IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Interregional Workshop on Design Safety of Small Modular Reactors (SMRs)

Hosted by

The Government of the People's Republic of China

Through the

Nuclear Power Institute of China

Chengdu, China

16 to 20 October 2023

Ref. No.:ME-INT2023-2301231

Information Sheet

Purpose

The purpose of the event is to facilitate discussion and promote the exchange of information regarding the challenges and experiences involved in applying design safety requirements to small modular reactors (SMRs) and demonstrating the safety of their designs comprehensively. Additionally, the event will cover approaches for creating an effective regulatory framework that can address the challenges posed by emerging innovative features and designs that are the first of their kind.

Working Language

The working language of the event will be English.

Deadline for Nominations

Nominations received after **4 July 2023** will not be considered.

Project Background

To meet the growing demand for energy and to mitigate global climate change challenge, the interest in Small Modular Reactors (SMRs) and Micro-Reactors (MRs) is growing, especially in regions inaccessible to large electricity grids and regions with smaller electricity grids that need technology options deployed incrementally to closely match increasing energy demand. SMRs and MRs are also viable options for users with needs beyond electricity supply, e.g., district heating, desalination, industrial process heat, as well as hydrogen. The purpose of the project is to provide broad support to Member States in the development and deployment of SMRs and MRs. The project provides a broad range of fora to enable effective capacity building through training and technology transfer activities on all aspects of SMR development. The project also covers the emerging MRs, the development of SMRs for electric and non-electric applications, and the coupling of such nuclear systems with renewables in integrated energy systems. The aim of the project is to enable national stakeholders to gain enhanced understanding of key characteristics of SMR and MR technologies and their applications, and to formulate, in line with international safety standards, countries' specific legal and regulatory frameworks, and generic user requirements and criteria for SMR technologies.

This workshop is one of the activities within the project. The aim of this workshop is to enable national stakeholders to understand key design characteristics of SMRs, to enable effective capacity building on design safety aspects of SMR, and to share of regulatory experience and user requirements among countries.

Scope and Nature

The event is planned to cover particular examples of different SMR technologies (e.g., light water cooled SMR, high temperature gas SMR, sodium fast SMR, lead cooled fast SMR, molten salt SMR). The workshop is planned to include presentations and discussions on relevant design, safety assessment and regulatory aspects of SMRs, covering i.e. the following topics:

- General approach on the application of safety principles, basic safety concepts and essential design safety requirements.
- General design characteristics and safety consideration for different types of SMRs.
- Safety aspects of the selection of appropriate design codes, the use of new materials and manufacturing techniques, and qualification for the very specific and demanding environments of some SMRs.
- Application of deterministic and probabilistic safety analysis to SMRs.
- Experiences or challenges on the safety demonstration of design features that are novel or characteristic for SMRs, e.g. reliability assessment of passive safety features; inherent safety design; compact design.
- Experiences or challenges on the safety considerations of modular designs, including the impact analysis among reactor modules and the sharing of safety features.
- Options and experiences for modernising regulatory process, e.g., application of existing regulatory frameworks to SMRs, transition to less prescriptive approaches and stepwise licensing.

The workshop will address various SMR technologies, such as light water cooled SMR, high temperature gas SMR, sodium fast SMR, lead cooled fast SMR, molten salt SMR. It will include presentations from the participants providing their national experience on design safety approaches to SMRs. Invited experts as well as the IAEA staff will present and share their experience, highlighting common challenges and good practices.

The hosting organization provides technical tours.

In addition, the workshop will provide opportunities for participants to network and continue sharing information and good practices as well as other potential follow-up tasks and coordinated activities, as appropriate.

Expected outputs

The expected outputs of the workshop are:

- Participants will get better understanding of the current design characteristics of SMRs.
- Participants will get better understanding of the approach for application of design safety requirements to SMRs
- Participants will get a better understanding and exchange experiences in safety demonstration of innovative design features of different SMR technologies.
- Participants will get better understanding of the current challenges of safe design of SMRs and an also expanded view on relevant regulatory framework related aspects.

Participation

The event is open to up to 30 participants from the following Member States participating in the TC Project INT2023:

Recipient countries,

Algeria, Argentina, Belarus, Bolivia, Brazil, Bulgaria, China, Croatia, Czech Republic, Egypt, Estonia, Ethiopia, Ghana, Greece, Guatemala, Hungary, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Libya, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Rwanda, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Thailand, Tunisia, Türkiye, United Republic of Tanzania, Uzbekistan, Zambia.

Donor countries,

At no cost to the IAEA, participants from following countries can also be considered:

Australia, Canada, France, Italy, Japan, Belgium, Denmark, Spain, Finland, India, Republic of Korea, Russian Federation, United Kingdom, United States of America.

Participants' Qualification and Experience

The target participants of this workshop are those individuals working in Member States' regulatory bodies, design organizations, operating organizations and research and development institutions who are engaged in safety analysis for nuclear power plants for SMRs. Practical experience with deterministic and/or probabilistic safety analysis is essential for detailed discussions and sharing national experiences during the workshop.

Application Procedure

Candidates wishing to apply for this event should follow the steps below:

1. Access the InTouch+ home page (https://intouchplus.iaea.org) using the candidate's existing Nucleus username and password. If the candidate is not a registered Nucleus user, she/he must create a Nucleus account (https://websso.iaea.org/IM/UserRegistrationPage.aspx) before proceeding with the event application process below.

2. On the InTouch + platform, the candidate must:

    a. Finalize or update her/his personal details, provide sufficient information to establish the required qualifications regarding education, language skills and work experience ('Profile' tab) and upload relevant supporting documents;

    b. Download and complete the Designation of Beneficiary and Emergency Contact Form, and upload to InTouch+ ('Profile' tab under the personal section) specifying the document name. If already provided, kindly discard this step;

    c. Search for the relevant technical cooperation event (EVT2301231) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority.(for donor countries, Applicants may download the Nomination Form for meeting from the IAEA's webpage. Completed forms must be endorsed by the relevant government authority and may be sent to the IAEA, preferably by email to Official Mail - IAEA Mail address Official.Mail@iaea.org, with copy to Mr Jing Zhang J.Zhang@iaea.org and Mr Niu Mingye M.niu@iaea.org.)

NOTE: Completed applications need to be approved by the relevant national authority, i.e. permanent mission, the National Liaison Officer, and submitted to the IAEA through the established official channels by the provided designation deadline. **All nominations must include a scan of the candidate's first page of passport with photo.**

NOTE: A medical certificate signed by a registered medical practitioner dated not more than four months prior to starting date of the event must be submitted by candidates when applying for a) events with a duration exceeding one month, and/or b) all candidates over the age of 65 regardless of the event duration.

Administrative and Financial Arrangements

Nominating authorities will be informed in due course of the names of the candidates who have been selected and will at that time be informed of the procedure to be followed with regard to administrative and financial matters.

Disclaimer of Liability

The organizers of the event do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the course, and it is clearly understood that each Government, in approving his/her participation, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

Note for female participants

Any woman engaged by the IAEA for work or training should notify the IAEA on becoming aware that she is pregnant.

The Board of Governors of the IAEA approved new International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. The Standards deal specifically with the occupational exposure conditions of female workers by requiring, inter alia, that a female worker should, on becoming aware that she is pregnant, notify her employer in order that her working conditions may be modified, if necessary. This notification shall not be considered a reason to exclude her from work; however, her working conditions, with respect to occupational exposure shall be adapted with a view to ensuring that her embryo or foetus be afforded the same broad level of protection as required for members of the public.

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