EXECUTIVE SUMMARY

The OECD Nuclear Energy Agency (NEA) has, in response to interest from member countries, an ongoing activity on Partitioning and Transmutation (P&T) of nuclear waste. One of the key components of this international activity is a series of Information Exchange meetings, providing experts with a forum to present and discuss current developments in the field.

This Information Exchange Meeting was the eighth in the series. It was hosted by the University of Nevada, Las Vegas, USA and was organised in co-operation with the US Department of Energy, the European Commission and the International Atomic Energy Agency. Earlier meetings have been organised in Mito, Japan (1990), at ANL, USA (1992), in Cadarache, France (1994), in Mito, Japan (1996), in Mol, Belgium (1998), in Madrid, Spain (2000), and in Jeju, Korea (2002).

The general theme of the 8th Information Exchange Meeting was the impact of advanced fuel cycles to waste management strategies.

The meeting was opened with a general session, in which six national and two international P&T programmes were presented, covering current activities in Japan, the United States, France, the Republic of Korea, the Russian Federation and China, as well as the international programmes of the European Commission (EC) and of the International Atomic Energy Agency (IAEA).

Five technical sessions and two poster sessions, covering mainly scientific and technical issues in the P&T field, were organised. The contents of the different sessions are described below.

Session I: P&T Systems and Waste Management

Session I comprised six papers in total, providing information on the potential impacts of P&T on nuclear waste repositories and on the preliminarily evaluations of the P&T costs as well as the qualified waste streams generated. It was noted that one of the benefits of P&T for waste repositories was a delay or reduced need for additional repository capacity.

Session II: Partitioning Technology

Five papers provided information on recent progress in aqueous and pyrochemical processing of spent fuel, conversion of oxide into a metal or chloride for a pyrometallurgical partitioning, electrochemical separation of actinide and lanthanide in a molten fluoride media and experience of the crush-leach process for treating used TRISO-coated fuels. Recent studies of the partitioning of cesium and strontium, aiming at reducing the heat load of spent nuclear fuels in a geological repository, were also discussed.

Session III: Fuels for Transmutation Devices,

Six papers were presented, covering research on nitride fuel and pyrochemical process developments, preliminary performance analysis of the metallic fuel for ADS, characterisation of actinide alloys as fuels, modelling, fabrication, characterisation and irradiation of uranium free nitride fuel, and conversion of reprocessed plutonium and neptunium into oxides form using direct denitration. Design concepts and process analysis for fuel manufacturing was discussed in one of the presentations.

Session IV: Transmutation; General

Session IV included five papers. An overview of experiments to be performed in the PHENIX reactor in France was given. A concept of a pebble bed HTR in a once-through fuel cycle mode to reduce the radiotoxicity of minor actinides produced in LWRs was introduced, followed by an inter-comparison of two computational fluid dynamics codes. The last two papers dealt with nuclear data issues, including a complete evaluation of Pb and Bi isotopes, and a proposal for a comprehensive experimental programme covering most minor actinide nuclear data in a wide energy range.

Session V: Transmutation; ADS

Session V consisted of six papers. The session started with an overview of the European research programme for the transmutation of high-level nuclear waste in an accelerator-driven system. Next, the results of the transmutation performance assessment in the small-scale ADS was presented, followed by a paper on R&D activities for accelerator-driven transmutation system. An overview of the experimental reactor-accelerator coupling project illustrated the ADS related activities in the USA. Safety issues and safety indicators for accelerator-driven transmuters with dedicated oxide fuels were discussed. Finally, a paper on neutronic analysis studies of the spallation target window for a gas-cooled ADS concept was presented.

Poster Sessions I and II

The poster sessions included 38 papers, covering a large range of topics, such as the effect of P&T on waste management strategies, thermodynamic data of actinides, fuel behaviour, waste immobilisation and deactivation, and separation process development, transmutation of actinides, nuclear data measurements, materials for ADS systems and target development.

In the Closing Session, the session chairs presented the highlights of their respective sessions. The chairs of Session I (A. Van Luik and P. Finck) stated that there was evidence of the P&T community becoming fully integrated with its users what concerned the back end of the fuel cycle. They agreed with the suggestions that the discussions of the back-end of the fuel cycle should be included in the programme of future P&T Information Exchange Meetings. In addition, the chairs of Session I recommend that waste management organisations seriously look at the request for safety evaluations in support of the on-going NEA study on the effect of advanced fuel cycles on waste management policies.

The chairs of Session IV (M. Salvatores and F. Varaine) remarked that, at this conference, relatively few oral presentations were made in the crucial fields of materials and heavy liquid metals (HLM) technology, and it was recommended to take this point into account in future workshops.

The chairs of Session V (P. D'Hondt and H. Oigawa) pointed out that a number of technical challenges are common to different concepts, such as safety, material damage by protons and neutrons, thermal-hydraulics, corrosion, etc. These are suitable topics for international collaboration, in particular the basic ideas for safety evaluation of ADS. Experiments related to ADS, performed at universities, are also very welcome to foster the involvement of the next generation's nuclear scientists and engineers.

The scientific chair of the meeting, James Laidler, closed the meeting. The next (9^{th}) Information Exchange Meeting on P&T is scheduled to be held in Nîmes, France in autumn 2006.