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International Atomic Energy Agency
Background Guide 2025

Written by Luke Glaspool and Lillian Newton

NATIONAL MODEL UNITED NATIONS

Dear Delegates,

Welcome to the 2025 National Model United Nations Washington DC Conference (NMUN•DC)! We are pleased to introduce you to our committee, the International Atomic Energy Agency. Your committee's work is facilitated by volunteer staff. This year's committee staff are Director Luke Glasspool and Assistant Director Lillian Newton. Luke is currently studying an MSc in Global Development and has read an MA in Legal and Political Theory, as well as a BA in History, Politics and International Relations. Lillian graduated in May 2025 with an MA in Security Studies and previously earned her BS in National Security. The preparation of these materials was supported by Under-Secretary-General Kenny Nguyen, and Secretary-General, Alliyah Edwards.

The topics on the agenda for this committee are:

1. Managing Radioactive Waste and Its Disposal
2. Enhancing Effective National and Global Response Arrangements and Capabilities to Minimize the Impacts from Nuclear Radiological Incidents and Emergencies

The International Atomic Energy Agency is an independent intergovernmental organization working closely with the United Nations to foster the peaceful use of nuclear material. Through the advancement of atomic technology and spreading sustainable usage knowledge, while preventing its use for weapons development. The body's mandate includes providing technical assistance, establishing safety standards, conducting inspections, and sanctioning non-compliant Member States by restricting assistance.

This Background Guide serves as an introduction to the topics for this committee. However, it is not intended to replace individual research. We encourage you to explore your Member State's policies in depth and use the bibliography to further your knowledge on these topics. In preparation for the conference, each delegation should submit their Position Papers by 11:59 p.m. (DC Time) on 15 October in accordance with the guidelines in the Position Paper Guide and DC Position Papers page.

Two resources, available to download from the NMUN website, serve as essential instruments in preparing for the Conference and as a reference during committee sessions:

- The NMUN Delegate Preparation Guide, which explains each step in the delegate process, from pre-conference research to the committee debate and resolution drafting processes. Please take note of the information on plagiarism and the prohibition on pre-written working papers and resolutions.
- The NMUN Rules of Procedure, which includes the long and short form of the rules, as well as an explanatory narrative and example script of the flow of procedure.

In addition, please review the mandatory NMUN Conduct Expectations on the NMUN website. They include the conference dress code and other expectations of all attendees. We want to emphasize that any instances of sexual harassment or discrimination based on race, gender, sexual orientation, national origin, religion, age, or disability will not be tolerated. If you have any questions concerning your preparation for this committee, please contact Under-Secretary-General, Kenny Van Nguyen at usgkenny.dc@nmun.org or the Secretary-General, Alliyah Edwards at secgen.dc@nmun.org.

We wish you all the best in your preparations and look forward to seeing you at the Conference!

Luke Glasspool, Director
Lillian Newton, Assistant Director

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Committee Overview

Introduction

The International Atomic Energy Agency (IAEA) is an independent intergovernmental organization that works closely with the United Nations and was founded "in response to the deep fears and expectations resulting from the discovery of nuclear energy."[1] The primary aim of the IAEA is to guarantee the peaceful use of nuclear material.[2] The agency has a dual purpose: to advance nuclear technology and spread knowledge on effective and sustainable usage of nuclear energy while simultaneously preventing the usage of nuclear material for atomic weapons and non-peaceful purposes.[3]

The work of the IAEA has been crucial in the development of nuclear security standards that allow the peaceful use of nuclear technologies and guarantee the protection of human health and the environment.[4] The IAEA's principal focus is in addressing current security challenges and ensuring the continuous political will of its members, but it also works to supports efforts to achieve the Sustainable Development Goals (SDGs), including through its subsidiary programs, such as the Peaceful Uses Initiative (PUI) and the Zoonotic Disease Integrated Action (ZODIAC).[5] The PUI that was launched in 2010 and aims to finance unfunded projects in the area of peaceful usage of nuclear technologies, and provide additional financial support to projects that foster technical cooperation.[6]

Mandate, Function, and Powers

According to article 2 of the *IAEA Statute* (1956), the IAEA aims to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world" and thus, the primary role of the IAEA is to ensure that atomic energy is used for safe, secure, and peaceful purposes.[7] The mandate is further defined by the provisions of the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) (1968), which established binding international law on the non-proliferation of nuclear weapons, the disarmament of existing nuclear weapons systems, and the advancement of peaceful nuclear technology, thereby defining the tasks and responsibilities of the IAEA.[8]

While the following list is not exhaustive, the mandate of the IAEA can be summarized as:

- The IAEA **will generally**: assist with and surveil the peaceful use of atomic energy through the provision of research and technical assistance; make provisions about the standards for materials, services, equipment, and facilities to conduct research and produce nuclear power; encourage and assist in the exchange of information, training, and scientists, acquiring the

[1] Fischer. *History of the International Atomic Energy Agency: The first Forty Years*. 1997. pp. 1-3; New Zealand Ministry of Foreign Affairs and Trade. *United Nations Handbook 2023-24*. 2023. pp. 378-384.
[2] International Atomic Energy Agency. *IAEA Statute*. 1989.
[3] Llukmani. *International Atomic Energy Agency. General Conference: Day 5 Highlights*. 2021; International Atomic Energy Agency. *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*. 2015.
[4] International Atomic Energy Agency. *The IAEA Mission Statement*. 2023.
[5] Kamishima. IAEA Bulletin. *Ten years of the IAEA Peaceful Uses Initiative*. 2020.
[6] Ibid.
[7] International Atomic Energy Agency. *IAEA Statute*. 1989.
[8] United Nations, General Assembly. *Treaty on the Non-Proliferation of Nuclear Weapons (A/RES/2373 (XXII))*. 1968.

facilities, plants, and equipment necessary to conduct its tasks and responsibilities; examine facilities and equipment, including sending inspectors to Member State facilities and to request progress reports from those states; request information on health and safety standards, and the production and recovery of fissionable materials; take steps to sanction states that are non-compliant IAEA provisions, including suspending or terminating IAEA assistance or withdrawing material and equipment provided by the agency.[9]

- The IAEA **will not generally**: certify a Member State's compliance with safeguards or try to predict a Member State's future intentions regarding its nuclear program; take enforcement action with regards to safeguard inspections; make decisions about actions to be taken against the Member States not complying with safeguards.[10]

Additional functions of the IAEA are set out in article 3 of the NPT, which obliges States Parties to accept safeguard provisions agreed upon between the Member State and the IAEA in accordance with the provisions outlined in the *IAEA Statute* and the NPT.[11] The IAEA is responsible for supervising and ensuring compliance with the established safeguard provisions, including the prevention of the misuse of nuclear material for non-peaceful usage, such as nuclear weapons or other explosive nuclear devices, and the supervision of the production, possession, and usage of fissionable material.[12] Finally, the *IAEA Statute* established the IAEA's reporting requirements to United Nations bodies, including annual reports to the General Assembly, reports to the Security Council if needed, and reports to other organs on matters relating to their area of work.[13]

Governance, Structure, and Membership

The General Conference, attended by all IAEA Member States, is the highest policy body of the IAEA and meets annually.[14] The General Conference discusses and makes decisions on matters within the scope set in the *IAEA Statute*, including the election of the Board of Governors, the approval of applications for membership, the appointment of the Director-General, and deciding on changes to be made to the *IAEA Statute*.[15] Additionally, the General Conference considers the annual report of the IAEA, votes on the budget suggested by the Board of Governors, adopts reports submitted to the United Nations, approves agreements made between the IAEA and the United Nations or other organizations, and has the power to suspend Member States.[16]

The Board of Governors, which consists of 35 representatives of IAEA Member States elected by the General Conference, meets five times each year, makes recommendations to the General Conference concerning the IAEA's accounts, actions, and budget, and considers applications for IAEA membership.[17] The board also prepares the IAEA's annual report on the activities and actions of the agency, which is

[9] International Atomic Energy Agency. *IAEA Statute*. 1989.
[10] Priest. IAEA Bulletin. *IAEA safeguards and the NPT: Examining interconnections*. 1995. pp. 10-11.
[11] United Nations, General Assembly. *Treaty on the Non-Proliferation of Nuclear Weapons (A/RES/2373 (XXII))*. 1968.
[12] Ibid.
[13] International Atomic Energy Agency. *IAEA Statute*. 1989.
[14] International Atomic Energy Agency. *General Conference*. 2023.
[15] International Atomic Energy Agency. *IAEA Statute*. 1989.
[16] Ibid.
[17] International Atomic Energy Agency. *Board of Governors*. 2023.

presented to the General Conference each year.[18] Overall, the board is responsible for carrying out the work of the IAEA as outlined in the Statute and according to its responsibilities to the General Conference.[19]

[18] International Atomic Energy Agency. *IAEA Statute*. 1989.
[19] Ibid.

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United Nations, General Assembly. *Treaty on the Non-Proliferation of Nuclear Weapons (A/RES/2373 (XXII))*. 1968. Retrieved 20 October 2023 from: http://www.undocs.org/en/A/RES/2373(XXII)

1. Managing Radioactive Waste and Its Disposal

Introduction

Radioactive waste is defined in the International Atomic Energy Agency (IAEA) *Safety and Security Glossary* (2022) as material for which no further use is foreseen but still contains radionuclides; it can take the forms of gas, liquids, or solids.[20] Sources of radioactive waste can include but are not limited to: medical waste, industrial waste, decommissioning of nuclear installations, research facilities, and military facilities.[21] In essence, the production of nuclear energy creates radioactive waste.[22] IAEA defined High Level Waste (HLW) and Intermediate Level Waste (ILW) in its *Nuclear Safety and Security Glossary* (2022).[23] HLW is a type of nuclear waste created by the reprocessing of spent fuel, and it requires permanent isolation due to its high radioactivity, whereas ILW is a type of radioactive waste which contains a level of radioactivity that requires a level of isolation.[24] The World Nuclear Association (WNA) found that 200,000 metres cubed of low-level and intermediate-level waste, and 10,000 metres cubed of high-level waste are generated worldwide from nuclear power production each year, with the figure set to rise further.[25] WNA identifies 90% of radioactive waste as low-level, meaning that it is sent to land-based disposal sites.[26] However, around 3% of the total volume of radioactive waste is high-level and highly radioactive.[27]

High-level radioactive waste requires isolation from other environments for multiple millennia.[28] Humankind has populated earth for approximately 200,000 years, yet WNA identifies that it will take nearly 240,000 years for nuclear energy byproducts such as plutonium to be considered safe.[29] The two largest examples of released radioactive waste are the Chernobyl power reactor in 1986 and the Fukushima Daiichi power reactor in 2011.[30] Combined, the Chernobyl and Fukushima Daiichi accidents led to over 450,000 people being evacuated out of the areas for their safety.[31] Radioactive waste presents a hazard towards human, animal, plant life, and by extension, the environment.[32] In order for radioactive waste to neutralize sustainably, it must be managed effectively.[33] Currently, no method is known to neutralise radioactive waste, however, long-term isolation in a geological repository is the most popular method.[34] Deep geological repositories, which are built for the disposal of HLW and ILW are just beginning to operate.[35] Most notably, Finland began disposing of high-level waste in 2024, making it the

[20] International Atomic Energy Agency. *Terminology Used in Nuclear Safety, Nuclear Security, Radiation Protection and Emergency Preparedness and Response*. 2022.
[21] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[22] World Nuclear Association. *Radioactive Waste Management*. 2022.
[23] International Atomic Energy Agency. *IAEA Nuclear Safety and Security Glossary*. 2022.
[24] Ibid.
[25] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[26] Ibid.
[27] Ibid.
[28] Ibid.
[29] World Nuclear Association. *Radioactive Waste – Myths and* Realities. 2024.
[30] World Nuclear Association. *Safety of Nuclear Power Reactors*. 2025.
[31] World Nuclear Association. *Fukushima Daiichi Accident*. 2024; World Nuclear Association. *Chernobyl Accident 1986*. 2025.
[32] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[33] Ibid.
[34] Ibid.
[35] International Atomic Energy Agency. *Finland's Spent Fuel Repository a "Game Changer" for the Nuclear Industry, Director General Grossi Says*. 2020.

first Member State to do so.[36] WNA has emphasized that the success achieved by Finland was in part a result of its ability to adhere to the foundational conventions surrounding the disposal of radioactive waste, such as Agenda 21.[37]

International and Regional Framework

Article three of *The Statute of the International Atomic Energy Agency* (1956) establishes IAEA as the main body for addressing radioactive waste, and that Member States should adhere to the guidelines set out by IAEA.[38] The guidelines and principles set out by IAEA fall under safety standards.[39] The 1972 *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*, also known as the London Convention, is the first convention to protect the marine environment from pollution.[40] Its 87 signatories signed the convention to stop the dumping of radioactive waste in the ocean.[41] In 1996, the London Protocol replaced the London Convention with all marine dumping being prohibited except for wastes that are on the reverse list.[42] The United Nations Environment Programme (UNEP) found that the London Convention is responsible for the end of 30 years of radioactive waste dumping in the ocean by over 13 Member States.[43]

Agenda 21 is a non-binding action plan that was a product of the United Nations Conference on Environment and Development (UNCED), commonly known as the Earth Summit, that took place in Rio de Janeiro in 1992.[44] Agenda 21 focuses on increasing knowledge sharing and strengthening the capacities of Member States to manage radioactive materials.[45] Chapter 19, on “Environmentally Sound Management of Toxic and Dangerous Products” of Agenda 21 contains six programme areas, ranging from information exchange on toxic chemicals and chemical risks, to the strengthening of national capacities for the management of chemicals.[46] Chapter 20, on “Environmentally Sound Management of Hazardous Wastes", identifies programme areas ranging from minimizing the generation of hazardous wastes, to eliminating the export of hazardous wastes to Member States that prohibit such imports.[47] Although the action plan is not binding, Agenda 21 has inspired subsequent binding international documents on the topic of radioactive waste disposal such as the 1997 *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*.[48]

[36] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[37] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[38] International Atomic Energy Agency. *The Statute of the IAEA*. 2024.
[39] International Atomic Energy Agency. *Safety Standards*. 2024.
[40] International Atomic Energy Agency. *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*. 1972.
[41] Ibid.
[42] International Atomic Energy Agency. *Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter*. 1996.
[43] United Nations Environment Programme. *Radioactive Substances*. N.d.
[44] United Nations, Department of Economic and Social Affairs. *Agenda 21*. N.d.
[45] United Nations, Sustainable Development. *Agenda 21*. 1992, p. 227.
[46] Ibid.
[47] Ibid.
[48] Ibid.

The *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* was the first binding document to address the issue of radioactive waste on a global scale.[49] The convention applies to spent fuel, or radioactive waste, from nuclear energy such as from nuclear reactors, and radioactive waste from military use that is repurposed for civilian use.[50] Article 16 of the Joint Convention creates a peer review process, whereby Member States compare national reports during each review meeting.[51] The Eighth Review Meeting took place in March 2025 at IAEA Headquarters in Vienna and urged every contracting party to the Joint Convention to submit their national reports to maintain its high level of engagement with Member States.[52]

Paragraph 23 of the *Johannesburg Plan of Implementation* (JPOI) (2002) ratified the commitment outlined in Agenda 21 to the sound management of hazardous wastes for sustainable development.[53] JPOI calls for the promotion of Member States to support each other in strengthening their capacity for the sound management of radioactive wastes by providing technical and financial assistance.[54] The *Ministerial Statement on Partnerships for Meeting the Global Waste Challenge* (2004) was adopted at the seventh meeting of the Conference of the Parties (COP) as a response to the *Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal* (1992).[55] The Statement identifies the environmentally sound management of radioactive wastes as part of the wider issue of water protection.[56] The Statement further signifies a shift to recognizing the importance of mobilizing additional financial resources to build partnerships towards ensuring sustainable radioactive waste.[57]

Role of the International System

IAEA currently has 33 active technical cooperation projects, where IAEA provides expertise to specific Member States, and seven active coordinated research projects regarding the disposal of radioactive waste.[58] These projects range from ‘Processing Technologies for High Level Waste’, to ‘Developing and Establishing a National Policy for Radioactive Waste Management’ in Africa.[59] Furthermore, IAEA has published multiple reports covering best practices and knowledge sharing on radioactive waste.[60] The most recent report by IAEA, *Lessons Learned Programmes for Effective Knowledge Management in Nuclear Organizations* (2024) covers best practices and knowledge sharing for public and private nuclear

[49] International Atomic Energy Agency. *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.* 1997.
[50] Ibid.
[51] Ibid.
[52] International Atomic Energy Agency. *Eighth Review Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management*. 2025.
[53] United Nations, Department of Global Communications. *Report of the World Summit on Sustainable Development*. 2002.
[54] Ibid.
[55] Basel Convention. *Ministerial Statement on Partnerships for Meeting the Global Waste Challenge*. N.d.; Basel Convention. *Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their Disposal & Basel Protocol on Liability and Compensation*. 2023.
[56] Basel Convention. *Ministerial Statement on Partnerships for Meeting the Global Waste Challenge*. N.d.
[57] Ibid.
[58] International Atomic Energy Agency. *Radioactive Waste and Spent Fuel Management*. 2024.
[59] International Atomic Energy Agency. *Processing Technologies for High Level Waste, Formulation of Matrices and Characterisation of Waste Forms*. 2024; International Atomic Energy Agency. *Developing and Establishing a National Policy for Radioactive Waste Management*. 2024.
[60] International Atomic Energy Agency. *Radioactive Waste and Spent Fuel Management*. 2024.

organizations in order to provide a safe radioactive waste disposal process.[61] IAEA also hosts conferences on a variety of topics, such as the 2023 International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability.[62] IAEA's Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) programme provides an expert peer review service for radioactive waste.[63] The voluntary peer reviews consist of a team of IAEA specialists using IAEA safety standards to review Member States and organizations responsible for radioactive waste management.[64] The reviews can consist of meetings, interviews with nuclear facilities and Member States, site visits, and document reviews.[65] Once a review is conducted by a team from ARTEMIS, the findings are provided to the Member State or organization in a draft report and can be found in the public ARTEMIS database.[66] A 2022 report by IAEA, called *Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) Follow-up Mission to Germany*, found that ARTEMIS has not adopted standardized measurements in its peer review service, making it difficult to compare the progress of different Member States.[67]

The Nuclear Energy Agency (NEA) is an intergovernmental agency that is organized under the Organization for Economic Co-operation and Development (OECD).[68] NEA's goal is to assist Member States in further developing through co-operation the safe disposal of radioactive waste.[69] NEA produces reports, hosts working forums, and provides a database on the disposal of radioactive waste.[70] In 1975, NEA established the Radioactive Waste Management Committee (RWMC), which is an international body of senior policymakers, regulators, and researchers that are independent as well as being associated with Member States.[71] RWMC provides a neutral forum where its Member States, European Commission, and IAEA, which participates as an observer, share knowledge and best practices surrounding the disposal of radioactive waste.[72] RWMC focuses on three areas that radioactive waste disposal impacts: the environment, economy, and society.[73] RWMC addresses each area by adopting three overarching frameworks: legislative, organizational, and regulatory.[74]

On a regional level, the European Union (EU) adopts directives to ensure that its Member States follow the safety guidelines of IAEA.[75] For example, its Directive on "Shipments of Radioactive Waste and Spent

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[61] International Atomic Energy Agency. *Lessons Learned Programmes for Effective Knowledge Management in Nuclear Organizations*. 2024.
[62] International Atomic Energy Agency. *International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability*. 2023.
[63] International Atomic Energy Agency. *Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS)*. 2024.
[64] Ibid.
[65] Ibid.
[66] Ibid.
[67] International Atomic Energy Agency. Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) Follow-up Mission to Germany. 2022.
[68] Nuclear Energy Agency. *About Us*. 2025.
[69] Ibid.
[70] Ibid.
[71] Nuclear Energy Agency. *Radioactive Waste Management Committee (RWMC)*. 2025.
[72] Ibid.
[73] Ibid.
[74] Ibid.
[75] European Commission. *Radioactive Waste and Spent Fuel*. N.d.

Fuel" (2006), prohibits the export of radioactive waste to any Member State outside of Europe that does not have the capabilities to safely dispose of it.[76] Furthermore, its Directive on "Radioactive Waste and Spent Fuel Management" (2011), requires all of its Member States to have a national policy for spent fuel and radioactive waste.[77] Additionally, EU Member States also carry out self-assessments and invite international peer reviews of their national frameworks and national programmes at least every 10 years.[78] The first round of international peer reviews was carried out under ARTEMIS provided by the IAEA, and was completed in 2023.[79]

The Association of Southeast Asian Nations (ASEAN) established a Network of Regulatory Bodies on Atomic Energy (ASEANTOM) in 2013.[80] ASEANTOM shared best practices and experiences in regulating radioactive waste with regard to IAEA safety guidelines.[81] ASEANTOM also focuses on capacity building with its Member States through training courses and technical collaboration.[82] Between 2018-2021 ASEANTOM collaborated with the IAEA to host workshops on 'Security Management and Security Plan on Radioactive Materials and Associated Facilities' as well as the 'Regional Project on Nuclear Security: Strengthening Regulatory Capacities for Licensing, Inspection and Enforcement for the Security of Radioactive Materials and Associated Facilities in Southeast Asia.'[83]

The African Union (AU) manages its radioactive waste disposal through initiatives such as the *African Nuclear-Weapons-Free Zone Treaty* (2009) and the African Nuclear Energy Funding Initiative (ANEFI).[84] The *African Nuclear-Weapons-Free Zone Treaty*, also known as the Pelindaba, mandates the AU Member States to follow IAEA frameworks as well as prohibits the dumping of radioactive waste.[85] ANEFI is an initiative supported by the African Commission on Nuclear Energy (AFCONE) and US-based company DeepGeo, which facilitates the disposal of radioactive waste for Member States of the AU.[86] One method of facilitation is preparing AU Member States to establish deep geological repositories in the near future.[87] Currently, South Africa is the only AU Member State to possess its own national facility for radioactive waste disposal, located in Vaalputs, which focuses on low-level and intermediate-level waste.[88]

Deep Geological Disposal of Intermediate-Level Waste and High-Level Waste

The concept of geological disposal is defined by IAEA in its 2024 report, *Roadmap for Implementing a Geological Disposal Programme*, as the disposal of radioactive waste in a disposal facility located

[76] European Union. *On the Supervision and Control of Shipments of Radioactive Waste and Spent Fuel*. 2006.
[77] European Union. *Establishing a Community Framework for the Responsible and Safe Management of Spent Fuel and Radioactive Waste*. 2011.
[78] European Commission. *Radioactive Waste and Spent Fuel*. N.d.
[79] Ibid.
[80] Association of Southeast Asian Nations. *Nuclear Safety, Security, and Safeguards*. 2025.
[81] Ibid.
[82] Ibid.
[83] Trajano. APLN. *Enhancing Nuclear and Radiological Emergency Preparedness and Response in ASEAN and Beyond: Regional Practices and Challenges*. 2023.
[84] African Union. *African Nuclear-Weapons-Free Zone Treaty (The Treaty of Pelindaba)*. 2009.
[85] Ibid; United Nations, Department of Global Communications. *Treaty of Pelindaba*. N.d.
[86] World Nuclear News. *AFCONE and DeepGeo Launch African Nuclear Initiative*. 2024.
[87] Ibid.
[88] World Nuclear Association. *Nuclear Power in South Africa*. 2025.

underground to provide long term containment and isolation.[89] The World Nuclear Association found that around 3% of all radioactive waste is HLW.[90] Currently, there is no known method to completely neutralise radioactive waste according to the United Nations Office for Disaster Risk Reduction (UNDRR).[91] However, according to WNA, deep geological disposal is universally adopted as the best solution for the disposal of HLW, backed by the research of the European Commission.[92] The only geological repository in existence is the Waste Isolation Pilot Plant (WIPP) in the United States, which is reserved military waste.[93] WIPP does not have a license for the disposal of spent fuel of HLW.[94] In its 2023 report, *Verifying Spent Nuclear Fuel in Deep Geological Repositories*, the IAEA recognized the difficulties in creating and maintaining safeguards as this is a new way of disposing of radioactive waste.[95]

Finland has made the most progress in building a deep geological repository for its radioactive waste.[96] The repository, based in Onkalo, has received the necessary licensing for the disposal of HLW and plans to keep the HLW at a depth of 400 metres embedded in bedrock and packed in copper canisters.[97] The design of the repository is based on the KBS-3 concept proposed by Sweden who is also looking to set up a geological repository in Östhammar.[98] In late 2024, the Onkalo repository embarked on its first trial run of depositing HLW into copper canisters at a depth of 430 metres.[99] The Director-General of IAEA, Rafael Grossi, praised the repository as crucial for the future nuclear sustainability around the world.[100] Following the success of Finland, Sweden is set to become the second Member State to build a deep geological repository having secured the licence to build the facility.[101] It has not yet been announced by Sweden when the facility will be finished being built and when it can start disposing of HLW.[102]

WNA recognized that not every Member State has the geological requirements to acquire a geological repository and even the Member States that do, might not have the economic means to acquire one.[103] The existence of a multinational or regional geological repository was first suggested in a 1980 report by IAEA titled *International Nuclear Fuel Cycle Evaluation* (INFCE) and was further supported by the Director-General of the IAEA in 2003.[104] In 2004, IAEA identified three conditions for a successful regional or multinational repository: incremental additions to a large national programme, a multinational facility with international management and control, and collaborative partnering among Member States.[105]

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[89] International Atomic Energy Agency. *Roadmap for Implementing a Geological Disposal Programme*, 2024.
[90] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[91] United Nations Office for Disaster Risk Reduction. *Radioactive Waste*. 2019.
[92] Ibid.
[93] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[94] Ibid.
[95] International Atomic Energy Agency, *Verifying Spent Nuclear Fuel in Deep Geological Repositories*. 2023.
[96] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[97] Ibid.
[98] Ibid.
[99] World Nuclear News. *Successful Start to Trial Run at Finnish Repository*. 2024.
[100] International Atomic Energy Agency. *Finland's Spent Fuel Repository a "Game Changer" for the Nuclear Industry, Director General Grossi Says*. 2020.
[101] World Nuclear News. *Environmental Permit Granted for Swedish Repository*. 2024.
[102] Ibid.
[103] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[104] International Atomic Energy Agency. *International Nuclear Fuel Cycle Evaluation*. 1980; World Nuclear Association. *International Nuclear Waste Disposal Concepts*. 2020.
[105] World Nuclear Association. *International Nuclear Waste Disposal Concepts*. 2020.

Regionally, there have been ongoing negotiations since 2009 surrounding a multinational storage facility in Europe with the European Repository Development Organization (ERDO).[106] There are barriers to a regional or multinational repository, such as ensuring that every participating Member State adheres to the strict guidelines set out by IAEA as well as respecting the sovereignty of each Member State.[107]

Deep geological disposal of HLW and ILW is not without its opposition, as Greenpeace has stated that depending on nuclear power is a waste of time due to its ability to stay radioactive for prolonged periods of time.[108] Greenpeace criticised Japan, and its nuclear processor plant in Rokkasho, for its disposal of ILW as it claims that the plant is making the waste even more dangerous.[109] Greenpeace doubts the ability of the international community to guarantee the safety of radioactive waste throughout the entire disposal process.[110] The existence and so-far success of the trial run by the Onkalo repository puts into question the criticisms posed by Greenpeace.[111] IAEA used the Onkalo repository as an example in *Verifying Spent Nuclear Fuel in Deep Geological Repositories* that deep geological repositories are the most environmentally sound method of disposing of HLW despite the concerns by Greenpeace of ensuring that the radioactive fuel is stored safely for the duration of its disposal process.[112]

Knowledge Sharing to Spread Best Practices on Disposing Radioactive Waste

An IAEA-posted article states that specialized knowledge is required for safe and effective management of radioactive disposal.[113] Member States that currently dispose of radioactive waste, or wish to dispose of radioactive waste in the future, are reliant on the ongoing availability and maintenance of the latest knowledge to ensure that they are in line with safety guidelines.[114] IAEA has identified nuclear knowledge as the most important element of nuclear management, emphasizing the role of education, training, and capacity building in maintaining knowledge levels for every Member State.[115] IAEA is responsible for producing the Safety Standards which consists of three sets of publications: the Safety Fundamentals, the Safety Requirements, and the Safety Guides.[116] The Safety Fundamentals was first published by IAEA in 2006 and covered the role of governments, reducing radiation risks, and the protection of present and future generations within the scope of radioactive waste management.[117] The Safety Requirements (GSR) have been published since 2011 and have covered topics such as regulatory frameworks for safety to

[106] European Repository Development Organization. *European Repository Development Organization Model Structure and Plan*. N.d.
[107] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[108] Greenpeace. *Nuclear Power: a Dangerous Waste of Time*. 2009; Green Peace. *The Global Crisis of Nuclear Waste*. 2019.
[109] Greenpeace. *Nuclear Power: a Dangerous Waste of Time*. 2009.
[110] Ibid.
[111] International Atomic Energy Agency. *Finland's Spent Fuel Repository a "Game Changer" for the Nuclear Industry, Director General Grossi Says*. 2020.
[112] International Atomic Energy Agency. *Verifying Spent Nuclear Fuel in Deep Geological Repositories*. 2023.
[113] International Atomic Energy Agency. *Nuclear Knowledge Management*. 2024.
[114] Ibid.
[115] Ibid.
[116] International Atomic Energy Agency. *Safety Standards*. 2024.
[117] International Atomic Energy Agency. *Safety Fundamentals for Protecting People and the Environment*. 2006.

radiation protection.[118] Lastly, the Safety Guides (GSG) consist of both specific safety guides and general safety guides.[119] Until 2024, there have been over one hundred safety guides published by IAEA, the most cited being the 'Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material' (2018).[120] The IAEA Safety Standards exist to constantly provide Member States with the knowledge required to safely dispose of radioactive waste and limit the ineffective methods of disposal, such as dumping at sea.[121]

According to the NEA, radioactive waste management is a knowledge-dependent activity that works within regulatory frameworks that must be upheld for potentially hundreds of years.[122] Due to the length of time that it takes to dispose of some radioactive waste, records must be maintained effectively throughout the entirety of the disposal process to avoid disposing of the radioactive waste in a way that can harm others.[123] This is because information systems will change over the hundreds of years that the radioactive material is being disposed of and it is also likely file formats will become obsolete.[124] NEA identifies the role of data in knowledge sharing as vital for the protection of future generations in disposing of radioactive waste.[125] NEA has set up the Working Party on Information, Data and Knowledge Management (WP-IDKM) to coordinate information across the disposal cycle of radioactive materials across Member States.[126] WP-IDKM has four working areas as set out in the WP-IDKM Roadmap (2019): overseeing the safety of radioactive disposal on a case by case basis, increasing knowledge management, archiving information, and maintaining awareness of disposed waste and repositories.[127] Each of these four areas are overseen by their own individual expert group consisting of professionals and scientists.[128] The most recent publication by the WP-IDKM was its *Metadata for Radioactive Waste Management* (2018), providing an overview of the current levels of data surrounding radioactive waste as well as how it can be organized and expanded on in a way that is more effectively understood by the international community.[129] The NEA and its WP-IDKM have emphasized the importance of data in the knowledge sharing process of best practices for disposing of radioactive waste.[130]

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[118] International Atomic Energy Agency. *Governmental, Legal and Regulatory Framework for Safety*. 2016; International Atomic Energy Agency. *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*. 2014.
[119] International Atomic Energy Agency. *Governmental, Legal and Regulatory Framework for Safety*. 2016; International Atomic Energy Agency. *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards*. 2014.
[120] International Atomic Energy Agency. *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material*. 2018.
[121] International Atomic Energy Agency. *International Conference on the Safety of Radioactive Waste Management, Decommissioning, Environmental Protection and Remediation: Ensuring Safety and Enabling Sustainability*. 2023.
[122] Nuclear Energy Agency. *IDKM of radioactive waste management*. 2025.
[123] Ibid.
[124] Ibid.
[125] Ibid.
[126] Nuclear Energy Agency. *Symposium on Information, Data and Knowledge Management for Radioactive Waste: Challenges Across All Timescales*. 2025.
[127] Ibid.
[128] Ibid.
[129] Nuclear Energy Agency. *Metadata for Radioactive Waste Management*. 2022.
[130] Nuclear Energy Agency. *IDKM of radioactive waste management*. 2025.

The role of IAEA plays in knowledge sharing does not only extend to the international stage, it also provides knowledge sharing on the domestic level.[131] For instance, IAEA helped both Ghana and Malaysia in their disposal processes of radioactive waste.[132] IAEA assisted the Malaysia Nuclear Agency as well as the Atomic Energy Licensing Board in developing guidance documents, carrying out testing and capacity building, and designing equipment.[133] As a result of the technical and practical guidance given to Malaysia, it was able to successfully produce a borehole facility capable of successfully disposing of radioactive waste in line with IAEA safety guidelines.[134] Even before the borehole project, IAEA supported Malaysia in obtaining the loan and equipment needed for radiation detection.[135] Being able to detect radiation allows the Malaysian government to dispose of its radioactive waste more effectively.[136] IAEA also worked with the Ghana Atomic Energy Agency to support Ghana with its own borehole project, in particular, the regulatory authorization processes.[137] Two years after supporting Ghana, a team of experts from the IAEA reviewed the process Ghana was making in its radioactive disposal and commended Ghana for its commitment to upholding radiation safety standards.[138] The completion of the borehole disposal facilities in Ghana and Malaysia, accredited to IAEA, acts as an example that IAEA can share knowledge to Member States in order to create a successful radioactive waste disposal programme.[139]

Conclusion

With the proper infrastructure and method of disposing of radioactive waste, nuclear energy has the opportunity to provide a key role in providing future generations with clean, affordable energy.[140] However, using nuclear energy means creating radioactive waste which could potentially take a thousand years to dispose of.[141] As the international community develops best practices to safely dispose of radioactive waste, there is the opportunity to work alongside IAEA so that the rest of the international community is also able to adopt such methods.[142] Successful Member States, such as Finland, are able to lend their expertise to other Member States that are looking to dispose of HLW in accordance with IAEA frameworks.[143] Providing future generations with clean energy is equally as important as preventing future generations to deal with the consequences of radioactive waste that has not properly been disposed of.[144] The disposal of radioactive waves will only be as effective as the information that was used to dispose of

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[131] International Atomic Energy Agency. *Malaysia and Ghana at the Forefront of Borehole Disposal of Sealed Radioactive Sources*. 2022.
[132] Ibid.
[133] Ibid.
[134] Ibid.
[135] International Atomic Energy Agency. *Malaysian Nuclear Security Support Center to Make IAEA Radiation Detection Equipment Available Regionally*. 2020.
[136] Ibid.
[137] International Atomic Energy Agency. *Malaysia and Ghana at the Forefront of Borehole Disposal of Sealed Radioactive Sources*. 2022.
[138] International Atomic Energy Agency. *IAEA Mission Finds Ghana Committed to Nuclear and Radiation Safety, Encourages Continued Improvements*. 2024.
[139] International Atomic Energy Agency. *Malaysia and Ghana at the Forefront of Borehole Disposal of Sealed Radioactive Sources*. 2022.
[140] International Atomic Energy Agency. *Energy*. 2024.
[141] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[142] Ibid.
[143] Ibid.
[144] International Atomic Energy Agency. *Finland's Spent Fuel Repository a "Game Changer" for the Nuclear Industry, Director General Grossi Says*. 2020.

it, which is why knowledge sharing is a key part of the process of disposal.[145] By exploring further avenues for neutralizing HLW and sharing knowledge between Member States, the international community will be in a better position to provide a more sustainable future.[146]

Further Research

As delegates conduct further research and consider how to address this topic, they should consider: are deep geological repositories the best way to store HLW? How can IAEA promote a regional or multinational repository? What safety guidelines need to be considered for further geological disposal of radioactive waste to take place? Which areas of managing radioactive waste should IAEA prioritise in knowledge sharing? How can the international community improve the current level of data available on radioactive waste disposal around the world?

[145] World Nuclear Association. *Storage and Disposal of Radioactive Waste*. 2024.
[146] International Atomic Energy Agency. *Finland's Spent Fuel Repository a "Game Changer" for the Nuclear Industry, Director General Grossi Says*. 2020.

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2. Enhancing Effective National and Global Response Arrangements and Capabilities to Minimize the Impacts from Nuclear and Radiological Incidents and Emergencies

Introduction

Among its priorities, the International Atomic Energy Agency (IAEA) works to reduce the impact of nuclear and radiological emergencies, defining such events as "An emergency in which there is, or is perceived to be, a hazard due to: (a) The energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or (b) Radiation exposure."[147] Radio-nuclear events also include incidents, such as precursor and initiating events, and accidents, both unintentional and malicious in nature.[148]

The 1986 reactor meltdown at the Chernobyl Nuclear Power Plant stimulated the international community to produce the first major radio-nuclear accident regime, the Emergency Preparedness and Response (EPR) framework, leading to an evolution of IAEA's respective responsibilities.[149] An estimated 8.4 million people across the Soviet Union were exposed to radiation from the Chernobyl accident.[150] Two and a half decades later, a tsunami caused by a major earthquake in Japan disabled three nuclear reactors and damaged a fourth located at the Fukushima Daiichi Nuclear Power Plant.[151] While the incident did not directly result in any deaths or cases of radiological sickness, over 100,000 people were evacuated, many of which have yet to return home.[152] The 2011 accident initiated a period of examination, led by IAEA, of the original nuclear safety and emergency preparedness framework, forcing Member States to reflect on the capacity and the strength of their related institutions.[153]

Nuclear accident rarity is reflected in the fact that the events at Chernobyl and Fukushima are the only two major reactor disasters to have occurred to-date.[154] This rarity can be attributed, in part, to global radio-nuclear safety and emergency preparedness policies and mechanisms the international community has adopted and effectively upheld.[155] Member States have continually worked to strengthen nuclear safety, protecting workers, the public, and the environment from preventable radiation exposure and risk by standardizing the safe use of nuclear technology.[156] The United Nations, global and regional organizations, and governments have also improved capacity building efforts, strengthening the means and mechanisms required to successfully prevent and respond to radio-nuclear incidents.[157]

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[147] International Atomic Energy Agency. *IAEA Nuclear Safety and Security Glossary*. 2022. p. 68.
[148] Ibid, p. 77.
[149] Burns et al. Nuclear Energy Agency. *Principles and Practice of International Nuclear Law*. 2022. pp. 23, 37; International Atomic Energy Agency. *International Framework for Emergency Preparedness and Response*. 2025.
[150] United Nations, Department of Global Communications. *International Chernobyl Disaster Remembrance Day 26 April*. N.d.
[151] World Nuclear Association. *Fukushima Daiichi Accident*. 2024.
[152] Ibid.
[153] Burns et al. Nuclear Energy Agency. *Principles and Practice of International Nuclear Law*. 2022. p. 99.
[154] Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024; World Nuclear Association. *Safety of Nuclear Power Reactors*. 2025.
[155] Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024.
[156] International Atomic Energy Agency. *IAEA Nuclear Safety and Security Glossary*. 2022. p. 139.
[157] United Nations, Department of Global Communications. *Capacity-Building*. N.d.

Nuclear power remains a highly safe method to produce energy.[158] For the production of every one terawatt-year (TW.yr), the quantity of energy consumed by the global community in about five months, there are less than 0.01 deaths which result from nuclear energy related accidents; this is in juxtaposition to fuels such as coal (120 deaths/TW.yr), natural gas (71.9 deaths/TW.yr), and solar (0.245/TW.yr).[159] Today, around 440 nuclear power reactors supply the world with 9% of its electricity and about 220 research reactors are located in over 50 Member States for purposes beyond power.[160] Many fields outside of energy are enhanced by the safe use of nuclear materials, including medicine, research, and industry.[161]

Nevertheless, accidents can happen despite the best efforts of individuals and organizations to abide by global and national rules and to institute proper safety measures.[162] Accident impacts are wide ranging in scale and consequences of who, or what, they affect.[163] These events may lead to physical, mental, and societal impacts on victims, including radiation related injuries, evacuation, or relocation of individuals and families located near the incident.[164] Victims' health may be negatively impacted by indirect consequences of incidents, including the loss of livelihoods or homes and victim stigmatization.[165] As a result, radio-nuclear incidents can have negative impacts on those directly affected and communities by-large.[166]

International and Regional Framework

In 1986, shortly after the Chernobyl nuclear accident, the IAEA General Conference adopted the first two major nuclear emergency preparedness and response conventions: the *Convention on Early Notification of a Nuclear Accident* (Early Notification Convention) and the *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (*Assistance Convention).[167] The former establishes a communication system to alert Member States of the occurrence and nature of nuclear accidents, specifically when radioactive material likely poses a transnational threat.[168] The Early Notification Convention's reporting requirements enables IAEA to provide accurate assessments to potentially impacted Member States.[169] The latter, the Assistance Convention, allows Member States to appeal for aid and sets out cooperation standards to facilitate support, requiring Member States to notify the committee of their available resources in the wake of an accident.[170] Together, these two Conventions

[158] World Nuclear Association. *Safety of Nuclear Power Reactors*. 2025.
[159] Ibid.
[160] World Nuclear Association. *Nuclear Power in the World Today*. 2025.
[161] International Atomic Energy Agency. *Accident Reports*. 2025.
[162] Ibid.
[163] Geosev. World Health Organization. *Radiation Emergencies*. 2025; Geosev. World Health Organization. *Strengthening global preparedness to radiation emergencies*. 2025.
[164] Geosev. World Health Organization. *Radiation Emergencies*. 2025.
[165] Ibid.
[166] Ibid.
[167] Burns et al. Nuclear Energy Agency. *Principles and Practice of International Nuclear Law*. 2022. p. 23; International Atomic Energy Agency. *International Framework for Emergency Preparedness and Response*. 2025.
[168] International Atomic Energy Agency. *Convention on Early Notification of a Nuclear Accident (INFCIRC/335)*. 1986.
[169] Ibid.
[170] Ibid.

constitute the legal basis of international response to radio-nuclear incidents, remaining central pillars of the EPR framework today.[171]

The 1991 *Convention on Environmental Impact Assessment in a Transboundary Context*, commonly known as the Espoo Convention, outlines Member States' responsibility to account for, limit, document, and communicate potential transnational harm to the environment during the planning process for certain activities.[172] The heat output of nuclear power stations and reactors, alongside the production of nuclear fuels are on this list.[173] The subsequent 2003 *Protocol on Strategic Environmental Assessment to the Espoo Convention*, commonly known as the SEA Protocol, added requirements for Member States to use the evaluations required under the Espoo Convention in the planning process, promoting better sustainability and environmental considerations.[174]

In 1994, IAEA adopted the *Convention on Nuclear Safety* (CNS) with the goal of reducing global radio-nuclear risks by improving national and international standards regarding nuclear installations' safety.[175] Objective III of the CNS specifically discusses the prevention and mitigation of radiological accidents, highlighting Member States' responsibility to take preventative measures when building nuclear facilities.[176] Article 16 of the CNS further describes each Contracting Party's responsibility to create nuclear installation emergency plans, communicate pertinent emergency preparedness and response details to the public and authorities, or in the case of the Member State not having any nuclear installations, create and test emergency response plans in the case they are impacted.[177]

In the wake of the nuclear accident at Fukushima Daiichi, IAEA Member States adopted the *IAEA Action Plan on Nuclear Safety* (2011) to improve response time to accidents and elevate basic nuclear safety standards.[178] The plan aims to strengthen 12 areas of nuclear safety, focusing largely on standards, governance, protection, oversight, and communication.[179] Four years later, in 2015, IAEA published the General Safety Requirements publication *Preparedness and Response for a Nuclear or Radiological Emergency*, commonly known as the IAEA Safety Standards Series No. GSR Part 7, updating guidelines for organizational responsibility and authority in the wake of radio-nuclear accidents, accounting for new expertise gained since 2002.[180] The revised 2015 Safety Requirements strengthened and enhanced emergency preparedness and response arrangements made between Member States.[181] The safety requirements are binding to IAEA and on Member States being assisted by the organization, but are otherwise voluntary.[182] The IAEA Safety Standards series more broadly focuses on best practices,

[171] International Atomic Energy Agency. *International Framework for Emergency Preparedness and Response*. 2025.
[172] United Nations Economic Commission for Europe. *Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)*. 2017.
[173] Ibid.
[174] Ibid.
[175] International Atomic Energy Agency. *Convention on Nuclear Safety (INFCIRC/449)*. 1994.
[176] Ibid.
[177] Ibid.
[178] International Atomic Energy Agency. *IAEA Action Plan on Nuclear Safety*. 2025.
[179] Ibid.
[180] International Atomic Energy Agency. *Preparedness and Response for a Nuclear or Radiological Emergency (IAEA Safety Standards Series No. GSR Part 7)*. 2015.
[181] Ibid.
[182] Ibid.

technical guidance and tools, as well as general recommendations that are divided into three categories of publication: Safety Fundamentals, Safety Requirements, and Safety Guides.[183]

In its seventh edition, the 2017 *Joint Radiation Emergency Management Plan of the International Organizations*, synonymously, the Joint Plan, describes current interagency radiological emergency response networks, allowing organizations involved in emergency preparedness and response to understand the responsibilities and activities of other organizations after an incident.[184] The Joint Plan is not meant to replace arrangements made by organizations and should instead be viewed as an information guide.[185]

To further enhance response in the aftermath of a radio-nuclear accident, the World Health Organization (WHO) published *A framework for mental health and psychological support in radiological and nuclear emergencies* (2020).[186] The publication focuses on helping Member States address the long-lasting consequences radio-nuclear events often have on the psychosocial well-being and mental health of impacted individuals.[187] In 2022, the Organization for Economic Co-operation and Development (OECD) and Nuclear Energy Agency (NEA) published the report *Building a Framework for Post-Nuclear Accident Recovery Preparedness: National-Level Guidance*.[188] This document outlines best practices regarding accident recovery operations to help facilitate the creation of long term post-accident and recovery management plans.[189] The guidance provided is designed to be adapted to the national needs of any Member State, helping to broadly improve effective incident response capacity.[190]

More recently, regional bodies have adopted policies to help coordinate local capacity building and communication efforts; one example is the Association of Southeast Nations' (ASEAN) *Protocol for the Preparedness and Response to a Nuclear or Radiological Emergency*.[191] The Protocol details appropriate response procedures and communication pathways ASEAN Member States should use in knowledge sharing efforts, incident response, and the notification process of radio-nuclear incidents.[192] Initiated in 2022, but officially announced at the 68th General IAEA Conference, the *Arab Roadmap for Cooperation in Radiological and Nuclear Emergency Preparedness and Response* (2024) similarly aims to enhance cooperation and coordination between Arab States in efforts to prevent, prepare, and manage radio-nuclear events.[193] The League of Arab States, Arab Atomic Energy Agency, and IAEA have worked jointly to produce this roadmap, assisted by IAEA's Incident and Emergency Centre (IEC).[194]

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[183] Ibid; International Atomic Energy Agency. *IAEA Safety Standards on Emergency Preparedness and Response*. 2025.
[184] International Atomic Energy Agency. *Joint Radiation Emergency Management Plan of the International Organizations*. 2017.
[185] Ibid.
[186] World Health Organization. *A framework for mental health and psychosocial support in radiological and nuclear emergencies*. 2020.
[187] Ibid.
[188] Nuclear Energy Agency. *Building a Framework for Post-Nuclear Accident Recovery Preparedness: National-Level Guidance*. 2023.
[189] Ibid.
[190] Ibid.
[191] Association of Southeast Nations Network of Regulatory Bodies on Atomic Energy. *Protocol for the Preparedness and Response to a Nuclear or Radiological Emergency*. N.d.
[192] Ibid.
[193] Midgley. International Atomic Energy Agency. *68th IAEA General Conference: Day 2 Highlights*. 2024.
[194] Ibid.

Role of the International System

Under the *Statute of the International Atomic Energy Agency* (1956), the committee is responsible for promoting international cooperation and to assist Member States equitably on topics related to non-military uses of atomic energy.[195] Following this directive, IAEA has created bodies and programs that play key roles in improving cooperation, capacity building, and communication regarding radio-nuclear preparedness and response.[196] IAEA's IEC is responsible for coordinating communication lines and management support during radio-nuclear events, disregarding if the origin was unintentional or malicious.[197] IEC helps Member States meet safety standards and grow their emergency response capacity, in addition to offering services such as the Unified System for Information Exchange in Incidents and Emergencies (USIE).[198] USIE allows Member States to notify the international community of situations and enables Member States to request information and IAEA resources.[199] Member States can register their ability to provide assistance through the Response and Assistance Network, fulfilling their commitments to the Assistance Convention.[200] Capabilities that can be registered include scientific expertise on decontamination and radiation assessments to the provision of experts on medical response and radiation treatments.[201]

Created in 1986, after the accident at Chernobyl, IAEA helped to establish the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE) to synchronize international interagency cooperation and networking.[202] IACRNE is responsible for the improvement and implementation of the Joint Plan and oversees the Working Group on Coordinated International Exercises.[203] The latter coordinates convention exercises, particularly ConvEX-3s, which are held to test the EPR framework and provide an opportunity for IAEA, Member States, and associated professionals to practice and gain practical knowledge and hands-on skills.[204] The exercises are held at three levels, with the most recent ConvEx-3 hosted by Romania on 14-15 May 2025.[205] The exercise simulated a "severe nuclear emergency" located at the Cernavoda Nuclear Power Plant.[206]

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[195] Conference on the Statute of the International Atomic Energy Agency. *Statute of the International Atomic Energy Agency*. 1956.
[196] International Atomic Energy Agency. *Emergency preparedness and response*. 2025.
[197] International Atomic Energy Agency. *Incident and Emergency Centre*. 2025.
[198] Jayarajan. International Atomic Energy Agency. *IAEA and Countries Collaborate to Strengthen Nuclear and Radiological Emergency Response*. 2023; Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024.
[199] Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024.
[200] International Atomic Energy Agency. *Response and Assistance Network (RANET)*. 2025.
[201] Ibid.
[202] Inter-Agency Committee on Radiological and Nuclear Emergencies. *Inter-Agency Response to Radiological and Nuclear Emergencies*. N.d.
[203] International Atomic Energy Agency. *Coordination of inter-agency response*. 2025.
[204] Ibid; International Atomic Energy Agency. *EPR exercises and training*. 2025.
[205] International Atomic Energy Agency. *EPR exercises and training*. 2025; Jayarajan. International Atomic Energy Agency. *Strengthening Global Nuclear Emergency Preparedness: Registration Open for 2025 ConvEx-3 Exercise*. 2025.
[206] Jayarajan. International Atomic Energy Agency. *Strengthening Global Nuclear Emergency Preparedness: Registration Open for 2025 ConvEx-3 Exercise*. 2025.

Both members of IACRNE, WHO, and the World Meteorological Organization (WMO) provide preparation and response assistance–health and environmental services respectively–to radio-nuclear incidents.[207] WHO, mandated to assist in public health and medical countermeasures in such events, created the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN) in 1987 to meet these demands.[208] REMPAN coordinates the research and development of medical countermeasures and enables WHO to advise health officials on technical aspects of radio-nuclear event response.[209] In addition to IACRNE, WHO and IAEA supports the United Nations Forum on Chernobyl, a body formed in 2003 to assess the long-term scientific and socio-economic implications of the Chernobyl Power Plant accident.[210]

WMO operates ten Regional Specialized Meteorological Centres (RSMCs) across the globe that, in under three hours, can provide specialized environmental simulations predicting the movement of airborne radioactivity in the atmosphere.[211] RSMCs work closely with IEC, IAEA, and WMO at large to provide timely insights and notifications of events.[212] The centers are part of WMO's larger Emergency Response Activities Programme, a framework meant to facilitate worldwide responses to all types of airborne hazardous materials that can cause environmental emergencies.[213]

Through the Committee on Radiological Protection and Public Health's Working Party on Nuclear Emergency Matters, OECD NEA is responsible for administering and assessing the International Nuclear Emergency Exercise (INEX) series.[214] INEX-6, held in 2024, focused on building stronger strategies for remediation and recovery practices in the aftermath of an accident.[215] The exercise was the largest held in over two decades, indicating Member States' growing participation and interest in such events.[216] NEA is additionally responsible for the International Nuclear and Radiological Event Scale, a voluntary system used by Member States to measure and rate the impacts of radiological events, including accidents, leaks, and the significance of anomalies or malfunctions.[217]

The first International Symposium on Communicating Nuclear and Radiological Emergencies to the Public (2018) took place across five days in Austria, where the participants discussed how to better coordinate national and international efforts to improve information communication during emergencies.[218] The topic of the forum focused on incident messaging to the public and media.[219] Another conference series, Competent Authorities Meetings, allows global stakeholders to ensure the continued, effective implementation of the EPR framework through biannual discussions of potential advancements,

[207] Inter-Agency Committee on Radiological and Nuclear Emergencies. *Inter-Agency Response to Radiological and Nuclear Emergencies*. N.d.; Geosev. World Health Organization. *Radiation Emergencies*. 2025; World Meteorological Organization. *Emergency Response Activities*. 2025.
[208] Geosev. World Health Organization. *Radiation Emergencies*. 2025.
[209] Ibid.
[210] International Atomic Energy Agency. *Chernobyl: The True Scale of the Accident*. 2005.
[211] World Meteorological Organization. *Emergency Response Activities*. 2025.
[212] Ibid.
[213] Ibid.
[214] Nuclear Energy Agency. *Strengthening nuclear and radiological emergency preparedness, response and recovery*. 2024.
[215] Ibid.
[216] Ibid.
[217] International Atomic Energy Agency. *International Nuclear and Radiological Event Scale (INES)*. 2025.
[218] International Atomic Energy Agency. *International Symposium on Communicating Nuclear and Radiological Emergencies to the Public*. 2018.
[219] Ibid.

challenges, and changes to the field of radio-nuclear emergency preparedness and response.[220] The 2024 meeting highlighted modern challenges that impact response tools and methods, including the threats posed by cyber, severe weather, and conventional conflicts.[221]

The Global Nuclear Safety and Security Network (GNSSN) is both an arrangement and online platform designed to connect Member States, regional bodies, partners, and individuals to improve nuclear security and safety.[222] While this network is not solely focused on emergency preparedness or response, capacity building is highlighted as a main goal.[223] GNSSN includes regional organizations such as the Asian Nuclear Safety Network (ANSN) and the European and Central Asian Safety Network (EuCAS).[224] Established in 2002, ANSN increases regional cooperation by promoting the gathering, sharing, and analyzing of nuclear safety related information amongst its members.[225] EuCAS was created in 2016 with the goal of facilitating better capacity building measures, expertise networks, and knowledge sharing, among other activities; it now includes over 20 Member States and partner organizations in the region.[226]

Protecting the Public in the Wake of a Radiological or Nuclear Incident

Radiation emergencies often impact those living and working close to the incident, with radiation exposure posing significant physical and mental health risks.[227] Individuals may be directly exposed to radiation externally, from radioactive material and its airborne contaminants, or internally, from consuming contaminated food, water, and breathing or absorbing radiological material into skin or open wounds.[228] Radiation exposure may result in a dose so little there are no overt signs to higher doses which may cause physical radiation injuries and even death.[229] Health impacts often vary in significance, ranging from short-term, such as blisters, to long-term, such as cancer.[230] Even if individuals are not directly exposed, they may suffer negative mental health impacts from the trauma of the event and its consequences.[231]

The global standard as low as reasonably achievable (ALARA) sets the objective to minimize the number of exposures and the number of individuals exposed to the lowest possible.[232] Paired with recognizing social and economic factors in protection efforts, ALARA helps ensure the optimization of *The 2007 Recommendations of the International Commission on Radiological Protection* (ICRP).[233] The 2007 Recommendations impose dose restrictions for planned exposure events and calls for radiation exposure

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[220] Jayarajan. International Atomic Energy Agency. *Strengthening Global Cooperation on Nuclear Energy Preparedness*. 2024.
[221] Ibid.
[222] International Atomic Energy Agency. *The Global Nuclear Safety and Security Network (GNSSN)*. N.d. p. 1.
[223] Ibid, p. 2.
[224] Ibid, p. 9.
[225] International Atomic Energy Agency, Global Nuclear Safety and Security Network. *About ANSN*. 2025.
[226] Global Nuclear Safety and Security Network. *EuCAS - European and Central Asia Safety Network*. N.d.
[227] World Health Organization. *Disaster Risk Management for Health: Radiation emergencies*. 2011. p. 1.
[228] Ibid, p. 2.
[229] Geosev. World Health Organization. *Radiation Emergencies*. 2025.
[230] World Health Organization. *Disaster Risk Management for Health: Radiation emergencies*. 2011. p. 2.
[231] Ibid, p. 2.
[232] Nuclear Energy Agency. *Committee on Radiological Protection and Public Health (CRPPH)*. 2025.
[233] Ibid.

to be taken into account in the decision-making process for those activities, limiting exposure when possible.[234] Even with such guidelines and standards, radiation related events of all risk levels often produce public distress.[235] Providing proper risk and safety notifications to the public; effectively managing evacuations, decontamination, and treatment services; and ensuring long-term monitoring of at-risk groups and the environment can help Member States to reduce public panic in the aftermath of an emergency.[236]

The 2018 International Symposium on Communicating Nuclear and Radiological Emergencies to the Public aimed to increase clear messaging during radio-nuclear events through stakeholder and participant engagement, providing information sessions on effective messaging techniques, audience focus, and lessons learned from previous accidents.[237] The international community has also come together to produce documents key to protecting public health, including WHO's *A framework for mental health and psychological support in radiological and nuclear emergencies*.[238] The framework helps to bridge gaps in guidance regarding ongoing health support, combining traditional radiation protection efforts with targeted mental health approaches during immediate and long term response efforts.[239] More recently, the 2024 *Generic procedures for medical response during a nuclear radiological emergency* (EPR-Medical 2024) was published by IAEA to replace the 2005 version as a planning resource for radiological and nuclear related emergencies.[240] This document is a manual; its recommendations are derived from best practices and expert knowledge, ranging in topic from immediate medical response and triage to hospital procedures as well as post-incident mental and physical care.[241] EPR-Medical 2024 helps IAEA fulfill some of its obligations under the Assistance Convention, allowing the organization to share best practices derived from global research and experience with Member States.[242]

Radio-Nuclear Emergencies and the Environment

While low-levels of radiation are naturally present in the environment, radiological emergencies release additional radioactive materials into the atmosphere which are then distributed throughout the Earth's ecosystems.[243] In the case of the Chernobyl reactor meltdown, the United Nations Forum on Chernobyl, cited by the European Parliament, has described a number of long-term radiological impacts including high rates of death in animals, arthropods, and coniferous plants in addition to genetic mutations and reproductive dysfunction in exposed plants and animals.[244] Only recently has radiation protective measures expanded from a human-focused approach to be inclusive of the impacts on flora and fauna

[234] International Commission on Radiological Protection. *The 2007 Recommendations of the International Commission on Radiological Protection*. 2007.
[235] World Health Organization. *Disaster Risk Management for Health: Radiation emergencies*. 2011. p. 2.
[236] Ibid, pp. 1-2.
[237] International Atomic Energy Agency. *International Symposium on Communicating Nuclear and Radiological Emergencies to the Public*. 2018; International Atomic Energy Agency. *CN265 International Symposium on Communicating Nuclear and Radiological Emergencies to the Public*. 2018.
[238] World Health Organization. *A framework for mental health and psychosocial support in radiological and nuclear emergencies*. 2020.
[239] Ibid.
[240] International Atomic Energy Agency. *Generic Procedures for Medical Response During a Nuclear or Radiological Emergency*. 2024.
[241] Ibid.
[242] Ibid.
[243] International Atomic Energy Agency. *Environment*. 2025.
[244] European Parliament. *Chernobyl 30 years on: Environmental and health effects*. 2016. p. 4.

within the environment.[245] While individuals and organizations involved with nuclear material and power are responsible for preventing incidents that could contaminate the environment, accidents and missteps nevertheless occur.[246] As noted in the Joint Plan, national governments hold the primary responsibility to protect the environment, alongside life and property.[247] IAEA and its Member States have become increasingly aware of their roles in protecting the environment, taking steps, for instance, to better manage nuclear waste and to reduce the long term impacts of radiation on ecosystems globally.[248]

Radiological environmental remediation is the process of making radiation affected land and water sources safe for the public, reducing radiation exposure in contaminated habitats.[249] Steps to remediate land may include restricting access to affected areas, cleansing soil and water from radioactive contamination, and implementing post-remediation management plans.[250] This process is affected by IAEA's Safety Standards–which enforce public and environment protection regulations during normal nuclear facility operations and during remediation–alongside other key frameworks.[251] IAEA additionally supports Member States through the Network of Environmental Management and Remediation (ENVIRONET).[252] ENVIRONET is a knowledge and skill sharing system for environmental remediation practices, helping coordinate Member State and organization access to best practices, key skills, training, guidance, and advice forums.[253]

Efforts to protect the environment from undue radiation exposure stem from the 1991 Espoo Convention and were later improved with the adoption of the 2003 SEA protocol.[254] These two frameworks ensure Member States are cognizant of the impacts of radiological and nuclear material involved activity, encouraging Member States to choose construction and activity methods that produce the least amount of harm to the environment in their implementation.[255] More recently, efforts such as the 2020 ICRP Publication 146, titled *Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident*, focus on phases of response to large scale incidents and their impacts on the environment.[256] ICRP Publication 146 specifically looks to learn from the events of Chernobyl and Fukushima and their lasting consequences, aiming to ensure responses to radio-nuclear accidents are

[245] International Atomic Energy Agency. *Environmental release*. 2025.
[246] International Atomic Energy Agency. *Radiological environmental remediation*. 2025.
[247] International Atomic Energy Agency. *Joint Radiation Emergency Management Plan of the International Organizations*. 2017. p. V.
[248] International Atomic Energy Agency. *Radioactive Waste Management: Solutions for a Sustainable Future*. 2023.
[249] International Atomic Energy Agency. *Radiological environmental remediation*. 2025.
[250] Ibid; International Atomic Energy Agency. *Environmental release*. 2025.
[251] International Atomic Energy Agency. *Environmental release*. 2025.
[252] International Atomic Energy Agency. *ENVIRONET*. 2024.
[253] Ibid.
[254] United Nations Economic Commission for Europe. *Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)*. 2017; United Nations Economic Commission for Europe. *Protocol on Strategic Environmental Assessment to the Espoo Convention (SEA Protocol)*. 2017.
[255] Ibid.
[256] Kai et al. International Commission on Radiological Protection. *ICRP Publication 146: Radiological Protection of People and the Environment in the Event of a Large Nuclear Accident*. 2020.

conducted sustainability and consider best practices for directly protecting flora, fauna, and the environment by-large.[257] The world continues to learn from these disasters through scientific and incident response revelations gained from assessments of both the Chernobyl and Fukushima accidents.[258]

Conclusion

While very rare, radio-nuclear accidents and incidents can have devastating short and long-term impacts on people and the environment.[259] It is the ongoing responsibility of the international system, and most importantly national governments, to take steps to uphold nuclear safety by strengthening international standards and engaging in capacity building.[260] Continuing to utilize and maintain radio-nuclear emergency preparedness and response arrangements is critical in limiting the consequences of such events.[261] These steps can help to protect the public from health risks, ranging from immediate radiation related injuries to subsequent psychological impacts.[262] Additionally, bolstering capabilities and response networks can help Member States shelter ecosystems from undue harm from radiation, resulting from both normal uses of nuclear materials and from nuclear emergencies.[263] While IAEA and its partners have worked hard to uphold frameworks and arrangements to address the issue of radio-nuclear incidents, efforts must continue to create sustainable and adaptable preparedness and response solutions all Member States can adopt.[264]

Further Research

As delegates conduct further research and consider how to enhance international and national preparedness and response efforts to radio-nuclear events, they should consider the following: what gaps remain in the modern EPR framework? How can Member States improve their own response capabilities, as well as their capacity to help other Member States during accidents or emergencies? What resources should be given to individuals and families affected by radio-nuclear incidents, especially in the long-term? What initiatives, if any, has their Member State implemented to protect ecosystems from the harms of radiation and exposure to nuclear waste? How can the international community enhance responses to radio-nuclear incidents caused by new and emerging threats, such as cyber, extreme weather patterns, and conventional war?

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[257] Ibid.
[258] Ibid; United Nations, General Assembly. *Report of the United Nations Scientific Committee on the Effects of Atomic Radiation: Sixty-seventh and sixty-eighth sessions (A/76/46).* 2021.
[259] Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024.
[260] International Atomic Energy Agency. *Joint Radiation Emergency Management Plan of the International Organizations*. 2017. p. V; Jayarajan. United Nations Office for Disaster Risk Reduction. *From preparedness to resilience: The role of the IAEA in nuclear and radiological emergency response*. 2024.
[261] International Atomic Energy Agency. *Emergency preparedness and response*. 2025.
[262] World Health Organization. *Disaster Risk Management for Health: Radiation emergencies*. 2011. p. 2.
[263] International Atomic Energy Agency. *Radiological environmental remediation*. 2025.
[264] International Atomic Energy Agency. *Emergency preparedness and response*. 2025; Conference on the Statute of the International Atomic Energy Agency. *Statute of the International Atomic Energy Agency*. 1956.

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International Atomic Energy Agency. *Convention on Early Notification of a Nuclear Accident (INFCIRC/335)*. 1986. Retrieved January 28 2025 from: https://www.iaea.org/sites/default/files/infcirc335.pdf

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International Atomic Energy Agency. *Chernobyl: The True Scale of the Accident*. 2005. Retrieved 31 May 2025 from: https://inis.iaea.org/records/3p9y3-7aa33

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International Atomic Energy Agency. *International Nuclear and Radiological Event Scale (INES)*. 2025. Retrieved 6 February 2025 from: https://www.iaea.org/resources/databases/international-nuclear-and-radiolo gical-event-scale

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