



Characterization of Conditioned Nuclear Waste
for its Safe Disposal in Europe

Role of End-Users in WP2 Task 1 “End-Users requirements & Methodology for conditioned waste characterization”

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on behalf of the WP 2 and WP 6 partners



To identify:

- key parameters that need characterization;
- technologies/methods commonly used for characterization of conditioned waste;
- waste acceptance criteria applied and the possibilities of their harmonization in Europe
- specific problematic issues for the characterization of conditioned radioactive waste;
- R&D needs and potential on-going R&D programme on the topic of conditioned radioactive waste characterization;
- potential applications of R&D actions to be included in CHANCE;
- socio-technical and ethical issues associated with the waste characterization process.

Q1. What types of radioactive waste, including spent fuel, are managed by your organization?

Waste type*	Yes/N o	Main origin	Comment
Very low level waste			
Low level Waste			
Intermediate level waste			
High level waste			
Spent fuel			
Other (eq. liquid waste)			

*according to the IAEA General Safety Guide N° GSG-1

You can **adapt it**, depending on the clasification scheme applied in your organization/ country

Q2. What is the option for storage/disposal of radioactive waste and spent fuel in your country?

Waste type *	storage / disposal option	Existing/ Project
Very low level waste		
Low level Waste		
Intermediate level waste		
High level waste		
Spent fuel		
Other		

- please specify the **storage / disposal option** for each waste category identified in Q1
- please specify the **existing or planned facilities** for radioactive waste storage and disposal in your country

Q3. What are the waste acceptance criteria (WAC) for the storage / disposal facilities identified above in Q2 (operational and foreseen to be commenced in the future)?

- for each storage / disposal option please include **the main parameters that have to be characterized**
 - **Radiological parameters**
 - **Chemical parameters**
 - **Mechanical parameters**
 - **Other type of parameters** (homogeneity, types of conditioning matrices, specifications for the container, waste accepted with restriction, forbidden waste, etc.)

- if possible, please **justify why you need to characterize** these parameters

Q4. Should WAC be harmonized across Europe? If so, how?

please express your personal point of view

Q5. How do you deal with the fact that the WAC as well as the final disposal concepts are in constant evolution (techno-scientific progress, experiences, stricter attitudes ...)?

- how do you deal with the historical waste
- do you have to characterize more (as required by the current WAC)

Q6. What methods are you applying in characterisation of conditioned radioactive waste?

- please specify and give as much details as possible on the **methods applied in your organization for radioactive waste characterisation** (including characterisation of waste before its conditioning) or provide the corresponding reference documents (if any)
- please specify how you **correlate** the so-called **hard to measure radionuclides** with **easy to measure nuclides**
- if you are complementing the measurement data with **modeling/calculations**, please specify and describe them specifying, if any, potential **needs of codes' validation by National Control Authority**
- please specify if you correlate the chemo-toxicity with radio-toxicity of the waste

Q7. What are the uncertainties associated to the methods you are currently using in radioactive waste characterisation?

- please specify the **levels of uncertainties** for each method used in your radioactive waste characterisation
- please specify the **target level** of uncertainties
- what is the **source** of the uncertainty?
- please specify your **action(s)** (if any) to decrease the uncertainty level in characterisation of conditioned radioactive waste

Q8. Which other uncertainties (e.g. technical, conceptual, social, political, ethical) do you anticipate with regard to waste characterisation for safe disposal?

Uncertainties may relate to **changes in the final disposal concept, regulation and/or policy, divisions of responsibilities, limits of knowledge, amounts of waste, societal incentives or pressures, financial constraints, safety/security protocols**

- Please list the **three, in your opinion, most important ones** and specify:
- what is the **impact** of each of these uncertainties on waste characterization (e.g. on the relationship between actors, operational safety, costs, ...)
 - whether and **how these uncertainties are dealt with** at present (e.g. through various procedures, leaving the option of re-characterization, storing the waste in a certain manner, ...)
 - any **suggestions** you may have on whether and **how these uncertainties could be managed** (e.g. new equipment, a political decision, involving other disciplines, reconditioning, flexible tariffs, ...)

Q9. Do you have in your organization waste categories and/or waste forms that do not have a dedicated option for disposal? If yes, are you characterize these waste?

if yes, please :

- specify **what are** these waste categories
- identify what are the **potential limits for the acceptance** of these waste categories in the existing or future disposal facilities
- specify what are the **plans for managing these waste** categories
- specify if you are doing characterization for these waste
- If you characterize these waste, please specify what kind of measurements are you performing

Q10. What are the major technical difficulties you encounter in characterising your conditioned radioactive waste?

- please specify what are the conditioning methodologies and/or matrices used in your organisation

- please specify any technical problems you face in the characterization process

Q11. What are the R&D needs that could solve the difficulties identified in Q10?

- please identify what techniques/methods could complement the ones already used in your institution/country to improve the level of radioactive waste characterisation

Q12. Do you have an active R&D programme on radioactive waste characterisation?

- if yes, please specify what are the **main topics addressed**
- please specify if you are **interested to be involved in R&D projects** related to radioactive waste characterisation

The CHANCE project will address and develop some specific techniques: Calorimetry, Muon Tomography and Cavity Ring-Down Spectroscopy (for details see www.chance-h2020.eu).

Q13. Do you foresee an application of one of the techniques developed in CHANCE in your radioactive waste characterisation?

- if yes, please specify:
 - for what **type of waste** you could use these methods
 - how these methods **improve** the characterisation of your conditioned radioactive waste or decrease the uncertainty level

Q14. In your country, who is in charge of characterization and who is in charge of control? How the characterisation and control processes are structured?

- what organisation(s) is **responsible** for radioactive waste characterisation
- what organization is **in charge with control**
- please specify if the same techniques are used both in characterization and in control processes

Q15. What is the role of host communities in these processes?

- Do** host communities (i.e. the local community where the waste is stored / (will be) disposed) **have a role in waste characterization** and/or **control** in your country?
- Should** these communities **have a role in waste characterization** and/or **control** in your opinion and if so which one?
- How do you deal** with the **concerns of local communities**, e.g. concerns about the content of the disposal facility?
- Do you think that continuous **improvement of waste characterization** by innovative methods can **improve the perception of risk associated** with waste disposal?

Q16. Which disciplines / fields of expertise / actors are involved in the characterization of conditioned waste in your country? Are there any missing in your opinion?

- please specify:
 - disciplines / fields of expertise / actors involved in characterization
 - mission ones, if any

Q17. In your opinion, why is waste characterization important for your organisation?

Please rate the importance	Very high	High	Low	Very low
Verification of the declared inventory				
Improvement of characterization methods and techniques				
Operational safety				
Long term safety				
Economics (cost determination)				
Waste classification in view of disposal choices				
Optimisation of disposal concepts				
Stakeholder involvement				
Regulatory requirements				
Long term monitoring				
Retrievability				
Communication				
Documentation				
QM & incident management				
Other:				

Q18. In your opinion, what lessons can be drawn from the waste characterization processes in your country?

- lessons can be either positive or negative
- you can compare with other countries, but this is not necessary.

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Thank you for your attention