IAEA

Atoms for Peace and Development

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International Atomic Energy Agency
Agence internationale de l'énergie atomique
Международное агентство по атомной энергии
Organismo Internacional de Energía Atómica

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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 the Safety Approach for Liquid Metal Cooled Fast Reactors and the Analysis and Modelling of Severe Accidents** (hereinafter referred to as "event") to be held at the IAEA's Headquarters in Vienna, Austria, from **13 to 17 March 2023**.

The purpose of the event is to provide a platform for Member States to exchange information on the design of liquid metal cooled fast reactors (LMFRs), with regard to the general approach to design safety and the consideration of severe accidents in the design and safety assessment of sodium cooled and lead cooled innovative reactors, with an emphasis on analysis and modelling of severe accidents. The event will discuss experiences and technological challenges related to the safety approaches used in the design and safety assessment of LMFRs, including consideration of the relevant severe accident phenomena, models and tools used for the design and safety analyses of LMFRs, as well as regulatory and licensing aspects.

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 from reactor design organizations, licensee organizations, research organizations, national regulators and technical support organizations with specialized knowledge of, or experience in, design and safety assessment of LMFRs, analysis and modelling of severe accidents for LMFRs, or any other activity related to LMFR design or regulation, to represent the Government at this event. Member States are strongly encouraged to identify suitable women 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 at the time of designating the participant(s) using the attached Grant Application Form (Form C).

It should be noted that compensation is not payable by the IAEA for any damage to or loss of personal property. The IAEA also does not provide health insurance coverage for participants in IAEA events. Arrangements for private insurance coverage on an individual basis should therefore be made. The IAEA will, however, provide insurance coverage for accidents and illnesses that clearly result from any work performed for the IAEA.

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 **16 December 2022** using the attached Participation Form (Form A). Completed and authorized Participation Forms should be sent either by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed). Copies should be sent by email to the Scientific Secretary of the event, Mr Simone Massara, Division of Nuclear Installation Safety, Department of Nuclear Safety and Security (Email: S.Massara@iaea.org), and to the Administrative Secretary, Ms Leticia Sedlazek (Email: L.Sedlazek@iaea.org). The Scientific Secretary of the event will liaise with the participants directly concerning further arrangements, including travel details, as appropriate, once the official designations have been received.

Should Governments wish, in addition, to appoint one or more observers to assist and advise the designated participants, they are kindly requested to inform the IAEA of the names and contact details of any such observers by the above date. In accordance with the established rules, Governments are expected to bear the cost of attendance of any observers they may send to IAEA events. Compensation is not payable by the IAEA for any damage to or loss of observers' personal property or for illness, injury or death occurring while travelling to or in connection with their attendance at IAEA events.

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.

2022-10-07

Enclosures: Information Sheet

Participation Form (Form A)

Form for Submission of a Paper (Form B)

Grant Application Form (Form C)

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International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on the Safety Approach for Liquid Metal Cooled Fast Reactors and the Analysis and Modelling of Severe Accidents

IAEA Headquarters
Vienna, Austria

13–17 March 2023

Ref. No.: EVT2204904

Information Sheet

Introduction

The International Atomic Energy Agency (IAEA) has published a comprehensive set of Safety Standards which provide the fundamental principles, requirements and guides to underpin the safety of nuclear installations worldwide. More recently, the IAEA has assessed the applicability of the Safety Standards to advanced evolutionary and innovative reactors. This review concluded that, although many of the IAEA Safety Standards are largely applicable to those technologies, it is essential to gather detailed technical information about the safety characteristics of different non-water cooled reactors, such as sodium cooled and lead cooled reactors, which are jointly referred to as Liquid Metal Cooled Fast Reactors (LMFR). This information can support the development of an international repository of knowledge to enhance global understanding of the safety related issues and the safety demonstration of these technologies and to contribute to the future development of the IAEA Safety Standards.

One of the key safety areas for consideration for advanced reactors is the range of accidental sequences leading to severe accidents, the severe accident phenomena and the propagation of the severe accident sequences. Indeed, in recent years, LMFRs have been the object of increasing interest in the framework of design approaches aiming at enhancing the use of their intrinsic safety features, with the objective of developing designs where the likelihood of severe core damage would be strongly reduced, as compared to early designs, with the ultimate objective of practically eliminating severe accident sequences potentially leading to large or early radioactive releases.

The Department of Nuclear Safety and Security and the Department of Nuclear Energy of the IAEA have been working jointly in the area of severe accidents for LMFRs ensuring that matters that affect the design and safety of the reactors are considered comprehensively and holistically, including severe accident analysis methods and modelling tools.

Objectives

The objective of the event is to provide a platform for Member States to exchange information on the design of liquid metal cooled fast reactors, with regard to the general approach to design safety and the consideration of severe accidents in the design and safety assessment of sodium cooled and lead cooled innovative reactors, with an emphasis on analysis and modelling of severe accidents.

The event will discuss experiences and technological challenges related to the safety approaches used in the design and safety assessment of LMFRs, including consideration of the relevant severe accident phenomena, models and tools used for the design and safety analyses of LMFRs, as well as regulatory and licensing aspects.

The IAEA intends to develop a new publication (TECDOC) to compile the outcomes of the meeting and address considerations on the safety of LMFRs. In addition, the meeting will contribute to the ongoing development of a TECDOC on the safety approach for the design of advanced reactors.

Target Audience

The event is targeted at professionals from reactor design organizations, licensee organizations, research organizations, national regulators and technical support organizations with specialized knowledge of, or experience in, design and safety assessment of LMFR, analysis and modelling of severe accidents for LMFR, or any other activity related to LMFR design or regulation.

The event is, in principle, open to all officially designated persons. The IAEA, however, reserves the right to restrict participation due to limitations imposed by the available meeting facilities. It is, therefore, recommended that interested persons take the necessary steps for the official designation as early as possible.

Working Language(s)

The working language of the meeting will be English. No simultaneous interpretation will be provided.

Topics

The scope of this Technical Meeting will encompass design and safety assessment of LMFRs with special emphasis on hypothetical severe accidents, including modelling and analysis of the severe accident progression, numerical code development and validation, and regulatory approaches and licensing.

The event is intended to cover the following topics:

- Scenarios leading to core degradation in LMFRs (such as loss of flow, local instantaneous blockage, reactivity insertion, loss of heat sink, cumulated with the failure of shutdown systems);
- Design and safety assessment of LMFR for prevention and mitigation of severe accidents:
  - Design orientations for the prevention of accidental sequences leading to severe accidents and elements of the supporting safety demonstration;
  - Intrinsic safety features based on the natural behaviour of sodium cooled and lead cooled fast reactors with various nuclear fuel options (e.g. oxide, nitride, metal), primary system types (pool-type, loop-type) and layout;
  - Definition of core damaged plant state used for the demonstration of the effectiveness of mitigation features;
  - Elements of the safety demonstration associated to the consideration of accidental sequences leading to severe accidents (including implementation of defence-in-depth, deterministic safety analysis, probabilistic safety assessment, classification of structures, systems and components, risk-informed performance-based approaches, etc.);
  - Practical elimination of sequences leading to large or early radioactive releases.
- LMFR severe accident phenomena and analysis models:
  - Mechanistic models for core degradation under severe accident conditions;
    - Fuel pin behaviour (fuel-cladding interaction, in-pin fuel movement, reactivity effects);
    - Initiation/primary phase (including two-phase thermal-hydraulics);
    - Event termination or transition/secondary phase (hexcan failure, fuel-coolant interaction, melt propagation and material movement and associated reactivity effects, potential secondary power excursions due to recriticality effects);
    - Expansion phase (expansion of sodium vapor bubble, pressure increase and release of mechanical energy);
    - Material relocation (debris formation, thermochemistry effects, jet impingement)
    - Long-term behaviour (coolability, recriticality).
  - Radioactive material release and transport in-vessel and ex-vessel (including sodium fires);
  - Conservative simplified/parametric models during the core degradation phases;
  - Code development and performance optimization, multi-physics approaches, platform architecture;
  - Experimental programs, code validation, uncertainty analyses.
- Experiences in the regulation and licensing of LMFRs.
- International programs on LMFR design and safety.

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 **16 December 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 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. 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. Further information can be found in the Data Processing Notice concerning IAEA InTouch+ platform.

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 2 pages (including figures and tables) and should not exceed 500 words. It should be sent electronically to the Scientific Secretaries of the event (see contact details below), not later than **16 December 2022**. Authors will be notified of the acceptance of their proposed presentations by **20 January 2023**.

In addition, participants have to submit the abstract together with the **Participation Form (Form A)** and the attached **Form for Submission of a Paper (Form B)** 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 **16 December 2022.**

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 **16 December 2022**.

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.

IAEA Contacts

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary/Secretaries 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:

www.iaea.org/events/EVT2204904

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Participation Form

Technical Meeting on the Safety Approach for Liquid Metal Cooled Fast Reactors and the Analysis and Modelling of Severe Accidents

IAEA Headquarters, Vienna, Austria and virtual participation via Microsoft Teams

13–17 March 2023

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 or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary S.Massara@iaea.org and to the Administrative Secretary L.Sedlazek@iaea.org.

Deadline for receipt by IAEA through official channels: 16 December 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 submit a paper? Yes ☐ No ☐

Would you prefer to present your paper as a poster? Yes ☐ No ☐

Title:

I plan to attend virtually: Yes ☐ No ☐

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.

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Form for Submission of a Paper

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Deadline for receipt by IAEA through official channels: 16 December 2022

Title of the paper:		
If applicable: Abstract ID in IAEA-INDICO:		
Family name(s) and first name(s) of all author(s) (same as in passport(s):	Scientific establishment(s) in which the work has been carried out	City/Country
1.		
2.		
3.		
Family name(s) and first name(s) of author presenting the paper (same as in passport):	Mr/Ms:	
Mailing address:		
Tel. (Fax):		
Email:		

I plan to attend virtually:	Yes ☐ No ☐

I hereby agree to assign to the International Atomic Energy Agency (IAEA):

☐ the copyright; or

☐ the non-exclusive, worldwide, free-of-charge licence (this option is only for those authors whose parent institution does not allow them to transfer the copyright for work carried out in that institution) granting the IAEA world rights for the use of the aforementioned material in this and any future editions of the publication, in all languages, and in all formats available now, or to be developed in the future (digital formats, hard copy etc.).

Please note: If granting the licence mentioned above, please supply any copyright acknowledgement text required.

Furthermore, I herewith declare:

☐ that the material submitted to the IAEA is original, except for such excerpts from copyrighted works as may be included with the permission of the copyright holders thereof, has been written by the stated authors, has not been published before, and is not under consideration for publication by another entity;

☐ that any permissions and rights to publish required for third-party content, including but not limited to figures and tables, have been obtained, that all published material is correctly referenced; and

☐ that the material submitted to the IAEA does not contain any libellous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any person or entity.

Date: **Signature of main author:**

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Grant Application Form

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Deadline for receipt by IAEA through official channels: 16 December 2022

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yy/mm/dd):	Nationality:	
I plan to attend virtually:	Yes ☐ No ☐	

1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended from	to

2. Recent employment record (starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years worked from	to

3. Description of work performed over the last three years:

4. Institute's/Member State's programme in field of event:

Date: **Signature of applicant: _____**

Date: **Name, signature and stamp of Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority _____**