



Technical Meeting on Safety Demonstration of Innovative Technology in Power Reactor Designs

IAEA Headquarters, Vienna, Austria

26–28 June 2023

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Information Sheet

Introduction

The current set of IAEA Safety Guides for nuclear power plants was primarily developed for water cooled reactors based on proven technology. However, there is now a need to consider designs with innovative technology, and this need is expected to increase in the coming years. Accordingly, the IAEA has recently completed a high-level review of applicability of the IAEA safety standards to various technologies, including SMRs and non-water-cooled reactors¹. The outcome of this review identified areas for enhancement of IAEA safety standards in relation to the development and assessment of the safety case for first-of-a-kind (FOAK) reactor designs.

There is a growing interest amongst IAEA Member States in advanced reactors such as small modular reactors (SMRs) and other FOAK designs. Such new types of reactors may employ new approaches and concepts which are different from existing practices (at all different levels, including the component level, system level, and reactor level). These reactors include designs with first of a kind design features, non-water-cooled technologies, inherent safety features, highly integrated software-based systems,

¹ Pre-print version is available using this link https://inis.iaea.org/collection/NCLCollectionStore/_Public/53/077/53077569.pdf?r=1

advanced manufacturing techniques, and other advanced solutions that may not be extensively used in current operating reactors.

Amongst the challenges that reactor developers can face when making safety demonstrations for FOAK reactor designs, the following are of particular importance: limitations in the traditional application of approaches and methods for safety assessment (e.g. probabilistic safety assessment (PSA), and deterministic safety assessment (DSA)), limited information and research on phenomenology, limited or no operating experience, lack of applicable codes and technical standards, and limitations in the application of the design safety approaches used in the current fleet of reactors (e.g. system design criteria and functional design criteria).

These issues, if not adequately addressed, may challenge the developers', operators' and other stakeholders' ability to demonstrate the safety of innovative technologies, and may also impact the evidence available for regulatory bodies to take timely decisions on the safety of first of a kind reactor designs involving innovative technology (e.g. granting a licence).

The need to address these topics is increasing in urgency considering the dynamic developments in the nuclear industry, and the expected timeline of deployment of advanced reactor designs using innovative technology. Therefore, and in response to the request from the Member States, the IAEA has initiated the development of a *Safety Guide on Safety Demonstration of Innovative Technology in Power Reactor Designs* (DS537). The outcomes of this event will provide important input to tailor the efforts on, and facilitate the development of, the Safety Guide.

Objectives

The objective of the event is to provide a platform for the participants to share experiences in the safety demonstration for first of a kind reactor designs, in particular related to resolving or mitigating uncertainties associated with innovative technology. It is also planned to discuss the challenges and potential solutions related to the safety demonstration for innovative technology in power reactors covering different stages (such as design, licensing, manufacturing and construction).

Special emphasis will be put on key aspects of the safety demonstration, including design safety requirements and safety assessment approaches, covering a wide range of topics related to the use of innovative technology in power reactor designs.

Target Audience

The event is targeted at professionals from regulatory bodies, design development organizations and operating organizations who are engaged in developing or assessing the safety demonstration for innovative technology in power reactor designs (this includes both innovative reactor designs, such as SMRs and non-water-cooled reactors, and existing reactor designs utilizing innovative technologies and solutions). Participation of professionals with experiences in developing methodologies and approaches to address, mitigate, and/or resolve unknowns associated with innovative technology, including systems, components, materials and advanced manufacturing techniques is encouraged.

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed below. This will significantly enhance the discussions and effectiveness of the meeting.

Working Language(s)

English.

Topics

The following topics are planned to be covered during the Technical Meeting:

- Development of design, construction and manufacturing requirements, from a safety point of view, for innovative technology in power reactor designs (including practices on pre-operational testing and qualification);
- Practices for safety assessment for innovative technology in power reactor designs (including safety analysis, assessment of engineering aspects, equipment qualification, human factors and long-term safety);
- Means of gathering the data for design and safety assessment of innovative technology (including consideration of tests and experiments);
- Consideration of interfaces between safety, security and safeguards for innovative technology;
- Regulatory expectations in terms of safety submissions for innovative technology in power reactor designs;
- Practices for addressing the knowledge gaps and uncertainties related to innovative technology in power reactor designs.

The IAEA encourages participants to provide presentations and to share their practices and experiences on the topics listed above.

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 **13 March 2023**. 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 the 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.

Expenditures and Grants

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made using the **Grant Application Form (Form C)**, which has to be stamped, signed and submitted by the competent national authority to the IAEA together with the **Participation Form (Form A)** by **13 March 2023**.

Venue

The event will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page:

www.iaea.org/events.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

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

Event Web Page

Please visit the following IAEA web page regularly for new information regarding this event:

<https://www.iaea.org/events/evt2202451>