



Interregional Workshop on Graded Approach for Site Evaluation for Small Modular Reactors (SMRs)

Hosted by

The Government of the People's Republic of China

through the

China Nuclear Power Engineering Co., Ltd.

Beijing, China

26 to 30 June 2023

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Information Sheet

Purpose

The purpose of the event is to discuss aspects of a graded approach for site evaluations for SMRs, that are being used by several Member States, including potential characteristics which could be considered by licensees and regulators.

Working Language

The workshop will be conducted in English.

Deadline for Nominations

Nominations received after **15 April 2023** 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, regions with smaller electricity grids that need technology options deployed incrementally to closely match increasing energy demand, and regions where delivery of fossil fuels is cumbersome. The purpose of the project is to provide broad support to Member States in the deployment of SMRs and MRs. The project provides a forum to enable effective capacity building through training and technology transfer activities on all aspects of SMR development. The project 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 understand 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.

The development of proposed SMR design is rapidly evolving worldwide. Currently there are over 80 proposed designs for SMRs characterized by different design approaches, technologies, and safety features. SMR concepts vary from evolutionary variants of light water reactors. Some of these include advancements on light-water cooled reactors (LWR-SMRs), high temperature gas cooled reactors (HTGRs); liquid metal-cooled fast neutron reactors, very high temperature gas-cooled reactors, gas-cooled fast reactors, supercritical water-cooled reactors, and molten salt reactors.

SMRs are becoming more attractive to potential developers because of the perceived simplicity of design, economies of scale in modular production, shorter construction times, and reduced siting costs. Many SMRs are being designed to have passive safety features that do not require emergency cooling systems for decay heat removal or offsite power for active systems. Because of the reduced risk of SMRs as compared to traditional large reactors it is envisaged that siting requirements may be reduced or minimized commensurate with the risk. The consideration of risk inherent in all aspects of licensing, siting, design, and operation is known as a “graded approach”. It seems obvious that more stringent site selection criteria, design margins, and operating margins would be applied to a large pressurized water reactor (High Risk), than to SMRs (Medium or Low Risk).

In view of the interest of some Member States in the development and deployment of SMRs, it is necessary to disseminate information gathered by other Member States in the use of a graded approach in site selection of proposed SMRs. The process of site selection includes identifying specific characteristics of potential sites. These characteristics include properties that can be used to identify hazards and the sites natural defence to mitigate the risk associated with those hazards. An example would be the vicinity of the site to identified earthquake faults with the potential to cause surface rupture. Another example would be the elevation of the site with respect to nearby bodies of water (flood hazard). The level of effort (burden) undertaken to identify these site characteristics could be defined using a graded approach.

This workshop will focus on the development of a framework for the use of a graded approach in site selection. Lessons learned from Member States with similar programs will also be presented.

Scope and Nature

During this 5-day workshop, the selected participants will receive presentations from international experts from the IAEA, the Peoples Republic of China, and other Member States, as well as will conduct exercises, and participate in interactive discussions.

Field visit to a nuclear power plant is considered as an option of the agenda.

The workshop will be conducted in Beijing. The format of the workshop will be largely classroom style with presentations delivered by selected experts and other Member States. Time will be provided for breaks that promote discussion and networking among participants.

References:

- INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Energy for a Net Zero World.
- INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Technology Review 2021 - Report by the Director General, IAEA, Vienna (2021).
- 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, Safety Report on Applicability of Safety Standards to Non-Water-Cooled Reactors and Small Modular Reactors, Safety Reports Series No-123, IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Technology Roadmap for Small Modular Reactor Deployment, Nuclear Energy Series No. NR-T-1.18, IAEA, Vienna (2021).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Small modular reactor: A new nuclear energy paradigm, booklet, IAEA, Vienna (2022).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Applicability of Design Safety Requirements to Small Modular Reactor Technologies Intended for Near Term Deployment, TECDOC-1936, IAEA, Vienna (2020).
- INTERNATIONAL ATOMIC ENERGY AGENCY, Site Evaluation for Nuclear Installations, IAEA Safety Standards Series No. SSR-1, IAEA, Vienna, 2009
- SMR REGULATORS' FORUM, Pilot Project Report: Considering the Application of a Graded Approach, Defence-In Depth and Emergency Planning Zone Size for Small Modular Reactors, (IAEA, Vienna (2018)

Expected outputs

The expected output of the workshop is to strengthen capacity in the following areas:

- Methods for evaluating site characteristics
- Tools commonly used to gauge the “risk” of a potential site
- Grading approaches used for various risk levels
- Topics where additional research and development are needed

Participation

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

Algeria, Argentina, Bolivia, Plurinational State of, Brazil, Bulgaria, Croatia, Czech Republic, Egypt, Estonia, Ethiopia, Ghana, Greece, Guatemala, Hungary, Indonesia, 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.

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

Australia, Canada, France, Italy, Japan, Belgium, Denmark, Finland, India, Republic of Korea, Russian Federation, United Kingdom of Great Britain and Northern Ireland, United States of America.

Participants' Qualification and Experience

Participants who will most benefit from this workshop include those individuals working in Member States' governments/nuclear energy programme implementing organizations (NEPIOs), Design Institute, regulators, and/or potential owners and operators of SMRs.

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

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. Search for the relevant technical cooperation event (EVT2207192) 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 training course from the [IAEA website](#).

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.

Training on Basic Security in the Field (BSITF)

In order to comply with UN system-wide security measures, it is required that all workshop participants complete the online security awareness training BSAFE (which replaces BSITF and ASITF), prior to traveling to locations where UN security phases are in effect. The aim of these course is to educate participants on how best to avoid or minimize potential dangers and threats, and to demonstrate what individuals can do if they find themselves in insecure situations. The course is available online (<https://training.dss.un.org/course/category/6>).

Once an individual has completed the training, he/she must go back to the main training page to receive the certificate. If the button to get the certificate is not immediately visible, please refresh the page. BSAFE is maintained by UNDSS; in case of problems with the system, please contact UNDSS through the "Contact Us" page on the training website (<https://dss.un.org/dssweb/contactus.aspx>).

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 from recipient countries 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.

NOTE: The event will be hosted in Beijing, therefore nominated participants who require a visa to enter People's Republic of China should submit the necessary application to the nearest diplomatic or consular representative of People's Republic of China as soon as possible.

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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