



Interregional Training Course on Cost-effective Solutions in the Radioactive Waste Management for Near-Term Deployable SMRs and Decommissioning by Design

Hosted by

The Government of the Russian Federation

through the

State Atomic Energy Corporation ‘Rosatom’

St. Petersburg, Russian Federation

02 to 06 September 2024

Ref. No.: TN-INT2023-2400887

Information Sheet

Purpose

The purpose of the event is to train participants from Member States who is currently developing or embarking the establishment of Small Modular Reactors (SMRs) regarding cost-effective solutions for the management of radioactive waste arising from these future SMRs.

Working Language

The training course will be conducted in English.

Deadline for Nominations

Nominations received after 3 July 2024 will not be considered.

Project Background

The International Atomic Energy Agency (IAEA) promotes the safe and peaceful uses of nuclear energy including the management of radioactive waste according to nationally and internationally agreed principles and standards with safe disposal as endpoint for all waste types.

The need to increase access to affordable electricity resulted in an increasing interest in small modular reactors that produce electricity of up to 300 MW(e) per module, resulting in more than 80 concepts under development. SMR concepts vary from evolutionary variants of Light Water Reactors (LWR-SMRs, either land or marine based), that benefit from many decades of operating experience of the current fleet of LWRs; High Temperature Gas Cooled Reactors (HTGR-SMRs); Liquid Metal Fast Reactors (LMFR-SMRs) and molten salt reactors (MSR-SMRs). SMR designs use a variety of coolants (e.g., water, liquid metal, molten salts) and fuel forms (e.g., oxide/ceramic, metal, TRISO, liquid fuel salts).

Small modular reactor (SMR) concepts are designed to ensure minimal waste arisings during operation and decommissioning and the establishment of waste management processes is critical to ensure that radioactive waste could be managed safely and cost-effectively. Small modular reactor (SMR) designs rely on new nuclear fuel types resulting in waste management challenges due to differences in enrichment, matrices, compositions and burnup.

The IAEA recognizes the increasing interest in small modular reactors that could produce electricity of up to 300 MW per module to facilitate the increase access to affordable electricity and as such the IAEA has initiated platforms to share knowledge and to strengthen the capacity building in waste management of SMRs. The purpose of this training course is enabling stakeholders to gain enhanced understanding on the key characteristics of SMRs technology and the associated radioactive waste arisings in order to formulate a cost-effective waste management plan

Scope and Nature

The five-day training course will include lectures, structured discussions and underpinned by exercises designed to practice and reinforce the cost-effective solutions in the radioactive waste management applicable to SMRs.

Examples of contents that are being planned (depending on availability of experts):

- Day 1: General Lectures;
- Day 2: Lectures on cost effective waste management of operational waste;
- Day 3: Lectures on cost effective waste management of decommissioning waste;
- Day 4: Lectures on cost effective waste management of fuel manufacturing;
- Day 5: Final comments and closing.

By the end of this Training Course, the participants are expected to be familiar with the following aspects radioactive waste management applicable to SMRs:

- IAEA fundamental safety principles, RW management objectives;
- IAEA approach to development of Policies and Strategies for RW management;
- IAEA Agency-wide Platform on SMRs and Their Applications;
- SMRs Technology and its fuel cycle;

- Waste management options for different SMRs;
- Development of the waste inventory, waste acceptance criteria and waste management plan for waste from SMRs;
- Cost implications for RW management from SMRs;
- Potential international and regional cooperation in RW management .

In addition, the training course will provide opportunities for participants to network and continue sharing information and good practices as well as other potential follow-up tasks and coordinated activities, as appropriate.

References:

INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Standards Series No. GSR Part 5, Rev. 1, “Predisposal Management of Radioactive Waste” IAEA, Vienna (2009).

INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Technology Review 2021 - Report by the Director General, IAEA, Vienna (2021).

INTERNATIONAL ATOMIC ENERGY AGENCY, Advances in Small Modular Reactor Technology Developments — A Supplement to: IAEA Advanced Reactors Information System (ARIS) - 2022 Edition, IAEA, Vienna (2022).

INTERNATIONAL ATOMIC ENERGY AGENCY, Safety Report on Applicability of Safety Standards to Non-Water-Cooled Reactors and Small Modular Reactors, Safety Reports Series No-123, IAEA, Vienna (2022).

INTERNATIONAL ATOMIC ENERGY AGENCY, Technology Roadmap for Small Modular Reactor Deployment, Nuclear Energy Series No. NR-T-1.18, IAEA, Vienna (2021).

INTERNATIONAL ATOMIC ENERGY AGENCY, Small modular reactor: A new nuclear energy paradigm, booklet, IAEA, Vienna (2022).

INTERNATIONAL ATOMIC ENERGY AGENCY, Applicability of Design Safety Requirements to Small Modular Reactor Technologies Intended for Near Term Deployment, TECDOC-1936, IAEA, Vienna (2020).

INTERNATIONAL ATOMIC ENERGY AGENCY, Deployment Indicators for Small Modular Reactors, IAEA-TECDOC-1854, IAEA, Vienna (2018).

Expected outputs

The expected output of the Training Course is to strengthen capacity in the following areas:

- Fundamental safety principles that apply to RW management;
- Main key considerations when developing a waste management plan for SMRs;
- Different cost-effective technical options for waste management from SMRs.

Participation

The event is open to up to 20 participants from the following Member States participating in the TC Project INT/2/023:

Algeria, Argentina, Armenia, Belarus, Bolivia, Brazil, Bulgaria, China, Croatia, Czech Republic, Egypt, El Salvador, Estonia, Ethiopia, Georgia, Ghana, Greece, Guatemala, Hungary, Indonesia, Iran, (Islamic Republic of), Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Libya, Lithuania, Madagascar, Malaysia, Mexico, Morocco, Myanmar, Namibia, Nigeria, Pakistan, Peru, Philippines, Poland, Qatar, Romania, Rwanda, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Thailand, Tunisia, Türkiye, Ukraine, United Republic of Tanzania, Uzbekistan, Zambia. The selected participants to attend will be funded through INT2023.

Australia, Belgium, Canada, Denmark, Finland, France, India, Italy, Japan, Republic of Korea, Russian Federation, Spain, United Kingdom, United States of America. The participants to attend will be cost free to IAEA.

The selected participants can attend this course virtually in a case if is unable to attend in face to face due to travel restriction and or other reason.

Participants' Qualification and Experience

The target audience of this Training Course are those individuals working in Member States' governments/nuclear energy programme implementing organizations (NEPIOs) or prospective owner/operator organizations, particularly those needing to understand the key issues and challenges associated with waste management of SMRs.

The activities will be conducted in English and candidates should have sufficient English proficiency to participate in the training course without difficulty.

Candidates are requested to provide a summary of how this training will provide direct benefit to their current or future job position.

Accepted participants should visit the IAEA e-Learning modules on RW management to be familiar with the subjects on nuclear fuel cycle options, factors that influence the decision of waste management option in a country, radioactive waste storage, radioactive waste disposal and safety case development:

- [Course: Course on Safety Case Development \(iaea.org\)](https://www.iaea.org/TrainingCourses/Details/1800)
- [Course: Course on Disposal of Radioactive Waste \(iaea.org\)](https://www.iaea.org/TrainingCourses/Details/1801)
- [E-books on Treatment, conditioning and storage of radioactive waste \(electronic available in Aug 2024\)](#)

Application Procedure

Candidates wishing to apply for this event should follow the steps below:

1. Access the InTouch+ home page (<https://intouchplus.iaea.org>) using the candidate's existing Nucleus username and password. If the candidate is not a registered Nucleus user, she/he must create a Nucleus account (<https://websso.iaea.org/IM/UserRegistrationPage.aspx>) before proceeding with the event application process below.
2. On the InTouch + platform, the candidate must:
 - a. Finalize or update her/his personal details, provide sufficient information to establish the required qualifications regarding education, language skills and work experience ('Profile' tab) and upload relevant supporting documents;
 - b. Search for the relevant technical cooperation event (EVT2400887) under the 'My Eligible Events' tab, answer the mandatory questions and lastly submit the application to the required authority.

NOTE: Completed applications need to be approved by the relevant national authority, i.e. the National Liaison Office, and submitted to the IAEA through the established official channels by the provided designation deadline. **All nominations must include a scan of the candidate's first page of passport with photo.**

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

Should online application submission not be possible, candidates may download the nomination form for the training course from the [IAEA website](#).

Administrative and Financial Arrangements

Nominating authorities will be informed in due course of the names of the candidates who have been selected and will at that time be informed of the procedure to be followed with regard to administrative and financial matters.

Selected participants who indicate their need, will receive financial support to contribute to the expenses of their costs for internet connection for the duration of the event in line with IAEA rules and procedures.

Disclaimer of Liability

The organizers of the event do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the course, and it is clearly understood that each Government, in approving his/her participation, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

Note for female participants

Any woman engaged by the IAEA for work or training should notify the IAEA on becoming aware that she is pregnant.

The Board of Governors of the IAEA approved new International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources. The Standards deal specifically with the occupational exposure conditions of female workers by requiring, inter alia, that a female worker should, on becoming aware that she is pregnant, notify her employer in order that her working conditions may be modified, if necessary. This notification shall not be considered a reason to exclude her from work; however, her working conditions, with respect to occupational exposure shall be adapted with a view to ensuring that her embryo or foetus be afforded the same broad level of protection as required for members of the public.

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