The International Atomic Energy Agency (IAEA)

Topic:

Strategies for Lowering Environmental Degradation and Land Contamination Associated with Nuclear Power Generation and Radioactive Waste Management

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I. Quorum

- Argentina
- Australia
- Belgium
- Brazil
- Canada
- China
- Czech Republic
- Finland
- France
- Germany
- Hungary
- India
- Japan
- Lithuania
- Malaysia
- Netherlands
- Romania
- Russia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Ukraine
- United Kingdom
- United States
- Vietnam

II. Committee Background

The International Atomic Energy Agency was officially established on 29 July 1957. Speaking to the correspondent after a ceremony in the Rose Garden of the White House, Washington D.C., President Eisenhower restated his address to the UN General Assembly in December 1953 when he proposed setting up the IAEA.

Nuclear technology and its contentious uses as a weapon or as a helpful and practical instrument are closely associated with the IAEA. One of the main national security goals of the United States is to avoid the improper use of nuclear weapons, and the IAEA helps achieve this goal. To ensure that nuclear activities remain peaceful, it has appointed nuclear safeguards, which include monitoring, inspection, analysis, and other activities. “The IAEA warns the international community about suspected cases of nuclear proliferation and works to ensure that states are fulfilling their commitments to accept safeguards on all nuclear material for peaceful use” (History |IAEA, n.d.)

To sum up, "The Atoms for Peace" was created by President Eisenhower and submitted to the UN General Assembly. They founded the worldwide Atomic Energy Agency, which inspires responsible and safe worldwide

nuclear trade and collaboration. To make sure that the lawful commercial transfer of U.S. goods and services is implemented responsibly, IAEA safeguards are essential for shared nuclear cooperation between other countries and the United States. Its goal is to verify the security, safety, and peace of the nuclear business in the United States.

III. History of Topic

I want to start by learning more about nuclear power generation and radioactive waste. Regardless of the fuel utilized, waste is produced when electricity is generated. To safeguard both the environment and human health, this waste needs to be controlled. While the majority of radioactive waste is controlled and contained, some must be buried deeply and

permanently. “Nuclear power generation confines all of its waste, in contrast to other forms of thermal electricity generation” (*Radioactive Waste Management*, 2022)

The majority of nations, including the United States, Argentina, Australia, Belgium, Canada, Czech Republic, Finland, France, Japan, Netherlands, Republic of Korea, Russia, Spain, Sweden, and Switzerland, as well as the United Kingdom, chose deep geological disposal for nuclear waste management. The idea of disposing of radioactive waste underground is nearly as old as nuclear energy. The idea is straightforward: garbage is disposed of in containers that are buried more than a few hundred meters below the surface. Additionally, evaporation of liquid waste and cremation of solid waste are two popular treatment methods. To transport, store, and dispose of the waste, the third stage of process conditioning transforms it into a form that is safe, stable, and manageable.

To achieve the Sustainable Development Goals (SDGs) of the UN, waste management is essential. It encompasses a variety of methods and

approaches meant to encourage responsible production and consumption as well as waste reduction, reuse, and recycling. The International Atomic Energy Agency (IAEA) is currently in charge of drafting a Convention on the Safety of Radioactive Waste Management, even though there are no international agreements for the generation of radioactive waste. Contracting parties may be required by this Convention to account for waste inventories.

IV. Topic Information

The Department of Energy (DOE) is an intergovernmental organization that makes sure that energy is used and distributed correctly and addresses nuclear and environmental challenges through transformative technology and science solutions. DOE focuses on the spent of nuclear fuel and oversees the waste from weapons programs. However, “DOE estimates that about 90% of the volume of the waste contains 10% of radioactivity. It examines this portion of the waste to be low-activity waste, which experts believe may be safely treated and disposed of with methods other than vitrification.” (*Nuclear Waste Disposal | U.S. GAO*, n.d.). Vitrification means converting into glass or a glass-like substance by exposure to heat. This is mainly focused on the United States of America.

Meanwhile, the primary challenges in radioactive waste are managing spent fuel, transferring information of long-term storage to future generations, and the elevated levels of radioactive waste that are hugely harmful to humans and can take hundreds of years to decay. It’s also difficult to dispose of due to its radioactivity and hazardous properties. Improper disposal can severely contaminate the soil.

Some of the top authorities on nuclear waste were commissioned by Greenpeace to create a summary of the state of nuclear waste worldwide. “

The toxic legacy of decades of nuclear reactor operation and all the waste that is still produced to support it remains a central element in any debate on the future of nuclear power" (*THE GLOBAL CRISIS OF NUCLEAR WASTE*, n.d.). Including decisions on nuclear reactor phase out, as the nuclear industry finds it difficult to compete in the fast-changing global energy market. The amount of nuclear waste produced worldwide will increase with each year that a nuclear reactor is in operation. Every nation under review was found to be without a safe and sustainable way to handle the enormous amounts of radioactive waste. All nuclear reactors produce high levels of spent fuel, for which there are currently no safe and secure long-term disposal options.

On the other hand, the waste can be reused; the spent nuclear fuel can be recycled to make fuel and byproducts. Countries like France, Japan, Russia, China, and Italy are currently recycling their spent nuclear fuel. "Nuclear waste protects our air quality as a form of zero emission clean energy. And that is because nuclear fission generates electricity without the harmful byproducts that coal, natural gas, and oil emit" (*Air Quality*, n.d.)

V. Current Issues

China:

"China is the world's most populated country and has an enormous export market, which we can say by now that its industry is growing to become a danger to our environment." (*Top 5 Most Polluting Countries*, n.d..). China

has a percentage of pollution by radiation in global statistics of 30% due to the big emission of carbon dioxide. Also, Chinese communities rely on coal-powered power plants and coal-burning heating sources.

Yet, China started to perform certain programs of the decommissioning of nuclear facilities and radioactive waste management. China has the disposal capability for radioactive solid and liquid waste, and the technical support system is now in place, which will reduce the harm to nuclear safety and the environment.

Japan:

On March 11, 2011, there was a natural disaster in Tokyo. The Great East Japan Earthquake and tsunami initiated a severe nuclear accident at the Fukushima Daiichi nuclear plant. At the plant, three of the six reactors sustained severe core damage and released hydrogen and radioactive materials.

We have to keep in mind that as a result of the Fukushima Daiichi power plant accident, radioactive material was released into the atmosphere and the marine environment. This led to an immediate fallout and the contamination of surfaces in local areas.

Costa Rica:

Costa Rica generates around 99% of its electricity from renewable sources. Agriculture and climate are the two main factors of most crucial natural resources, the country has few mineral resources. Hydroelectricity is the central source of energy, They use systems that store water in a reservoir behind a dam. Water is released through turbines to create energy. One amazing benefit of these actions is the low carbon footprint and sustainability. The country frequently generates 98% or more of its electricity from renewable sources, with hydroelectricity contributing a large portion of that. This also helps the country maintain a very low carbon footprint compared to other nations.

Although Costa Rica has a lot of renewable energy, sometimes they rely on seasonal variability; for example, their use of hydroelectricity can be affected by “El Niñ,o” a phenomenon that causes severe drought on the Pacific coast. This will affect the water flow and energy generation.

Germany:

Germany decided to close their nuclear plants, this made the “Energiewende,” which is a plan to transform all energy into renewable energy. This was after the Fukushima disaster. Over 50% of the gross electricity generated in Germany in 2023 came from renewable sources, with wind power being the most prominent. However, the country is still heavily reliant on fossil fuels for domestic power production.

To connect Almost all the world’s countries are responsible for the elevation of global pollution. The situation is so critical that the

International Energy Agency (IEA) has forecast an increase in emissions of 130% by 2050 if we continue unabated.

VI. UN Actions

Remember, nuclear safety is the responsibility of all nations that have the use of nuclear technology. The IAEA is the UN agency that focuses on nuclear and atomic energy. In other words, IAEA is the committee that supplies a visible and sustainable global nuclear safety and security framework for our environment and society. "NPT (Non-Proliferation of Nuclear Weapons), an international treaty that aims to prevent the spread of nuclear weapons and weapons technology, and checks that the nuclear materials are only used for peaceful purposes" (*Atomic Energy | United Nations*, n.d.)

Furthermore, the UN Decade on Ecosystem Restoration is a global initiative that ensures the prevention and reversal of the degradation of ecosystems worldwide. While it addresses a ton of ecosystem challenges, including deforestation, desertification, and loss of biodiversity, it also acknowledges the need for restoration in areas affected by various forms of environmental degradation, including those impacted by nuclear incidents.

VII. Conclusion

In conclusion, the International Atomic Agency works on the intersection of nuclear power and environmental degradation. It aims to ensure that nuclear energy is used safely and effectively for the benefit of people and the environment. It's a great help for countries that have a lot of radioactive waste and lack of renewable energy, because this agency's priority is the health of our environment and reducing radioactive pollution. All of the previous organizations were created in response to global concerns about nuclear weapons and the potential for their proliferation. Its primary goals are to promote the peaceful use of nuclear energy while ensuring that these technologies are not diverted for military purposes. The topic of environmental degradation isn't a future issue, this is a problem we need to take into consideration now for future generations. Let's give our environment the seriousness it deserves.

VIII. Guiding Questions IX.

1. “How do the economic and political situations of countries like Costa Rica, which relies heavily on renewable energy, influence their approach to nuclear power and radioactive waste management?”
2. “What challenges do developing nations face in managing nuclear waste, and how does international aid or the lack thereof affect their ability to dispose of radioactive materials?”
3. “How have international treaties like the Nuclear Non-Proliferation Treaty (NPT) and the Convention on the Safety of Radioactive Waste Management shaped the political landscape of nuclear energy and waste disposal?”
4. “What are the political challenges in enforcing international agreements on nuclear waste management, and how do countries navigate their obligations under these treaties?”
5. “How does China’s growing nuclear energy sector, combined with its significant pollution levels, influence global discussions on nuclear energy and environmental responsibility?”
6. “In light of China’s reliance on coal and nuclear power, what political and economic pressures does the country face in transitioning to more sustainable energy sources while managing its nuclear waste?”
7. “What innovative technologies could be developed to improve the safety and efficiency of deep geological disposal of nuclear waste? “
8. “How might advances in robotics or AI contribute to safer, more effective waste storage?”

9. “What novel reactor designs, such as thorium reactors or small modular reactors, could offer safer and more sustainable alternatives to traditional uranium-based reactors while minimizing radioactive waste production?”
10. “How can innovations in reactor design contribute to reducing the long-term environmental impact of nuclear energy, especially concerning land contamination and radioactive material leakage?”

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