

WAC 2 Webinar Summary

Webinar Date	May 20, 2021
Webinar Time	09:00 to 12:00 CEST
Chair	Lumir Nachmilner
Prepared by	Lumir Nachmilner and Tim Schatz

Background

The PREDIS project hosted a technical webinar (*Waste Acceptance Criteria 2: Needs, Challenges and Opportunities*) on April 21, 2021. This webinar was aimed at identifying the most pressing WAC-related issues facing waste owners, generators and management organizations as well approaches to deal with them. The program (see Appendix 1 for agenda) for this webinar consisted of two sessions of presentations by invited speakers: a session on general stakeholder perspectives and a session on end user perspectives.

- Lumir Nachmilner (CVREZ) discussed the motivation, scope and set of key takeaways from the earlier WAC webinar 1. Highlighted outcomes included challenges in developing and/or modifying WAC, the needs of less mature RWM programmes, highest priority activities and whether the projects presented in WAC webinar 1 were addressing identified needs.
- Piet Zuidema (Nagra ret.) gave a presentation on the history of WAC development which emphasized that many lessons have been learned along the way. The importance of WAC and corresponding processes to overall waste management and the necessity of developing waste acceptance procedures very early in the waste management programme were stressed. Lastly it was noted that a great deal of experience is available, and it should be taken advantage of as much as possible.
- Seif Ben Hadji Hassine (EC) gave a presentation on EC expectations and activities in the areas of classification of radioactive waste and WAC. The commission is interested in promoting cross border collaboration between Member States on sharing technical and licensing practices on final disposal solutions and creating opportunities for the EU-wide market in these areas. There is a current EC study on radioactive waste classification schemes in the EU which aims towards an aligned, harmonized application of an international regulatory framework in waste management and decommissioning. Some expected outcomes of this study are the development of a strategy for European/internationally shared treatment and storage facilities as well as a strategy for predisposal operations, treatment solutions, interim storage, repository, safety, operations, monitoring of materials and wastes and stakeholder involvement.
- Patrik Konneus (Studsvik) described experience from a decommissioning project regarding a radiological point of view for WAC compliance. Lessons learned were that characterization can be done conservatively, it is better to be done after strategic sorting and packing and it should be tailored to meet WAC. It was also advised that a continuously good dialogue with the regulator should be maintained.
- Adrien Rooses (Orano) presented the waste conditioning strategy used by Orano. This strategy follows five golden rules: avoid waste at the source, maximize sorting and decontamination, reduce volumes, condition as early as possible and initiate R&D at the right time. In order to fulfil these strategic aims, Orano reduces risk with an incremental approach (e.g., examine different retrieval and conditioning scenarios), maintains flexibility in order to adapt without complete resets (e.g., use of cement formulas adapted to mixed wastes), does not rush R&D work (e.g., thoroughly test process performance with real waste) and strengthens competencies in conditioning (e.g., development

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work is carried out throughout project lifetimes to increase understanding and confidence). These tactics were demonstrated for a legacy waste consisting of a mix of graphite and magnesium.

- Anastasia Savidou (NCSR) discussed waste management concerns specific to Small Inventory Member States (SIMS). These concerns include insufficient characterization and conditioning, lack of disposal strategy, only generic or preliminary (or no) WAC available, waste management routes undefined especially for challenging wastes, lack of resources and long-term storage. SIMS need cost effective and readily implementable solutions. The use of waste packages/containers which can provide long-term storage stability, easy transport, waste retrieval and direct disposal acceptance or compatibility with overpacking is of current interest. It is expected that results from EURAD ROUTES and PREDIS will be useful for SIMS.
- Marja Vuorio (COVRA) described the waste management perspective from the Netherlands. The inventory consists of processed LILW, depleted uranium, vitrified HLW, spent research reactor fuel and other HLW. Mainly the management of LILW was discussed. It is expected that the wastes will be stored in above ground facilities for around 100 years and will ultimately all be disposed of in a single DGR. Wastes are processed through characterization, separation, volume reduction, immobilization and packaging steps. LILWs are durably packaged to be suitable for both storage and disposal as safety functions are largely comparable. However, long-lived mobile nuclides must be characterised for disposal purposes. Each waste type is stored in its own facility. COVRA is interested in exploring new processing routes through the EURAD and PREDIS projects.
- Angelo Paratore (SOGIN) provided the waste management view from Italy. The disposal strategy involves the temporary storage of wastes on site until the National Repository is available, at which point VLLW-LLW will be subject to near surface disposal and ILW-HLW will be stored until a DGR can be accessed. At present, preliminary WAC are used to meet a set of qualification requirements and additional metrics based on waste characterization and dialogue with waste producers, preliminary repository designs, preliminary 'site independent' safety assessments and international best practices. Of particular interest is the trade-off between early and deferred conditioning using homogeneous/heterogeneous grouting and reversible packaging in high integrity containers, respectively.
- Peter Lietava (SUJB) gave a presentation on WAC from the regulator perspective. The responsibilities of the licensees were reviewed. It is up to licensees to establish preliminary WAC and to update them to reflect the development of the storage/disposal project. Moreover, licensees shall develop WAC/ report changes to WAC and submit them to the regulator for review and approval if appropriate, ensure that the waste accepted for storage/disposal conforms to WAC, ensure that each waste package consigned for storage/disposal is traceable, review the management system of the organization submitting waste and the quality of information provided and establish procedures for dealing with waste packages that do not conform to WAC. It was noted that regulators encounter issues concerning a lack of knowledge or data on waste forms and waste packages.

The presentations are available on the PREDIS website (<https://predis-h2020.eu/wac2-webinar-20-5-2021/>).

Following the formal presentation sessions, a set of small group discussions were held. Attendees were randomly assigned to 1 of 4 moderated breakout rooms. The aim of the 30-minute discussion session was to gather perspectives framed around the following questions (although discussions were not limited).

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- How to close the gap between characterization (or lack thereof), selecting appropriate treatment and conditioning options and WAC development?
- In the absence of WAC, what are the trade-offs between preliminary treatment and conditioning and delayed treatment and conditioning, and which balance of these factors is acceptable?

In all, more than 170 participants registered to attend the webinar from 30 countries including some from outside Europe. Representation was divided between PREDIS end user group members + general stakeholders and consortium partners at 37% to 63%. A total of 119 people joined the webinar over its duration.

Live-polling was conducted during the webinar. Poll questions were intended to gauge feedback and opinions on the biggest challenges regarding WAC and where shared solutions and information would provide the most benefit.

Outcomes

Some key takeaways from the deliberations of the discussion sessions were as follows:

Approach in the absence of disposal solutions

- ▣ Predisposal and disposal WAC should optimally be formulated together; if disposal is unavailable, good international practices can be followed.
- ▣ Reversible packaging in high integrity containers, which are viable for long-term storage and allow for deferred conditioning or possibly direct disposal, might be an answer.
- ▣ RW processed without disposal WAC will likely require re-characterisation followed by a decision on re-processing.
- ▣ Adoption of practices similar to the UK's Letter of Compliance process can help in formulating WAC when disposal solutions are lacking.
- ▣ Even if a disposal solution is not available, future management processes should be duly envisaged. Moving forward blindly can be dangerous, therefore, characterization records should be kept and duly archived, mixing of waste should be avoided, etc.
- ▣ Flexibility in waste treatment/conditioning should be directly proportional to the uncertainty of a disposal solution.

Characterization and WAC development

- ▣ Closing the gap between characterization on the one hand and treatment & conditioning and WAC development on the other hand will require committed communication between all relevant actors in different organizations (waste producers, waste managers, safety authorities) as well as those within the same organization (people working in the field of characterization, waste acceptors, installation development engineers,...).
- ▣ Radiological, chemical and physical characterization should be performed on raw waste as early as possible.
- ▣ For new wastes, characterization (radiological, chemical and physical) should be performed in each phase of the process, starting from sorting, in order to avoid the mistakes of the past.

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- ▣ Do not overemphasize free release radionuclide vectors; the level of conservatism is too restrictive for disposal.
- ▣ Characterization should be aligned to the planned waste management process.
- ▣ Cross-border cooperation and otherwise sharing experience in technology implementation would support WAC specification.
- ▣ Archiving representative waste samples could allow for future WAC development.

General

- ▣ Harmonization is essential. However, harmonization across all aspects of waste management over all inventories everywhere is neither credible nor desirable. Rather, in this context, sharing of knowledge, experience and information can be considered somewhat akin to harmonizing.
- ▣ Harmonization should be viewed as an opportunity not only for identifying best practices, etc., but also for market opening and increased transparency.
- ▣ From a practical point of view, there are two main waste acceptance categories: those acceptable to near-surface type facilities and those requiring deep(er) geologic disposal.
- ▣ Absolutely key factors in the management of radioactive waste are segregation & characterisation of raw waste.
- ▣ Predisposal technologies specify requirements on input waste streams and, as a consequence, on RW characterisation techniques as well.
- ▣ Shared disposal facilities remain illusory, but in the future, namely for SIMS and HLW/SNF, they might be inevitable.
- ▣ The PREDIS project represents an opportunity to develop new conditioning and characterization methods and techniques as well as implement and share and implement any new developments.

Live-polling indicated (see Appendix 2 for all live-polling results) that:

- ▶ To the question about the biggest challenges regarding WAC, the most common responses (in the word cloud representation) were harmonization, legacy wastes and characterization.
- ▶ To the question about shared solutions and information providing the most benefit regarding WAC, the most common responses (in the word cloud representation) were characterization, small inventories and waste form qualification.

Overall, the level of interest and satisfaction with the WAC 2 webinar was favourable. The webinar had a high retention rate (> 64%) to its close. Preliminary analyses of participant responses to a post-webinar survey also indicated a good level of satisfaction (average overall score of 4.3/5.0). Participants also reflected that the presentations were relevant, informative and interesting.



Waste Acceptance Criteria 2: Needs, Challenges and Opportunities

Free webinar on May 20, 2021 from 9-12 (CEST)

Agenda

09:00 to 11:15 CEST – Presentations

Introduction

09:00-09:10 Welcome & Introduction

General Stakeholder Perspectives

09:10-09:20 Key takeaways from WAC webinar #1 on April 20 (Lumir Nachmilner, CVRez, CZ)

09:20-09:30 History of WAC (Piet Zuidema, retired Nagra, Switzerland)

09:30-09:40 EC expectations on RTD cooperation (Seif Ben Hadj Hassine, EC)

09:40-09:50 Case Study on WAC compliance for conditional clearance (Patrik Konneus, Studsvik, Sweden)

09:50-10:00 break

End User Perspectives

10:00-10:15 Waste Producer Large Inventory (Adrien Rooses, Orano, France)

10:15-10:30 Waste Producer Small Inventory (Anastasia Savidou, NCSR, Greece)

10:30-10:45 Waste Management Organization Early Stage Program (Marja Vuorio, Covra, Netherlands)

10:45-11:00 Waste Management Organization Early Stage Program (Angelo Paratore, SOGIN, Italy)

11:00-11:15 Regulator (Peter Lietava, SUJB, Czech Republic)

11:15-11:25 break

11:25 to 11:45 CEST – Breakout room discussions

- *How to close the gap between characterization (or lack thereof), selecting appropriate treatment and conditioning options and WAC development?*
- *In the absence of WAC, i) what are the trade-offs between preliminary treatment and conditioning and delayed treatment and conditioning and ii) which balance of these factors is acceptable?*

11:45 to 12:00 CEST – Close

11:45-11:50 Feedback from breakout rooms

11:50-11:55 Summary and Conclusions

12:00 Adjourn



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Appendix 2. Live-Polling Results

What are the biggest challenges regarding WAC?

Mentimeter



36

Where would shared solutions and information provide the most benefit regarding WAC?

Mentimeter



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