

## IAEA SUB-PROGRAMME ON SAFETY ENHANCEMENT OF RESEARCH REACTORS

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For more than sixty years research reactors has been a corner stone in the development and application of nuclear science and technology and in education and training of nuclear scientists and engineers. The benefits of research reactors also extended to many other fields including medical and industrial applications. Research reactors also can play an important role for building the technical and safety infrastructure in countries embarking on nuclear power programmes. Continued safe operation of research reactor facilities is essential for the benefits of the whole nuclear community.

Through its programmes and activities, the IAEA continues to provide a main contribution to enhancing the safety of research reactors worldwide. The programme and associated activities are continuously adapted to address the needs of Member States, issues and trends, and challenges facing the research reactor community. The activities support Member States to improve their regulatory effectiveness and to enhance the management of safety of their facilities through the application of the Code of Conduct on the Safety of Research Reactors and the IAEA safety standards.

The development and promotion of IAEA safety standards is a key activity within the sub-programme. At present, the corpus of safety standards reached maturity. Eleven Safety Guides have been published covering all areas important to safety, and significant progress has been achieved in the revision of the safety requirements documents to incorporate the feedback from the accident at the Fukushima-Daiichi nuclear power plants. Several Safety reports and technical documents were also published to provide additional guidance. These safety standards documents form the basis of the IAEA safety review services for research reactors, including the Integrated Safety Assessment (INSARR) missions.

For Member States embarking on their first research reactor or a new reactor project, the IAEA provides a range of services to support Member States to establish the necessary infrastructure, including publication of guidelines, conduct of expert and advisory services and organization of training activities. The IAEA also continued to provide support to enhance the safety of research reactors under Project and Supply Agreements.

Additionally, IAEA continued to provide support to research reactor organizations in a wide range of areas including regulatory supervision, safety management, safety analysis, ageing management, operational radiation protection, safety of experiments, emergency planning, decommissioning plans, and managing the interface between safety and security.

Safety is further enhanced by the international exchange of information and sharing of operational experience feedback. The IAEA operates a web-based incident reporting system for research reactors (IRSRR) that facilitates the collection of information, analysis of data and dissemination of lessons learned to enhance safety. To further promote networking and sharing of experience, the IAEA supports regional and international co-operation to enhance safety, including facilitating establishment of regional safety advisory committees and assisting them to function effectively. Regional committees are now functioning in Africa, Asia, and Europe.

The implementation of the abovementioned programme and activities resulted in significant progress in enhancing the safety of research reactors worldwide, as reported by the Member States self-assessments in application of the Code of Conduct on the Safety of Research Reactors. However, further improvements are needed in some areas and efforts are still needed to address emerging challenges. These areas management of ageing research reactors, safety of experiments, periodic safety reviews, decommissioning planning, and, in view of the feedback from the accident at the Fukushima-Daiichi nuclear power plants, with respect to regulatory effectiveness, consideration of human factors, protection against external hazards, and emergency preparedness in particular for reactors with potential off-site consequences.

The paper presents and discusses the elements mentioned above with a summary of the IAEA activities, recent progress and achievements for improving research reactor safety worldwide, and outlines of the strategy for implementing further improvements.

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