Forum: General Assembly 1 – Disarmament and International Security

Issue: The question of effectively dealing with nuclear waste.

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Introduction

The start of the 21st century has been highlighted with growing concerns over global warming, environmental degradation and various other grave issues facing our Earth. The UN proposed a set of Millennium Development Goals (MDGs) that all countries would aim to achieve and in this manner, restore order in the world. One of the main goals in these set of aims includes achieving sustainable development. Sustainable development is essentially development that meets the needs of the present without compromising the ability of future generations to meet their own needs and access resources.

In order to achieve sustainable development, several techniques have been suggested foremost of which is the use of alternative or non-conventional sources of energy. These include solar, wind, tidal, nuclear energy etc. Those based on natural sources such as solar and wind energy is highly volatile on the basis of the climate. Nuclear energy on the other hand, is easily accessible and generates much larger amounts of energy. If exploited properly, it can be put to use on a large scale and solve some of the energy crises facing the world. However, the main issue with implementing nuclear energy relates to the type and amount of nuclear waste produced during energy conversion. Thus, the concept of nuclear waste and tackling it is an important one in our present world. Solving this issue would make the use of nuclear energy much more effective and the overall plans of sustainable development would be better undertaken.

As delegates, it is your purpose to understand this topic from the point of view of your country and design solutions that will relate to both your country and other member nations of the UN. Before doing this, delegates should be aware of the key definitions relating to this topic and the previous solutions used to combat this issue.

Definition of Key Terms

Nuclear Waste

Nuclear waste is a waste product containing radioactive material. It is usually the product of a nuclear process such as nuclear fission through industries not directly connected to the nuclear power industry may also produce nuclear waste. Nuclear waste is also loosely termed as radioactive waste. When discussing nuclear waste specifically, it can also be divided into several different types.

High Level Waste (HLW)

It is a type of nuclear waste created by the reprocessing of spent nuclear fuel. It exists as both raw waste such as spent raffinate and other waste streams created by nuclear reprocessing, and waste formed by vitrification of the raw waste. (RSC 1)

Intermediate Level Waste (ILW)

It also contains many long-lived radioactive elements, but they do not generate significant amounts of heat. ILW includes used reactor components and fuel casings. (RSC 2)

Low Level Waste (LLW)

This comprises mainly of contaminated lab waste such as gloves. LLW is less radioactive than the other categories but still requires careful storage and disposal. (RSC 3)

Nuclear Reprocessing

Nuclear reprocessing separates components of spent nuclear fuel. Reprocessing serves multiple purposes, whose relative importance has changed over time. In simple words, it is the process by which any usable elements such as uranium and plutonium are separated from fission products and other materials in spent nuclear reactor fuels.

General Overview/UN Perspective

The idea of using nuclear reactions as a source of energy is a relatively new concept. Hence, the threat of nuclear waste to our environment has also arisen only recently but the UN has already initiated a strong stance against the generation of harmful, toxic nuclear waste.

Wastes – The Theory behind them

Nuclear power produces wastes which are contained and managed, with the cost of this being met by the electricity customer at the time. It does not produce any significant wastes which are

dispersed to the environment. It therefore avoids contributing to increased carbon dioxide levels in the atmosphere.

The main wastes produced by "burning" uranium in a nuclear reactor are very hot and radioactive, placing them among the most unpleasant wastes from modern industry. However, these "high-level" nuclear wastes are modest in quantity. Handling and storing them safely is quite straightforward, they simply need to be shielded from human exposure, and cooled. Shielding can be by water, concrete, steel or other dense material, cooling is by air or water. For instance, when spent fuel is removed from a typical reactor, it is done under water and the spent fuel is transferred to a large storage pool where it may remain for up to 50 years.

About 30 kg of spent fuel arises each year in generating enough electricity for about 1000 people in the western world. The management and disposal of these wastes is funded from the time they are generated.

Other radioactive wastes also arise from the nuclear fuel cycle, these have greater volume but are more easily handled and disposed of. One characteristic of all radioactive wastes which distinguishes them from the very much larger amount of other industrial wastes is that their radioactivity progressively decays and diminishes. For instance, after 40 years, the spent fuel removed from a reactor has only one thousandth of its initial radioactivity remaining, making it very much easier to handle and dispose of. (World Nuclear Association 1)

Chernobyl Nuclear Disaster

The Chernobyl disaster was a nuclear accident that occurred on 26 April 1986 at the Chernobyl Nuclear Power Plant in Ukraine. The disaster occurred at nuclear reactor number four in the Chernobyl plant and as a sudden rapid growth in power output took place, and when an attempt was made for emergency shutdown, an unexpected and more extreme spike in power output occurred which led to a reactor vessel rupture and a series of explosions.

In context to the issue, the Chernobyl disaster lead to radioactive waste being discharged into the atmosphere that spread through entire Europe. Since the USSR did not have proper and effective nuclear storage facilities, this disaster became more infectious and dangerous. . In total, nearly 5000 people died directly due to the toxic waste of the nuclear reactor while it was approximated that over 60,000 people had been indirectly affected by the incident. Thus, countries should prioritize and resources and time to dealing with nuclear waste since, if this issue is neglected it can cause widespread risk to the human race and our Earth.

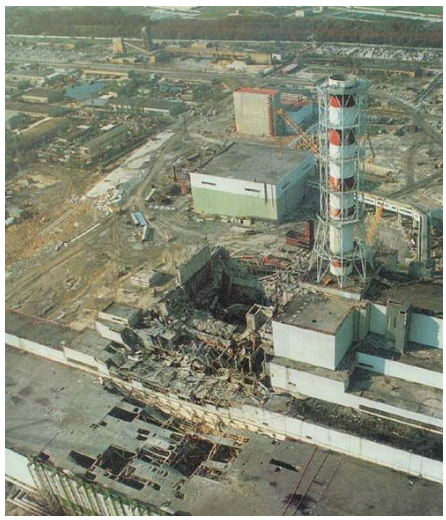

Image: The extent of damage caused by the Chernobyl Nuclear Disaster in the former USSR, modern day Ukraine. (Source: Electrodes Wordpress)

What has been happening recently?

The safe and environmentally sound management of radioactive wastes is the subject of Chapter 22 of Agenda 21. The chapter notes that the radiological and safety risk from radioactive waste varies from very low for short-lived, low-level waste, to very large for high-level waste. Annually, about 200,000m^3 of low-level and intermediate level waste and 10,000m^3 of high level waste are generated from nuclear power production and these volumes are increasing.

The objective of Chapter 22 is to ensure that radioactive waste is safely managed, transported, stored and disposed of, with a view to protecting human health and the environment, within the wider framework of an interactive and integrated approach to radioactive waste management and safety.

The Commission on Sustainable Development considered the safety of radioactive wastes during its seventh session in 1999, in relation to transboundary movement of this waste, and again during its ninth session in 2001, in relation to nuclear energy technologies. As a result of its deliberations on this issue, the World Summit on Sustainable Development stressed the importance of effective liability measures for international maritime transportation and other transboundary movement of radioactive material, radioactive waste and spent nuclear fuel, and encouraged Governments to examine and improve measures and internationally agreed regulations regarding the safe handling, transport and disposal of this waste. (DSD 1)

Major Parties Involved and Their Views

United States of America (USA)

In USA high-level civil wastes all remain as used fuel stored at the reactor sites. It is planned to encapsulate these fuel assemblies and dispose of them in an underground engineered repository at Yucca Mountain, Nevada. This is the program which has been funded by electricity consumers to US$ 26 billion so far, of which about US$ 6 billion has been spent. Thus, the USA is taking initiatives to reduce the extent of damage caused by nuclear waste. (World Nuclear Association 2)

European Union (EU)

In Europe some used fuel is stored at reactor sites, similarly awaiting disposal. However, much of the European spent fuel is sent for reprocessing at either Sellafield in UK or La Hague in France. The recovered uranium and plutonium is then returned to the owners (the plutonium via a MOX fuel fabrication plant) and the separated wastes (about 3% of the spent fuel) are vitrified, sealed into stainless steel canisters, and either stored or returned. Eventually they too will go to geological disposal.

Sweden represents the main difference. It has centralised used fuel storage at CLAB near Oskarshamn, and will encapsulate used fuel there for geological disposal by about 2015. Finland is establishing a final repository at Olkiluoto. European funding is at similar level to USA per kWh. (World Nuclear Association 3)

People's Republic of China (PRC)

The nuclear industry in China was started from the early year of 1950s. The radioactive waste was generated in the nuclear techniques application include research reactor, research, isotope, etc. Some of the radioactive wastes are not properly characterized at the earlier years for the reason of techniques and understanding of radioactive waste management. However, most of the wastes were properly stored safely.

The waste generated from the nuclear stations are now stored in site. The low and mediate level radioactive wastes are sent to the near surface repositories. The high level wastes are considered to be sent to geological repository.

Most of the standards are interpreted from IAEA standards. (FNCA 1) Since China has long-term goals on relying on nuclear power for its future energy needs, it has created mechanisms that will help facilitate nuclear waste management. However, some of the older nuclear reactors in China continue to generate harmful nuclear waste and the issue with radioactive waste is that it can spread and reach other countries as well. In such a situation, the problem ceases to be a national one and becomes an international issue relating to transboundary damage.

Russia

Possibly one of the more controversial nations on the given issue, Russia was one of the main countries in the former USSR which was known for its nuclear power and reactors. Russia continues to operate several nuclear reactions for energy generation purposes and defense purposes. It initially had nuclear storage facilities in place to isolate harmful nuclear waste.

However, just recently an environmental nightmare took place at Russia's largest nuclear waste storage facility. On this vast site, 32 tons of highly radioactive waste with high uranium content was stored in crumbling concrete bunkers and rusting tanks and containers. (BBC News 1) This leak is said to have the potential to cause damage equivalent to the infamous Chernobyl Nuclear Disaster.

The cost of repairing the situation has also been immense for Russia. It was approximated that at least $4 billion would be required to purchase equipment and machines required to load and shift the waste to some place safer. Thus, we see that if nuclear waste is not dealt with properly, its effects both economically and environmentally are great.

Timeline of Relevant Resolutions, Treaties and Events

Date	Description of Event
August 30, 1975	The Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention) is enacted which prevents the dumping of wastes, including radioactive waste at sea.
September 24, 1982	House leaders in the US Parliament champion for the approval of the nuclear waste disposal policy. The US begins to take the issue seriously.
April 26, 1986	Chernobyl Nuclear disaster occurs showcasing one of the most widespread forms of nuclear waste dangers as the radioactive waste spreads to various parts of Europe.
June 23 – 27, 1997	The General Assembly adopts a resolution for the Program for the Further Implementation of Agenda 21. This was the 19th special session of the General Assembly and was held at New York. The conference was specially targeted at the dangers caused by radioactive wastes and the need to store and clear them efficiently.

June 18, 2001	The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management is enacted which promotes safe and environmentally sound management of spent fuel and radioactive waste covering issues such as storage, transboundary movement, treatment and disposal of these materials.
July 18, 2001	Somalia's president, Abdiqasim Salad Hasan called on the UN to probe the nuclear waste reportedly buried along the shores, and in many other places in Somalia. The president said an investigation was needed to verify reports from foreign sources that reported nuclear waste had been buried in the country for the past 10 years.
October 8, 2002	The risk of nuclear proliferation in the Middle East and the threat of nuclear waste accidents in the Caribbean Sea were the some of the highly debated topics in the General Assembly First Committee.

Evaluation of Previous Attempts to Resolve the Issue

There have been several attempts to identify and solve problems associated with nuclear and radioactive wastes. From the timeline, we can see that many conventions and protocols have been held and initiated to address the specific aspects and consequences of nuclear and radioactive waste. Some of these policies have been successful and have helped reduce the risks caused by nuclear waste to a large extent. However, many still fail to address the problem all together.

The most recent resolution enacted on nuclear waste management was the discussion paper submitted by the UN Department for Sustainable Development (E/CN.17/2010/14). A major issue faced by past resolutions and a huge challenge that delegates may come across is designing clauses that would help tackle nuclear damage but that would also be applicable to a wide range of countries. Furthermore, feasibility is a major problem encountered by past resolutions as some clauses are too financially demanding to be implemented in the large developing countries.

Finally, many past resolutions have used ideas and policies such as sanctions and penalties in order to deter the dumping of nuclear wastes. However, these policies have remained largely unsuccessful since, rich developed countries can afford to pay the penalties and continue dumping their wastes at a lower cost.

Possible Solutions

Since the issue of dealing with nuclear waste has great scope and is relevant to all the continents of the world, there are a wide range of solutions possible. Delegates should prioritize solutions more applicable to their nation but also remember to configure methods that will work in other regions of the world. However creative and unique a solution is, it must also be realistic and more importantly, economically feasible. If it doesn't fulfill these criteria, it will not have the scope to be implemented on a global scale.

Firstly addressing the issue of dumping, the most obvious method possible would be to employ sanctions or penalties on MNCs found guilty of this practice. However, this would be economically disadvantageous to many developed nations and thus, a better system needs to be created. One possible measure could be providing incentives/subsidies or tax concessions for MNCs that use nuclear reprocessing or efficient storage systems that isolate nuclear waste and eliminate any risks caused by it. A system of incentives would be easily feasible and also applicable in most developed nations. Instead of posing penalties, providing something positive is more beneficial for member nations as a whole.

Another possible approach would be from the scientific side. There are ongoing researches to find more sophisticated methods of nuclear waste storage. For example, new materials and alloys are being tested for radioactive waste storage. These designs however require large amounts of initial capital for research and development purposes. Since they are experimental, they are likely to fail and hence, there is a risk factor that countries must bear if they are to invest in such technology. Furthermore, LEDCs may not be able to access such solutions and thus, MEDCs may be called upon to provide these technologies. Ultimately, nuclear wastes can also be tackled simply by member states reducing their dependence on nuclear energy and rather, switching to other sources of energy such as geothermal energy which has great potential in the long-run. If countries would also reduce nuclear testing, a large chunk of nuclear waste would be eliminated since testing nuclear weapons is a large contributor to radioactive waste.

These ideas are just some basic ones presented and many other possibilities exist. However, the relevance, validity and feasibility of such ideas should be properly weighed out before they are presented in a resolution. Delegates should try their best to create and draft resolutions that approach the issue from various angles. Solving this problem is crucial in the 21st century. The last thing we want is another Chernobyl Nuclear Disaster.

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Appendix or Appendices

I. http://www-ns.iaea.org/conventions/waste-jointconvention.htm

This link provides comprehensive access to many of the treaties passed by the International Atomic Energy Agency (IAEA) on the issue of radioactive waste management.

II.http://webapps01.un.org/dsd/partnerships/public/search.do?dispatch=search&searchLogic=searchTypeAnd&keywords=&partnerFreetext=&themeSearchType=0&themes=113&subRegion=&from=s&resultPerPage=0&search=Search

This link provides a list of regional organizations that are dedicated to the practice of waste management. These are affiliated to the UNO and hence, their activities are considered to be global and region-specific.