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国际原子能机构

International Atomic Energy Agency

Agence internationale de l'énergie atomique

Международное агентство по атомной энергии

Organismo Internacional de Energía Atómica

Vienna International Centre, PO Box 100, 1400 Vienna, Austria

Phone: (+43 1) 2600 • Fax: (+43 1) 26007

Email: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) • Internet: <https://www.iaea.org>

In reply please refer to: EVT2103177

Dial directly to extension: (+43 1) 2600-22882

The Secretariat of the International Atomic Energy Agency (IAEA) presents its compliments to the IAEA's Member States and has the honour to draw their attention to the **Technical Meeting on Advanced Technologies and Systems for Containment Preservation in Accident Conditions** (hereinafter referred to as "event") to be held virtually via Cisco Webex from **11 to 14 October 2022**.

The purpose of the event is to present and discuss recent advances in technological solutions and active and passive systems applied to preserve containment integrity during design basis accidents and design extension conditions with core melting; to harmonize international understanding; and to identify major issues and future directions for research and development for advanced active and passive systems used for containment preservation.

The attached Information Sheet provides further details of the event.

The event will be held in English.

Member States are invited to designate one or more participants to represent the Government at this event. Member States are strongly encouraged to identify suitable women participants.

Designations should be submitted to the IAEA through the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) not later than **2 September 2022** using the attached Participation Form (Form A). Completed and authorized Participation Forms should be sent either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Copies should be sent by email to the Scientific Secretaries of the event, Mr Alexei Miassoedov, Division of Nuclear Power, Department of Nuclear Energy (Email: [A.Miassoedov@iaea.org](mailto:A.Miassoedov@iaea.org)) and Mr Mikhail Lankin, Division of Nuclear Installation Safety, Department of Nuclear Safety and Security (Email: [M.Lankin@iaea.org](mailto:M.Lankin@iaea.org)), and to the Administrative Secretary, Ms Dorothy Kalocsai (Email: [D.Kalocsai@iaea.org](mailto:D.Kalocsai@iaea.org)). The Scientific Secretaries of the event will liaise with the participants directly concerning further arrangements, as appropriate, once the official designations have been received.

The IAEA takes no responsibility for, and the provider of the virtual meeting services has represented and warranted that the Services shall not contain, and that no end user shall receive from the software used to hold the virtual meeting, any virus, worm, trap door, back door, timer, clock, counter or other limiting routine, instruction or design, or other malicious, illicit or similar unrequested code, including surveillance software or routines which may, or is designed to, permit access by any person, or on its own, to erase, or otherwise harm or modify any data or any system, server, facility or other infrastructure of any end user (collectively, a “Disabling Code”).

The Secretariat of the International Atomic Energy Agency avails itself of this opportunity to renew to the IAEA’s Member States the assurances of its highest consideration.



2022-06-17

Enclosures: Information Sheet

Participation Form (Form A)



**IAEA**

International Atomic Energy Agency

*Atoms for Peace and Development*

# **Technical Meeting on Advanced Technologies and Systems for Containment Preservation in Accident Conditions**

**Virtual Event**

**11–14 October 2022**

**Ref. No.: EVT2103177**

## **Information Sheet**

### **Introduction**

Following the Accident at the Fukushima Daiichi Nuclear Power Plant (NPP), the IAEA has held various meetings to strengthen research and development strategies and priorities regarding accident management including severe accidents. The IAEA International Experts Meeting on Strengthening Research and Development Effectiveness in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant, held in Vienna in 2015, prepared a list of recommendations for research and development (R&D) activities to be promoted by the IAEA. This comprehensive list represents compiled experts' views on the needs for further R&D activities and international cooperative efforts. It was further refined at the Technical Meeting on Post-Fukushima Research and Development Strategies and Priorities held in December 2015.

Furthermore, the IAEA has organized a series of Technical Meetings addressing the status and R&D gaps in experimental and analytical research for accident conditions (including severe accidents) in water cooled reactors including those relevant for containment safety design and analyses.

Technical Meeting on Severe Accident Mitigation through Improvements in Filtered Containment Venting for Water Cooled Reactors Held in Vienna, Austria, 31 August–3 September 2015 resulted in IAEA-TECDOC-1818 on Severe Accident Mitigation through Improvements in Filtered Containment Vent Systems and Containment Cooling Strategies for Water Cooled Reactors (May 2017).

Technical Meeting on the Status and Evaluation of Severe Accident Simulation Codes for Water Cooled Reactors, Vienna, Austria, 9–12 October 2017 resulted in IAEA-TECDOC-1872 on Status and Evaluation of Severe Accident Simulation Codes for Water Cooled Reactors (June 2019)

Technical Meeting on Hydrogen Management in Severe Accidents, Vienna, Austria, 25–28 September 2018 resulted in IAEA-TECDOC-1939 on Developments in the Analysis and Management of Combustible Gases in Severe Accident in Water Cooled Reactors Following the Fukushima Daiichi Accident (December 2020).

During these meetings, the containment performance during accident conditions (mainly during severe accidents) was confirmed to be one of the high priority areas. To minimize the accident impact outside the plant, keeping the containment function as the last barrier for the release of radioactivity into the environment is a key element of the defence-in-depth nuclear safety concept. Reliable performance of available active and passive safety systems is crucial to achieve this objective.

Although considerable experimental and analytical efforts were already made, international activities on containment behaviour indicated that there are still research gaps that require additional efforts and international cooperation and coordination of Member States activities. This includes e.g. the accuracy and reliability of numerical simulations and availability of experimental data needed for validating individual models and codes.

## Objectives

The overall purpose of this event is to obtain a state-of-the-art knowledge on understanding of containment behaviour during accident conditions in NPPs with water cooled reactors. The event will serve as a forum for Member States to exchange knowledge on technological aspects (e.g. current and new code developments and methodologies, design solutions) as well as safety related aspects, identify gaps for future improvements, and gather information for collaboration on all these aspects.

In addition to the operating fleet of nuclear reactors, safety relevant technological aspects of evolutionary and innovative reactor designs, in particular of small modular reactors (SMRs), will also be discussed, accounting for the growing interest of Member States for the deployment of these reactors.

The event will have the following specific objectives:

- Present and discuss recent advances in technological solutions applied to preserve containment integrity in accident conditions (including severe accidents);
- Discuss achievements and possible future direction for analysis of containment structural response under accident conditions;
- Discuss achievements and possible future directions for development of advanced active and passive systems and associated methodologies;
- Exchange results on experiments addressing containment behaviour and identify gaps in the experimental database;
- Discuss the advances in in-containment instrumentation and measurement techniques for severe accident management and severe accident R&D;

- Exchange information on modelling approaches used for analysis of containment behaviour, including lumped-parameter and CFD codes, their capabilities, benchmarking activities, modelling uncertainties and validation status;
- Discuss and provide recommendations for performing realistic plant simulations;
- Review progress on safety-related topics for both operating and advanced designs and experience by national regulators and technical support organizations in reviewing safety analysis reports.

The event will include discussion sessions to enable participants to contribute to the summary and highlights of the event, and to discuss and provide recommendations to the IAEA for future R&D dedicated to containment behaviour. The list topics to be discussed during the meeting is given in the Appendix.

Contributions to the event in the form of presentations, summaries and session discussions will result in the preparation of an IAEA publication. This publication is intended to represent the reference information for interested organizations, including code developers and code users, licensees, technology developers, national regulators and technical support organizations. It will also provide the public with a harmonized overview of efforts in these areas.

## **Target Audience**

The event is open to representatives of nuclear power organizations from Member States considering, planning or expanding a nuclear power programme, including government organizations (policy makers, analysts, national regulators, technical support organizations and R&D organizations), and industry (vendors, engineering companies, plant operators and technology developers).

## **Working Language(s)**

English

## **Expected Outputs**

The expected outputs of this event are as follows:

- Detailed screening and overview of up-to-date status from Member States on the analysis of containment behaviour during accident conditions in NPPs with water cooled reactors;
- Exchange of information on ongoing activities in code development and validation, and identification of needs for future experimental R&D required to assess the capabilities of the codes dedicated to containment behaviour more accurately;
- Review of practices by licensees, national regulators and technical support organizations;

- Report summarizing the discussions held and the results presented for subsequent development of an IAEA publication.

## 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 **2 September 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 technical 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.

## Papers 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. The abstract will be reviewed as part of the selection process for presentations. The abstract should be in A4 page format, should extend to no more than 1 page (including figures and tables) and should not exceed 1000 words. It should be sent electronically to Mr Alexei Miassoedov and Mr Mikhail Lankin, the Scientific Secretaries of the event (see contact details below), not later than **2 September 2022**. Authors will be notified of the acceptance of their proposed presentations by **9 September 2022**.

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 **2 September 2022**.

# IAEA Contacts

## Scientific Secretaries

### Mr Alexei Miassoedov

Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 22882

Email: [A.Miassoedov@iaea.org](mailto:A.Miassoedov@iaea.org)

### Mr Mikhail Lankin

Division of Nuclear Installation Safety  
Department of Nuclear Safety and Security  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 22685

Email: [M.Lankin@iaea.org](mailto:M.Lankin@iaea.org)

## Administrative Secretary

### Ms Dorothy Kalocsai

Division of Nuclear Power  
Department of Nuclear Energy  
International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 VIENNA  
AUSTRIA

Tel.: +43 1 2600 25795

Fax: +43 1 26007

Email: [D.Kalocsai@iaea.org](mailto:D.Kalocsai@iaea.org)

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.

# Appendix

## List of topics to be discussed in the meeting

1. Containment behaviour in general
  - a) Overview of containment phenomena;
  - b) Containment mechanical strength analyses;
  - c) Strategies for keeping the containment integrity;
  - d) Containment safety design and analyses for large and small WCRs;
  - e) Regulatory and licensing approaches towards containment preservation;
  - f) Lessons learned from the Fukushima accident;
2. Active and passive systems. Specific phenomena.
  - a) Control of containment thermodynamic parameters (pressure, temperature; e.g. containment coolers, venting systems, sprays etc.);
  - b) Control of burnable gases (ignitors, recombiners);
  - c) Suppression containments;
  - d) Basemat failure due to molten corium-concrete interaction;
  - e) In-containment severe accident instrumentation (incl. measurement and visualisation techniques);
  - f) Backfitting of safety systems;
3. Experimental and modelling activities
  - a) Experimental activities on containment behaviour (incl. CFD-grade data);
  - b) Application of lumped-parameter and CFD codes (including sub-grid modelling) to containment behaviour;
  - c) Current practices in modelling specific safety systems;
  - d) Scaling from tests to reactor applications, role of boundary conditions;
  - e) Uncertainty analysis of experimental and analytical results;
4. General discussion
  - a) Complementary ongoing projects;
  - b) Identification of needs for future R&D (experiments, modelling, design applications);
  - c) Discussion of meeting outputs (IAEA publications e.g. status report, CRP, etc.).



# Participation Form

## Technical Meeting on Advanced Technologies and Systems for Containment Preservation in Accident Conditions

### Virtual Event

**11–14 October 2022**

To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretaries [A.Miassoedov@iaea.org](mailto:A.Miassoedov@iaea.org) and [M.Lankin@iaea.org](mailto:M.Lankin@iaea.org), and to the Administrative Secretary [D.Kalocsai@iaea.org](mailto:D.Kalocsai@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 2 September 2022**

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms
Institution:		
Full address:		
Tel. (Fax):		
Email:		
Nationality:	Representing following Member State/non-Member State/entity or invited organization:	
If/as applicable: Do you intend to make a presentation?      Yes <input type="checkbox"/> No <input type="checkbox"/> Would you prefer to present your paper as a poster?      Yes <input type="checkbox"/> No <input type="checkbox"/> Title:		

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. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate.