IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Interregional Workshop on Experimental Testing and Validation for Design and Safety Analysis Computer Codes for Small Modular Reactors

IAEA Headquarters, Vienna, Austria

18 to 21 June 2024

Ref. No.: ME-INT2023-EVT2304138

Information Sheet

Purpose

The purpose of the event is to share experience and information on experimental testing and code validation for Small Modular Reactors (SMRs), to identify current needs and gaps, and to discuss potential for collaborations, sharing resources, and work on globally recognized common approaches.

Working Language

The working language(s) of the event will be **English**.

Deadline for Nominations

Nominations received after 29 February 2024 will not be considered.

Project Background

To meet the growing demand for energy and to mitigate global climate challenge, the interest in Small Modular Reactors (SMRs) and Micro-Reactors (MRs) is growing, especially with 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 that need beyond electricity supply, e.g., district heating, desalination, industrial process heat, as well as hydrogen. The purpose of the "INT2023 Supporting member States' Capacity Building on Small Modular Reactors and Micro-reactors and their Technology and Applications as a Contribution of Nuclear Power to the Mitigation of Climate Change" 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 forum 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 deployment 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 on 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.

Scope and Nature

Assessments by means of computer codes is key for the design and licensing of Nuclear Power Plants (NPPs) and are also used in quantifying the safety margins. Given their impact on safety, those computer codes are required to be validated for their intended application through experimental tests. Some SMR concepts involve specific design characteristics that require modelling capabilities that are beyond the validated boundaries of existing codes or include physical phenomena for which the existing experimental data is inadequate. The significant efforts and resources associated with performing validation or experimentation constitute a challenge to a safe and secure timely deployment of SMRs because validation should cover anticipated conditions during both normal operations and accidents, and the relevant validation databases should fully cover SMRs conditions.

To overcome those challenges, the IAEA is organizing a workshop for experimental facilities, technology holders/developers of SMRs, Regulators' Technical Support Organizations (TSOs) and International Organizations to share knowledge on experiments and code validation. This workshop aims at facilitating international information exchange, cooperation and resource sharing for experiments and code validation to support safe and secure global deployment of SMRs.

The event has several specific objectives, which are as follows:

- Disseminate information about international and national experimental testing and code validation programmes and discuss similarities, gaps, and potential for collaborations.
- Discuss gap and priorities specific to each SMR technology and phenomena and propose potential collaborative work.
- Review the content of the IAEA's database of experimental facilities for SMRs and the Network for Experiment and code validation Sharing for SMRs (NEXSHARE) and provide suggestions or additional content for their next revision.
- Discuss globally recognized common approaches and best practices in testing and code validation to provide greater confidence on data and codes used in safety cases.

The event will feature presentations from the IAEA, experts from International Organizations (OECD/NEA, GEN-IV Forum, etc), national laboratories, developers of SMRs technologies, code developers, owners of experimental facilities and Technical Support Organizations. The event will include panel sessions and discussion sessions to enable participants to exchange information and lessons learned, contribute to the summary, and highlights of the meeting, and make recommendations to the IAEA and other participating organizations on future activities in this area.

Technology-specific discussions will be organized in parallel sessions. Technologies covered in the workshop include water cooled, high temperature gas cooled, molten salt and liquid metal fast reactors.

In addition, the event 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 key output of the event is to share experience, information and common approaches on experimental testing and code validation for SMRs.

Discussions are expected to identify current needs and gaps, and to initiate potential collaborations and sharing resources amongst the participants.

Finally, the event is expected to allow the IAEA to consolidate the participants' inputs on the NEXSHARE network and its experimental facilities database. The information compiled will also be used to scope future publications and collaborative activities within the frame of NEXSHARE to support experimental testing and code validation for SMRs.

Participation

The IAEA will consider providing funding of up to 40 participants in this workshop from the following Member States participating in the TC Project INT2023:

Algeria, Argentina, Armenia, Belarus, Bolivia, Brazil, Bulgaria, China, Croatia, Czech Republic, Egypt, El Salvador, Estonia, Ethiopia, Georgia, Ghana, Greece, Guatemala, Hungary, Indonesia, Islamic Republic of Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Libya, Lithuania, Madagascar, Malaysia, Mexico, Morocco, Myanmar, Namibia, 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.

At no cost to the IAEA, participants from following countries can also be considered: Belgium, Canada, Denmark, Finland, France, Italy, Japan, Republic of Korea, Spain, United Kingdom, United States of America.

Participants' Qualification and Experience

The target audience of this event are individuals working in Member States' design organization (vendors, code developers), owners of experimental facilities, and technical support organizations; particularly those involved in the key issues and challenges associated with experiments and code validation needed for SMRs.

The activities will be conducted in English and candidates should have sufficient English proficiency to participate in the event without difficulty.

Accepted participants should familiarized themselves with the following references to get the most out of the event:

- INTERNATIONAL ATOMIC ENERGY AGENCY, Advances in Small Modular Reactor Technology Developments - A Supplement to: IAEA Advanced Reactors Information System (ARIS) - 2022 Edition, IAEA, Vienna (2022)

- INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA-TECDOC-2003, Lessons learned in Regulating Small Modular Reactors, Vienna (2022)

- INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Safety Standards, General Safety Requirements, GSR Part 4 (Rev.1), Safety Assessment for Facilities and Activities, Vienna (2016), Requirement 18: Use of computer codes

- INTERNATIONAL ATOMIC ENERGY AGENCY, IAEA Safety Standards, Specific Safety Guide, SSG-2 (Rev. 1), Deterministic Safety Analysis for Nuclear Power Plants, Section 5. Use of computer codes for deterministic safety analysis

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;

Search for the relevant technical cooperation event (EVT2304138) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority

NOTE: Completed applications need to be approved by the relevant national authority, i.e., the National Liaison Office, 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.**

For additional support on how to apply for an event, please refer to the InTouch+ Help page. Any issues or queries related to InTouch+ can be addressed to InTouchPlus.Contact-Point@iaea.org.

Should online application submission not be possible, candidates may download the nomination form for the meeting from the IAEA website.

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.

Selected participants will receive an allowance from the IAEA sufficient to cover their costs of lodging, daily subsistence and miscellaneous expenses. They will also receive either a round-trip air ticket based on the most direct and economical route between the airport nearest their residence and the airport nearest the duty station through the IAEA's travel agency American Express, or a travel grant, or they will be reimbursed travel by car/bus/train in accordance with IAEA rules for non-staff travel.

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.

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