Forum: Disarmament Committee

Issue: Limiting the production of fissile material for nuclear weapons or other nuclear explosive devices

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Introduction

In a world that is growing increasingly polarized, armed conflict between states has become inevitable. It often takes a single misstep for tensions to flare up, and what follows will undoubtedly devolve into a crisis. In such a tense environment, any actor wishing to consolidate power would be wise to find indirect ways to get a leg up against their rivals, either through intervention and diplomacy, or through utilizing technology to their advantage.

The latter has been particularly lucrative over the past two centuries. Humanity has seen countless developments in a variety of scientific fields, and in the hopes of applying this progress to ensure its sustained prosperity, it has given rise to new discoveries and inventions- each of which has had important consequences, for better or for worse. Nuclear physics is certainly not an exception. An improved understanding of the physical world, at its most fundamental level, has been crucial in the creation of new and important technologies, such as nuclear power and advanced medical imaging. It was clear that tools like radiation could be harnessed for society's betterment—but it was also evident that they could soon be the harbingers of mass destruction.

Nuclear weapons have always been an issue of great contention.Their immense destructive power has made them lucrative for nations willing to invest the necessary resources and workforce into their creation, which is exactly why they have been a staple of many important international conflicts. Their usefulness also extends far past the battleground—even possessing such a device puts one at an advantage during diplomatic discussions, through giving them the necessary leverage to strike fear into other nations.

However, it is clear that none of these benefits come without an exorbitant cost. Nuclear weapons pose a grave danger to the environment, and their effects are incredibly long-lasting; regions where such munitions were tested and deployed remain irradiated, even after decades have passed, and the radiation left behind has the power to destroy ecosystems and cause irreversible damage to a variety of different lifeforms, including humans. The possibility of Mutually Assured Destruction also calls into question the ethics of allowing states to wield weaponry, potent and extreme enough to result in the very end of the world itself.

Thus, international organizations have tried, time and time again, to regulate, limit or outright ban nuclear weapons, hoping to stop their proliferation. Such drastic measures require the cooperation of all states, though, which has proven to be the most difficult part in resolving this issue. It is for this reason that an indirect approach to addressing the problem may be preferable, especially one that tries to tackle the issue at its core through the regulation of fissile material.

This report aims to study how fissile material has been utilized and restricted in the past, in order to provide an alternative perspective on how new measures to limit their production could prevent the possibility of future nuclear catastrophe. Before that, though, an explanation of what these materials are- and of their relevance to the matter at hand- may prove to be necessary.

Definition of Key Terms

Fissile Material: The United Nations Office for Disarmament Affairs, or UNODA defines fissile material as any type of material that can undergo a fission reaction. Such reactions usually involve splitting the nucleus (or core) of an atom into smaller fragments, in order to produce large amounts of kinetic energy and radiation in the process. Said energy can then be transferred to other atoms to induce a chain reaction, which will eventually culminate in a large-scale explosion.

For this reason, fissile material can be thought of as the foundation of all nuclear explosive devices. Small amounts are capable of producing hundreds of kilotons of explosive force, but their creation is a difficult and tiresome process. Uranium-235 and plutonium-239 are common picks for nuclear weapons, due to their ability to easily decay, yet producing them often involves countless steps, including excavation, milling, leaching, enrichment and eventually, assembly into fuel pellets and fuel rods. Nevertheless, the extraction and processing of fissile material is a lucrative sector, especially with the newfound popularity of nuclear power (Nuclear Essentials).

Weapons of Mass Destruction: According to the Federal Bureau of Investigation (FBI), the United States' federal law enforcement agency, weapons of mass destruction (WMD's) are devices intended to cause vast amounts of harm to a large number of people through *"chemical, biological, radiological or nuclear"* means.

The risks posed by the deployment of WMD's extends far past the damage they cause within warzones; they also have a sizable impact on innocent civilians caught in the crossfire, on general infrastructure, and on the physical and biological environment (Homeland Security). For this reason, their production and active usage is severely limited by both domestic and international law; the UNODA is responsible for implementing global measures to ensure that they are not a recurring threat.

Nuclear Proliferation: Among one of the most important issues in the 21st century is that of nuclear proliferation, which refers to the acquisition of nuclear weaponry and other kinds of radiological weapons of mass destruction by countries that did not originally possess the necessary technology to produce them. Proliferation may also occur when third parties like private contractors, defense agencies or terrorist groups are able to readily access nuclear arms that should otherwise be prohibited (Britannica).

For proliferation to occur, states and international actors must be able to obtain fissile material in an easy and convenient manner; hence, one way to tackle the problem would be to prevent the general transfer of fissile material between nations. However, non-proliferation is multifaceted, and there is no guarantee that this will suffice in incentivizing nuclear disarmament.

Radiation Sickness: A significant consequence of being exposed to nuclear weapons is that of acute radiation syndrome, otherwise known as radiation sickness. Remaining in an irradiated environment for too long, or receiving a sudden, large burst of radiated energy, is often enough to trigger its onset symptoms, which can include nausea, weakness, dizziness and fever—with the likely end result being eventual death (Mayo Clinic).

Emergency medical care is often not enough to deal with radiation sickness, which can persist over the course of many days. It is for this reason that those in the blast zone of a nuclear weapon, regardless of how far from the centre they are, have a significant chance of perishing, even long after the initial detonation. Thankfully, cases of this syndrome have been rare, with reduced casualties since the incidents in Hiroshima, Nagasaki and Chernobyl.

Mutually Assured Destruction: Also known as mutual annihilation, MAD is a hypothetical situation that would arise if a nation attempted to use nuclear weapons on a defender that already has its own nuclear arsenal. The result of this would most certainly be that the second state launches their own counterattack in retaliation, and if these weapons are not intercepted in some way, then both sides will be annihilated. Thus, nobody would experience a favorable outcome from the conflict.

This situation has its advantages and disadvantages. MAD means that no country would ever have the incentive to deploy weapons of mass destruction during wartime, knowing that it could indirectly be endangering itself. However, it would also discourage a country from giving up its nuclear arms, as their absence could make them vulnerable against those who have not yet participated in non-proliferation. The possibility of accidental detonations also poses a large risk, as it could trigger mutual annihilation between parties that are not even in a state of conflict (Britannica).

Arms Race: Cambridge Dictionary refers to an arms race as any situation in which two rival nations will continuously try to gain military superiority over the other, through investing in stronger weapons, equipment and defense technologies. Such a scenario will lead to a gradual increase in both the quantity, and the destructive force of the arms that are being produced and created by either side, which may in turn perpetuate further tension—leading to a cycle in which neither state will conclude

their armament. Diplomatic intervention becomes essential at such a stage, as arms races in the past have set the foundation for the development of weapons of mass destruction, as was the case during the Cold War. See the Overview below for more details.

General Overview

With all of the key terms laid out, it is now time to discuss the development of this issue, from its origins in the 20th century to its controversial status in the modern era. The first point of interest in this overview will be the second world war- a conflict that gave rise to nuclear weaponry, while simultaneously demonstrating the immense authority that wielding it could grant in the new international order.

World War 2 (1939-1945)

The year is 1942, and after three years of persistent conflict with Nazi Germany, the United States of America (USA) is intent on finding a way to stop the war before it spirals out of control.

Armed with the knowledge that German scientists were already investigating new ways to harness nuclear fission to create a powerful explosive device, the government assembled a large team of scientific and military personnel to begin work on the construction of the very first nuclear weapon- the atomic bomb. This research, designated as the “Manhattan Project”, would face many obstacles to its fruition, including difficulties in the provision of fissile material (due to the lack of convenient ways to enrich uranium and plutonium at the time), budgetary constraints (owing to the project’s almost 2 billion dollar price tag), and security concerns about espionage (which were a direct result of strained relations with the Soviet Union).

Nevertheless, a functioning atomic bomb would eventually be finished by the 15th of July, 1945. Said device was detonated one day later, as part of the first atomic weapons test in history, aptly titled “Trinity”. Its explosive power was almost twenty thousand times that of a tonne of TNT, and its effects were undoubtedly nothing short of catastrophic (Britannica). However, the success of Trinity meant that the USA now had the greenlight to actively use nuclear weaponry against its enemies, and it would not take long for two more atomic bombs to be deployed, this time on a foreign country: Japan.

Hiroshima and Nagasaki, to this day, remain the most prolific cases of just how devastating nuclear weapons can be when exploited during wartime. Both bombs vaporized tens of thousands of people, mere seconds after their detonation; destroyed upwards of two thirds of the buildings in their respective cities; and indirectly resulted in long lines of deaths through inducing radiation sickness and cancer in vast groups of the populace. It is for this reason that many groups in opposition to nuclear proliferation still use them as tragic reminders of what unrestricted access to such powerful tools, capable of total eradication, will lead to (Council on Foreign Relations).

Despite the hostile sentiments that many of the scientists working on the Manhattan Project carried

towards their invention, the American government was not deterred, as the USA was set on being the nation to lead the rest of the world in the new field of nuclear warfare, where weapons of mass destruction could be the difference between defeat- and a quick, surefire victory. More research and development was necessary, however, and it was determined after World War 2 had finalized that the USA was no longer the sole nation working on their nuclear arsenal; the Soviet Union, its greatest competitor, had also decided to join the fray.

Cold War (1947-1991)

Experts in the American military predicted that the Soviet Union, with its lacking technology and weak infrastructure, would be incapable of producing a nuclear explosive on its own that could rival the arsenal that the USA already had in its possession. In 1949, new intel demonstrated that they could not have been further from the truth. Only years after the Cold War had begun, the Soviet Union had already created RDS-1, a nuclear explosive that perfectly imitated the warheads that had been used against Japan during WW2. This was thanks to many important advancements, including the discovery of vast stockpiles of uranium in Balkan territories, and the acquisition of confidential information from the early stages of the Manhattan Project.

Now that it was known that both sides had the resources and technology to manufacture weapons of mass destruction, the main goal of both the USA and Soviet Union's programmes became surpassing the other in quality and quantity. This rivalry naturally evolved into an arms race, as the two superpowers rushed to be the first to achieve technology like hydrogen bombs, long-range ballistic missiles and automatic navigation systems (Council on Foreign Relations). By the 1970's, their combined stockpile of nuclear warheads had reached a milestone of 40 thousand, each of which now carried megatons of explosive force.

At around this same time, new countries started to enter this arms race, threatening to disrupt the already unsteady balance between the two blocs. The United Kingdom and France were the first to participate in their own nuclear tests, but they would soon be followed by the People's Republic of China as well- which would show extensive progress in designing new missile systems and developing more dangerous hydrogen bombs. At this rate, the only thing stopping more economically developed nations from engaging in nuclear proliferation would be the accessibility of fissile fuel, but even that would cease to be a barrier to entry as more and more large deposits would be found within Eastern Europe and Central Asia.

In this environment, the possibility of full-blown nuclear war also seemed to be growing unavoidable. The US was becoming restless with the Soviets' construction of secretive missile bases in Cuba, and its attempts to intervene and prevent a possible attack on American cities from these sites only seemed to flare up military tensions. The only things that prevented further escalation were diplomatic negotiations; after days of contentious discussions, it was decided that the Soviet Union would withdraw all of its missiles from Cuba, and in return, the USA would do the same from its storage units in Turkey (History).

This event, now known as the Cuban Missile Crisis, would become a turning point for both the Cold War, and for the development of nuclear weaponry. The international community saw firsthand how political disputes over these weapons could easily spill over into threats and military standoffs- the next stage of which would likely have far-reaching, destructive consequences. Faced with such a frightening hypothetical, their best course of action was to introduce new limitations urgently, to try and avoid a similar crisis in the future- but more substantial measures would be necessary to avoid and ward off the true consequences of nuclear proliferation. This is where international agreements, treaties and diplomacy began to take centre stage.

Non-Proliferation Attempts

The first meaningful attempt at hindering the uncontrolled proliferation of nuclear arms began in 1963, with the Limited Test Ban Treaty, or LTBT for short. The provisions of this agreement were mainly centred around stopping nuclear tests from taking place within the atmosphere or underwater, to reduce their environmental impact and ensure that tests would occur in a safer and more controlled environment (Office of the Historian). The LTBT would go on to be replaced by the Partial Nuclear Test Ban Treaty (PNTBT), which would be signed and ratified by other nations as well, for a more comprehensive set of restrictions on nuclear testing.

Over the next decade, a variety of bilateral agreements would also be enacted between the US and Soviet Union, including the Anti-Ballistic Missile Treaty (or ABM Treaty), which imposed limits on how many ABM systems either nation could possess at a given time; the Intermediate-Range Nuclear Forces Treaty (INFT), which restricted all forms of ballistic missiles capable of targeting a smaller range; and the Strategic Arms Limitation Talks (SALT) Treaties, which were responsible for the establishment of a complete ban on the production “...of new intercontinental ballistic missiles for a duration of five years.” (Council on Foreign Relations) Unfortunately, even the agreements meant to be permanent did not last for long, as the USA would go on to retract itself from almost all of its deals with the Soviet Union (now the Russian Federation), under pretexts of Russian non-compliance or self-defence.

Not every measure would become unsuccessful, however. There were also more universal treaties being drafted by committees like the International Atomic Energy Agency (IAEA), one prevalent example of which was the Treaty on the Non-Proliferation of Nuclear Weapons- shortened as the NPT. Not only was it the most influential international agreement that had been prepared on the matter, but it was also the one that had the most support from armed actors like the US, UK, Russia and China. The NPT’s main goals, besides disarmament, have been to disincentivize states without nuclear weapon technology from obtaining any in the first place, and to encourage cooperation on the peaceful use of fissile materials in fields outside of national security and defense. While it is not necessarily strict, it has had a lasting impact on the state of nuclear proliferation worldwide- though many would claim that this is still not sufficient progress.

It is worth mentioning, before concluding the overview, that this issue has become particularly

prevalent again following the Russo-Ukrainian war. Threats regarding the utilization of inter-continental ballistic missiles and weapons of mass destructions against NATO have made it clear that something must be done to get rid of the nuclear arsenal hoarded by the world's superpowers- but without new agreements appropriate for the conditions of the 21st century, and some form of global collaboration and unity, this is clearly impossible.

Major Parties Involved and Their Views

United States of America

Having been the first country to introduce the possibility of nuclear warfare to the rest of the world, the USA has played an important role in spearheading the cause of nuclear non-proliferation through its treaties with the Soviet Union, and its participation in the IAEA and UNODA- but it'd be insincere to ignore how it has greatly contributed to the issue as well. Despite ratifying the NPT, and announcing a multitude of measures it would be taking to diminish its nuclear arsenal, the USA still has more than 3500 active warheads (Statista), and continues to terminate many of its bilateral agreements with other global superpowers on the topic of denuclearization.

Russian Federation

Similarly to the US, Russia also has an expansive array of weapons of mass destruction at its disposal, with approximately 4500 active warheads and more than 400 ICBMs (Nuclear Notebook). This has become especially important in the armed conflict with Ukraine, as Russia has made it clear, time and time again, that it is willing to order nuclear strikes on NATO member states, if they attempt to intervene and provide Ukraine with missile systems of its own (Reuters). These threats suggest that nuclear war is still a possibility, even in the face of mutual annihilation, and serve as a reminder of why non-proliferation is a matter that must be urgently tended to.

Kazakhstan

Although Kazakhstan does not actively have any nuclear weaponry, it is the world's largest producer and exporter of natural uranium, due in part to its large stockpiles from the Soviet era, and its many uranium reserves. Much of this is sold off to countries like China and Russia, who have regularly invested in Kazakhstan's mining operations in order to procure the fissile material they need. Thus, any attempts at limiting the production of such material would have a severe economic impact on Kazakhstan, as well as other exporters like Canada, Namibia and Uzbekistan.

People's Republic of China

Unlike many of the other nuclear superpowers, China's involvement in nuclear non-proliferation measures has been fairly minimal. It is a signatory of agreements like the NPT and Comprehensive Nuclear-Test-Ban Treaty (CTBT), but it has ratified neither of them, and continues to develop its arsenal of WoMD's, known as the nuclear triad. Since 2020, the Chinese government has also

declared a shifting nuclear policy, one that no longer restricts the usage of warheads exclusively to retaliatory attacks.

South Africa

The final country involved is South Africa, which is an outlier when it comes to the topic of nuclear disarmament. Despite having built test sites and warheads of its own throughout the 20th century, South Africa was the first (and so far, only) nation to willingly dismantle its own nuclear arms, and engage in complete denuclearization. It also heavily limited its extraction of fissile material, and later joined the NPT to aid countries in the transition towards peaceful uses of nuclear energy.

Timeline of Events

Delegates may find a list of important events regarding nuclear proliferation and the acquisition/regulation of fissile material below.

16 July 1945	Project Manhattan's work culminates in the Trinity test, which goes down in history as the first recorded nuclear explosion
6-14 August 1945	Atomic bombs "Little Boy" and "Fat Man" are dropped on Hiroshima and Nagasaki, followed by Japan's surrender
3 October 1952	The United Kingdom becomes the third nation to achieve nuclear armament, succeeded by France over the following months
1 November 1952	"Ivy Mike", the first sustained hydrogen bomb, is detonated by the USA
29 July 1957	The International Atomic Energy Agency is formed with the assistance of the USA's President Eisenhower
16-28 October 1962	The USA discovers Russia's nuclear silos in Cuba, prompting the two week long Cuban Missile Crisis
10 October 1963	The Limited Test Ban Treaty is signed by the USA, UK and Russia
1 July 1968	The Nuclear Non-Proliferation Treaty is opened to signatures, and will enter into effect two years later
18 May 1974	India launches its first thermonuclear device, prompting its neighbor Pakistan to accelerate its own nuclear program
8 December 1987	The Intermediate-Range Nuclear Forces Treaty is signed and ratified

	by the USA and Russia
20 September 2017	The controversial Treaty on the Prohibition of Nuclear Weapons opens to signatures, but receives none from any states in possession of them
1 February 2019	The US withdraws from its long-standing INF treaty with Russia

Relevant UN Documents

- Treaty on the Non-Proliferation of Nuclear Weapons (1st of July, 1968)
- Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons and its Preparatory Committee (11th of December, 2015, A/RES/70/28)
- Treaty on the Prohibition of Nuclear Weapons (7th of July, 2017, A/CONF.229/2017/8)
- *Update on the Treaty Banning the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices* (6th of December, 2023, A/RES/78/28)
- *Report of the Secretary-General on the Treaty Banning the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices* (16th of July, 2013, A/68/154)
- High-Level Fissile Material Cut-Off Treaty Expert Preparatory Group (13th of July, 2018, A/73/159)
- Proliferation of Nuclear, Chemical and Biological Weapons (28th of April, 2004, S/RES/1540)

Note that the two documents italicized refer to a treaty on the regulation of fissile material that has yet to have been drafted, despite high levels of international support from both nuclear superpowers, disarmed states, and organizations like the European Union (EU). Also, links to all of these documents have been attached in the Notes section below.

Evaluation of Previous Attempts to Resolve the Issue

Despite the sheer quantity of international documents and reports that have been created to address the rise of nuclear weapons, no effective solutions have been truly implemented on a permanent basis. While the NPT and CTBT have set a precedent for nations to avoid the uncontrolled and rampant use of warheads, they have done nothing to encourage dismantling or limiting such weapons. It can also be claimed that the former perpetuates an unfair system in which nuclear arms are distributed among only a small number of nations- only worsening the imbalance of political and military power.

The Treaty on the Prohibition of Nuclear Weapons may appear to be a solution to this, considering that it provides more clear and definitive restrictions on the subject matter, going as far as to ban

nuclear missiles altogether- but its limited support and lack of ratifications by any global superpowers means that its effectiveness is questionable. After all, a multilateral treaty only works if it is internationally accepted, and no state will willingly give away its most important weapons, unless it is given an incentive for it.

Finally, it is worth mentioning the Nuclear Suppliers Group, or NSG, a large organization that includes both nations with nuclear weapons in their possession (like the USA, Russia, China and France) and those that participate in supplying fissile material to them (such as Kazakhstan, Australia and Canada). The organization implements "...two sets of Guidelines for nuclear and nuclear-related exports," (NSG) which aim to limit proliferation and prevent fissile material from reaching non-state actors. However, critics of the NSG claim that important suppliers are still not in the NSG, despite regular applications, and that terrorist activity in the Middle East has undermined their efforts to keep the trade of fissile material controlled and heavily regulated by allowing illegal trade networks to prosper. Their guidelines on the exchange of "sensitive nuclear technology" have often been characterized as ambiguous as well.

Possible Solutions

Any solutions geared towards tackling this agenda item will likely fall into one of two categories: direct intervention, or more indirect diplomacy.

The first approach will centre around taking measures to ensure nuclear disarmament can occur in a swift and absolute manner. The creation of a treaty to limit the production and transfer of fissile material, especially material that is intended to be used in nuclear weapons, could be beneficial, as long as it is equipped with an effective, UN-backed verification mechanism.

Delegates are also advised to consider alternatives to the NSG; a UN organization that oversees the trade and acquisition of fissile material, with the support of major exporters of uranium and plutonium, could impose stricter regulations on their circulation- any negative economic effects this might have could then be counterbalanced by incentivizing peaceful uses of nuclear technology, so that international demand for fissile material remains high, but is reserved for more sustainable and safe operations like developing nuclear power.

On the other hand, a different methodology could instead focus on encouraging more nations to support nuclear disarmament, through a variety of indirect means. Providing economic or political incentives to nations willing to disband their nuclear arms forces could be a good first step, and the same could also be done for states who have not yet signed important treaties like the NPT or TPNW. Creating an international convention on the regulation of fissile material would also prove helpful, as it would act as a platform for discussions regarding a core aspect of nuclear non-proliferation.

Finally, seeing as it is essential to recognize that such destructive technology should not pass into the hands of non-state violent actors, new measures could be established to prevent the trafficking of fissile material or nuclear weaponry across borders, especially in vulnerable regions like the Middle East. This could involve collaboration with countries to improve their security forces, or the formation of a new UN body to investigate possible cases of arms trafficking pertaining to weapons of mass destruction.

Notes from the Chair

While I hope that this report was fairly comprehensive and covered both the historical roots of nuclear proliferation, and recent developments surrounding this issue, I would highly encourage delegates to conduct research on their own. Taking a look at the official documents mentioned beforehand, the links of which have been given below, and at all of the sources outlined in the bibliography, would be a great way to get acquainted with the issue at a deeper level- and remember that while fissile material is the focus of this agenda item, broader connections to the UN's mission of non-proliferation are still important. Thus, delegates should certainly think about whether the measures they are advocating for will be effective in the long run, and in what ways they will surpass pre-existing initiatives.

With that said, I am excited to see the array of creative solutions they will be able to offer throughout the conference, and I wish them luck in preparing their resolutions.

Treaty on the Non-Proliferation of Nuclear Weapons
Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons and its Preparatory Committee
Treaty on the Prohibition of Nuclear Weapons
Update on the Treaty Banning the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices
Report of the Secretary-General on the Treaty Banning the Production of Fissile Material for Nuclear Weapons or Other Nuclear Explosive Devices
High-Level Fissile Material Cut-Off Treaty Expert Preparatory Group
Proliferation of Nuclear, Chemical and Biological Weapons

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