

**SUMMARY OF WORKING GROUP DISCUSSION ON  
SUBCRITICAL SYSTEMS AND INTERFACE ENGINEERING**

*Chair: W. Gudowski*

### **What are the expected results of our discussion?**

- Understanding where we are internationally with ADS programmes and to clarify the details.
- Understanding to where different projects are heading.
- Finding synergies and benefits in international collaboration and a good balance between COMPETITION and COLLABORATION.
- Agreement on what message we should convey to nuclear utilities and to the nuclear community as a whole on ADS and P&T issues.
- Some important technical issues not yet answered:
  - What is the maximum beam power accepted by a reactor? (Reactor perspective is not only beam trips!)
- Advise OECD/NEA on priorities in its P&T and ADS activities.

### **Good starting point – conclusions of M. Salvatores' presentation regarding putting an international perspective on the future of ADS**

“The perceived role of P&T has evolved from an optional strategy aiming to reduce the burden on deep geological storage, to an integral component of future nuclear systems. In this new perspective, ‘transmutation’ is achieved in an optimum manner in a fast neutron reactor, with the homogeneous recycling of not separated TRU.”

*The main reactions to this statement are:*

- The perception by the geological disposal community is not in line with the statement especially perceived in EURADWASTE 2004. P&T is perceived for the moment as a burden for geological disposal. **Thus, there is a real need for communication between the two communities.**
- In an electricity market open for competition it will be difficult to make a dirty fuel cycle acceptable to the utilities. **This will be jeopardizing the competitiveness of nuclear electricity generation** (one of the Gen. IV criteria).
- Multiple recycling needed within P&T is unacceptable to utilities as considered in the homogeneous burning.
- Transmutation is achieved in an optimum manner in a fast neutron system, be it a critical reactor or an ADS system.

“Specialized devices, like ADS, can have a role in a transition scenario between the present LWR-dominated to a future FR-dominated situation.”

*The main reactions to this statement are:*

- ADS is a dedicated system for waste burning but not simply for the transition period between the LWR era and the FR-dominated era. **ADS will be a dedicated waste burner also when the FR will be deployed for economical reasons.**
- Even if ADS will be for a transition period, this will be a long one (**around one century**).
- Why such a huge effort for a transition period if limited to 20 to 30 years as claimed by the Gen. IV community?

“In any case, ADS deployment can hardly be considered by a single country in isolation and a ‘regional’ approach is needed, where countries with rather different policies in terms of nuclear power development can join efforts to develop shared facilities.”

*The main reactions to this statement are:*

- **This is true at the Asian level as a Japan-China-Korea initiative** has begun to join the effort related to the R&D support programme for ADS and even to join the effort for ADS facilities in the J-PARC ADS part (the latest statement on the wishes of Japan; enlargement to world collaboration).
- A joint effort in R&D support can also be achieved through the ISTC initiatives.
- This is true at European level under the EC FP (4, 5, 6) programmes for R&D support but a step further would be needed in terms of realisation.

## **Target issues**

“The best solution issue – window or windowless.”

*The main reactions to this statement are:*

- Windowless can be a favoured design under the condition that after a hydraulic demonstration and a vacuum interface compatibility demonstration, the realisation of an experimental testing is realised.
- Scale 1/1 experiment is needed.
- If windowless can be accepted, one should not avoid a cold window to protect the accelerator from eventual contamination.
- The technology of cold windows, even used in other applications, needs to be demonstrated at the high-power proton beams considered for ADS accelerators.

- An assessment of the maximum power acceptable in the windowless design should be established.
- The optimum acceptable proton energy for ADS application is 600 to 800 MeV; thus one cannot relax more on the energy to avoid high currents.

“Can we envisage an experiment in the near future to help us resolve this issue? A WINDOWLESS MEGAPIE? Where and when?”

*The main reactions to this statement are:*

- Yes such an experiment should be prepared and performed.
- An attempt was done during the FP6 project IP EUROTRANS but due to budget shorting this is not taken in the present programme.
- PSI and SCK•CEN are thinking about such an experiment.

“Too little work has been done on the consequences of a window break.”

*The main reactions to this statement are:*

- For the first time, work on this topic has been reported by JAERI and the group recommends an increase in this effort.

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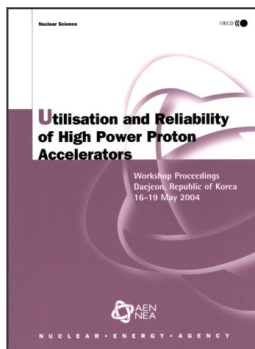
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