A. Background

The International Atomic Energy Agency (IAEA) safety standards require that nuclear facilities and activities in which fissile material is handled be managed in such a way as to ensure criticality safety. The IAEA has published a Specific Safety Guide covering criticality safety in the handling of fissile material, including nuclear fuel and fuel materials, which complements the existing IAEA safety standards that deal with nuclear fuel cycle facilities (NFCFs) and their decommissioning, as well as with the transportation, predisposal management and disposal of wastes containing fissile nuclides.

Most nuclear materials are capable of sustaining a chain reaction outside of a reactor under certain conditions. If a criticality incident occurs, its consequences can be severe, with the potential to cause fatalities due to radiation exposure and/or release of radioactive material to the environment. It is now almost twenty years since the last significant criticality accident and it is timely to review and reinforce learning from that event and subsequent operating experience in this area.

The IAEA Safety Requirements publication covering NFCFs was recently revised. Issued in 2017, the new version, *Safety of Nuclear Fuel Cycle Facilities* (IAEA Safety Standards Series No. SSR-4),
replaces IAEA Safety Standards Series No. NS-R-5 (Rev. 1), on which much IAEA safety guidance on NFCFs was based. SSR-4 establishes requirements related to criticality safety and introduces the new concept of ‘design extension conditions’. Additionally, two new IAEA Specific Safety Guides, covering nuclear fuel reprocessing and nuclear fuel cycle research and development facilities, were also published in 2017. These publications also include guidance on criticality safety in the handling of nuclear material.

In this context, the IAEA, as part of its activities aimed at enhancing the safety of NFCFs, is organizing this **Technical Meeting on Criticality Safety in Nuclear Fuel Cycle Facilities**, to be held from 9 to 13 April 2018 at the IAEA’s Headquarters in Vienna, Austria.

### B. Objective

The meeting is intended to provide the participating Member States with a forum to discuss criticality safety in NFCFs, including the relevant IAEA requirements and guidance, and to share national practices and experience related to criticality safety assessment, regulatory oversight and operating experience.

### C. Participation

Participation in the meeting is subject to designation by governments or national organizations. The meeting is open to participants from all IAEA Member States having or planning NFCFs. Criticality safety specialists from operating organizations and technical support organizations, as well as regulators responsible for criticality safety, may participate in this meeting.

### D. Working Language

The working language of the meeting will be English.

### E. Topics for the Meeting

The meeting will outline the measures recommended by the relevant IAEA safety standards for ensuring sub-criticality when dealing with fissile (and fissionable) material and for planning the response to criticality incidents. It will cover operational states, credible abnormal conditions, conditions included in the design basis, and design extension conditions. Lectures will be given by the IAEA representatives on these topics. In addition, the relevant IAEA safety standards covering criticality will be presented in detail and the experience gained by Member States in their implementation will be discussed with a view to their future revision in the light of operating experience and the publication of the IAEA Safety Series No. SSR-4 in 2017. The participants are expected to present their national practices and experiences related to the topics of the meeting.
The emphasis will be on the practical application of criticality control within NFCFs. The topics to be covered will include:

1. IAEA safety requirements for NFCFs (i.e. SSR-4).
2. IAEA Specific Safety Guides on NFCFs, including *Criticality Safety in the Handling of Fissile Material* (IAEA Safety Standards Series No. SSG-27), and its relationship to other IAEA safety standards, and a possible approach for their revision.
3. Approaches to ensuring criticality safety; criteria, margins and management.
4. Criticality safety assessment, methodologies, verification and validation.
5. Specific practices for NFCFs covered by the scope of the meeting, including:
   - Criticality safety for nuclear fuel management and predisposal radioactive waste management, including storage.
   - Criticality safety for nuclear fuel cycle research and development facilities.
6. Preparedness for, and response to, a criticality accident, criticality detection and alarm systems.
7. National experiences related to the application of criticality controls.

Discussions in working groups will address various aspects of criticality safety in the IAEA safety standards, including criticality safety analyses and criticality prevention and control in different activities and at different stages of the lifetime of a facility. The discussions are expected to identify issues of common concern and the need for development of relevant IAEA standards and training materials.

**F. Visas**

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of the Austrian government as soon as possible.

**G. Application Procedure**

Designations should be submitted using the attached Participation Form (Form A). Completed forms should be endorsed by the competent national authority (Ministry of Foreign Affairs or National Atomic Energy Authority) and returned through the established official channels. They must be received by the IAEA not later than **2 February 2018**. Designations received after that date or applications sent directly by individuals or by private institutions cannot be considered. Designating governments will be informed in due course of the names of the selected candidates and at that time full details will be given on the procedures to be followed with regard to administrative and financial matters.
H. Organization

The IAEA Scientific Secretaries for the meeting are Mr Ramon Gater and Ms Marina Nepeypivo of the Research Reactor Safety Section, Division of Nuclear Installation Safety.

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the meeting to the Administrative Secretary.
# Participation Form

**Technical Meeting on Criticality Safety in Nuclear Fuel Cycle Facilities**

**IAEA Headquarters, Vienna, Austria**

9–13 April 2018

To be completed by the participant and sent to the competent official 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), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed).

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 February 2018**

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Do you intend to give a presentation?  
Yes [ ]  No [ ]

Title: