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THE ROLE OF RRS IN THE DEVELOPMENT OF THE NATIONAL INFRASTRUCTURE FOR NUCLEAR SCIENCE AND TECHNOLOGY PROGRAMMES

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The main purpose of this paper is to define the potential and limitations of a Research Reactor (RR) and related nuclear infrastructure in helping a country to build national infrastructure for nuclear science and technology programmes and in particular for nuclear power infrastructure.
The RR related infrastructure includes the guidelines, laws, regulations, international agreements, education and training support, and support organisations such as an independent regulatory body and/or supporting/oversight government ministries, as well as physical arrangements such as facility, fuel and waste management, radiation protection, safeguards, etc. The specific RR infrastructure is described in the IAEA document Specific Considerations and Milestones for a Research Reactor project, NES No. NP-T-5.1, 2012, which is briefly presented in this paper, including the phases of the development of the RR related infrastructure and the 19 infrastructure issues and conditions to be fulfilled for each of them at the end of each phases.
One important question is: Which was the historical role of the RR in developing nuclear power programs and what will be its benefit in the future?, and the paper try to answer to this question based on the experiences of the countries with developed nuclear power program and the newcomers. In the past, the medium to high power RRs were used on more complex research and development activities related to NPP technologies such as fuel and material testing. Also the lower powers RRs, due to their more flexible operation, were more often applied to education -and in less common cases, training- missions. In small nuclear power programme countries there are many examples of utilities bringing licensed NPP operators to RRs for practical/ refresher training and facilitating a better understanding of the laws of physics but this contribution does not comprise a significant portion of the RR's utilisation schedule. In all cases, these RRs also serve non-power missions related to science, medical and industrial isotope production, and/or other quasi-commercial activities.
The majority of newcomer countries with RRs indicated that a RR helped them to be more confident about nuclear power technology and also provided a tool for public information and stakeholder involvement. All the countries embarking on a nuclear power programme are using or have plans to use RRs (although not necessarily their own) for basic education in the nuclear power field (through technical courses and utilisation of the RR) in cooperation with Universities. Most also intend to develop the RR organisation into a future Technical Support Organization (TSO), based on the specific training to be received from the first NPP Vendor country. These information are based on the participation to the different IAEA Integrated Nuclear Infrastructure Review (INIR) missions in newcomer countries.
The RRs that are operated in compliance with international standards of nuclear safety, security and safeguards demonstrate a nation's commitment towards development of nuclear technology in all its aspects.

Organization

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