

The Tenth OECD Nuclear Energy Agency Information Exchange Meeting on

Actinide and Fission Product Partitioning and Transmutation

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Opening Address

Thank you very much, Mr. Chairman, for your kind introduction.

Good morning ladies and gentlemen, it is a great honor to have a chance to address you at this Tenth OECD Nuclear Energy Agency Information Exchange Meeting on Actinide and Fission Product Partitioning and Transmutation.

On behalf of the Atomic Energy Commission, I would like to appreciate the OECD/NEA for its excellent leadership to organize and promote the policy and research on Partitioning and Transmutation. Besides, I am very delighted that Japan hosts this meeting following 1990 and 1996.

Nuclear Policy of Japan

First let me introduce briefly the nuclear policy of Japan. In 2005, the Atomic Energy Commission decided a Framework for Nuclear Energy Policy, in which we categorized important actions into the three of short, medium and long terms.

The short-term actions are those aiming at using existing power plants as long as practicable, of which the life is expected to be extended more than 50 to 60 years. They include activities for maintaining the public confidence in the safety management of existing plants and related facilities, improving the performance of existing plants, and promoting the use of Pu (plutonium) recovered from the spent fuels in LWRs. In particular, one of the most crucial issues in the short term is to make progress in site finding for geological disposal of high-level wastes.

One of actions in the mid-term is to prepare advanced and innovative LWRs for replacement of retiring plants, as a number of existing plants will be retired in 10 to 30 years.

The long-term actions are those related to the development of innovative nuclear energy systems which can be competitive with other technology in the future market in terms of social acceptability as well as safety, economy and environmental protection. The R&D includes nuclear science and technology researches on fusion reactor and Partitioning and Transmutation (P&T) with ADS (Accelerator Driven System). And, one of the major projects in this term is the development of a fast breeder reactor and its fuel cycle system, which is expected to be commercially available in 2050s.

Management of HLW

Nuclear energy is one of the most effective means to both ensure a steady energy supply and reduce global emission of green-house gases, while it is necessary to ensure safety, security and non-proliferation.

At the same time, the management of high-level radioactive waste is one of the most crucial issues for expanding nuclear energy. The policy in Japan is to dispose vitrified wastes in deep underground below more than 300 m. No disposal site, however, has been decided as of today, as we couldn't gain public acceptance and trust on its safety, yet. In this regard, the situation may be much or less common in every country. But this issue is more serious for us, because vitrified high-level wastes are going to be produced by the Rokkasho commercial reprocessing plant, which is about to come to full-scale operation soon.

Role of P&T

Now, let's turn to the P&T. I believe that there are two roles of P&T.

- (1) One is to reduce public concern for geological disposal of HLW with very long-life nuclides as MAs. This idea is a rather classical reason of MA transmutation.
- (2) The other is a little bit special, while more essential. Now, it is planned in Japan that 40,000 to 50,000 vitrified HLWs are stored at one disposal site. While, 55 nuclear power plants are in operation in Japan, supplying about 50MWe. As a result, about 1,000 spent fuel assemblies are produced every year, and processed into almost same number of vitrified HLWs in a reprocessing plant. The situation means that a new disposal site is needed every 40 to 50 years, if the present policy is kept. This hurdle is too high to overcome for us.

You know that the disposal site can be used efficiently by more than 4 to 5 times, if long-life

exothermic FPs such as Cs-137, Sr-90 and MAs are removed from HLW. And, needless to say, it will bring invaluable benefit in disposal policy and cost, as well. These are the reasons why we have promoted the R&D for P&T as the long term action.

Assessment of P&T by AEC

The research and development of P&T has been carried out under international and domestic resumes for almost 20 years. The AEC recently initiated an assessment of P&T, where the technical feasibility of transmutation is discussed, focusing on transmutation with FBR and ADS, and partitioning technology of MAs and FPs. The assessment is very important for deciding a next policy of P&T.

By the way, the AEC asks an innovative FBR cycle technologies with such performances as safety, reliability, commercial competence, high breeding ratio for fuel utilization, nuclear proliferation resistance, and mitigation of environmental burden. FBR has, in physics, a potential for MA transmutation with its hard fast neutron spectrum, while it is very important to figure out for us whether the transmutation of MA is compatible with other criteria required as a nuclear technology system or not. For examples, the additional increase of Na-void coefficient in a MA core might affect significantly to the critical safety design. The breeding performance is essential to fast reactor, and how much is it influenced by MA burning? It is also pointed out that the manufacture and treatment of MA fuel assemblies is very difficult in commercial base because of large nuclear-heat emission and strong radiations.

I would like to ask all participants to make these issues clarified. Because we have an idea that the deployment plan of FBR in market place must not be delayed by the requirement of MA transmutation. Essential performances of FBR are breeding, safety, reliability and commercial competence. I have concern that the requirements of AEC for next FBR system may be too much in this regard.

For ADS system, it does not seem that sufficient and essential information has been classified for subcritical MA burning system with high power accelerator, yet. I think that the R&D of ADS still remains in fundamental stages. I would like to ask you to prepare a load map for R&D of ADS system based on the current knowledge under international cooperation. Right now, we are confronted with a difficulty, whether R&D facilities should be constructed or not in J-PARC. The judge should be done considering the scientific discussion of international community. In this regard, a reliable road map is essential for our decision.

Further, we must pay more attention to the partitioning, as well. It is very important to make clear what kinds of nuclides have to be separated for P&T, and to assess the state of the art of partitioning technology, since partitioning system influences definitely the future process of spent fuels, and even fuel cycle including next generation reprocessing plant.

Closing

The AEC-Japan is going to decide a policy of P&T covering management of spent fuels in future. This meeting, in this context, is very timely. I am sure that this meeting will provide invaluable opportunity for sharing experience and exchanging information and ideas for international cooperation. Let me wish you all success in this meeting.

Thank you for your kind attention.