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# **International Atomic Energy Agency**



## **TritonMUN XII**

Chaired by Reina Ishii

# Topic: Radioactive Waste

## I. Background

Since the end of the nineteenth century, there have been many issues and concerns regarding radioactive material within the international community. Radioactive material draws attention due to the contamination it brings to the environment and human life. Many radioactive waste products originate from by-products of nuclear power generation and nuclear technology used in research, medicine, energy resources, and nuclear warfare. Although there are methods of disposing of it, there is still a sufficient amount of waste left, which drives concerns for the health of the global community.

As stated previously, radioactive waste is produced from nuclear fuel. The initial concerns about this waste when it is first being processed are the levels of toxicity it contains, because of the remains of isotopic transition metals and uranium, and the amount of time it takes to decay. The decay time for these by-products vary based on the materials that were previously used and are remaining; the decay period can range between 50 to over 25,000 years.<sup>1</sup> Since radioactive waste contains highly contaminated material and is extremely hazardous, it must be isolated and confined in a designated area in which it can be left to decay.<sup>2</sup> Even so, many nations so far have been efficiently using these nuclear remains by recycling the fuel, since there is still material left that can provide some energy use.<sup>3</sup> However, each of these methods is determined by the starting material of the nuclear fuel. The starting fuel can help determine the by-products produced, decay time of the fuel, and whether or not the remains can be used as

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<sup>1</sup>United States Nuclear Regulatory Commission. "Backgrounder on Radioactive Waste." *U.S. NRC*. United States Nuclear Regulatory Commission, 3 Apr. 2015. Web. 15 Aug. 2015.

<sup>2</sup>"What Is Nuclear Waste?" *Whatisnuclear.com*. Whatisnuclear.com, 2014. Web. 15 Aug. 2015.

<sup>3</sup>*Ibid*.

recyclable fuel. So far, the protocol to dispose such material is generally the same throughout the world, but there are some factors that need to be taken into consideration.

On a global scale, different types of radioactive waste exist within certain countries and regions around the world. Due to the variation of severity in radioactive waste, there are different protocols for both managing and disposing such waste. According to the World Nuclear Association, there are four different levels in which the radioactive waste can be categorized. The lowest level of all is known as “exempt waste & very low level waste (VLLW),” which indicates that the radioactive waste does not contain any hazardous material that can significantly harm humans or the environment.<sup>4</sup> An example of this level’s waste is mineral waste or material that can be found in dismantling operations, such as concrete, bricks, and piping.<sup>5</sup> The next level is low-level waste (LLW). This level of waste can come from hospitals and industries, but it is short-lived radioactivity, including paper, rags, and tools.<sup>6</sup> Intermediate-level waste (ILW) is waste that exposes more radioactivity and is typically found in chemical sludge and at radioactive sites.<sup>7</sup> The highest level to classify radioactive waste is high-level waste (HLW), which is the main concern of the international community; this material comes directly from the nuclear technology that uses such fuels to operate.<sup>8</sup> The difficulty of having high-level waste is that the material found in this level can be both long and short-lived, which is based on the material being used and produced. With each level of radioactive waste, there are different methods of disposing of these hazardous materials.

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<sup>4</sup>World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*. World Nuclear Association, July 2015. Web. 15 Aug. 2015.

<sup>5</sup>Ibid.

<sup>6</sup>Ibid.

<sup>7</sup>Ibid.

<sup>8</sup>Ibid.

For many countries that have experience using radioactive materials, they already have an idea of what measures to take for each of the different levels of waste. One method used in areas that have nuclear reactors that use uranium and plutonium is recycling the used fuel. Many nations have reused the by-products formed from the reactors, since the remains of the fuel are sufficient enough to produce energy.<sup>9</sup> The material being used is not the same as the initial material, but due to the isotopic characteristics the by-products have from the starting material, this allows the nuclear fuel to be reused with lower nuclear energy production, but less exposure to radioactive waste. However, after a while such material can no longer be recycled. Many countries limit recycling to one or two cycles. In the end, the hazardous material will eventually need to be properly disposed of in order to avoid any contamination and further exposure to radioactivity to the environment.

Due to the difference in levels of radioactivity in nuclear waste, each level is disposed of in its own way. Very low-level waste is disposed of in the same manner as normal waste or even reused for other purposes, or recycling. Low and intermediate-level wastes are buried close to the surface, in a similar manner to landfill, since they have lower decay times.<sup>10</sup> For high-level waste and sometimes intermediate-level waste, the final step for proper disposal of these nuclear by-products includes isolating the material and confining it in a designated area. When the nuclear fuel can no longer be reused, radioactive material is transferred into a concrete cask and placed in different areas. Some countries will bury it deep within the Earth's crust in a deserted location, and others will dispose of casks underwater.<sup>11</sup> Along with the cask, there are more layers that help to protect the environment from exposure to radioactivity. These outer layers are

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<sup>9</sup>Ibid.

<sup>10</sup>World Nuclear Association. "What Are Nuclear Wastes?" *World Nuclear Association*. World Nuclear Association, n.d. Web. 17 Aug. 2015.

<sup>11</sup>World Nuclear Association. "Waste Management Overview." *World Nuclear Association*. World Nuclear Association, Dec. 2012. Web. 17 Aug. 2015.

“insoluble matrix, corrosion-resistant container, bentonite clay, and stable rock structure;” In order for any radioactivity to be exposed, all of the listed layers must be penetrated.<sup>12</sup> These casks are placed in their designated locations for almost 1000 years, since most of the radioactive material should have decayed at that point.<sup>13</sup> The remaining material in the casks is later used in reactor cores due to its high concentration.<sup>14</sup>

Radioactive waste has been monitored and managed for quite some time, but financing the management and disposal of such hazardous material is costly. When managing radioactive waste, it is important to take into consideration what level of waste it is to determine what protocols must be pursued. Most of the funds for radioactive waste management come from private companies and industries, as well as the government, but this is not enough funding for areas that have a significant amount of waste.<sup>15</sup> However, since most areas do not use nuclear energy, there are administrative restrictions on matter, such as where and from whom these funds come. Waste management of radioactive waste is a multi-million dollar industry, but most programs fail to properly dispose of waste or require new protocols in order to efficiently eliminate it.<sup>16</sup>

## II. United Nations Involvement

The International Atomic Energy Agency (IAEA), was established by the United Nations in order to find better usage of nuclear energy in peaceful manners, as well as procedures to

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<sup>12</sup>Ibid.

<sup>13</sup>Ibid.

<sup>14</sup>Ibid.

<sup>15</sup>World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*. World Nuclear Association, July 2015. Web. 15 Aug. 2015.

<sup>16</sup>Nuclear Energy Institute. "Costs: Fuel, Operation, Waste Disposal & Life Cycle." *NEI - Nuclear Energy Institute*. Nuclear Energy Institute, n.d. Web. 18 Aug. 2015.

properly use and dispose of nuclear material around the world. The IAEA assists the international community in establishing tailored disposal programs for radioactive waste management, developing disposal facilities based on geographic and geological conditions, preserving and disseminating the operational knowledge of waste disposal, upgrading repositories, providing enhanced training with technology and professionals, addressing the safety, scientific, technical, institutional and socio-political issues in relating to waste management, and prosecuting investigations of facilities used world-wide.<sup>17</sup> With regard to these goals, the IAEA has achieved active participation from many member states.

Understanding the concerns of radioactive waste, the IAEA has created and recommended safety standards and guidelines for nations to follow in order to reduce exposure to hazardous material.<sup>18</sup> In terms of radioactive waste management, the International Atomic Energy Agency has set a list of nine fundamental principles: protection of human health, protection of environment, protection beyond national borders, protection of future generations, burdens on future generations, national legal framework, control of radioactive waste generation, radioactive waste generation and management inter-dependencies, and safety of facilities.<sup>19</sup> Based off of these principles, many nations have developed their own protocols tailored to the nation's usage of nuclear technology. More importantly for the IAEA and nations' protocols, these sets of guidelines must adhere to the Non-Proliferation Treaty (NPT).<sup>20</sup> The NPT is a treaty ratified in 1968 and is based upon the views of non-proliferation, disarmament, and the right to

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<sup>17</sup>International Atomic Energy Agency. "Radioactive Waste Disposal." *Nuclear Fuel Cycle & Waste Technology*. International Atomic Energy Agency, 28 May 2013. Web. 22 Aug. 2015.

<sup>18</sup>World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*. World Nuclear Association, July 2015. Web. 15 Aug. 2015.

<sup>19</sup>"IAEA Safety Fundamentals: The Principles of Radioactive Waste Management (Extract from Safety Series No III-F - An IAEA Publication within the RADWASS Programme)." *The Environmental and Ethical Basis of Geological Disposal of Long-Lived Radioactive Wastes*. OECD, n.d. Web. 25 Aug. 2015.

<sup>20</sup>Ishii, Reina. *Disposal of Nuclear Weapons and Implementation of Nuclear-Weapon-Free Zones*. 2013. TS. Collection of Reina Ishii, La Jolla, CA.

pursue the peaceful use of nuclear technologies.<sup>21</sup> This treaty calls upon all non-nuclear states to allocate all nuclear technologies to those states that have the ability to possess them (i.e. P5 members and a selected few).<sup>22</sup> The treaty focuses on the refusal to use any of the nuclear arms for military purposes, the need to set up a system of verification to prevent the spreading of nuclear weapons into unapproved nuclear states, and the maintenance of friendly and open discussions between member states.<sup>23</sup> This treaty focuses on the need for all nations to participate in a regulatory protocol when dealing with nuclear technology, because it is hazardous to the human and the environmental, as well as life within the international community. Along with the NPT, the IAEA's Waste and Environmental Safety Section has agreed upon different safety standards for handling radioactive waste.<sup>24</sup> Knowing that every nation has different concerns and methods of handling such situations, the IAEA established the Radioactive Waste Safety Standards Programme (RADWASS), in order to assist member states of the IAEA in generating their own set of rules and regulations, when managing and disposing of radioactive waste.<sup>25</sup>

The IAEA has created many publications in informing and instituting protocols that help improve safety standards when handling radioactive material. In 2006, IAEA published safety standards focused on geological disposal of radioactive waste, which distinguishes different methods that can be considered when disposing radioactive material based on the available resources and geological conditions of the location.<sup>26</sup> By 2009, IAEA issued two other publications of safety standards in regards to predisposal management, and classification of

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<sup>21</sup>Ibid.

<sup>22</sup>Ibid.

<sup>23</sup>Ibid.

<sup>24</sup>World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*. World Nuclear Association, July 2015. Web. 15 Aug. 2015.

<sup>25</sup>Ibid.

<sup>26</sup>International Atomic Energy Agency. *Geological Disposal of Radioactive Waste*. Vienna, Austria: IAEA, 2006. WS-R-4. *International Atomic Energy Agency*. IAEA, 2006. Web. 25 Aug. 2015.

radioactive waste.<sup>27,28</sup> Since the disposal process for all levels of radioactive waste is performed similarly, based on geographic and geological circumstances, IAEA acknowledges that these methods work for most member states. However, it is important to once again that these methods of disposal and recycling require a large quantity of funds. Therefore, the International Atomic Energy Agency continues to find ways of helping developing countries, lacking sufficient funds, to utilize nuclear energy properly and efficiently. Also, since the production of nuclear waste is growing, it is important for the international community to work collaboratively with IAEA in order to develop better methods to store and dispose of radioactive material.

### III. Questions to Consider

1. In areas with nuclear activity, what levels of radioactive waste is present? Are these materials properly disposed of?
2. When developing new rules and regulations for radioactive waste management, what are the factors that need to be taken into consideration?
3. How much do environmental, socio-political, and financial principles play a role when creating new protocols?
4. Are there any methods that previously worked for member states that should be considered in order to help better improve waste management?
5. How can the international community help improve and increase the involvement and participation in radioactive waste management?

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<sup>27</sup>International Atomic Energy Agency. *Predisposal Management of Radioactive Waste*. Vienna, Austria: IAEA, 2009. GSR Part 5. *International Atomic Energy Agency*. IAEA, 2009. Web. 25 Aug. 2015.

<sup>28</sup>International Atomic Energy Agency. *Classification of Radioactive Waste*. Vienna, Austria: IAEA, 2009. GSG-1. *International Atomic Energy Agency*. IAEA, 2009. Web. 25 Aug. 2015.



## IV. Suggested Sites

**For more about the UN and the International Atomic Energy Agency**

IAEA Website: <https://www.iaea.org/>

IAEA Relationship with the UN:

<https://www.iaea.org/technicalcooperation/Partnerships/Relation-UN/index.html>

UN Charter: <http://www.un.org/en/documents/charter/>

**For general information regarding international affairs and country profiles:**

CIA World Factbook: <https://www.cia.gov/library/publications/the-world-factbook/>

BBC World News Country Profiles: [http://news.bbc.co.uk/2/hi/country\\_profiles/default.stm](http://news.bbc.co.uk/2/hi/country_profiles/default.stm)

**For more about Radioactive Waste Management:**

IAEA Safety Standards :

<http://www-ns.iaea.org/standards/documents/default.asp?s=11&l=90&sub=40>

IAEA Waste Technology Section:

<https://www.iaea.org/OurWork/ST/NE/NEFW/Technical-Areas/WTS/disposal.html>

IAEA Radioactive Waste Management News Center:

<https://www.iaea.org/newscenter/focus/radwaste-management>

IAEA Radioactive Waste Management Publications :

<http://www-ns.iaea.org/standards/documents/topics.asp?sub=170>

**For Model UN tips and guidelines:**

Best Delegate: <http://bestdelegate.com/>

## V. Works Cited

International Atomic Energy Agency. *Classification of Radioactive Waste*. Vienna, Austria:

IAEA, 2009. GSG-1.

International Atomic Energy Agency. *Disposal of Radioactive Waste*. Vienna, Austria: IAEA,

2006. SSR-5.

International Atomic Energy Agency. *Geological Disposal of Radioactive Waste*. Vienna,

Austria: IAEA, 2006. WS-R-4. *International Atomic Energy Agency*. IAEA, 2006. Web.

25 Aug. 2015.

International Atomic Energy Agency. *Predisposal Management of Radioactive Waste*. Vienna,

Austria: IAEA, 2009. GSR Part 5. *International Atomic Energy Agency*. IAEA, 2009.

Web. 25 Aug. 2015.

"IAEA Safety Fundamentals: The Principles of Radioactive Waste Management (Extract from

Safety Series No III-F - An IAEA Publication within the RADWASS Programme)." *The*

*Environmental and Ethical Basis of Geological Disposal of Long-Lived Radioactive*

*Wastes*. OECD, n.d. Web. 25 Aug. 2015.

Ishii, Reina. *Disposal of Nuclear Weapons and Implementation of Nuclear-Weapon-Free Zones*.

2013. TS. Collection of Reina Ishii, La Jolla, CA.

Nuclear Energy Institute. "Costs: Fuel, Operation, Waste Disposal & Life Cycle." *NEI – Nuclear*

*Energy Institute*. Nuclear Energy Institute, n.d. Web. 18 Aug. 2015. "What Is Nuclear

Waste?" *Whatisnuclear.com*. Whatisnuclear.com, 2014. Web. 15 Aug. 2015. World Nuclear

Association. "What Are Nuclear Wastes?" *World Nuclear Association*. World Nuclear

Association, n.d. Web. 17 Aug. 2015.

World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*.

World Nuclear Association, July 2015. Web. 15 Aug. 2015.

World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*.

World Nuclear Association, July 2015. Web. 15 Aug. 2015.

World Nuclear Association. "Waste Management Overview." *World Nuclear Association*. World Nuclear Association, Dec. 2012. Web. 17 Aug. 2015.

United States Nuclear Regulatory Commission. "Backgrounder on Radioactive Waste." *U.S*

*NRC*. United States Nuclear Regulatory Commission, 3 Apr. 2015. Web. 15 Aug. 2015.

World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*.

World Nuclear Association, July 2015. Web. 15 Aug. 2015.

World Nuclear Association. "Radioactive Waste Management." *World Nuclear Association*.

World Nuclear Association, July 2015. Web. 15 Aug. 2015.