3.2 State-of-Knowledge** – take advantage of PREDIS internal and external experts to produce State-of-Knowledge documents (Theme overview, Domain Insights and SoK) populating Theme 2 “Pre-disposal activities” in the EURAD Roadmap.
- **WP3.3 Training** – the programme aims to match PREDIS partners’ and end-users needs with available trainings and in cases no training offers exist, to produce requested training modules. In some cases training can be integrated with EURAD training school or other programs.
- **WP3.4 Mobility** – the programme aims at facilitating cooperation between partners and Member States, and the acquisition of tacit knowledge needed to develop a professional career in the different subjects related to the predisposal of radioactive waste.

The dedicated KM Work Packages are complemented by KM-related activities within the RD&D Work Packages, such as the delivery and update of the State-of-the-Art (SotA) reports, the training of PhD students, and the preservation of project results (data, reports, scientific papers) following the respective project’s data management guidelines.

Another strive for end-users input and leverage between the different types of partners is through the agreement on a KM and Networking program, where PREDIS has contributed with input and review, and that was adopted at the EURAD General Assembly N°4 (January 18, 2021). The programme is presently in consultation with IAEA, OECD/NEA, ERDO, IGD-TP, EURADScience, SITEX II and RATEN to ensure a broad endorsement.

Both projects also recognise the need to coordinate their KM activities with the large international knowledge providers such as IAEA and OECD/NEA, as well as trainings and courses given by Research Entities (REs), Technical Support Organisations (TSOs), Waste Management Organisations (WMOs), and Waste Generators, also making use of the accumulated training modules in the European Commission Directorate General for Research and Innovation project repository (**CORDIS**). Our strive to reinforce collaboration between EURAD, PREDIS, IAEA and OECD/NEA is based on seeking complementary and efficient use of experts while avoiding duplication of efforts. The strive has triggered an intensive communication between the organisations and through IAEA and NEA’s presence at EURAD and PREDIS workshops, webinars and other events as well as EURAD’s presence at IAEA conferences.

How are Knowledge Management and Networking needs and priorities identified?

Both EURAD and PREDIS are reactive and responsive while developing proactive ideas for the knowledge management and networking needs of their partner and stakeholder communities.

Needs are identified from a combination of identification of gaps using the Roadmap and Experts (top-down), and specific needs raised directly by the wider community of stakeholders (bottom-up). Concretely, this has been done either via surveying the KM needs and gaps among organisations through targeted questionnaires and interviews or by listing prioritised topics where gaps exist or information is not sufficient.

To answer those needs, different actions were developed. Both EURAD and PREDIS created series of webinars to network, share knowledge and address specific KM questions which answers are used to steer the KM activities. The webinars also serve as an avenue for further education for many of the participants as they represent varying international views and experiences. Additionally, they facilitate the opportunity to discuss and gain new ideas from diverse stakeholder speakers and participants.

The EURAD School of Radioactive Waste Management is also an answer to those needs. Its webpages promote existing trainings and offer a list of available research infrastructures offering young scientists a possibility to orient among the large number of advanced infrastructures existing in Europe.

Both EURAD and PREDIS launched a Mobility Programme dedicated to financially support junior and senior professionals, as well as PhD students and post-docs from EURAD and PREDIS partners and linked third parties to visit infrastructures from partners and to undertake internships and/or exchange programmes between institutions within the scope of EURAD and PREDIS.



What is the significance of networking and role of experts?

The greatest asset of EURAD and PREDIS is the many decades of RWM experience, talent and knowledge held within our community. Through EURAD and PREDIS, we are able to harvest the shared knowledge present within the different communities of practice to help orientate our future research and training priorities, and to structure the transfer of knowledge between programmes and to future generations.

During execution of our projects, a substantial and increasing effort is devoted to stimulate interactions between inter-project experts with different scientific background to exchange knowledge and complement their knowledge short-comings. The six different levels of interactions identified; (i) between partners inside each KM WP programme, (ii) between both KM programmes (iii) between KM WP and R&D, Strategic Studies WPs, (iv) between different actor groups (waste generators, REs, WMOs, TSOs) (v) between projects such as EURAD-PREDIS interaction with CHANCE, MICADO, SHARE, THERAMIN and others and, finally, (vi) towards the end-users, are calling for an intensified exchange and will take some time before we are a homogenous joint programme.

What are the expected main achievements for the coming years?

Within EURAD the main expected achievements include the finalisation of the large roadmap update, which will be a living document that can be consciously adapted in the future. The work with populating the Roadmap will continue during the whole duration of EURAD, and most probably past EURAD. Editing of existing SoK documents for consistency in the roadmap document structure (presently a Wiki structure) and making this structure available for testing and feedback from the public will be an important milestone as it shows how all the components (Theme-Overviews, Domain Insights, SoK, SotA, EURAD R&D publications, training, competences, guidance, ...) are inter-linked in the SoK documents, which in their turn are structured in the Roadmap. Based on the request from R&D WPs a number of trainings are in preparation. Indications from the WPs is that, as the Covid-19 pandemic situation eases up, more mobility grant applications will be received and awarded. The production of the pilot guidance on “Cost Assessment and Financing Schemes of Radioactive Waste Management Programmes” will be finalised together with an end-user needs driven priority list for future guidance topics. Using the built-up structures and procedures, the work will progress as planned in the annual work plan (AWP3) with the difference of, already now noticed, more intensive interactions between KM WPs, but also between KM WPs and R&D and Strategic Studies WPs.

The PREDIS KM will pursue similar goals, contributing to the EURAD SoK documents and training modules, facilitating mobility grants and providing further deliverables that serve as guidance to the wider stakeholder community. Additionally, the waste generators as new actors will certainly have slightly different requirements on the KM strategy and activities as compared to EURAD. We will continue to engage via events like webinars and discussion groups with waste generators, to convey their needs and ideas on SoK and SRAs, so their views can be integrated to the EURAD-PREDIS cooperative actions.

The part of the EURAD Roadmap related to pre-disposal activities that are under PREDIS responsibility to be developed and populated, will advance as authors of the respective DI and SoK documents will be identified and first two pilot cases developed in 2021. The preliminary planning is that 2 documents will be written in autumn 2021 and that all PREDIS related DI documents will be authored by the end of 2022. The mobility programme started with the first deadline of applications in September 2021 and the training catalogue together with analysed end-user needs will also be published soon. To create coherence among the students (presently 31) and get their input on what they expect from PREDIS, a students’ workshop is arranged for October 2021 building upon their session at the May 2021 workshop.

It should also be pointed out that a significant effort will be made by both projects to include and give opportunities for young scientists to present themselves.

EURAD and PREDIS may appear to be running parallel and in a complimentary way but in reality they pursue similar goals related to KM and are actually working closely together on many aspects of knowledge management, as shown by the main achievements: PREDIS follows the mobility portal of EURAD, it adds more training modules to the School of RWM, EURAD experts may contribute to SoK documents on predisposal that are specific to them (i.e. about predisposal handling of spent fuel, from SFC participants). This fruitful interaction also stimulate emergence of new working methods and ideas and will foster the importance of knowledge management in the field of RWM.

Want more information or wish to provide feedback?

EURAD Knowledge Management & Networking Programme 2021: soon to be available on EURAD website

School of Radioactive Waste Management website: <https://euradschool.eu/>

EURAD Roadmap 2021: <https://www.ejp-eurad.eu/roadmap>

PREDIS website: <https://predis-h2020.eu/>

