



The Forum to Stimulate Knowledge Innovation for Nuclear Energy

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INPRO Technical Briefing on the Occasion of INPRO's 10th Anniversary,
September 22, 2010

Japan's Nuclear Energy Policy

- Firmly commits to the promotion of safe, secure, safeguarded and sustainable nuclear energy use in every part of the world
- Promotes a carefully decided set of actions in three different time frames, short-term, mid-term, and long-term.

Actions in three time periods (1/2)

- Short-term actions

- Pursue excellence in the operation the existing LWR fleet
- Pursue public confidence in the use of nuclear energy
- Pursue closing of the back-end of fuel cycle technologically and institutionally

Actions in three time periods (2/2)

- A Major Mid-term action
 - Prepare to start the operation of the first Generation III++ Advanced LWR before the start of the retirement of existing fleet of LWRs in around 2030
- Major Long-term actions
 - Promote fast breeder reactor and its fuel cycle technology R&D
 - Promote R&D of HTGR for hydrogen production, Separation and Transmutation, Fusion

Nuclear Energy and the INPRO

- Witnessing rising expectation from every corner of the world that nuclear power will play a key role in meeting increasing energy demand, while assuring supply security and reducing carbon dioxide emission.
- Nuclear energy is the result of human creativity, ingenuity and innovation.
- Nuclear energy technology should be placed under an appropriate *framework* with global actions that incentivizes, encourages and propels its proper use and its innovation forward.
- The IAEA and the INPRO should continue to play such a role in future.

The INPRO: A Knowledge Innovation Infrastructure for GNEC*

- Its central construct should be to
 - Bring together leading thinkers and practitioners from different industrial sectors and types of enterprise, from governments and public policy agencies and from professional organizations for cross-fertilization of innovative solutions for these topics critical to effective and efficient promotion of peaceful nuclear energy use from which all participants can benefit.

*GNEC: Global Nuclear Energy Community

Proposals of Discussions in the INPRO

- Nuclear Safety -

- Accident anywhere in the world is accident everywhere. After all, we have no reason to argue that different nuclear safety standard is applied when you cross the national border.
- The INPRO should provide a forum for the global community to exchange views on “How safe is safe enough?” among experts in diverse countries and to pursue global consensus on the answer to the question as an input to IAEA safety standard.
- The experts will be able to extract the need for innovation of knowledge and technology related with nuclear safety through these discussion.

Proposals of Discussions in the INPRO

- Nuclear Safety -

- Specific example of topics for discussion:
 - Any additional requirements on the safety goals and objectives prepared for design and operation of LWRs when we apply them to fast reactors that are different from LWRs in terms of positive coolant void coefficient and possibility of re-criticality in severe accident conditions
 - Effectiveness of additional innovative safety features to be introduced to mitigate the impact of these difference

Proposals of Discussions in the INPRO

- Nuclear Security -

- Facilitate exchange of knowledge and innovation related with the application of the IAEA recommendation on the physical protection of nuclear material and nuclear facilities and other relevant international instruments.
- Recognizing the increasing pressure to improve security, facilitate the development of methodology for quantitative security risk analysis and quantitative security objectives so that balanced view will prevail in the near future.

Proposals of INPRO activities

- Infrastructure Building and maintenance -

- The IAEA has published a series of technical reports including milestone document that guides a progressive development of national nuclear infrastructure, by covering every aspect needed for the country's nuclear preparedness.
- The INPRO dialogue forum has been successful in providing opportunities of discussion on key relevant issues.
- This forum may evolve into a forum to share national status information of infrastructure building for learning from each other and mutual confidence building.

Proposals of the INPRO Activity

- Financing -

- It is irrational to exclude nuclear energy from Clean Development Mechanism (CDM). On the other hand, a report of Carbon Retirement has informed us that the Mechanism is inefficient as only \$2.76 out of \$10 buyer's carbon offset goes to setting up and running the project.
- The forum should deliberate a more innovative bilateral / multilateral carbon offset mechanism involving the IAEA as validator and verifier.
- The IAEA standards and code of conduct, various evaluation tools developed in the INPRO and the review capability could be valuable resources for validation and verification of offsets.

Proposals to the INPRO Activity

- Proliferation Resistance - (1/2)

- Global need for enrichment and reprocessing services in 2050 (1500 Gwe) can be satisfied by 10 large scale enrichment service providers and 10 large reprocessing service providers.
- A school of thought claims that these 10+10 providers should be multilateralized to realize a global community with higher proliferation resistance.
- Various fast reactor R&D groups are pursuing the realization of a sodium cooled fast reactor that loads fuel containing minor actinides (MA) so as to increase proliferation resistance of the system.

Proposals to INPRO activities

- Proliferation Resistance - (2/2)

- Existence of MA, due to considerable increase in gamma and neutron doses and decay-heat, requires specific protection and cooling means for fabrication and transportation of the fuels.
- The INPRO forum should deliberate various ways to combine fast reactors and multilateral fuel cycle centers and combine need for increasing proliferation resistance of global community and existence of various nuclear energy systems, in general.

Importance of Collaborative R&D Effort of the INPRO

- To select R&D topics and concentrate the resources on few selected is a prevailing policy in many national R&D programs.
- Accordingly innovative ideas and approaches alternative to those selected are studied as minor topics or topics in the generic/basic research activity in such national R&D programs.
- Carefully selecting topics from them, the INPRO may initiate various second track R&D programs from the point of view of such national programs based on a small contribution from many countries. Many a little makes a mickle!

Conclusion

- Support the INPRO to continue to promote dialogue for innovative learning and knowledge creation among various states and stakeholders, as we believe that the energy technologies supported by such dialogue will lead to harvest from which the global community will benefit.

Thank you very much
for your kind attention.