

# International Conference on Fast Reactors and Related Fuel Cycles: Safe Technologies and Sustainable Scenarios (FR13)

Paris – March 4-7, 2013

## Closing Session

*Ron Cameron, OECD - NEA*

### Summary of Sustainability of Advanced Fuel Cycles Panel Session II

*Panel Members: D. Warin (France); P.R. Vasudeva Rao (India); T. Abe (Japan); G. Il Park (Korea, Rep. of); V. Kagramanyan (Russia); M. Regalbutto (USA); D. Haas (EC); V. Kuznetsov (IAEA).*

The second of the two panels was held from 3.30 to 5.30pm on the 5<sup>th</sup> March. There were eight panellists, six from member countries and two from international organisations.

Sustainability was discussed in terms of the social, environment and economic perspectives, which arise from the original Brundtland definition of sustainability. The panel presented their perspectives of the need to move towards a sustainable future, involving better use of uranium, reductions in high-level radioactive waste, safe, secure and economic operation of nuclear reactors and the fuel cycle. In all cases, it was considered that sustainability in the long-term must involve fast reactors and a closed nuclear fuel cycle, although both Korea and the IAEA pointed out that these are clearly national decisions and there will not be a single solution for all countries.

In fact, it was emphasised that, given the size of nuclear programme in various countries of the world, only the larger countries are likely to implement a full version of the closed fuel cycle. This raises the issue of how smaller nuclear countries will gain access to the reprocessing and recycling capabilities which are needed to deal with their spent fuel. Given this situation, there was strong support to continue international collaboration, such as that provided by the GIF and INPRO.

The progress towards a closed nuclear fuel cycle also requires advances in technologies, such as partitioning and transportation, fuel design, new waste matrices for encapsulation of high-level waste and developments in reprocessing technologies. Different types of fuel cycles involving fast reactors were also discussed, including a fully closed cycle using Pu fuel and fast reactors and other symbiotic fuel cycles involving both fast reactors and LWRs. It was recognised that the transition from the LWR cycle to a fast reactor cycle will be difficult. The European Commission pointed out that there were a number of risk factors that must be addressed on the way to sustainability. Several speakers indicated the importance of public acceptance for any such transition and therefore the need for discussion with the public in an open manner on the advantages and disadvantages of fast reactors. It was also noted that, in any such discussions, the impression should not be given that there were problems with the existing LWR cycles.

While the panel members outlined national approaches and the development of technologies within their countries, the drivers for the move to introduce fast reactors and recycling seem to vary between the different countries. In some cases that need is expressed mainly in terms of resource utilisation and ensuring a long term supply of fuel, as well as a means to deal with plutonium inventories. In other cases, the driver seems to be the need to manage radioactive waste, to reduce the amount of material requiring to be sent to deep geological repositories and the demonstration to the public that the industry is not leaving an undue burden on future generations.

Overall, it was agreed that there are clear advantages in introducing fast reactors and a full recycle of Pu for the long term sustainability of nuclear energy. However, the time frames for such a move are uncertain and the way such a process will be introduced by many countries is still not decided. In the interim, continued research is needed on the technologies that will support a full recycling process and international cooperation remains a primary means by which progress can be achieved.