SESSION I

P&T Systems and Waste Management

P. Finck (ANL, USA) and A. Van Luik (DOE, USA)

Papers presented **6**

Effect of Advanced Fuel Cycles on Waste Management Policies
J-M. Cavedon (PSI, Switzerland)

Effective Application of Partitioning and Transmutation Technologies to Geologic Disposal
J. Ahn (LANL, USA) and T. Ikegami (Nuclear Cycle Development Institute, Japan)

Can Thermal Reactor Recycle Eliminate the Need for Multiple Repositories?
C.W. Forsberg et al. (ORNL, USA)

Repository Benefits of Partitioning and Transmutation
R.A. Wigeland and T.H. Bauer (ANL, USA)

Results on Transient Scenarios towards GEN IV Systems
F. Varaine, J-P Grouiller (CEA-Cadarache), M. Delpech,D. Warin (CEA-Saclay, France)

P&T Potential for Waste Minimisation in a Regional Context
M. Salvatores, J-P. Grouiller (CEA-Cadarache, France), M. Delpech (CEA-Saclay, France), E. Schneider (LANL, USA), A. Schwenk-Ferrero, H-W. Wiese, J.U. Knebel (FZK, Germany)

Session Themes (Presenters)

- Description of international collaborative work on P&T and its potential effects on waste disposal, including examples of early results on material flow-sheets and costs (J-M. Cavedon).
- Examples of evaluations of potential P&T effects on repositories in terms of toxicity and loading (J. Ahn).
- Examples of three potential paths forward:
  - Using thermal reactors until a fast reactor becomes available (C.W. Forsberg).
  - Steps in moving from current reactor fleet towards an all-GEN IV system (F. Varaine).
  - Regional cooperation in both waste minimisation and disposal (M. Salavatores).

Papers provided information regarding several aspects of potential P&T impacts

- Studies of the potential impacts of P&T on repositories focus on the potential difference in environmental impacts and on the dramatically enhanced efficiency of a repository that receives only fission products (removal and very long term storage of Cs and Sr was suggested to allow even greater more mass loading).
- Waste streams that are a part of P&T are being quantified and P&T costs are preliminarily being evaluated (much uncertainty).
- Evaluating benefits of P&T to repositories includes the delaying or eliminating the need for the need of further extension of the repository capacity or for an additional repository, in addition, supporting a societal decision to implement a P&T program requires evaluating costs and risks.

Path forward discussions provided long-term strategic insights

- Generation IV technologies are best suited to long term management of waste stockpiles.
- Nevertheless, if Generation IV technologies are delayed, a combination of current technologies (MOX) with a limited number of very advanced accelerator driven systems would also offer a solution to the waste issue.
- An alternative approach to classical P&T schemes exists, where all materials are recycled in LWRs.
- Provided spent fuel is cooled for (up to) several decades, quasi equilibrium of TRU inventories can be reached using such an approach.
- The LWR approach raises some practicality and potential non-proliferation questions that need to be addressed.

Chairmen's recommendations

- At the conclusion of the meeting, in the wrap-up session, this first session received much discussion because it was evidence of the P&T community's becoming fully integrated with its users at the back end of the fuel cycle.
- Discussants suggested it was a topic that should be inserted into future P&T Information Exchange Meetings. The Chairmen of Session I agree.
- The first paper in this session asked for help in completing an NEA document that takes a first, hopefully comprehensive, look at the integration of P&T fuel cycles and the waste management. The Chairmen of Session I recommend that organizations seriously look at the call for waste-management organization participants to provide safety evaluations in support of this study.
