

SESSION III SUMMARY / DISCUSSION

K. Matsui

The Institute of Applied Energy (*mac@iae.or.jp*)

SFR R&D activities have reached a high level of advancement within the GIF, making the SFR the most advanced system among those studied by the Forum members. Russia should soon be joining the US, Japan, France, Korea, China, EURATOM already cooperating on that system.

Its major activities can be summarized as follows. The System Integration and Assessment (SIA) Project Plan will be finalized in 2009 by the System Steering Committee (SSC) and the provisional SIA Project Management Board (PMB). As far as the Advanced Fuel project, various fuel irradiation tests in the PHENIX, ATR and Joyo reactors, were analyzed and evaluated. Within the Component and BOP project, external ultrasonic sensors and under-sodium visualization are under development, and a system to implement super-critical CO₂ Brayton cycle has been investigated. In the frame of the GACID (Global Actinide Cycle International Demonstration) project, the analysis and evaluation of MA fuel material property and irradiated-fuel data has progressed, and the preparation for MA fuel material property measurement has started. Under Safety and Operation project, analyses and experiments are being carried out that support safety approaches and validate specific safety features.

GIF Policy Group has prepared a set of priority objectives for SFR for the next 5 years (see Appendix) as follows. In the field of Advanced fuels, priorities are 1) assessment of fabrication feasibility and irradiation behaviour of minor-actinide bearing fuels, 2) feasibility issues

regarding actinide recycling and 3) preliminary selection of advanced fuels. As for the Safety approach, priorities have been indicated: 1) converging safety approaches including the case of severe accident, 2) to compare approaches and seek for consensus in the field of re-criticality and potentially positive reactivity coefficient issues, and 3) to provide solutions to the in service inspection issue. Challenges still remain in the fields of PHENIX, Monju and possibly CEFR and BN-800 test analysis and inter-comparisons, in the development of energy conversion systems and in the development of advanced materials, codes and standards.

The SFR Trilateral Collaboration among France, Japan and US, initially focused on reaching a common understanding of the mission and requirements for an SFR, has been found useful in order to support and share experimental demonstration facilities, with the potential to accelerate basic SFR technology development under the GIF framework.

Finally, the potential synergy of INPRO and GIF has been discussed, making use of unique features of the activities performed by IAEA and INPRO, and investigating the potential use of Generation IV systems in countries not yet operating nuclear power as of today.

There are still challenges to tackle with, in particular related to the implementation of the Fast Breeder Reactors paradigm (sustainability, resources extension, waste minimization): where and when there will be a potential market? Would fast reactors be able to help to establish a “low” or

“zero” Carbon Society by 2050? Fast reactors came back from the state of lame duck under the “banner” of “MA burning” (like a true “Phoenix”...), and under a growing perception of their need for a global sustainability objective. Fast reactor role in order to ease waste disposal legacy and to expand the Uranium exhaustible resource, both are still justifiable goals to promote

public commitment to SFR development and commercialization. Does this imply that alternatives should not been investigated? These are just a few questions that we need to face sincerely in order to communicate with decision makers and public. This is probably not only appropriate for SFR, but applicable to any so-called innovative nuclear system.