

TABLE OF CONTENT

THANK YOU !



A huge thank you to all participants, speakers and moderators who contributed to the success and warm atmosphere of EURAD third annual event!



- In memory of – Pg2
- Announcement – Pg3  
Invitation to submit contributions to the special issue “Digitalization for nuclear waste management: Predisposal and disposal”
- A look back – Pg4-8  
OECD NEA – IDKM meeting  
Course Geochemical and reactive transport modeling for RWM  
Course Uncertainty Management  
Waste Management Symposium  
Training SoK Spent Fuel
- Did you know ? – Pg 8  
Summer School on WAC
- Focus – Pg 9  
ACED: Experimental characterization program on waste package scale
- EURAD 3rd annual event – Pg 10
- EURAD-2 – Pg 11
- Now published – Pg 12  
Upcoming events – Pg 12
- We are out there – Pg 13

## IN MEMORY OF



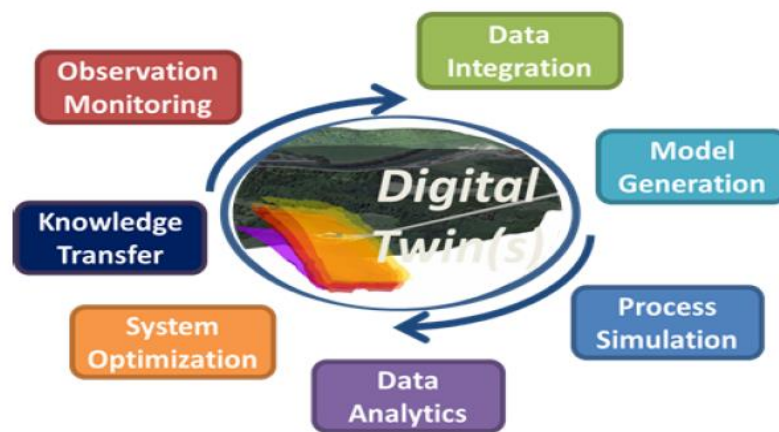
Gilles Hériard-Dubreuil, who was involved in EURAD through Mutadis and NTW, to define and develop the interactions with Civil Society, passed away early March.

Gilles played an important role in JOPRAD and in the building of EURAD where he brought his skills to help implement a governance scheme where civil society could have a significant place in European research.

Extract from the [SITEX.Network](#) and [Nuclear Transparency Watch](#) websites.

Announcement : special issue « Digitalization for nuclear waste management: Predisposal and disposal” – Invitation to submit contributions from EURAD and PREDIS

Following different break-out sessions on annual events and webinars, a joint effort was launched on "Digital Twins for long term management of radioactive waste". At the end of 2022, two important milestones were reached.



**1) Launch of a special issue on "Digitalisation for nuclear waste management: Predisposal and disposal"**

A Topical Collection in Environmental Earth Sciences is now opened to publish various article types such as opinion, research, overview and technical papers. The initiative is launched in a collaborative effort of PREDIS and EURAD. We strongly invite the partners of PREDIS and EURAD to consider this topical collection for consecutive publication and dissemination of results obtained in these two projects and other relevant activities.

Please check the website for more information on the scope and the submission procedure (closing in June 2024): [Link](#)

Do not hesitate to contact the guest editors with any questions and suggestions.

**(2) Editorial paper "Digitalization for nuclear waste management: Predisposal and disposal"**

In parallel, an editorial paper has been written as a collective effort with input from different types of organizations (WMO, TSO, RE) involved in EURAD and PREDIS. The editorial paper discusses some potential research aspects related to the use of digitalization, and specifically Digital Twins, in radioactive waste management (including geological disposal) and suggests a way forward. An open access version is available [here](#)

**WE HOPE THAT YOU CONSIDER THIS TOPICAL COLLECTION FOR DISSEMINATION OF EURAD AND PREDIS RESULTS!**



A look back

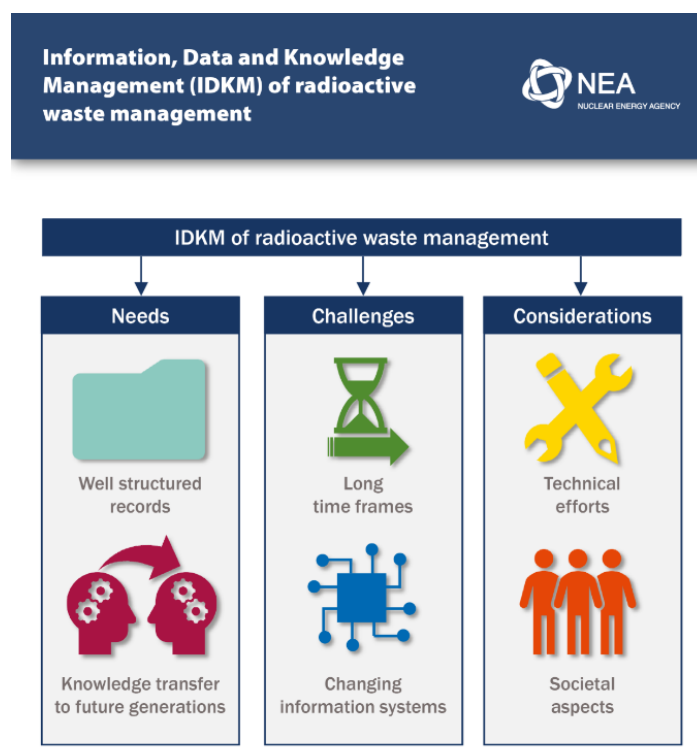
**OECD NEA – IDKM MEETING**

The OECD-NEA’s Radioactive Waste Management Committee (RWMC) established the Working Party on Information, Data and Knowledge Management (WP-IDKM) to examine the management of information, data and knowledge in view of disposal of radioactive waste.

Since 2019, the working party has brought together experts from 26 organisations representing 11 NEA member countries and the European Union. On behalf of EURAD and PREDIS, Paul Carbol gave a presentation on the programmes structures and knowledge management (KM) activities at the working party’s annual IDKM meeting in Paris, on 7-8 February 2023. The meeting participants originated from; Austria, Belgium, Canada, Czech Republic, France, Germany, Hungary, Italy, Japan, Norway, Sweden, United Kingdom, United States of America and IAEA.

Moreover, the face-to-face meeting contributed to deepen the ongoing cooperation between NEA and EURAD/PREDIS reflected in their involvement in authoring/reviewing State-of-Knowledge documents, contributing by input to the EURAD Roadmap and Strategic Research Agenda, lecturing in EURAD safety case courses and delivering speeches at EURAD events.

Finally, the meeting contributed to coordination of EURAD/PREDIS, IAEA and NEA knowledge management activities, thus avoiding duplication of actions. The KM expertise existing in this group is unique and is of crucial importance for further collaboration, especially in view of EURAD-2.



NEA (2020), Information, data and knowledge management (IDKM) of radioactive waste management, OECD Publishing, Paris



A look back

## COURSE "GEOCHEMICAL AND REACTIVE TRANSPORT MODELLING FOR RADIOACTIVE WASTE MANAGEMENT"

A course on geochemical and reactive transport modelling was organized between 6 to 10 February at the University of Bern, Switzerland. 32 participants followed lectures on theoretical aspects of geochemical and reactive transport models by different experts. Demonstrations of state-of-the-art reactive transport models were given by code developers or main users. In addition, in-depth training was given on one of three widely used geochemical codes – GEMS, ORCHESTRA and PHREEQC – with applications related to cement evolution and radionuclide sorption.



Course notes are available on [ProjectPlace](#).



A look back

### COURSE “UNCERTAINTY MANAGEMENT”

In February 2023, EURAD organised a 3-day training course on uncertainty management.



The course was coordinated by the UMAN Strategic Study and included contributions from lecturers from several other EURAD Work Packages (e.g. SFC, ROUTES, DONUTS). During the first day of the course, strategies, methods and tools identified in UMAN for managing uncertainties were explained and illustrated. Then, during the second day, the possible application of these strategies, methods and tools to uncertainties related to radioactive waste inventory was presented. Finally, on the last day, a civil society perspective on uncertainty management was presented and the management of human-related uncertainties was discussed. The course offered its participants a journey through the world of uncertainty management, from methodological to applied aspects, and disseminated several results from UMAN and other EURAD Work Packages. The feedback from the course participants was generally positive and some suggestions were made to improve the course if it is organised in a future EURAD implementation phase.





A look back

### WASTE MANAGEMENT SYMPOSIUM 2023

From February 28 to March 2<sup>nd</sup>, EURAD was able to share its latest achievements at the WM Symposium in Phoenix (US).



Several presentations and posters were presented on UMAN, ROUTES, MODATS and Knowledge Management work packages. EURAD also participated in a session on “Benefits for non EU parties to collaborate with EC projects”, together with PREDIS project.

This event was an opportunity to discuss future collaboration with American entities in the framework of the future programme.





## A look back

### TRAINING SOK SPENT FUEL

On the 18<sup>th</sup> of January 2023, Kastriot Spahiu, the author of the Spent Fuel State-of-Knowledge (SoK) document, discussed the SoK document, which focusses on the release of radionuclides from the spent fuel during disposal. He focused mostly on the highlights from the document and dove deeper into issues related to spent fuel which are not mentioned in detail in the SoK document. Additionally, the second part of this lecture was a discussion session which was based on questions from the audience. This training session was open to all, especially those who have an interest in EURAD SoK documents and spent nuclear fuel.

It was hosted online via Microsoft Teams. About 60 people attended the session live and contributed to the lively discussion session. For those that missed the session, a recording is available online via the EURAD School website ([link](#)). So far, about 15 people have registered for and watched the recording. The recording will remain available via the School's website. When watching the recording, it is still possible to submit questions via the 'question balloon' button in the bottom right. These questions will be forwarded to Kastriot. Finally, Kastriot's slides can also be downloaded from the EURAD School's websites ([link](#)).



## Did you know ?

In the Summer of 2023 (dates to be confirmed) the EURAD School of RWM and the PREDIS Knowledge Management WP will organise a Summer School on Waste Acceptance Criteria (WAC). To make sure that they build the competences that are required by the end-users, they launched a short survey in February – March 2023 to collect feedback on which topics related to WAC should definitely be included. The results of the survey are currently being analysed. A first look at the results shows that about 50% of the responses were from students (either from PREDIS or EURAD) and the other 50% are from junior and/or senior professionals. This indicates that the results will provide a good view of all end-user groups. After the EURAD Annual Event N°3, these results will be discussed with the subject matter experts and an outline for the training course will be made. Next, a date will be fixed. We encourage students to join this Summer School and use the Mobility Programme to help pay for their expenses. Stay tuned for updates on this Summer School!

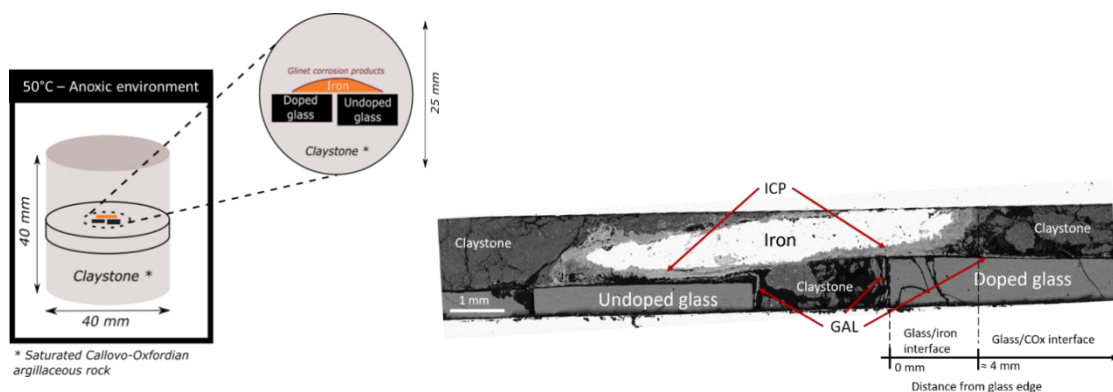




Focus

## ACED: EXPERIMENTAL CHARACTERIZATION PROGRAM ON WASTE PACKAGE SCALE

The experimental study for high-level radioactive waste concentrated on the study of three systems: “glass/steel/clay”, “glass/steel/cement – bentonite/clay”, and “glass/steel/cement”. The experimental program consisted of setting up new experiments and characterization of long-lasting experiments. Full experimental results will be available in D2.16 to be published soon. In addition, Alexis Delanoë (CEA, France) defended successfully his PhD on March 02, 2023 on the glass/steel/clay experiment. The experiments explored most of the situations expected for HLW glass in Europe (near neutral to hyperalkaline pHs) and provided information on glass dissolution rates, secondary phase precipitation and changes in the buffer.



*Experimental set-up of the glass/steel/clay experiment (CEA, left) and a Backscattered electron micrograph of the sample after 6.1 years (CEA, right)*

In case of intermediate level waste and its concepts in Europe, long-term experiments on corrosion and gas generation in waste containers, the degradation of concretes in contact with clay pore water, and the aggregate-cement reactions on 70–100 year old concretes were analyzed. Experimental results will be reported in D2.13. These systems allow to studying different aspects of long-term degradation of concrete and waste-concrete interactions.

## EURAD THIRD ANNUAL EVENT

**For three days (14-16 March 2023) more than 190 participants from 24 European countries gathered in Larnaca, Cyprus for the third annual event of the programme.**

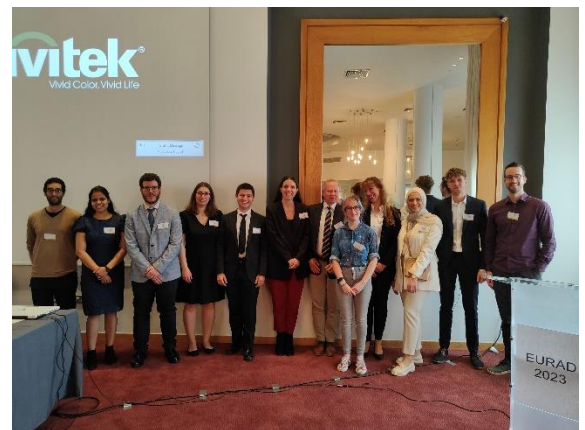


This event was an opportunity to exchange views on the different topics covered by EURAD. The first day of the event was dedicated to strategic presentations (IAEA Artemis missions, the role of scientists in the stakeholders' involvement, the benefits of joint programming), as well as to presentations by students involved in the programme, on a wide range of topics: mobility of radionuclides in compacted clay, chemo-mechanical coupling for modelling of reinforced concrete disposal underground structures, assessment of spent nuclear fuel for a safe geological repository, ...

EURAD's scope being broad and covering all activities related to radioactive waste management from cradle to grave, the second day was organized in parallel sessions: brainstorming session on innovation, cross-border cooperation and competencies. The last part of the event was devoted to technical sessions to share the results developed in the programme and to short presentations on cutting-edge topics.

The main conclusions of this event are:

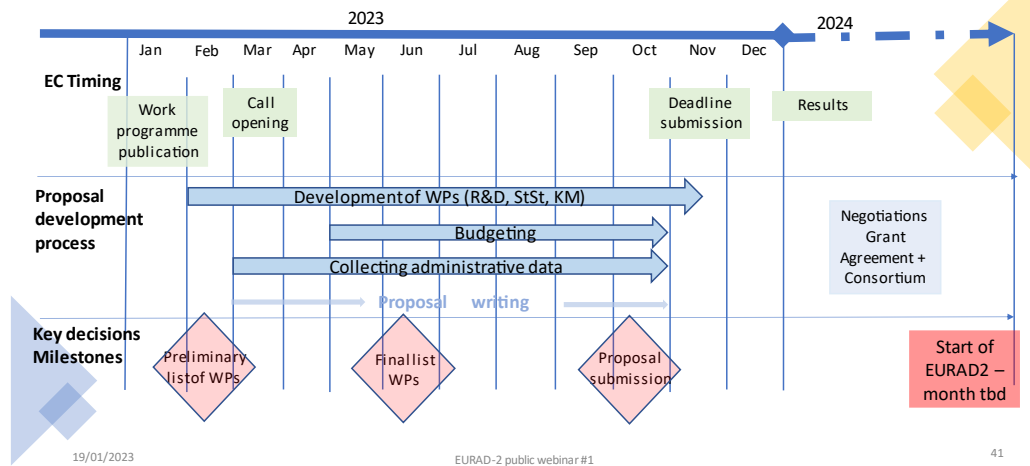
- Science continues to be important: to assess the impact of new technologies, to maintain state-of-the-art in science and address emerging issues
- The importance of education: to organize a framework for students to better understand the context and develop their personal network, the need of specialists and generalists
- The importance of maintaining, sharing and transferring knowledge and capabilities



## EURAD-2

On the sidelines of EURAD third annual event, EURAD-2 Core Group organised on 16 and 17 March in Larnaca, a public event, called EURAD-2 Focus Funnel, to discuss ideas of future work packages to help the Colleges refining the scope of the WP to issue a final list for June 2023.

### Moving forward EURAD-2 – Timeline – 1/2



### EURAD-2 FOCUS FUNNEL

The Core Group issued in December 2022 a Template #1 to draft first ideas of work packages (WP) with the aim to collect by the end of February the Colleges' top 15 priorities.

From the 55 ideas received, the Core Group suggested an agenda for the Focus Funnel and grouping of WP ideas based on the identification of common proposals or commonalities between the ideas.

After a first half-day presenting the process in detail, the second part of the event was organised with 5 rooms running in parallel (structured according to EURAD Roadmap Themes), where a first pitch of 5 min was provided by 1 College. The other two Colleges had then the opportunity to pitch their ideas for 5 min each before opening the floor for 15 minutes of discussion with the audience. It was also possible for participants to provide their feedback with post-its on the ideas.

A summary of this event, as well as the slides presented during the plenary session are available on both [EURAD](#) and [PREDIS](#) websites as well as the FAQ.

If you have any question which are not answered in this FAQ, we invite you to send it to the Core Group coordinator ([louise.theodon@andra.fr](mailto:louise.theodon@andra.fr)) who will update the FAQ accordingly.

### PUBLICATION OF THE WORK PROGRAMME

On Friday 17<sup>th</sup> March, the EC published the [EURATOM Work Programme for 2023-2025](#) where the call for EURAD-2 partnership is included.

The deadline for the submission of the proposal is November 08<sup>th</sup>, 2023 which coincides with the provisional planning drafted by the Core Group (see image)



## Now published

### Mid-term evaluation of the ICS activities and experimental model of interaction between EURAD participants and Civil Society (D1.14) – [Link](#)

This deliverable provides a description of the participatory methodology that has been designed for the purpose of evaluating EURAD ICS activities. It also provides a description of the foreseen program of work of the Evaluation Task in the coming stages of EURAD.

### MODATS – Lessons from URL Experiments (D17.3) – [Link](#)

This deliverable summarizes the survey responses to develop lessons for repository monitoring relating to the design of monitoring systems and the acquisition, management and use of monitoring data.

### State-of-Knowledge – Domain Insight : Conceptual planning (6.1.1) - [Link](#)

This document provides the overall goal for the Conceptual planning domain (Identify key decision points, and develop screening guidelines to enable a facility to be located to match national performance criteria and socio-economic, political and environmental considerations), extracted from the EURAD Roadmap goals breakdown structure (GBS).

Several open publications linked to EURAD work packages are also available under the Publications section on [EURAD website](#):

- On the estimation of nuclide inventory and decay heat: a review from the EURAD European project
- GAS transport in Boom Clay: the role of the HADES URL in process understanding
- 3D pore microstructures and computer simulation: Effective permeabilities and capillary pressure during drainage in Opalinus Clay
- Analysis of key thermal coupled factors in modelling of bentonite barriers



## Upcoming events

### APRIL

19: L&L – [UK GDF Programme update](#)

23-28: EGU 2023

### MAY

08-12: European Nuclear Young Generation Forum

31: L&L – [OFFERR – European platform for accessing nuclear R&D facilities](#)

### JUNE

14: L&L – [Submission of the application for authorization to create Cigéo \(France\)](#)

28: L&L – [IAEA Technical Working Group on Nuclear Fuel Cycle Option and Spent Fuel](#)



## We are out there



eurad



**Department of Biogeochemistry at H...** @biogeochem\_H... · 3 févr. ...  
The talk given by @SxxNWei at IRSN @IRSNFrance @radioprotection was about application of #microbiology and novel sequencing approaches #NGS to cementitious materials #cement used for nuclear waste disposals under project MAGIC of @EJP\_EURAD #nuclearwaste



**Dansk Dekommissionering**

449 abonnés  
2 sem. ·

Managing Director **Ole Kastbjerg Nielsen** and Head of Management Secretariat **Anja Kraag** are currently attending the EURAD Third annual event taking place at Larnaca in Cyprus. ...voir plus

[Voir la traduction](#)



**Archita Rajkumari** · 2e

Nuclear Engineer | Research Scientist at Institute for Energy Technology  
3 sem. ·

[#Alatepost](#)

Thank you [European Joint Programme on Radioactive Waste Management](#) for this insightful training course on UMAN (WP 10). We had a very good overview of the uncertainties and how to manage those towards the end of the 3 day course.

Thank you [BelV](#) for hosting a great course in Brussels.

[#training](#) [#wastemanagement](#) [#eurad](#) [#uman](#) [#uncertaintymanagement](#) [#radwaste](#) [#euprojects](#)



**Físicoquímica de Actínidos y Productos de Fisi...** @FFisi... · 7 mars ...

Do not miss @FFision last publication on "Radionuclide retention in Portlandite" related to our migration studies in radioactive waste repository barriers, in @EJP\_EURAD WP COR1 and ARNO @CienciaGob projects. [#nuclear](#) [#safety](#) [@CIEMAT\\_OPI](#) [authors.elsevier.com/sd/article/S01...](https://authors.elsevier.com/sd/article/S01...)

Progress in Nuclear Energy

Volume 159, May 2023, 104636

### Analysis of radionuclide retention by the cement hydrate phase portlandite: A novel modelling approach

[Oscar Almendros-Ginestà](#)  , [Tiziana Missana](#), [Miguel García-Gutiérrez](#), [Ursula Alonso](#)

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