



Technical Meeting on Operating Experience and Lessons Learned on Managing Non-Standard Legacy Power and Research Reactor Spent Fuels

**IAEA Headquarters
Vienna, Austria**

18 - 21 February 2025

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Information Sheet

Introduction

There is great interest in the development of Small Modular Reactors (SMRs) due to numerous drivers, including the need of many Member States for affordable, low carbon electricity sources. The IAEA booklet “Advances in Small Modular Reactor Technology Developments” 2024 edition list 68 active reactor designs in varying stages of development. These concepts and designs include a host of new fuel materials, fuel forms and cladding materials, resulting in new spent fuel types for which a back-end solution will need to be developed for their successful management.

While many of the designs are novel, there is a wealth of experience in the management of non-standard and exotic legacy fuels from earlier power development programmes. These are fuels that have been irradiated in research, experimental test and demonstration reactors, or are prototype assemblies used in commercial reactors, that have required bespoke management compared to standard commercial spent fuel inventories.

Experiences of the management of such fuels would be useful knowledge from which to incorporate into development programmes required to underpin the spent fuel management pathways for innovative SMR and advanced reactor fuels. Given that much of this knowledge was generated in the early days of commercial nuclear power through to the 1980s, it is timely to begin its collation before further intrinsic knowledge of the management of such fuels is lost.

The main objective of the event is to prepare an IAEA Technical Document on Operating Experience and Lessons Learned on Managing Non-Standard/Exotic Legacy Power and Research Reactor Spent Fuels, that can be utilized by Member States to support strategic decision making for managing non-standard/exotic spent fuels.

Objectives

The purpose of the event is to share technical information, operational experiences and lessons learned on the management of spent non-standard and exotic fuels from power and research reactors, gathered in an IAEA technical document that can be utilized by Member States to support strategic decision making for managing existing and future non-standard/exotic fuels (e.g. SMRs).

Target Audience

The event is intended for participants from research organizations, nuclear power plants and research reactors, nuclear fuel cycle facilities, waste management organizations, regulatory bodies, universities, and other organizations with expertise in the topic of management of non-standard and exotic spent fuels. Participants should be actively involved in the subject of the event, having considerable experience in the relevant activities and are able to share their insights.

Expected Outputs

The expected outputs from the Technical Meeting are the sharing of information, experience and lessons learned, to explore the opportunity to produce a draft IAEA Technical Document on Operating Experience and Lessons Learned on Managing Non-Standard/Exotic Legacy Power and Research Reactor Spent Fuels and to identify possible areas requiring further resolution.

Topics

Papers and presentations containing information to enable the gathering and development of the following items to be included in the IAEA TECDOC are welcomed:

- To provide an overview of existing non-standard and exotic spent fuels and how their characteristics affect long term management;
- To identify infrastructure needs, gaps and opportunities for the long-term management of these spent fuels;

- To share operational experiences, including challenges and lessons learned from Member States;
- To present how regulatory regimes are currently applied and how they might need to be adapted for the long-term management of non-standard and exotic spent fuels;
- To capture how these experiences and lessons learned can be applied in managing spent fuels for existing inventories and for new reactor designs such as SMRs.

Working Language(s)

English

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 or invited organization, participants are requested to submit their application via the InTouch+ platform (<https://intouchplus.iaea.org>) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **3 January 2025**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (<https://intouchplus.iaea.org>):
 - Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
 - Persons without an existing NUCLEUS account can register [here](#).
2. Once signed in, prospective participants can use the InTouch+ platform to:
 - Complete or update their personal details under ‘Complete Profile’ and upload the relevant supporting documents;
 - Search for the relevant event under the ‘My Eligible Events’ tab;
 - Select the Member State or invited organization they want to represent from the drop-down menu entitled ‘Designating Authority’ (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
 - If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
 - Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
 - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made at the time of the application submission in the InTouch+ platform (<https://intouchplus.iaea.org>) by **3 January 2025**.

For additional information on how to apply for an event, please refer to the [InTouch+ Help](#) page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.

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

In addition to the registration already submitted through the InTouch+ platform, participants have to submit an abstract, together with the Form for Submission of a Paper (Form B), to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA not later than **3 January 2025**.

Additionally, for the selection process, this abstract must be submitted through the [IAEA INDICO page no 399](#) later than **3 January 2025**. Authors will be notified of the acceptance of their proposed work by **10 January 2025**.

The IAEA encourages those participants submitting an abstract to deliver a presentation on the work of their respective institutions that falls under the topics listed in above Topics Section and to submit the corresponding full paper through INDICO platform by **10 February 2025** the latest. The paper should be in A4 page format, should extend to no more than 10 pages (including figures and tables) and should be in the IAEA template available in INDICO platform.

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, together with the submission of the application, by **3 January 2025**.

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:

<https://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.

Additional Information

Table A and Table B below provide a list of standard power reactor fuel types and standard research reactor fuel types, respectively, to identify which type of fuels are outside the scope of the Technical Meeting. Any fuel type not included in Tables A and B should be considered as non-standard, exotic, or legacy fuels and therefore included within the scope of this Technical Meeting (EVT2304628).

Instrumented pins, elements and fuel assemblies are excluded as these have higher fissile enrichments to compensate for the reduced uranium content, and also have features to support the instrumentation.

In addition, a survey is attached to this information sheet to capture the range of non-standard/exotic and legacy power and research reactor spent fuels held in storage pending further processing or disposal.

This information will be reported in the Proceedings of the Technical Meeting on Operating Experience and Lessons Learned on Managing Non-Standard/Exotic Legacy Power and Research Reactor Spent Fuels. The information will be of value to Member States in informing them on the ranges of fuels that have been irradiated and which institution/country is experienced on it.

Table A.- STANDARD POWER REACTOR FUELS OUTSIDE THE SCOPE OF THE TECHNICAL MEETING

LIGHT WATER REACTOR FUELS	Fuel cladding	Stainless steel (legacy)	
		Zirconium alloys	Zry-1 (E110)
			Zry-2
			Zry-4
			E365
			ZIRLO
			M5
			MBA
	Fuel matrix	Uranium dioxide	
		Mixed uranium / plutonium dioxide	
	Fuel matrix additive (burnable poison)	GdO ₂	
		Er ₂ O ₃	
	Fuel enrichment	1.7 – 5.0% ²³⁵ U (UO ₂ fuels)	
		~ 7% total Pu (MOX fuels)	
		REMIX up to 17% ²³⁵ U	
	Fuel burnup	< 80 GWd/tHM (LWR)	
HEAVY WATER REACTOR FUELS	Fuel cladding	Zirconium alloy (Zry-4)	
	Fuel matrix	Uranium dioxide	
	Fuel enrichment	Natural	
	Fuel burnup	< 9 GWd/tHM (LWR)	
GAS REACTOR FUELS	Fuel cladding	Magnesium–aluminium alloy (Magnox)	
		Stainless steel (20:25:Nb, AGR)	
	Fuel matrix	Uranium metal (Magnox)	
		Uranium dioxide (AGR)	
	Fuel enrichment	Natural (Magnox)	
		< 4% ²³⁵ U (AGR)	
	Other	Graphite sleeve (AGR)	
	Fuel burnup	< 9 GWd/tHM (Magnox) and < 40 GWd/tHM (AGR)	

Table B.- STANDARD RESEARCH REACTOR FUELS OUTSIDE THE SCOPE OF THE TECHNICAL MEETING		
TRIGA REACTOR FUELS	Fuel cladding	Stainless steel (304)
		Aluminium (legacy)
	Fuel meat (matrix)	U-ZrH _x
		Uranium dispersed in ZrH _x
	Fuel enrichment	< ~20%
	Other	Central zirconium rod
		Graphite moderator plugs
		Burnable poison discs
PLATE/TUBULAR FUELS	Fuel cladding	Aluminium alloy
	Fuel meat (matrix)	U-Al
		U ₃ -Si
		UAl _x -Al
		U ₃ O ₈ -Al
		UO ₂ -Al
MNSR/SLOWPOKE REACTOR FUELS	Fuel cladding	Aluminium
		Zircaloy-4
	Fuel meat (matrix)	U-Al
		UAl _x -Al
		UO ₂
	Fuel enrichment	< ~20%
		~90%
		~13%
	Other	Tank-in-pool type reactor
		Light water moderated

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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: <https://www.iaea.org/events/EVT2304628>

INDICO Webpage for Paper submission: <https://conferences.iaea.org/event/399/>

Enclosures:

- Form for Submission of a Paper (Form B)
- Survey Sheet of Non-Standard/Exotic Legacy Power and Research Reactor Spent Fuels