**FORUM:** Environment Commission

**QUESTION OF:** Measures for High-Level Radioactive Waste Management after Nuclear Power Generation

**MAIN SUBMITTER:** United States of America

**CO-SUBMITTERS:** Nepal, Canada, Ethiopia, Saudi Arabia, Niger, Angola, Japan, China, Peru, Iceland

ENVIRONMENT COMMISSION,

*Recognizing* that high-level radioactive waste (HLW) poses significant environmental and health risks, requiring long-term secure management strategies to safeguard ecosystems and future generations,

*Acknowledging* the global challenge of disposing of and storing HLW safely, with current storage systems often limited in terms of capacity, technological advancement, and long-term sustainability,

*Recalling* the importance of international cooperation in addressing the challenges of HLW, as outlined by relevant conventions such as the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management,

*Understanding* the need for rigorous safety standards, innovation in waste processing technologies, and transparent governance to ensure the safe management, disposal, and eventual neutralization of HLW,

*Appreciating* the efforts made by countries that have developed or are in the process of constructing deep geological repositories,

*Emphasizing* the importance of scientific research, public participation, and the implementation of best practices in the establishment of secure HLW management systems,

*Highlighting* the advancements in waste recycling technologies which can reduce the volume and radiotoxicity of HLW and promote resource sustainability,

1. Recommends all Member States to prioritize the safe, long-term containment and disposal of HLW by employing state-of-the-art technologies and practices that ensure security, minimize environmental impact, and account for future generations through methods such as but not limited to:

a) Investing in the development and implementation of deep geological repositories for the permanent isolation of HLW, with rigorous site selection criteria, including ways such as but not limited to:

i. Ensuring seismic stability to reduce the risk of radioactive leakage,

ii. Conducting hydrogeological assessments to prevent groundwater contamination,

iii. Involving local communities in consultations to foster trust and transparency,

iv. Implementing thorough environmental and safety impact assessments to evaluate long-term ecological effects,

b) Promoting the use of advanced containment and monitoring technologies that enhance the security and sustainability of HLW storage, such as but not limited to:

i. Remote sensing technologies for continuous monitoring of waste sites,

ii. Leak detection systems to identify potential risks;

2. Encourages Member States to invest in and accelerate research into innovative waste recycling and reduction technologies that can minimize the volume and radiotoxicity of HLW in such ways, but not limited to:

a) Supporting the development of pyro-processing and other advanced reprocessing technologies aimed at reducing the overall waste burden, through the ways including, but not limited to:

i. Promote joint international research initiatives to share knowledge and expertise,

ii. Fund pilot programs to demonstrate effective large-scale applications,

b) Fostering international collaboration on advanced recycling techniques that can recover valuable nuclear materials through facilitating cross-border research partnerships, providing a framework for sharing technological advancements,

c) Increasing financial and technical support for the development of waste reduction technologies, including:

i. Offering grants to companies and research institutions,

ii. Funding demonstration projects that focus on waste minimization,

iii.Encouraging public-private partnerships for innovation in nuclear waste management;

3.Calls for the establishment of a global, standardized HLW database, coordinated by an international body such as the International Atomic Energy Agency (IAEA), to track and monitor HLW worldwide, ensuring accountability, transparency, and global cooperation, including:

a) Create a universal reporting framework that requires all countries to report on HLW inventory, types, and storage conditions, with:

i. Public access to the database for transparency,

ii. Regular updates and audits to ensure accuracy,

iii. Secure handling of sensitive information while maintaining transparency;

b) Facilitating international information-sharing on best practices and technologies for HLW management, including such as but not limited to:

i. Forming working groups to address technical and regulatory challenges,

ii. Organizing workshops and training to foster knowledge exchange,

iii. Holding international conferences to share research findings and lessons learned,

c) Ensuring compliance with international standards through independent monitoring and assessment of national HLW programs, including periodic audits of HLW storage facilities, the development of independent oversight bodies to ensure adherence to safety regulations, and the public release of monitoring reports to foster transparency and accountability,

d) Strengthening global cooperation on HLW issues through coordinated policy frameworks and multilateral agreements that harmonize HLW management standards and promote cross-border collaboration on storage and disposal solutions;

4. Requests that all Member States launch public awareness campaigns in collaboration with international organizations, including the IAEA and relevant NGOs, to educate and engage communities on the safe management of HLW, emphasizing the importance of transparency and informed participation in ways but not limited to:

1. Launching education initiatives to inform the public and local governments about the risks and safety measures related to HLW, through efforts such as but not limited to:

i. Community outreach programs to explain disposal processes,

ii. Public forums for open dialogue and questions,

iii. Distribution of educational materials such as pamphlets and videos,

1. Integrating HLW management into national school curricula to build early awareness, with topics including, but not limited to:

i. The science of radioactive waste and its environmental impact,

ii. The role of waste management technologies,

iii. The ethical implications of nuclear waste disposal,

1. Facilitating ongoing dialogue between governments, local communities, and industry stakeholders by methods such as but not limited to:

i. Ensuring public consultations are held regularly to discuss concerns and solutions,

  ii. Involving local communities in decision-making processes,

iii. Sharing information transparently to build trust and accountability;

5. UrgesMember States to enhance international governance and regulatory frameworks for HLW management by promoting cooperation through existing bodies such as the United Nations and the IAEA, and by creating new multilateral initiatives that ensure global compliance and foster innovation, including:

a) Strengthening international cooperation on harmonizing global standards for the safe management of HLW, such as but not limited to:

i. Setting binding international regulations for storage and disposal practices,

ii. Creating a global treaty to enforce safe waste management protocols,

b) Supporting the creation of an independent international body to oversee and monitor the implementation of global HLW standards, with:

i. Powers to inspect national facilities and recommend improvements,

ii. The ability to monitor compliance through periodic assessments,

iii. Mandates for countries to submit regular progress reports to ensure adherence to established guidelines;

6. Encourages Member States to utilize robots in the management of high-level radioactive waste following nuclear power generation to improve safety, efficiency, and minimize human exposure to radiation in such ways but not limited to:

a) Developing and deploying systems that are specifically designed to withstand high-radiation environments, such as but not limited to:

i.Integrating advanced radiation shielding technologies, or the Advanced Radiation Protection(ARP) to extend robot operational life in hazardous areas,
ii. Equipping robots with radiation detection sensors to dynamically monitor radiation levels and adapt their operations accordingly,

b) Promote the integration of mechanic systems into existing radioactive waste management infrastructures, enabling unified coordination between human operators and robotic technologies at every stage of the waste management process,

c) Establish international standards for the design, certification, and operation of robotic systems used in HLW management, with:

i.Rigorous testing procedures to ensure robots meet safety and durability requirements for high-radiation environments,
ii. Independent certification by recognized authorities to ensure global compliance

with operational standards,

d) Encourage research, innovation, and international collaboration on advanced robotics technologies to further enhance waste management capabilities, including providing funding and support for multinational research initiatives.