Introductory remarks for Workshop on Accident Tolerant Fuel

Jim Gulliford
Simone Massara
OECD/NEA

Development of NEA-NSC ATF Workshop

- **June 2011 Ministerial Meetings, International Fukushima Forum**
  - All NEA Standing Committees to review PoW
- **June 2011 Nuclear Science Meeting**
  - NS Fukushima eForum (NSFF) created
- **November 2011 Nuclear Science Bureau**
  - Discussion threads from NSFF reviewed
  - Fukushima identified as topic of in-depth discussion at 2012 NSC meeting
- **June 2012 Nuclear Science Meeting**
  - Briefing on outcome of NSFF
  - Proposals for additional PoW items in NSC bodies discussed
  - Fukushima status report from JAEA
  - MELCOR modelling analyses of Fukushima accident
  - Proposal for ATF Workshop
- **December 2012 NEA-NSC Accident Tolerant Fuels Workshop**

Related NEA Activities

- Other NEA-NSC activities under discussion/development, e.g.
  - Re-criticality in degraded core, degraded spent fuel pond scenarios
  - Extension of materials modelling methods to severe accidents
  - Modelling of source term

- Multiple CSNI, CNRA, CRPPH activities initiated
  - See presentation in Session 1
  - Recently:
    - June 2012 OECD-NEA Benchmark Study on Accident at Fukushima Daiichi (BSAF): Start-up Workshop
    - November 2012 OECD-NEA Benchmark Study on Accident at Fukushima Daiichi (BSAF): 1st Programme Meeting/2nd Workshop

- Policy Debate on Defence-in-Depth at October 2012 NEA Steering Committee

Outcome of Nuclear Science Fukushima Forum

- Nuclear Science Fukushima Forum set up by NEA following June 2011 NSC meeting. Interest in Accident Tolerant Fuels quickly emerged.
- Main discussion concerned stainless steel cladding, with consensus that while stainless steel offers some benefits in terms of accident tolerance, it is not the ideal solution - there are also problems
- Other promising options such as SiC cladding
- Some candidate fuel matrices suggested (notably nitride fuel designs). Fuels for enhanced fission gas retention have already been developed (chromia-doped UO_2 and MOX, for example) or are under development (beryllia-doped UO_2)
- Some international activities underway investigating accident tolerant fuels. Most effective approach (to avoid duplication of effort) would be for NSC working groups to link in with these activities
- As these technical programmes become established, NSC groups should continue to review and discuss the activities with a view to establishing international cooperation as and when needed

Outcome of June 2012 NSC Meeting

- Proposal received from Working Party on Scientific Issues of the Fuel Cycle. (Kemal O. Pasamehmetoglu, Kathryn A. McCarthy)

- Vision is for establishing coordinated international project on ATF
  - Agreed that 1st step should be organisation of international workshop:

‘A workshop should be organised that brings together experts from the modelling, safety, operations and regulatory technical disciplines to help establish a coordinated international approach’

Overview of Workshop Programme

- Objectives
  - Review lessons learned from the Fukushima accident and identify desired advanced fuel characteristics;
  - Evaluate state-of-art of potential fuel/cladding candidates and related technical and regulatory issues;
  - Discuss future programmes of work, international cooperation and the role of OECD/NEA.

- Programme
  - Session 1: Lessons learned from the Fukushima accident
  - Session 2: Accident tolerant fuel design
  - Session 3: Reactor operation, safety, fuel cycle constraints, economics & licensing
  - Beak-out Discussions
    - A. Safety Issues B. Reactor performance, R&D and technology issues
  - Session 4: Synthesis and future programmes

Administrative

- Coffee served in meeting room(s) during morning and afternoon breaks
- Buffet lunch provided on Monday
- Lunch on Tuesday in NEA Canteen

- Presenters please pass ppt etc. files to Simone Massara

- Chairs – please note need to keep to schedule so that Break-out sessions can start in parallel

- Rapporteurs - please meet at end of 1st day for briefing