

EURAD-2

After a year of preparation, the proposal for EURAD-2 partnership has been submitted to the European Commission on November 8, 2023.

We would like to thank, once more, everyone involved in the preparation and submission process which led to a proposal of no less than 1200 pages!

A specific category has been created on EURAD website, to easily access all documentation linked to EURAD-2, including:

- [Recording and slides](#) from the last public webinar organized by EURAD-2 Core Group
- [Overview of the partnership](#), including one slide per technical workpackage with main information
- [Frequently Asked Questions](#)

EURAD-2 Key facts



5 years
2024-2029



66,6 M€
60 %EC
contribution



18
work packages



148
organisations



21 Member
States + 1
Associated
Country



22 Associated
Partners

Stay tuned for EURAD-2 kick off meeting which will be held in person in October 2024!

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ACED / DONUT workshop

From 8 to 10 November, in Mechelen (Belgium), 55 scientists (also from outside EURAD) have participated to the workshop entitled “Assessing the long-term evolution of engineered barrier systems of waste disposal systems”. This joint workshop was organized by the work packages ACED (Assessment of Chemical Evolution of ILW and HLW Disposal Cells) and DONUT (Development and improvement Of NUmerical methods and Tools for modelling coupled processes).

The engineered Barrier System (EBS) is a crucial component for containment and isolation in a radioactive waste disposal system. Components of a so-called “multiple-barrier system” between the waste matrix and the biosphere include a combination of waste containers (e.g. metal canisters, concrete), engineered barriers such as bentonite or cementitious materials and natural barriers such as salt formation, clay, volcanic or granitic rocks.



The number, types and assigned safety functions of the various engineered barriers depend on the chosen repository concept, the waste form, the radionuclides inventory in the waste, the selected host rock, the hydrogeological and geochemical settings of the repository site among others. EBS properties will evolve with time in response to the thermo, hydro, mechanical, radiological, and chemical gradients and interactions between the various constituents of the barriers and the host rock. Therefore, assessing how these properties evolve over long time frames is highly relevant for evaluating the performance of a repository design and safety function evaluations in a safety case.

For this purpose, mechanistic numerical models are increasingly used. Such models provide an excellent way for integrating in a coherent framework scientific understanding of coupled processes and their consequences on different properties of the materials in the engineered barrier system. These issues have been tackled within the ACED and DONUT EURAD work packages.

To discuss the progress made during the two work packages and to emphasize the synergy between the two WPs during EURAD five sessions have been held:

- Large-scale modelling
- Abstraction-Uncertainty-Sensitivity
- Study on phenomena at interfaces – Experimental and modelling studies
- Benchmarks
- Machine Learning in Reactive Transport Modelling

We thank all the participants for their very interesting contributions and the lively scientific exchanges.



ROUTES final annual meeting

The ROUTES Work Package meeting n°5, organized by COVRA in Nietwerp in September 2023, has been an opportunity for ROUTES participants to convene face-to-face, allowing them to gather in-person since the last annual meeting in Cherbourg in June 2022. During this event, task leaders had the opportunity to present their latest findings. Additionally, participants visited two facilities: the low-level and intermediate-level radioactive waste storage building (LOG) and the High-Level Radioactive Waste Treatment and Storage Building (HABOG) at COVRA's facilities.



Visit of the High-Level Radioactive Waste Treatment and Storage Building at COVRA's facilities

Participants have been invited to share their feedback regarding the value and impact of the ROUTES work. According to them, the ROUTES Work Package has enabled a comprehensive understanding of challenges related to predisposal issues, the elaboration of shared solutions, and solutions adapted to Small Inventory Member States (SIMS) at the European level. It gave an opportunity for underrepresented voices to tackle their own challenges and access potential solutions, and offered civil society representatives to bring their own perspective. Through networking, valuable connections are getting built emphasizing the importance for SIMS to work with Large Inventory Member States (LIMS).

Moreover, the work has led to the identification of potential stakeholders who are tackling similar waste-related challenges and, on the other hand, of potential customers interested in developing innovative treatment approaches for such waste. Furthermore, the implemented initiatives enhanced visibility on crucial topics, such as shared solutions.

This visibility creates opportunities for partnerships, especially with countries that may lack the resources to join the European Repository Development Organization (ERDO) association, which focuses on discussing feasible shared disposals, to get up-to-date information on the latest developments in this field. By fostering these collaborations, the ROUTES WP promotes global cooperation in effectively addressing the complex issue of radioactive waste disposal.

Finally, it was reminded that the ROUTES WP enabled the identification of twenty-two recommendations on Research and Development, strategic studies and knowledge management activities for future European collaboration. These recommendations were integrated to EURAD SRA and some of them will be pursued in the next phase of EURAD.



ICEM Conference

ROUTES Work Package Leader had the opportunity to present the “EURAD EC Project – Overview of the Routes WP Recommendations” at the International Conference on Environmental Remediation and Radioactive Waste Management (ICEM) in Stuttgart (Germany) from 3 to 6 October, 2023.

This oral presentation enabled to display the twenty-two knowledge management, R&D and strategic studies recommendations identified through the work carried out; some of these recommendations will be implemented in the next phase of EURAD.

In addition, the presentation highlighted the achievement of the three main objectives related to shared experience and knowledge, identifying safety-relevant issues, comparative analyses and the collaboration between member states.



SFC annual meeting

WP8 - SFC had their annual meeting from October 31st to November 2nd, 2023 in Tägi, Switzerland.

Around thirty participants, with representatives from several end-users, were gathered to follow the outcomes of the “Spent Fuel Characterisation and evolution until disposal” project, SFC.



An overview of each task was presented by the Task leaders and the technical sessions included scientific presentations of each subtask by the task members.

Following each presentation were discussions on the outcome of the research. The meeting also included a site visit to The Gösgen Nuclear Power Plant, KKG.



HITEC final annual meeting

MADRID, 24-25 OCTOBER

The final annual meeting of HITEC was arranged in Madrid, and housed by CIEMAT, Maria Victoria Villar. Our aim was to have this final meeting as face-to-face only. However, a hybrid meeting was finally arranged, while almost 30 people were present in Madrid. Unfortunately, I couldn't attend, but was able to follow the meeting online, like many others, too.



The aim of the meeting was to present the scientific conclusions and impacts on safety, to be published in deliverables, which were for the most part completed after the meeting. The two materials, clay host rock and bentonite buffer, were thoroughly discussed in this two-day meeting, and I assume during the nice dinner, too.

The experimental results for clay host rock give confidence to the positive impact of the self-sealing process on the restoration of the initial sealing properties of the clay host rock during the resaturation of the underground structures for radioactive waste. The benchmarking exercises for clay host rock showed that the codes can get very consistent results in an elastic isotropic case but some discrepancies were observed when introducing anisotropy, especially in the near-field.

Multiple test programmes, in both Ca- and Na-bentonite have also found evidence that, whilst changes to hydraulic permeability are perhaps less significant, swelling pressure can be substantially impacted by elevated temperatures. Useful discussions at the final project meeting led to a general agreement across project partners that this effect was found to be more pronounced at higher temperatures and dry densities, for all test programmes.



Workshop on Ukrainian experience from exercising radioactive waste management under exceptional conditions

EURAD workshop on Ukrainian experience from exercising radioactive waste management under exceptional conditions was organised online on **October 16th, 2023**.

The workshop was organised to present challenges faced by Ukrainian regulator (SNRIU) and its technical support organisation (SSTC NRS) to manage and provide regulatory oversight of nuclear infrastructures during war conditions. Ukraine faced the situation in which facilities licensed for the management of higher activity wastes were outside the full control of Ukraine licensees, due to the military occupation. Licensees were unable to fully perform permitted activities in compliance with safety requirements. There is no global experience or international recommendations on safety regulation under similar conditions.

The workshop activities were divided into 2 parts, starting with four presentations made by Ukrainian partners of EURAD and followed up with a Q&A session. The four presentations described the handling and relaxations of regulations due to war circumstances, the actual challenges experienced, lessons learned and the solutions applied regarding:

1. Maintaining Safety Principles and Provisions in Wartime Conditions

The SNRIU, in collaboration with the SSTC NRS and with support from the Norwegian regulatory body (DSA), has developed approaches and procedures for regulating the safety of facilities and activities within the Chernobyl Exclusion Zone which were affected by hostilities. The core of this approach is to require licensees to operate facilities in modes with minimal risk of emergencies and accidents while limiting authorized activities. Based on this, the scope of application of the safety principles and general provisions has been determined.

2. Handling Licensing Matters During and After Liberation by the Hostilities

After regaining control of the Chernobyl Exclusion Zone by Ukraine, licensees of facilities within the zone faced challenges complying with safety requirements due to factors such as a shortage of personnel and uncertainty regarding the safety of the facilities following the uncontrolled presence of occupying troops, which led to the temporary suspension of the licenses by the regulator. Before license restoration, facility operators had to ensure the facilities were in a safe state, capable of conducting authorized activities, and underwent comprehensive safety inspections.

3. Lessons Learned from Emergency Preparedness and Response in Wartime Conditions

Based on the Ukrainian experience, most recommendations, regulations and guidelines on emergency preparedness and response cannot be applied in the context of wartime. This problem became obvious for the experts of the SNRIU Information and Emergence Centre during an assessment of the consequences of a potential accident at the occupied Zaporizhzhya NPP. Currently, experts are working on adapting standard calculations and procedures to the war conditions.

Around 70 people participated in this workshop (from REs, TSOs, WMOs, Waste Generators (NPP), Regulators, EC, IAEA, CSOs, and AEC Uganda). The summary of the workshop is available by [clicking on this link](#).



Figure 1. Chernobyl NPP site.



Figure 2. Chernobyl NPP under the occupation.



IAEA Conference on Ensuring Safety and enabling sustainability

EURAD has been presented at the IAEA Conference in Vienna on “The safety of radioactive waste management, decommissioning, environmental protection and remediation”.

The motto of the conference was “Ensuring safety and enabling sustainability” showing that safe pathways for radioactive waste management are not always sustainable. The drivers of our updated strategic research Agenda are motivated both by issues of sustainability and of safety.



Figure 1 Side event panelists: How can end-users be more engaged in European programs ?

EURAD has contributed to the 8 sustainability goals (SDG) of the United Nations, for example to SDG 4 “quality of education” with our Knowledge Management Programme and EURAD School on RWM.

The title of our contribution to the conference was “A European collaboration towards safe radioactive waste management and sustainable knowledge”. Indeed, knowledge management is at the heart of European joint programme on radioactive waste management, linking different communities of practice and different stages of development of national programmes, with a vision of intergenerational sustainability.

A side event was organized together with the PREDIS and HARPERS projects to discuss how end-users can become engaged in European programs.



ROUTES WP

DMT GmbH & Co. KG had the opportunity to present the “Radioactive waste management for small amounts of waste - Results from the EURAD ROUTES Project” at this Conference.

Two tasks within the ROUTES WP are dedicated to solutions for small amounts of waste, focusing on both pre-disposal management as well as on disposal options. A target group for these RWM solutions are so-called Small Inventory Member States (SIMS).

During the oral presentation, the options for predisposal and disposal management of radioactive waste were presented, providing an overview of the methodologies used for the identification of suitable waste management routes and a summary of the main outputs of the tasks achieved to date was given.



Now published

ROUTES

- Implementation of ROUTES ICS action plan second phase (D9.17) – [Link](#)
- Suggestions for the management of challenging wastes while maintaining compatibility with options for disposal (D9.9) - [Link](#)

UMAN

- Generic strategies for managing uncertainties (D10.2) – [Link](#)
- Understanding of uncertainty management by various stakeholders (D10.13) – [Link](#)

State-of-Knowledge

- Authors Guidance and template (D11.8) – [Link](#)
- Specification of the EURAD KM platform (D11.9) – [Link](#)

Training

- Development of mobility programme (D13.8) – [Link](#)
- Update on training courses organized by EURAD WP13 (D13.9) - [Link](#)

MODATS

- Initial State of the art (D17.1) – [Link](#)

Domain Insights

- Timetable for Decision Making (1.1.2) – [Link](#)
- Vitrified HLW (3.1.2) – [Link](#)
- HLW and SNF containers (3.2.1) – [Link](#)
- EBS systems (3.4.1) – [Link](#)
- Area survey and site screening (6.1.2) – [Link](#)
- Information, data and knowledge management (7.2.2) – [Link](#)



Upcoming events

January

16-18: [EURAD training on requirements management system](#)

22-26: [MODATS training course on monitoring in geological disposal facilities of radioactive waste](#)

February

14: [Lunch & Learn – Accuracy and uncertainty in determination of SF inventory](#)

28: [Lunch & Learn – Advisory Board Committee \(ESK\)](#)

March

10-14: [Waste Management Symposium \(WM2024\)](#)

27: [Lunch & Learn – Sensitivity analysis comparisons on geologic case studies: an international collaboration](#)

April

16-18: [EGU 2024](#)

22-26: [EURAD final annual event](#)

MODATS training course on monitoring in geological disposal facilities of radioactive waste

The Monitoring training is targeted to offer an overview of monitoring aspects in the field of geological disposal (in crystalline and clay host rocks) and methodology to conduct a monitoring strategy. The training aims to provide participants a set of competences based on the work inside the EU project dedicated on monitoring (Modern, Modern2020...).

Upon completion of this training course, participants should be able to:

- Describe the relevant processes for the geological disposal during operational phases and early post-closure phase
- Discuss the role of monitoring for geological disposal during operational phases and early post-closure phase
- Understand the methodology to select monitoring parameters
- Describe monitoring sensors and technologies
- Discuss monitoring system design, installation, and operation
- Reflect on the contribution of monitoring data to decision making
- Understand expectations from different stakeholders

[Click here](#) to download the preliminary programme.

[Click here to register!](#) Deadline January 15, 2024

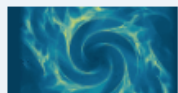


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Francis Claret • 1er
BRGM
1j •

To which extent pore water chemistry influence on a cesium adsorption model outcome? Maybe not that much but have a look to our last publication in Journal of Computational Science to get the accurate answer. A collaborative @CEA @BRGM # ISTO work within the #EURAD European Joint Programme on Radioactive Waste Management

[Voir la traduction](#)



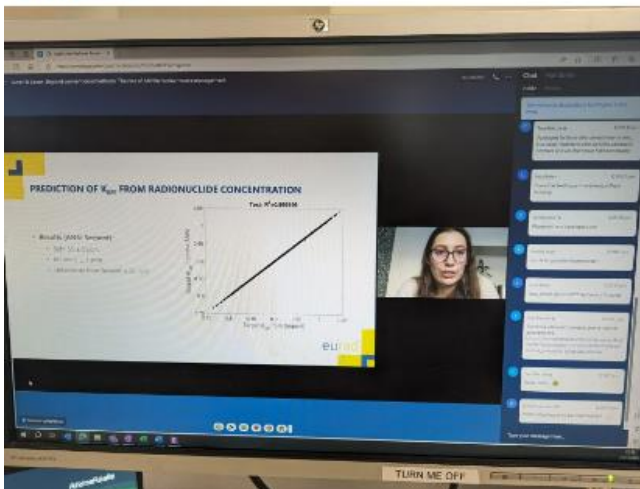
Dimension reduction for uncertainty propagation and global sensitivity analyses of a cesium adsorption model
sciencedirect.com • Lecture de 1 min

Vous et 12 autres personnes 1 republication

Pravinthan P (He/Him) • 2e
Graduate Environment Consultant at AtkinsRéalis | Radioactive Waste System...
2 sem. • Modifié •

Nuclear waste management is a long process spanning decades, therefore the technology around it evolves constantly. Attended a recent seminar by [European Joint Programme on Radioactive Waste Management](#) led by [Virginie S](#) ...voir plus

[Voir la traduction](#)



EURAD @EJP_EURAD · 16 nov. ...
DECOVALEX 2023 was a great opportunity to promote EURAD and international collaboration via high-level presentations, posters and panel discussion!



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Vous avez reposté

Fisicoquímica de Actínidos y Productos de Fisión @FFision · 5 oct. ...
[@Mikel_9](#), young researcher from [@FFision](#) [@CIEMAT_OPI](#), has just presented at the Spanish Nuclear Annual meeting [@SNEu235](#) [#Nuclearesentoledo](#) a study on the impact of gamma radiation on canister corrosion in waste repositories. This study is supported by [@EJP_EURAD](#) WP ConCorD.



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