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Safe Management and Effective Utilization
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OPENING ADDRESS

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Good morning Ladies and Gentlemen,

On behalf of the Director General of the IAEA, it is my pleasure and privilege to welcome you to this International Conference on Research Reactors: Safe Management and Effective Utilization. I would like to offer my sincere thanks to the Government of Australia, and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), for hosting this Conference in the beautiful city of Sydney. I would also like to thank you, the 220 delegates from around the world, for participating in this conference. I trust that you will have an interesting and enjoyable week of work.

For almost 60 years, research reactors have been centres of training, productivity and innovation in a wide variety of nuclear science and technology areas such as nuclear power, including material development, component testing, and computer code validation, in nuclear medicine and radioisotope production, in the use of neutron beams for research and analysis and as facilities for education and training. To date, some 672 research reactors have been built, and of these, 245 reactors in 54 countries continue to operate.

Of the almost 250 research reactors that are no longer operating, some have plans to restart operation in the future, some have commenced decommissioning, and some are in an extended shutdown state. In many cases RRs have very limited operating schedules caused by either the lack of a utilization plan or a lack of resources.

Recent utilization patterns of research reactors have been changing, such that they become either specialized for production or training, or state of the art machines to carry out cutting edge research. Here we can congratulate the Australian government and the Australian Nuclear Science and Technology Organisation (ANSTO) for the recent start up of OPAL, a state-of-the-art 20 megawatt multi-purpose facility for radioisotope production; irradiation services, neutron beam and advanced materials research.

At present with growing energy needs for sustainable and environmental friendly development, IAEA Member States are viewing nuclear energy as a viable option and requesting IAEA assistance to either build their first research reactor or to utilize research reactors operating in neighbouring countries, by means of networking and cooperation arrangements, as a first step in building up a national capability to start a nuclear power programme.

Research reactors may play a crucial role in providing the data needed to make informed decisions on the establishment of a national nuclear power programme as well as on further advances in power reactors and fuel cycles concepts, fuel development, material and system viability. The characterization of materials for fusion devices is another area where research reactor are an important tool. The IAEA has taken the initiative in this direction through organising experts meetings, workshops and encouraging collaboration through coordinated research projects.

The research reactor community, which has had a long and successful history of both productive and safe operation, now faces a number of critical issues ranging from the ageing of facilities and personnel and changes in governmental support to the need for financial independence to cover operational costs. Under-utilisation and a lack

of resources for operation are interlinked, causing problems in safety and other areas.

One of the main objectives of this conference is to discuss contributions and proposals to address these issues. Here I'd now like to share with you some ideas the IAEA has relating to this matter.

First and foremost is the issue of effective utilization of research reactors in a more economically competitive and safety-, reliability- and sustainability-conscious world where they must be effectively managed through all stages: planning, operations, finance and marketing of services. The IAEA is helping countries pursue viable utilization strategies on national and regional bases. The designation of ANSTO in April 2007 as the IAEA Collaborating Centre in the field of 'Neutron scattering applications' is an example of innovative approaches used to strengthen programme delivery and catalyse synergies for the benefit of MSs in the region.

Through strategic planning and allied support, the IAEA is encouraging facilities to become "regional centres of excellence," where co-operative research programmes and training within the region based on a single research reactor can be utilized by a number of neighbouring countries. The IAEA is also supporting the creation of coalitions or cooperative arrangements between operating research reactors (which may include other participants or sponsors) to improve all aspects of research reactor utilization. A paper with a detailed description of this approach will be presented later to this conference.

Research reactor operators can extend the use of available facilities to scientists and users from Member States that do not have research reactors but need to use them. The IAEA is encouraging research reactor facilities to share the available resources regionally. Regional TC projects, like a project underway in Africa, are already steps in this direction.

Most importantly effective research reactor utilization is not possible without due regard to their safety and security. So, in my second point I will address research reactors safety.

As many of you will be aware, about two thirds of operating research reactors are now more than thirty years old. Analysis of incidents reported to the IAEA Incident Reporting System for Research Reactors has shown that the root causes of over 50% of reported incidents are linked with the ageing of components. In spite of the refurbishment of systems and components, including instrumentation and control systems, ageing is still an important safety issue. The IAEA is providing assistance for establishing systematic and effective ageing management programmes through the organization of training workshops and expert missions, and the development of a safety standards document on ageing management. The research reactor community can learn a lot about aging management from the experience in PLiM developed for nuclear power reactors.

The PLiM approach has confirmed its practical advantages not only for ageing management but also for improving the efficiency of a total management system which can include optimisation of reactor maintenance, thereby improving its cost effectiveness. PLiM also offers advantages for preserving the operational knowledge needed to optimize decommissioning. The most recent Symposium on PLiM, in Shanghai, China, provided many examples in this area.

Due to a lack of resources many research reactors are without clear plans for their future, which affects the training and qualification of personnel, equipment maintenance, and the preparation and maintenance of safety documentation, which in turn raises safety concerns.

But even for well utilized research reactors, safety review missions have indicated that out of date or incomplete safety documentation and a lack of decommissioning plans are also a problem. In many countries effective and independent regulatory bodies have not yet been established leading to inadequate regulatory supervision of research reactors.

The IAEA is addressing these issues through the establishment of a Code of Conduct on the Safety of Research Reactors, about which you will hear more in the papers that follow. It provides guidance for the development and harmonization of national practices, laws, and

regulations and sets the desirable attributes for the management of research reactor safety. The IAEA organizes regional meetings to assist Member States in assessing compliance with the code, such as a regional meeting for Latin American countries which is planned for December this year.

The regional meetings indicate that there is a common need to increase attention to commissioning and modifications, re-evaluation of siting criteria, human factor development and preparation for decommissioning. One of the papers we will hear today will go into this in more detail.

The IAEA looks to the enhancement of the safety of research reactors through the development of safety standards and safety guides that support the application of the Code of Conduct, the provision of assistance in the areas of ageing management and decommissioning planning, and the improvement of regulatory capabilities and oversight. Its safety review missions such as Integrated Safety Assessment for Research Reactors (INSARR) and Integrated Regulatory Review Service missions (IRRS) to Member States having research reactors will improve regulatory infrastructures to ensure an effective supervision of the safety of such facilities.

The IAEA continues to operate the Incident Reporting System for Research Reactors (IRSRR) and to support the exchange and dissemination of lessons learned from incidents, in particular through the Research Reactor Information Network, which will help reduce the isolation of small organizations with limited resources. There are a large number of papers being presented at this conference concerned with these particular issues.

My third point addresses the need to effectively deal with the management of the research reactor nuclear fuel cycle. Minimization of the use of Highly Enriched Uranium (HEU) in civilian applications is an urgent need that can be achieved by converting existing reactors from Highly Enriched Uranium (HEU) to Low Enriched Uranium (LEU), designing new reactors to use exclusively LEU and returning HEU fresh and spent research reactor fuel to the country where it was originally enriched. The IAEA actively supports the Global Threat

Reduction Initiative (GTRI) and especially the Reduced Enrichment for Research and Test Reactors (RERTR) programme and the programmes to return fresh and spent HEU research reactor fuel to the United States and the Russian Federation. The IAEA also supports the development and qualification of the high density fuels that are needed for high flux research reactors.

The end-point of the research reactor fuel cycle, as it is now envisaged, is when the spent fuel is either: a) returned to the country of origin; b) reprocessed and the high-level and long lived wastes disposed or c) disposed of directly, or disposed of after conditioning, in a geological repository.

Perpetual postponement of a final decision is not reasonable considering that after achieving their goals the take-back programmes will certainly cease. Then every country with a RR will face the necessity of developing a national strategy for disposal. For several countries with or, even more so, without a small nuclear power programme the expensive construction of interim storage facilities and/or geological repositories for the relatively small amounts of spent fuel is not practicable. The option of reprocessing the fuel abroad which is not applicable in all cases does not eliminate the problem of the final disposal of any returned HLW anyway. A multinational long-term interim storage facility and eventually a multinational repository is a dream now.

My fourth point addresses the threat of nuclear terrorism. Strong measures must be taken to provide adequate physical protection for all nuclear and radioactive materials and facilities including transportation challenges. All activities associated with research reactor design, operation and utilization must include security implications against theft, sabotage or other malevolent activities. These issues are addressed by the Convention on Physical Protection of Nuclear Materials, the Convention on Suppression of Acts of Nuclear Terrorism, the UN Security Council resolutions 1540 and 1373 and the Code of Conduct on Safety and Security of Radioactive Sources. Efforts are needed to ensure both universal adherence to these international instruments and their full implementation. The IAEA assists Member States through guidance supplied in the Nuclear

Security Series, security advisory missions, human resources development and facility security upgrades.

So, in closing, what do we expect from this Conference?

Our main objective this week is to foster exchange of information on current research reactors and to provide a forum for reactor operators, designers, managers, users and regulators to share experience, exchange opinions and discuss options and priorities. The IAEA expects that your work during this week will result in a comprehensive set of conclusions and recommendations that contribute to the successful design and implementation of the Agency's programmatic activities in the areas of research reactors utilization, safety, security, operation, nuclear fuel cycle, maintenance, refurbishment, modernization, new designs, waste management and decommissioning.

The findings and recommendations of this Conference will contribute fresh ideas and creative approaches to maintain and improve the safe and sustainable operation of research reactors worldwide. The challenges that face all of us are in the application and implementation of these ideas and approaches. I, for one, believe we are up to the challenge.

Thank you for your attention and I look forward to your discussions and findings.