



ERDO-LWC Project
Legacy Waste Characterization
for streamlined disposability

*PREDIS Webinar n.1 on WAC
Information and resources*

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ERDO Association and sharing needs



- All countries (large or small) making use of nuclear technologies must have credible RWM policies and strategies including disposal
- It's not credible that countries with small nuclear programmes can be self-sufficient in solving all needs of a 'cradle-to-grave' approach in RWM
- The main goal of the ERDO Association (established Jan 2021 and based at the headquarters of COVRA, The Netherlands) is enabling the establishment of one or more operational, shared multinational waste management solutions

https://www.covra.nl/app/uploads/2021/01/ERDO_brochure.pdf

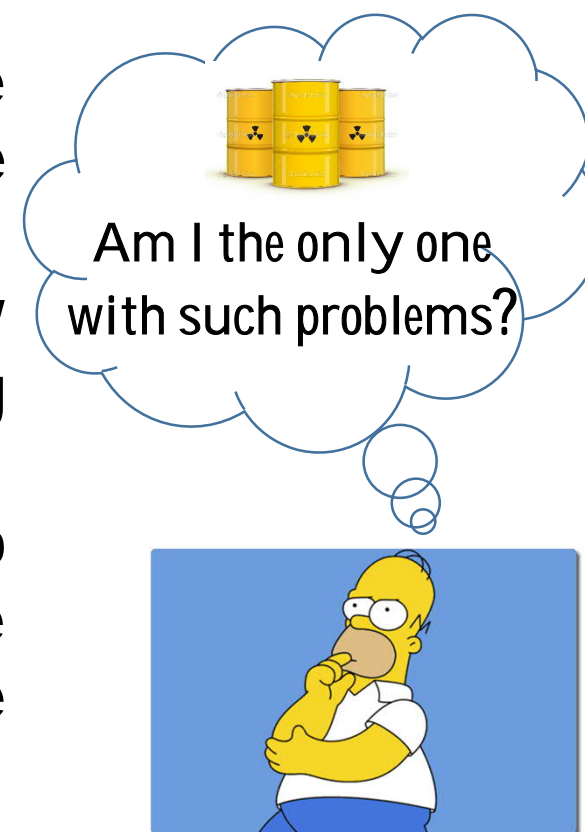
Why the ERDO-LWC project



- Nuclear activities performed in the past have been generating significant quantities of legacy waste often treated and conditioned according to obsolete rules or simply stored pending a suitable management solution
- Legacy Waste are often lacking sufficient physical-chemical-radiological characterization data for envisaging possible re-treatment/re-conditioning processes in line with future WAC and acceptance for disposal
- In some countries, this issue is worsened by the lack of disposal options and relevant WAC, insufficient human and financial resources which often lead to lack of RWM activity and frozen programs

Why the ERDO-LWC project

- Waste managers and decommissioning planners ask for early indications about possible treatment/conditioning processes for not slowing down D&WM programmes
- If such a guidance is not supplied in due time, usually waste generators choose between two possible alternatives:
 - ✓ Wait and see, i.e. safe temporary packaging of raw waste gaining flexibility for alignment to future WAC
 - ✓ Treatment/conditioning according to available rules with the unavoidable risk of generating unacceptable waste (i.e. future 'legacy waste'!)



ERDO-LWC Project objectives



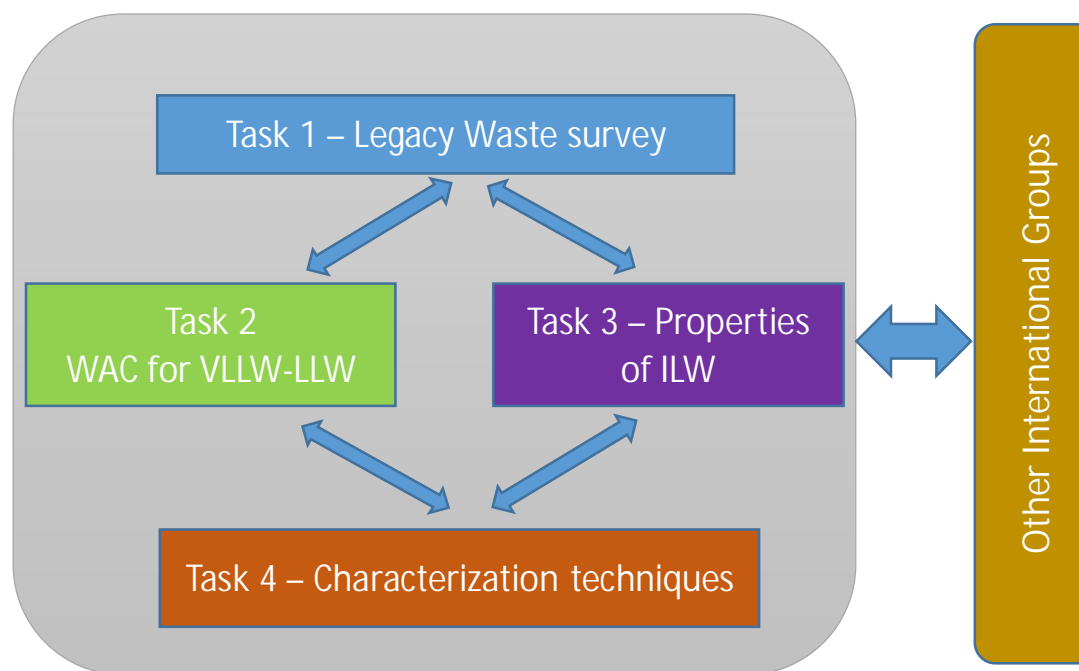
Project launched Feb 2020 within ERDO by Austria, Croatia, Denmark, Greece, Italy, The Netherlands, Norway, Slovenia

- Surveying the main Legacy Waste streams in the interested countries and looking for similarities and possible sharing of Waste Management Facilities/Knowledge/Good practice
- Identifying the minimum set of WAC (physical-chemical-radiological) to be respected by legacy VLLW-LLW or ILW packages for envisaging possible re-treatment/re-conditioning processes and disposability to a National or Multinational Disposal Facility
- Evaluating possible methodologies for quantitatively deriving the missing characterization data for the Legacy Waste streams

Project tasks



- Task 1: Survey of existing Legacy Waste streams
- Task 2: Minimum set of WAC for disposal of VLLW-LLW
- Task 3: Main properties of ILW potentially suitable for disposal
- Task 4: Characterization techniques



Task1 – Survey of existing legacy waste streams

The survey evidenced several common legacy waste stream groups:

- Disused Sealed Radioactive Sources (source of various dimensions from medical, industrial and research applications)
- Mixed waste (glass, plastic, clothes, rags, metal scraps, electrical material, instruments, etc.)
- Powdery waste (contaminated soil, zeolites, metal frit, etc.)
- Sludges (sediments, residues from water treatment)
- Resins (spent ion exchange resins)
- Liquid organic waste (oils, solvents, kerosene, etc.)
- Graphite (moderator/reflector from power and research plants)
- Alpha bearing solid waste (waste containing U, Pu, fissile mat.)
- Chemo-toxic materials (asbestos, Cd, Be, PCB, etc.)

Task1 – Survey of existing legacy waste



Preliminary results of the survey:

- 6 out of 13 LW stream groups are common to at least 5 out of 7 countries
- In almost all streams, chemical and also radiological characterization is lacking or of LOW reliability (characterization declared to be performed during sorting or re-treatment!)
- The current status is 'raw' or 'conditioned' according to obsolete rules; re-working is therefore necessary in many cases for disposability
- Re-treatment and re-conditioning are declared by many countries for almost all waste streams, but not always suitably defined

Task2 – Minimum set of WAC for VLLW-LLW disposal



Overview of current activities and next steps:

- 14 cases studies evaluated of WAC relevant to licensed or operational repositories for VLLW-LLW-ILW/SL
- Available reference documents are of help in identifying main common WAC to be respected for disposability (derived from common safety aspects or degradation scenarios)
- Preliminary results indicate that chemical and physical WAC are probably more important than radiological WAC for minimizing the onset of degradation scenarios and environmental impact (e.g. free-liquids, voids fraction, complexing/chelating agents, chemo-toxic materials, reactive metals, organic materials, explosive/flammable materials)

Task3 – Main ILW properties for potential disposal

Ongoing work and next steps:

- Looking for similar ILW streams in countries with reference geologic disposal solution in place
- Exploring available preliminary disposability assessments or long-term safety studies on the waste streams
- Deriving main requirements to be respected by the waste streams for potential disposability

Task3 – Main ILW properties for potential disposal



Example of ILW property derived by available disposability assessments

Property	Safety functions potentially affected	Description of potential effects	Findings from existing Safety Assessments	References
Complexing agents	Retardation of radionuclides	Reduction of the sorption of radionuclides	Isotopes of Mn and in some cases Ni, Pb and Eu affected	SKB, SFR Safety Assessment

Task4 – Characterization techniques

Activities yet to be started

- Checking the availability of characterization data of the main Legacy Waste streams for acceptance to disposal
- Looking at technologies and approaches for deriving the missing characterization data
- Formulating early indications to waste producers in order to allow the implementation of characterization and re-treatment/conditioning of the waste streams in line with WAC and properties defined in Task 2 and 3.

Homer, you're not the only one with these problems.
Sharing is strength!

Thanks for your
attention



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