IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on Codes and Standards, Design Engineering and Manufacturing of Components for Small Modular Reactors

Virtual Event

10–13 May 2022

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Information Sheet

Introduction

There are more than seventy (70) designs of small modular reactors (SMRs) technology from all types under different phases of development and deployment globally. A floating nuclear power SMR unit started its commercial operation in May 2020 in the Russian Federation after being connected to the grid a few months earlier. The HTR-PM, a high-temperature gas cooled reactor was connected to the grid in December 2021 after its two units reached criticality in September and October. One other land based SMR design is in advanced stages of construction with target operation date in 2023 in Argentina. Many other designs and technologies have entered licensing process aiming for immediate and near-term deployment around 2030. There is a significant increase of interest globally on SMRs for electricity production as well as on the use of SMRs for cogeneration of heat and electricity, for hydrogen production as well as for desalination of seawater. With this increased interest, the Member States are also asking for the Agency's consistent and coordinated support related to all aspects of Small Modular Reactors (SMR) development, deployment, and oversight. To respond to such request, the Agency engaged in a comprehensive and holistic effort to establish an Agency-wide Platform on SMRs and their Applications. The Platform aims at supporting Member States in the early deployment of SMRs, including in accelerating their technology development, readiness level, and demonstration.

The Technical Working Group (TWG) on SMR, established in 2018, focuses on technology development, design, deployment, and economics of SMRs that can be deployed in both expanding and embarking countries. The members of TWG-SMR provide advice and recommendations for the IAEA's activities on SMRs, among others in the areas of:

- Codes and design standardization of structures, systems, and components;
- Industrialization of SMRs, covering design, engineering, manufacturing, and supply chain; and
- Capacity building for embarking and expanding nuclear countries.

With relevance to these topics, the TWG-SMR discussed and highlighted key issues in this area. It was recognized that the Codes and Standards (C&S) could be country specific and dependent on the SMR design under consideration. Several Member States are working on and show interest in advanced SMR technology that involves high temperature materials; these issues should also be covered in C&S. Periodic surveillance such as weld examinations, steam generator tube inspections, structure integrity, etc, as was well as in-service inspections are essential to ensure nuclear facilities safety, resource optimization, as well as operation and maintenance. The requirements for commissioning, testing, in-service inspection and surveillance for SMRs may be different.

The functional requirements and safety design criteria may also be different between particularly non water-cooled SMRs and large nuclear reactors. This might require establishment of a technical forum to identify the differences in functional and operational requirements, so that exceptions on C&S can be identified accordingly. SMR industry is also driven by innovation at different stages of development and is also taking reference from other industries that have achieved a higher level of standardization. Adoption of new and advanced manufacturing methods and techniques will also require adaptation of existing codes and standards for the nuclear industry. Therefore, issues and impediments on design, manufacturing process and technology qualification of novel components for SMRs need to be identified and addressed including quality assurance and quality control for these new nuclear components. How can SMR industries learn from other regulated regimes to support a diversified/ larger supply chain and enable in-factory construction also needs to be properly addressed and understood.

As most SMR vendors are targeting standardization in several aspects of design, component manufacturing, construction, arrangements etc. there is a need for readily available codes and standards, providing clear rules and guidelines and/or equivalences between existing codes so that their licensing by regulatory bodies can be facilitated. This is beneficial in supporting development of common approaches that enable sharing of knowledge, assure fair global competition, protect intellectual rights, by still encouraging technological innovation for continuous improvements.

During the annual meetings of the TWG-SMR in 2018 and 2019, members have requested the IAEA to provide support, guidance, and capacity building on this subject. Therefore, to understand and address these issues at a global level, the IAEA is organizing a Technical Meeting on Codes and Standards, Design Engineering and Manufacturing of Components for Small Modular Reactors. These issues will be categorized under several topical sessions during the meeting. The meeting will also support the work of the IAEA's platform on SMRs and their application.

Objectives

The purpose of the event is to monitor progress made and discuss further activities related to codes and standards, design engineering, testing and manufacturing of components for small modular reactors. The primary objectives of the meeting are to:

- Facilitate the exchange of information and promote common approaches within the scope of the event and its related topics;
- Identify and discuss key enabling technologies and features of SMRs, including serial production of components, engineering for design simplification, design standardization, and manufacturing for modular construction;
- Discuss the opportunities and challenges posed by advanced manufacturing methods and techniques and their application for SMR structure systems and components – and determine key mechanism on how the issues could be addressed;
- Provide recommendations to the IAEA for future joint efforts and coordinated research activities (if required) in the field.

Target Audience

- Nuclear engineers, experts on SMR designs and technologies, experts of codes and standards, supply chain management, manufacturing, and construction technology;
- Agency's in-house experts particularly those from the Department of Nuclear Energy - Division of Nuclear Power and Department of Nuclear Safety and Nuclear Security – Division of Nuclear Installation Safety.

Working Language(s)

English.

Expected Outputs

- A working material summarizing the discussions of the meeting, feedbacks from the Member States and suggestions of future activities in the area;
- Draft framework to establish a network of relevant stakeholders to regularly meet and provide an up-to-date status of industrial codes and standards, design engineering, and manufacturing methods of components for SMRs.

Topics

The event will consist of general sessions and technical sessions. In general sessions, several of IAEA's in-house experts will provide overview of relevant activities within the IAEA, and how they can support the work under this area. Some of the presentations from contributing authors will also be considered under general session. In the technical sessions, all contributions, presentations and discussions will be categorized based on the following topics (this list might differ based on the type and number of submissions):

1. Industrial codes and standards and their applicability to Small Modular Reactors
    - This topic will include general presentations on codes and standards in nuclear industry and their applicability to SMRs, needs for the adaptation of existing codes and standards, requirement of new standards etc. The presentations could also highlight on how an equivalence can be established.
2. Advanced Manufacturing methods and techniques for components of Small Modular Reactors
    - This topic will include presentation on advanced manufacturing methods and techniques. These could be novel process or processes already used in some other industries.
3. Design Engineering for Standardization
    - This topic will include presentation on standardization of the design, construction, manufacturing, arrangements etc. The focus of the presentation should be on enabling a factory build environment for Small Modular Reactors.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **15 March 2022**. Participants who are members of an organization invited to attend are requested to send the **Participation Form (Form A)** through their organization to the IAEA by above deadline.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the Agency's Personal Data and Privacy Policy and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required.

Abstracts and Presentations

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed above.

Participants who wish to give presentations are requested to submit an abstract of their work on the session topics listed above.

The abstract should contain title, contributing author(s) names and affiliation, must be written in English, and provide sufficient information on the contents of the proposed presentation for evaluation. The abstract will be reviewed as part of the selection process for presentations. The abstract should be in Microsoft Word format and should not exceed 400 words. It should be uploaded to INDICO website (https://conferences.iaea.org/event/295/), not later than **15 March 2022**. Authors will be notified of the acceptance of their proposed presentations by **15 April 2022**.

The selected authors will then be requested to present their work, based on the abstract, during the technical meeting.

In addition, participants have to submit the abstract together with the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or their organization for onward transmission to the IAEA not later than **15 March 2022**.

Key Deadlines and Dates

Action	**Date**
Abstract submission deadline Submission of the Participation Form (Form A) Submission of the Form for Submission of a Paper (Form B)	15 March 2022
Notification of acceptance of abstract by the IAEA	15 April 2022
Technical Meeting	10–13 May 2022

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the event to the Administrative Secretary.