WG3 – New Waste Type in collaboration with SNETP

Presentations and speakers:

1- Importance of the waste form from a safety assessment perspective: The SR-Site experience (L. Zetterström Evins, SKB)

2- Results of R&D on future fuel cycle and associated HL waste disposal: the French case (D. Warin, CEA)

3 - RED IMPACT (W. von Lensa, FZJ)

4 - Advanced wasteforms for future nuclear fuel cycles (N. Hyatt, Sheffield U.)

5 - CarboSOLUTIONS: Implementing irradiated-graphite management (G. Laurent, EDF and W. von Lensa, FZJ)

6 - EDF pilot plant and a project for the graphite treatment (G. Laurent, EDF)

7- Management of current and future radwaste for deep geological repository : French approach and articulation with R&D (F. Plas, ANDRA)

8 - Long term behavior of waste forms from Gen IV Reactors towards Geological Disposal (G. De Angelis, A. Dodaro , M. Sepielli, ENEA)

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Strategy

The main idea with this WG is to, for the first time, exchange ideas between the different platforms SNE TP and IGD TP regarding future developments, both within the coming 20 years as well as further down the next several decades.

Expected changes in waste forms may have implications for geological disposal and needed R&D. The changes expected in waste forms that will need to be disposed of in geological repositories are of primary concern for WMOs.

The question is to what extent the future waste forms can be accomodated, or not, in the current repository concepts.

Rapporteurs : Dominique Warin SNETP / CEA
Lena Zetterström Evins IGDTP / SKB

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The vision of IGD-TP is Implementation of the first Geological repository for HLW in 2025 and the SRA is formulated based on this vision. Therefore, any waste that is expected to arise after this date is in some way out of the scope for IGD-TP.

However, this future waste (from Gen IV) still needs R&D!

A clear outcome from the discussions was the need for the IGD-TP to look at two different time scales, one more immediate and one more long-term.

Another outcome was the need to set up an effective link, both for the governing boards and for the participating experts, between the two platforms. A common fact sheet is one way to emphasize that this dialogue and link has been initiated. A Coordinated Action was suggested as a more direct route to strengthen the link.

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The starting point was to discuss, in line with the vision of IGD-TP, primarily changes expected in the coming two decades (e.g. higher burnups, change of cladding materials, use of fuel form other than UO2, increased separation and recycling, change in the reprocessing end-product, GenIII reactors…).

It needs to be pointed out that the focus of the group was not on evolution of existing reactors, eg higher burnup or changes of cladding materials, although it is envisaged that these changes will affect, in some way, the research related to spent nuclear fuel as a waste form.

The focus was rather the primary and secondary waste that will be generated from the R&D facilities dealing with GEN IV and other facilities…An example is about ILW.

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Presentations and messages :

1- "Now" : the current parks : the geological repositories under designs for "existing" spent fuels and waste. The licensing process is , or will very soon be, ongoing.

- **Sweden & Finland : the needs of the safety case illustrates the importance of a sound scientific basis and research programme for all fuels (or waste forms)**

- **France : the Cigéo project of geological disposal is "definitely" designed as a function of the waste industrial inventory**

- **Note however that there is specific issue concerning the strategy of dealing with graphite disposal in several countries**

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Presentations and messages :

2 - The irradiated graphite issues : depending of the countries : surface , sub-surface, underground ?

- **France : project for industrial solution and a pilot plant for graphite treatment**
- **Europe : CarboSOLUTIONS project for i-graphite management**

- **Carbowastes project is finished ; CarboSOLUTIONS is the next phase ; collaboration action is necessary between the two platforms on this issue .**

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Presentations and messages :

- **3 - "Long term" :**
- **France : prospective scenarios with Sodium Fast Reactors and P&T and their impact on a future repository**
- **UK : the MIDAS Concept, FPs and MAs separations for specific material waste forms**
- **Italy : specific waste forms from pyro-processing mainly of Lead Fast Reactor spent fuels**
- **Europe : RED-IMPACT : Impact of P&T and waste reduction technologies**

The future parks >2050 : the geological repositories for "future" spent fuels and wastes (including GEN IV fuel cycle) ; still, GD design is a long term action to be thought early ("global optimization" of a robust system waste form –GD barrier material for long term duration and safety assessment) ; and the issue of ILW ?

"EC coordinated action or collaborative project, such as " PyroMIDAS" ?

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Summary :

- **1 – Strategy and vision:**
  The link between the two platforms is important : to identify the common ground
  The IGD-TP should consider two different time scales (< 2025, >2025)

- **2 – The graphite issue:**
  Research collaboration efforts are needed; some urgency is indicated

- **3 – Suggested collaborative projects:**
  CarboSOLUTIONS
  Optimisation of waste forms from Gen IV : materials (ex : MIDAS and “pyrowastes”=