Annotation

The world uses a great deal of energy and the usage is increasing dramatically. Electricity is the most convenient and versatile form of energy. Increased use of electricity is an important factor in modernization and in achieving greater efficiency in the total energy use. Nuclear power generation is an established part of the world's electricity mix providing 17% of world electricity.

One of the current important issues of nuclear power is the long lived waste toxicity problem. This problem could be reduced in essential degree if, during energy production, there is an opportunity to incinerate at least the most toxic radioactive isotopes (long-lived fission products and minor actinides). The combination of external intensive neutron sources together with facilities containing nuclear fuel, so-called hybrid systems, are under investigation in several countries. The surplus of neutrons in such systems may be used to convert the most part of long-lived radioactive actinides into the isotopes having a shorter life-span.

The International Atomic Energy Agency (IAEA) has maintained an active interest in advanced nuclear technology related to Accelerator Driven Systems (ADS) and activities have been carried out within the framework of its Programme on Emerging Nuclear Energy Systems for Energy Generation and Transmutation, including the preparation of status reports on advanced technologies development, conduction of technical information exchange meetings and co-operative Co-ordinated Research Projects (CRPs).

Nowadays an increasing number of groups is entering this field of research; some of these groups are not embedded in wider national activities; for these groups there is a need for coordinating their efforts and for getting access to information from nationally or internationally coordinated activities. Consideration of the advantages of hybrid systems, and the wide field of interdisciplinary areas of research involved, clearly shows the need for an international cooperation in this new area.

A Consultancy meeting on Hybrid Concepts for Nuclear Energy Generation and Transmutation held in Vienna, in December 1996 recommended the IAEA to convene a Technical Committee Meeting on Feasibility and Motivation for Hybrid Concepts for Nuclear Energy Generation and Transmutation. The TCM was held at CIEMAT headquarters in Madrid, Spain, from 17- 19 September 1997. 68 participants and observers from 18 Member States and 4 International organizations and Scientific Centers attended this meeting and 32 papers were presented. The meeting included a workshop and 6 technical sessions. The Workshop "ADS in future nuclear fuel cycles and waste management" was included in the Agenda in order to inform participants in more detail on several major programmes/concepts of ADS development.

The country representatives' statements made during these sessions and panel discussions were focused on the following:

- several accelerator systems and sources concepts can be developed for ADS,
- it is however important to have a very reliable source of neutron coupled to the reactor system,
- effort to develop neutronic benchmarks and codes for ADS should be pursued at the international level,
- Accclcrator Driven Systems are not an alternative to geological disposal; however, they have the potential to drastically reduce the waste toxicity, thanks to their capacity to burn minor actinides and fission products. As a reprocessing stage will be required, non-proliferation concerns should therefore be addressed.
- further development of the ADS concept requires the building of a demonstration device with thermic power, as suggested by several participants, in the 100-300 MW range.
- this preindustrial test should provide inputs on the feasibility of the industrial deployment of ADS, including fuel cycle requirements, and a better understanding of the safety issues to be addressed.