



Atoms for Peace and Development

الوكالة الدولية للطاقة الذرية

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

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In reply please refer to: **EVT2200556**

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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 Safety and Performance Aspects in the Development and Qualification of High Burnup Nuclear Fuels for Water-Cooled Reactors** (hereinafter referred to as "event") to be held at the IAEA Headquarters in Vienna, Austria, from **14 to 18 November 2022**.

The purpose of the event is to provide a platform for Member States to exchange information on safety and performance of high burnup nuclear fuels for Water-Cooled Reactors, considering their development, qualification and licensing.

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 nuclear fuel or reactor design organizations, licensee organizations, national regulators, technical support organizations and research organizations with specialized knowledge of, or experience in, nuclear fuel development, qualification and licensing, or any other activity related to high burnup nuclear fuel safety and performance, 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 **14 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 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.



2022-07-21

Enclosures: Information Sheet

Participation Form (Form A)

Form for Submission of a Paper (Form B)

Grant Application Form (Form C)



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on Safety and Performance Aspects in the Development and Qualification of High Burnup Nuclear Fuels for Water-Cooled Reactors

**IAEA Headquarters
Vienna, Austria**

14-18 November 2022

Ref. No.: EVT2200556

Information Sheet

Introduction

An increasing maturity of nuclear technology and progress in knowledge of nuclear fuel behaviour, through operational experience (OPEX) of commercial nuclear power plants (NPP), supported by experiments and numerical modelling and simulation, have driven efforts by the nuclear industry worldwide towards an increase in the discharge burnup of nuclear fuel in Water-Cooled Reactors (WCR).

The current operating limit slightly varies among licensee organizations, but in many Member States it corresponds to a rod average burnup of 62 gigawatt-day/tons of uranium (GWd/tU) (average fuel sub-assembly of 55 GWd/tU), or other equivalent criteria. Nuclear fuel vendors and NPP operators continue extending the discharge burnup of nuclear fuel assemblies within the operating envelope accepted by national regulators. Nuclear fuel vendors and NPP operators might obtain economic benefits from such high burnup operation via, for example, longer reactor cycle operation, as well as decreases in purchases, transport and handling of fewer fuel assemblies for the core reloading.

Currently, increased rates of fuel discharge burnup (e.g., beyond 62 GWd/tU) are also being pursued by Member States in the framework of the development of advanced technology for nuclear fuel (which include so-called Accident Tolerant Fuels or Advanced Technology Fuels), particularly in association with

advanced fuel and cladding materials, which might require higher fissile enrichment rates (in some cases exceeding 5%) in order to counterbalance increased parasitic neutron absorption in the cladding. Some nuclear fuel vendors and NPP operators are even exploring the possibility of increasing the operating envelope up to 80 GWd/tU, which would imply the need to address considerable technical challenges, such as:

- Improvement of nuclear fuel analytical codes for the accurate prediction of fuel behaviour and performance at higher burnups;
- Update of source term calculations;
- Modifications for higher heat loads in the spent fuel pool;
- Performance of design and safety analyses at higher burnups addressing potentially new phenomena, including Fuel Fragmentation Relocation and Dispersal (FFRD);
- Possible degradation of safety performance in normal operation and in accident conditions, posing considerable challenges for the development and qualification of high burnup nuclear fuels.

Objectives

The objective of the event is to provide a platform for Member States to exchange information on safety and performance of high burnup nuclear fuels for WCR, considering their development, qualification and licensing.

The event will focus on operational experience of, and margins assessment by, licensee organizations, experience of fuel developers in the development and qualification of fuel designs and irradiation of ‘lead test’ or ‘lead use’ fuel rods beyond 62 GWd/tU, experimental testing in research reactors and associated modelling and simulation, validation and application of computer codes and methods for fuel design and safety analysis, and practices by national regulators and technical support organizations in development or adaptation of licensing frameworks for high burnup nuclear fuels.

Target Audience

The event is targeted at professionals from nuclear fuel or reactor design organizations, licensee organizations, national regulators, technical support organizations and research organizations with specialized knowledge of, or experience in, nuclear fuel development, qualification and licensing, or any other activity related to high burnup nuclear fuel safety and performance.

Working Language(s)

English.

Expected Outputs

Participants will share knowledge and experiences in safety and performance-related aspects in the development, qualification and licensing of high burn-up nuclear fuels for WCR.

The material presented during the event, along with the results of the technical discussions, will provide valuable input for the development of a technical document on the same topic and will also aim at identifying opportunities for enhanced international cooperation in the field.

Topics

The scope of this Technical Meeting will encompass design, qualification, licensing, and in-reactor operation of UO₂-Zr-based alloys (including doped-UO₂ and coated cladding), with discharge burnup exceeding 62 GWd/tU (fuel rod average) or 55 GWd/tU (fuel assembly average), or other equivalent criteria.

The event is intended to cover the following topics:

- Licensee organisations' operational experience and margins assessment at high burnup;
- Experience of fuel developers in development and qualification of fuel designs for high burnup, including advanced fuel and cladding designs, irradiation of test fuel rods beyond 62 GWd/tU, pool-site inspections and post-irradiation examinations;
- Experimental testing (in-pile and out-of-pile) and associated multiphysics and multiscale modelling and simulation of fuels at high burnup, with focus on:
 - High burnup phenomena characterization, including micro-structure, rim, FFRD, enhanced fission gas release, source term, etc.;
 - Thermo-physical, thermo-mechanical properties, corrosion, hydrogen pick-up;
 - National and international programs for integral safety testing (loss of coolant accident, reactivity insertion accident).
- Adequacy of safety design criteria at high burnup;
- Validation and application of computer codes and methods for design and safety analysis for high burnup fuels;
- Practices by national regulators and technical support organizations in development or adaptation of licensing frameworks for nuclear fuels to address specific safety features of high burnup nuclear fuels, with focus on regulatory expectations from qualification process, and opportunities for harmonization of national licensing approaches;
- Industry experience in performing economic assessments of expected benefits of increased burnup rates.

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 **14 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 the above deadline.

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

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 Mr Simone Massara, the Scientific Secretary of the event (see contact details below), not later than **14 September 2022**. Authors will be notified of the acceptance of their proposed presentations by **4 October 2022**.

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 **14 September 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 **14 September 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

Scientific Secretary:

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AUSTRIA

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Email: S.Massara@iaea.org

Co-Scientific Secretary:

Mr Ki Seob Sim

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Department of Nuclear Energy
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Email: K.S.Sim@iaea.org

Administrative Secretary:

Ms Leticia Sedlazek

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Tel.: +43 1 2600 22687

Email: L.Sedlazek@iaea.org

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.

Participation Form

Technical Meeting on Safety and Performance Aspects in the Development and Qualification of High Burn-up Nuclear Fuels for Water Cooled Reactors

IAEA Headquarters, Vienna, Austria

14 to 18 November 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 or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary, 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 Sedlazeck, (Email: L.Sedlazeck@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: 14 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 submit a paper?	Yes	No
Would you prefer to present your paper as a poster?	Yes	No
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. Further information can be found in the [Data Processing Notice](#) concerning IAEA InTouch+ platform.

Form for Submission of a Paper

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Deadline for receipt by IAEA through official channels: 14 September 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):

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

Furthermore, I herewith declare:

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- 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:

Grant Application Form

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14 to 18 November 2022

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Deadline for receipt by IAEA through official channels: 14 September 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 <input type="checkbox"/> No <input type="checkbox"/>	

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** _____