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IAEA
International Atomic Energy Agency
Atoms for Peace and Development

International Conference on Resilience of Nuclear Installations against External Events from a Safety Perspective – Focus on Climate Change

IAEA Headquarters
Vienna, Austria

20–24 October 2025

Organized by the
International Atomic Energy Agency (IAEA)

In cooperation with the
World Meteorological Organization (WMO)

Announcement and Call for Papers

A. Background

The International Atomic Energy Agency (IAEA) was established in 1957 with an overall objective to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the

world."[1] Article A. 6 of the statute authorizes the Agency to "establish or adopt…standards of safety for protection of health and minimization of danger to life and property." Article A.3 of the statute authorizes the Agency to "foster the exchange of scientific and technical information on peaceful uses of atomic energy." This conference serves as a forum for the exchange of scientific and technical information on the resilience of nuclear installations against external events. A special focus of this conference is the impact of climate change on the safety and resilience of nuclear installations.

The Agency has published multiple safety standards such as SSG-18, **Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations**, SSG-9, **Seismic Hazards in Site Evaluation for Nuclear Installations** and SSG-68, **Design of Nuclear Installations Against External Events Excluding Earthquakes.** These standards provide requirements and guidance toward achieving safety for nuclear installations that are subjected to external events. These events include natural hazards such as earthquakes, floods, tornadoes, hurricanes, and volcanic events. External events can also result from accidents at nearby facilities such as explosions, or human-induced hazards such as accidental aircraft impact.

Resilience may be defined as "*the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events."* In the context of external hazards, the resilience of nuclear installations is their ability to prepare and plan for, absorb, recover from, and more successfully adapt to these hazards. With regard to safety, resilience can be considered to be a measure of the plant's ability to recover to a safe state after an incident. Resilience also encompasses the development of flexible solutions that can support the response to emerging, changing, or unknown threats, as well as planning, response, and recovery strategies.

Nuclear installations have typically been designed to withstand external events by using a safety margin approach. Postulated events are defined based on historical data, expert judgment, and/or conservatively defined scenarios. Typically, the historical data used in these evaluations do not explicitly account for the effects of climate change and other non-stationarities. To strengthen the resilience of nuclear installations against external hazards, the industry must also account for factors such as the evolving nature of hazards (including the emergence of new natural and human-induced hazards), degradation of systems over time, adoption of new technologies, and changes in the size and characteristics of the population living in the vicinity of an installation. The nuclear industry should examine the impact of climate change on both planned and existing nuclear installations.

[1] International Atomic Energy Agency, **Statute of the International Atomic Energy Agency**, Part 1, Section 1, Issued 2000-01-01.

B. Purpose and Objectives

The purpose of this conference is to bring together nuclear industry representatives to share recent developments and lessons learned regarding the safety of nuclear installations with respect to external events, and to discuss methods to improve their resilience to external events. A special focus is the impact of climate change on the safety and resilience of nuclear installations. Many plants have been designed for loads resulting from natural phenomena, such as floods and high winds, based on analysis and interpretation of historical data. It is well known that climate change is affecting the severity, frequency, and other characteristics of many of these phenomena. Furthermore, changes in geological conditions (e.g., fluid injection to the Earth's crust), land use, aircraft flight patterns, and addition of new industrial facilities lead to non-stationarity of external hazards. It is envisaged that nuclear installation owners/operators, technical service organizations, regulators, designers, research institutes and vendors (nuclear steam supply system suppliers) will attend the conference. Gathering experts from various segments of the nuclear sector for discussion and collaboration is one way the Agency promotes the exchange of scientific and technical information. This information can be used by all Member States in designing, licensing, operating, and decommissioning their nuclear installations.

The objective of the conference is to share experiences and discuss current and novel methods to evaluate the resilience and robustness of nuclear installations and radioactive waste disposal facilities against external events, particularly in the context of the changing climate. This will include existing facilities, as well as those under design, licensing, and construction. In this context *nuclear facility* is defined as any facility in which nuclear material is produced, processed, used, handled, stored or disposed of, if damage or interference with such facility could lead to the release of significant amounts of radiation or radioactive material. In general, nuclear installations and radioactive waste storage facilities are in separate categories. Nuclear installations are subject to authorization that is part of the nuclear fuel cycle, except facilities for the mining or processing of uranium ores or thorium ores and disposal facilities for radioactive waste. This definition includes: nuclear power plants; research reactors and any adjoining radioisotope production facilities; storage facilities for spent fuel; facilities for the enrichment of uranium; nuclear fuel fabrication facilities; conversion facilities; facilities for the reprocessing of spent fuel; facilities for the predisposal management of radioactive waste arising from nuclear fuel cycle facilities; and nuclear fuel cycle related research and development facilities. Radioactive waste storage facilities are meant for permanent storage and retrieval of radioactive waste.

C. Themes and Topics

The conference will be arranged into themes and topics. The Programme Committee will assemble sessions on specific topics based on the synopses received. The Committee developed the following major themes and subtopics, and encourages submittals aligned with these.

1. Identification and analysis of external hazards, consideration of uncertainties in hazard analyses, and events resulting from combined hazards

    1.1. Site selection and site evaluation: risk-informed approaches, management of site investigations, and integration with non-safety criteria
    1.2. Hazard analysis methods: scenario definition and time-dependent aspects
    1.3. Climate change modelling: projection in time and identification of extreme and rare meteorological phenomena
    1.4. Treatment of hazard combinations in safety assessments
    1.5. Decision making with high uncertainties.

2. Impact of external hazards on nuclear installations and radioactive waste disposal facilities

    2.1. Lessons learned from recent events: climate-related, seismic, and human induced, including data analysis and processing tools
    2.2. Simulations of climate-related natural hazards (e.g., floods, hurricanes) and their impact on nuclear installations
    2.3. Impacts on installation safety and operations from rising sea level, heat sink temperatures, water availability, abundance of biologic agents, extreme weather, etc
    2.4. Lessons learned from considering climate change in the demonstration of safety of radioactive waste disposal facilities.

3. Safety features of innovative emergent reactor designs and their contribution to resilience

    3.1. Adapting nuclear installations to changing environmental conditions
    3.2. Safety assessment methods including risk indicators, robustness, resilience, safety targets, and defence-in-depth considerations
    3.3. Resilience of the energy infrastructure, component and structure fragilities, human factors, deterministic and probabilistic approaches (including vital area identification methods)
    3.4. Monitoring systems and techniques, including warning systems based on real-time data collection and short-term forecasts to aid operator actions
    3.5. Use of artificial intelligence to assist operator decision making and contingency plans
    3.6. Evaluation of safety of deeply embedded advanced reactors and associated construction and cost issues.

4. Post-event response

    4.1. Potential modifications to emergency planning zones, facility and operator response, equipment additions to enhance resilience
    4.2. Post-event recovery plans and public communication strategies
    4.3. International collaboration in emergency preparedness and disaster response
    4.4. Post-event recovery actions: walkdowns and informed-operation restart.

5. Risk-informed, performance-based approaches for safety assessments of nuclear installations against external events

    5.1. Evaluation of resilience strategies: applying risk management tools to enhance nuclear safety
    5.2. Evaluation of seismic base isolators from a safety perspective
    5.3. Evaluation of new technologies, such as steel concrete plate construction, and their impact on nuclear installation safety assessments.

6. Regulatory matters related to enhancing nuclear installation resilience

    6.1. Regulatory practices regarding external hazards affected by climate change
    6.2. International obligations under the Convention on Nuclear Safety and resilience under the Vienna Declaration on Nuclear Safety to address topics related to climate change.

D. Structure

This conference will have both plenary sessions for topics of broad interest, and parallel tracks organised along the major themes. After welcoming remarks from the conference president and the IAEA, the opening plenary session will feature several invited speakers to present their views on nuclear installation resilience. Additional plenary lectures will be scheduled later in the week.

Based on the expected number of participants and the 5-day duration, no more than two breakout sessions will run simultaneously. Technical sessions will be organized to maximize the topical distinctions among parallel sessions, so participants will be unlikely to find papers of highest interest to them scheduled simultaneously. Depending on the number of synopses received, one or more poster sessions may be scheduled during the conference.

Break time between sessions will be scheduled to allow for participant networking.

The closing plenary session will have the conference president discuss highlights and key points raised during the conference, as well as suggestions for future work toward improving nuclear installation resilience. IAEA staff will also provide closing remarks.

E. Expected Outcomes

This conference will enhance knowledge among Member State representatives; nuclear installation designers, operators and regulators; technical service organisations; and individual experts on the state of practice in nuclear installation resilience. This includes knowledge of:

- Probabilistic techniques for characterizing natural hazards, especially considering hazard evolution from climate change
- The latest concepts for enhancing the resilience of nuclear installations and components to respond to external hazards
- Methods for forecasting, monitoring, and adapting to evolving natural and human-induced external hazards
- Related emergency preparedness and response mechanisms designed to enhance resilience of nuclear installations
- Best practices in managing risk related to external hazards and nuclear installations.

The output from the conference will be a compilation of the presentation synopses submitted by authors prior to the conference. The synopses will be more extensive than abstracts, but shorter than research papers. After the conference, a summary will be published containing highlights and any recommended future actions to improve nuclear installation resilience.

More broadly, the conference will help to improve the global nuclear safety posture and international cooperation toward external event impacts and highlight the potential for improved resilience of advanced reactor technology. Researchers and practitioners will also learn where the most fruitful future improvements in nuclear installation resilience can be made.

The conference will provide a forum for enhanced networking opportunities among safety analysts, regulators, researchers, and others engaged in the safety of nuclear installations.

F. Target Audience

This conference is directed at a broad range of experts in the area of nuclear safety and natural hazard analysis and mitigation:

- Nuclear installation operators
- Technical and scientific service organizations (structural engineers, hazard analysts, etc.) to both regulatory bodies and industry
- Natural hazard researchers
- Nuclear installation regulators
- Nuclear steam supply system vendors
- Civil protection authorities and disaster managers

G. Call for Papers

Contributions on the topics listed in Section C are welcome as oral or poster presentations. All submissions, apart from invited papers, must present original work, which has not been published elsewhere.

G.1. Submission of Synopses

Synopses (approximately 500 to 600 words on one or a maximum of two printed A4 pages, may contain any charts, graphs, figures and references) should give enough information on the content of the proposed paper to enable the Programme Committee to evaluate it. Anyone wishing to present at the conference must submit a synopsis in electronic format using the conference's file submission system (IAEA-INDICO), which is accessible from the conference web page (see Section Q). The synopsis can be submitted through this system from **25 November 2024** until **31 May 2025**. Specifications for the layout will be available on IAEA-INDICO. The system for electronic submission of synopsis, IAEA-INDICO, is the sole mechanism for submission of contributed synopsis. Authors are encouraged to submit synopsis as early as possible. The IAEA will not accept submissions via email.

In addition, authors must register online using the InTouch+ platform (see Section H). The online registration together with the auto-generated Participation Form (Form A) and Form for Submission of a Paper (Form B) must reach the IAEA no later than **31 May 2025**.

IMPORTANT: The Programme Committee will consider uploaded synopses only if these two forms have been received by the IAEA through the established official channels (see Section H).

G.2. Acceptance of Synopses

The Secretariat reserves the right to exclude synopses that do not comply with its technical or scientific quality standards and that do not apply to one of the topics listed in Section C.

Authors will be informed by **30 June 2025** as to whether their submission has been accepted, either orally or as a poster, for presentation at the conference. Accepted synopses will also be reproduced in an unedited electronic compilation of Synopses which will be made available to all registered participants of the conference.

G.3 Proceedings

Following the conference, the IAEA will publish a summary report. The proceedings will be made available to read online.

H. Participation and Registration

All persons wishing to participate in the event must be designated by an IAEA Member State or should be a member of an organization that has been invited to attend.

Registration through the InTouch+ platform:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):

- Persons with an existing NUCLEUS account can **sign in here** 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 'Basic Profile' (if no financial support is requested) or under 'Complete Profile' (if financial support is requested) and upload the relevant supporting documents;
- Search for the relevant event (**EVT2306600**) 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 Conference.Contact-Point@iaea.org);
- If applicable, indicate whether a paper is being submitted and complete the relevant information;
- 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 Participation Form (Form A), Form for Submission of a Paper (Form B) and/or 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 form(s) will automatically be sent to the IAEA through the online platform.

NOTE: Should prospective participants wish to submit a paper or request financial support, the application needs to be submitted by the specified deadlines (see section O).

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.

If it is not possible to submit the application through the InTouch+ platform, prospective participants are requested to contact the IAEA's Conference Services Section via email: Conference.Contact-Point@iaea.org.

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

I. 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 conference. The IAEA has, however, limited funds at its disposal to help cover 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 conference.

If participants wish to apply for a grant, they should submit applications to the IAEA using the InTouch+ platform through their competent national authority (see Section H). Participants should ensure that applications for grants are:

1. Submitted by **31 May 2025**;
2. Accompanied by Grant Application Form (Form C); and
3. Accompanied by Participation Form (Form A).

Applications that do not comply with the above conditions cannot be considered.

Approved grants will be issued in the form of a lump sum payment that usually covers **only part of the cost of attendance**.

J. Distribution of Documents

A preliminary and final programme will be made available on the conference web page (see Section Q) prior to the start of the conference. The electronic compilation of synopses will be accessible free of charge to participants registered for the conference.

K. Exhibitions

A limited amount of space will be available for commercial vendors' displays/exhibits during the conference. Interested parties should contact the Scientific Secretariat by email RNI2025@iaea.org by **31 May 2025**.

L. Working Language

The working language of the conference will be English. All communications must be sent to the IAEA in English.

M. Venue and Accommodation

The conference will be held at the Vienna International Centre (VIC), where the IAEA's Headquarters are located. 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.

Participants must make their own travel and accommodation arrangements. Hotels offering a reduced rate for participants are listed on https://www.iaea.org/events. Please note that the IAEA is not in a position to assist participants with hotel bookings, nor can the IAEA assume responsibility for paying fees for cancellations, re-bookings and no-shows.

N. Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as early as three months but not later than 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.

For more information, please see the Austria Visa Information document available on https://www.iaea.org/events.

O. Key Deadlines and Dates

Submission of synopses through IAEA-INDICO	**31 May 2025**
Submission of Form B (together with Form A) through the InTouch+ platform	**31 May 2025**
Submission of Form C (together with Form A) through the InTouch+ platform	**31 May 2025**
Notification of acceptance of synopses for oral or poster presentation	**30 June 2025**
Submission of Form A only (no paper submission, no grant request) through the InTouch+ platform	**No deadline**

P. Conference Secretariat

General Postal Address and Contact Details of the IAEA:

International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA
Tel.: +43 1 2600
Fax: +43 1 2600 2007
Email: Official.Mail@iaea.org

Scientific Secretaries of the Conference:

Mr Michael Salmon
Division of Nuclear Installation Safety
Department of Nuclear Safety and Security
Tel.: +43 1 2600 22064
Fax: +43 1 26007
Email: RNI2025@iaea.org

Mr Stephen McDuffie
Division of Nuclear Installation Safety
Department of Nuclear Safety and Security
Tel.: +43 1 2600 24412
Fax: +43 1 26007
Email: RNI2025@iaea.org

Administration and Organization:

Ms Julie Zellinger
Conference Services Section
Division of Conference and Document Services
Department of Management
IAEA-CN-337; EVT2306600
Tel.: +43 1 2600 21321
Email: Conference.Contact-Point@iaea.org

Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on administrative matters to the IAEA's Conference Services Section.

Q. Conference Web Page

Please visit the IAEA conference web page regularly for new information regarding this conference.