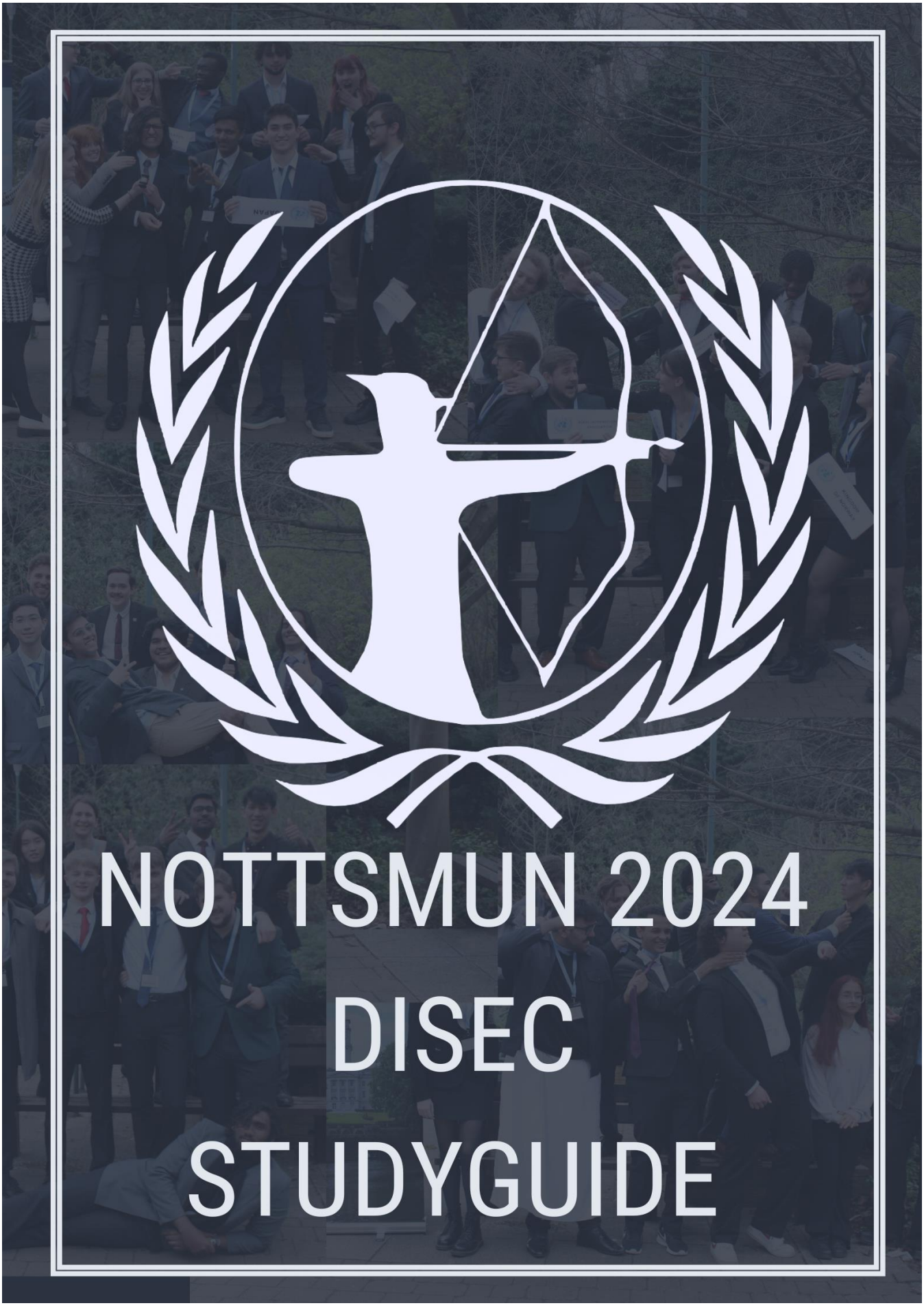

# NOTTSMUN 2024

# DISEC

# STUDYGUIDE

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# Introduction to the chairboard

## President - Eloise Hatton

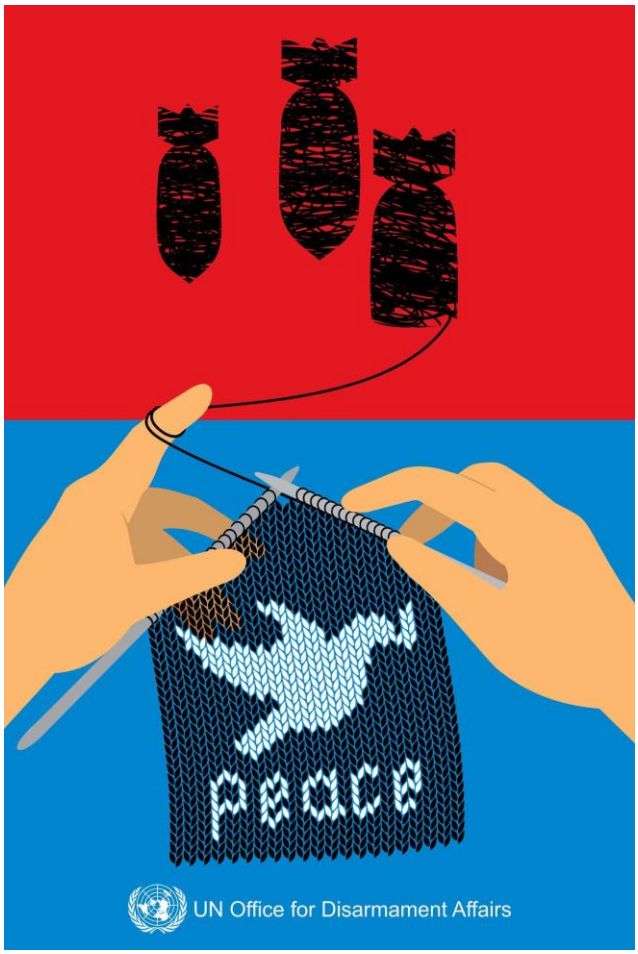
Eloise is a third year student at the University of York studying Social and Political Sciences.

I joined the MUN society at York in my first year, and was not quite sure what I was getting myself into! As someone who has been interested in politics since the age of 11, MUN was a natural fit for me and something I quickly loved. I am in my second year as President for UNA York, and have loved making the society more accessible to beginners, as well as attending ScotMUN in 2022 and NottsMUN in 2023. DISEC is my absolute favourite committee, so I am looking forward to supporting the debate and all delegates. In my free time, I enjoy knitting and crochet.

## President - Niampth Illif

Hi, I'm a second year Politics and International Relations student at Nottingham and I love politics and debate. For me this is what model UN is all about! The ability to delve into foreign affairs from a variety of views and read into conflicts I may not otherwise have done is brilliant. Being a member of the society for the second year now, it's amazing how much its helped my confidence public speaking and voicing my own opinions, something I'd love to empower MUN beginners to do!

# Introduction to the committee




The Disarmament and International Security Committee (DISEC) is the first committee established by the UN, hence it is referred to as the First Committee (UN, n.d.). The committee works with the UN Disarmament Commission and also the Conference on Disarmament which is based in Geneva (UN, n.d.).

DISEC discusses all disarmament and international security issues that can be covered by the UN Charter, and seeks to ensure international cooperation on these matters (UN, n.d.). The first ever resolution - Resolution 1(1946), was passed through DISEC and the First Committee also passed the first resolution to be co-sponsored by all member states (Resolution 1378).

Nuclear weapons (WMD), conventional forms of warfare, biological and chemical weapons, as well as disarmament fall into the scope of DISEC debates, and the committee has paved the way for agreements to be made.

However, DISEC is not the Security Council. It cannot approve or pass any military actions, and cannot impose any legally binding documents onto states (UN Charter, 1945). The aim of the committee is to encourage peace globally, and its resolutions take on the forms of recommendations (UN Charter, 1945).

References:

United Nations. *General Assembly of the United Nations*. [Online]. Available at: https://www.un.org/en/ga/first/ [Accessed 26 January 2024].

United Nations Member States. (1945). *United Nations Charter (full text) | United Nations*. United Nations. [Online]. Available at: https://www.un.org/en/about-us/un-charter/full-text [Accessed 26 January 2024].

# Agenda Item One: The non-proliferation of nuclear and chemical weapons as part of the Joint Comprehensive Plan of Action

## Introduction

There may be no greater threat to peace and security than nuclear and chemical weapons. Currently, over 22.000 nuclear weapons are estimated to exist worldwide, which would be enough to destroy the world multiple times[1]. The first time the world saw the use of a nuclear weapon, was with the bombings of Hiroshima and Nagasaki at the end of the Second World War. Combined, the nuclear bombs caused over 210.000 deaths and the survivors all suffered from a form of cancer afterwards. But even with this danger, many states refuse to give up their nuclear weapons, while others are actively seeking to acquire nuclear weapons and make them even stronger and larger. At this moment, eleven states are confirmed to hold nuclear weapons: China, France, India, Iran, Israel, Libya, North Korea, Pakistan, Russia, the United Kingdom, and the United States[2]. Even though there are currently several treaties and conventions that attempt to stop the proliferation of nuclear weapons, there is still no effective way to contain and decrease the number of nuclear arsenals worldwide.

This study guide will delve into key aspects of nuclear weapons in geopolitical relations, focusing specifically on the non-proliferation of nuclear and chemical weapons within the framework of the Joint Comprehensive Plan of Action (JCPOA).

### Background

The history of nuclear and chemical weapons is intertwined with the global arms race and efforts to prevent their proliferation. The development of nuclear weapons began during World War II, culminating in the United States dropping atomic bombs on Hiroshima and Nagasaki in 1945. The Cold War era saw the United States and the Soviet Union engaged in a nuclear arms race, escalating tensions and leading to the development of a significant arsenal of nuclear weapons.
Chemical weapons, with their devastating impact on human health, were used during World War I and condemned thereafter. The Chemical Weapons Convention (CWC) of 1993 aimed at eradicating these weapons, reinforcing the international commitment of disarmament.

[1] “Which Countries Have Nuclear Weapons?”
[2] “Timeline - Nuclear Museum.”

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), established in 1968, plays a pivotal role in preventing the spread of nuclear weapons. The NPT divides countries into nuclear-armed states and non-nuclear-armed states. Nuclear-armed states commit to disarmament, while non-nuclear-armed states agree not to develop nuclear weapons but are entitled to access peaceful nuclear technology. As of 2000, the five nuclear-armed states recognized by the NPT are the United States, Russia, China, France, and the United Kingdom. Numerous other countries have signed the NPT, reaffirming their commitment to preventing the further proliferation of nuclear weapons and promoting global security

By the end of the 20th century, Israel, India and Pakistan also held nuclear weapons. A few years later, the head of the nuclear programme of Pakistan secretly sold nuclear weapons to Libya, Iran and North Korea, who proceeded with developing their own arsenal[3]. The United Nations has taken many steps in the past already to address nuclear disarmament.

The General Assembly also held three special sessions on disarmament in 1978, 1982, and 1998. In all three sessions, Member States acknowledged the need to pursue total nuclear disarmament through international legal instruments and strong, internationally-based enforcement mechanisms. The special sessions also called on states to pursue regional measures to support disarmament and to form bilateral and multilateral cooperative arrangements to this end, inviting the participation of all Member States. Since the last session in 1988, several General Assembly resolutions have called for a fourth special session to be held; a working group was established to decide objectives and agenda items for the session but it has not announced the next session.

The United Nations Office for Disarmament Affairs (UNODA) was created in 1998 to promote nuclear disarmament and non-proliferation and to support regimes in the disarmament of WMDs. UNODA supports dialogue on disarmament and confidence-building measures by providing organisational support and current information on disarmament initiatives and agreements. UNODA also has a Weapons of Mass Destruction Branch that participates in multilateral non-proliferation and disarmament efforts and cooperates with entities including the General Assembly and CD on nuclear disarmament[4].

The Treaty on the Prohibition of Nuclear Weapons (2017) is the first comprehensive nuclear disarmament treaty, but the realisation of its provisions is limited by the lack

[3] Swami, “Pakistan Sold Iran Nuke Technology in 1980s, Former President Rafsanjani Reveals,” December 25, 2015.
[4] Twenty, “Nuclear Non-Proliferation Treaty - UNODA.”

of participation of all NWS. None of the nine NWS attended negotiations, nor have any signed the treaty. In addition to the NWS themselves, many military allies of NWS have also refrained from signing the treaty; for example, not a single NATO Member State has signed the ban treaty. In the case of NATO, many states argue that the ban treaty is at odds with the alliance's nuclear deterrence policy. The treaty calls on states to irreversibly eliminate their entire nuclear program, but without the participation of NWS, the treaty provisions cannot be fulfilled. Critics have also noted that the lack of verification measures to track and ensure disarmament further weaken the enforcement potential of the treaty, should NWS accede to the agreement.

## Timeline

**1945**: First use of nuclear weapons during the end of WWII. Two bombs dropped on Hiroshima and Nagasaki

**1957**: The Creation of the International Atomic Energy Agency (IAEA) with the mission of promoting peaceful uses of nuclear technology.

**1970**: The Non-Proliferation Treaty (NPT) enters into force and divides the world into NWS and NNWS.

**1980**: Start of the Iranian Cultural Revolution. Iranian "purges itself" from Western values and shortly after starts secretly acquiring uranium from Pakistan.

**2003**: The IAEA issues a report which declares that Iran has been engaging in nuclear activities and that said activities have never been reported.

**2005**: After two years of IAEA investigations, the Security Council decides to put sanctions on Iran. Iran's relations with the NWSs worsen.

**2013**: Hassan Rouhani is elected as president of Iran and brings a more moderate approach.

**2015**: The Joint Comprehensive Action Plan (JCPOA) is created.

**2018**: The United States withdraws from the JCPOA.

**2019**: Iran starts reducing its commitment to the JCPOA and cites the USA-imposed sanctions as the main reason for their lack of compliance.

**2020**: Iran announces that it will no longer comply with the JCPOA. In the same year, Iran and China draft a comprehensive partnership agreement.

**2022**: USA and Iran engage in indirect talks in Vienna. No concrete conclusions are reached.

# Discussion

## Non-proliferation of nuclear weapons

The Non-Proliferation Treaty is a landmark treaty when it comes to the prevention of the spread of nuclear weapons and technology, the promotion of the peaceful uses of nuclear energy and to achieve nuclear disarmament. Currently, 191 of the 208 States have signed and ratified the treaty, which is more than any other arms limitation and disarmament agreement. All five NWS also signed and ratified the treaty.

The NFT was violated by the United States and Russia by upgrading and diversifying their nuclear weapons. Both States also developed tactical nuclear warheads which can be used on the battlefield without releasing a great amount of radiation. Furthermore, the United States is also in the process of developing new categories of nuclear weapons, and investing over 300 billion dollars in these creations over the next decade. Besides these violations, the US is also supplying India with nuclear reactors and other advanced nuclear technology, all also violating the NPT. More violations of the NPT occurred by Iraq under Saddam Hussein, and Iran and Libya, having pursued nuclear weapons despite signing the treaty. Syria is suspected to have done the same, but never confirmed. NATO also holds a policy since the Cold War that doesn't rule out the use of nuclear weapons on the USSR. This policy remains unrevised, which is especially of concern with the Russo-Ukrainian conflict, where threats have been made by President Putin to use nuclear weapons, should NATO get involved.

Currently, there are multiple States of concern for the proliferation of nuclear weapons.

Namely, the newest States holding nuclear weapons – India, Pakistan, Israel and North Korea – never signed the NPT or withdrew from the NPT early on. These four states also showed a flaw in the NPT, namely that the treaty defines "Nuclear Weapon States" as those who had manufactured and tested a nuclear device before 1967. This means that all States who develop nuclear weapons after that could never be regarded as NWS.

The final country of concern is Iran. This will be discussed more in depth below.

# Case Study: The Iran Nuclear Deal

## History of Iran and Nuclear Power

In the 1970s and 80s Iran started working on their first nuclear power programs, in order to diversify their energy sources. Between the years 1979-1983 Iran underwent a series of events that became known as the Iranian Revolution. The newly formed government effectively rejected all Western values, broke old diplomatic ties with both European and other countries and completely changed the lives of their citizens, including enforcing strict dress codes for women and putting severe limitations on freedom of speech. The newly formed government also wished to reduce the country's reliance on oil exports. This, combined with the severed ties to Western countries and Iran's new drive for autonomy is what led to the newly formed government to start focusing on nuclear technology.

The Iran-Iraq war further incentivized the new government to invest in nuclear power, this time not only as an energy source but also as a potential weapon[5].

## Present-day challenges

In 2003, the IAEA concluded that Iran had taken steps in a nuclear program with the purpose of creating nuclear weapons. This led to high tensions in the US-Iranian relations. In 2015, Iran and six other world powers negotiated a long-term agreement to verify and significantly reduce Iran's capacity to produce material for nuclear weapons. This agreement – the Joint Comprehensive Plan of Action (JCPOA) - came to be known as the "Iran Nuclear Deal" or the "Iran Deal".

Under the JCPOA, painstakingly negotiated in 2015 by the Obama administration, Iran agreed to limit its nuclear program to peaceful purposes only, in exchange for a reduction in American sanctions. Concretely this meant that Iran would enact various limits on its nuclear program. Iran would limit its stockpile of enriched uranium (a vital component in nuclear programs), limit the centrifuges it was allowed to use to research uranium, dismantle its Nuclear Plant in Arak, and allow inspections by the International Atomic Energy Agency. In return, the United States eliminated or reduced some (but not all) of its sanctions against Iran, mostly those related to Iran's oil and banking sector, as well as no longer punishing non-US companies which conducted business with Iran. Additionally, UN sanctions that were placed on Iran would also, after several years, be reduced or eliminated[6].

This arrangement, however, would not be permanent.. Over a ten-year period, the restrictions on Iran's nuclear program would gradually be reduced and finally removed entirely. These are called the 'sunset clauses'. It means that over time (10 to 15 years),

[5] "From 'Atoms for Peace' to 'JCPOA': History of Iranian Nuclear Development. | K=1 Project."
[6] Robinson, "What Is the Iran Nuclear Deal?"

Iran would be allowed to pursue its nuclear program as it wishes, although under the expectation that it would only use its nuclear program for peaceful purposes.

The United Nations Security Council, in Resolution 2231, officially and unanimously endorsed this deal, allowing for UN inspections to ensure Iran's compliance with the agreement's provisions. While praised as a major step forward towards sustainable peace in the Middle East, the deal was not without its critics, as it would allegedly be paving the way for a nuclear Iran in the future.

The 8th of May 2017 would come to mark a pivotal moment in US-Iranian relations. Then President Donald J. Trump unilaterally declared that the United States of America would withdraw from the JCPOA. Trump had long called the Iran Deal "the worst, horrible, laughable". It therefore hardly came as a surprise when in 2017 he decided to withdraw of the United States. Ever since then, the agreement has been on shaky grounds, with EU diplomats in particular trying to keep the Iran Deal alive, with or without the United States. The withdrawal of the US of the Iran Deal escalated the conflict between Iran and the US, with the US reimposing harsh sanctions on Iran, and Iran continuing with its nuclear programme, for what use would it be to honour the Iran Deal if the US didn't?

# Blocs

## Iran, Russia and China

Iran wishes to continue at least some of their nuclear weapons programs. However, over the years, the country has shown willingness to compromise some of its aims and ambitions in order to be freed from sanctions. One of the countries that has never truly cut their ties to Iran is Russia[7], which also has expressed support for Irans right to peaceful nuclear development. Beyond that, Russia has directly helped Iran, by contributing to the construction Bushehr Power Plant. Similarly, China, while promoting non-proliferation, has always remained open for dialogue with Iran and encouraged the international community to the same. China has also brought forward the argument about a country sovereignty.

## USA, E3 and others

Ever since the JCPOA agreement has been made, USA has been one of its most vocal critics, especially during the Trump administration. The relationship between the USA and Iran have also been tense since the 1870s. The E3 countries (Germany,

[7] "The Persian-Russian Connection."

France and the UK) have similarly expressed their concerns with Irans nuclear development programs and called for more dialogue. Israel and Saudi Arabia have also been very vocal about their concerns with nuclear security in Iran. Israel especially has advocated for increasing international pressure on Iran.

## Questions to consider

- *Should efforts be renewed into creating a new JCPOA with the US and Iran, and if so, should previous violations of the JCPOA by both the US and Iran be forgiven or sanctioned?*
- *What limitations should be placed on Iran's nuclear and chemical program?*
- *What actions should be taken to the new nuclear weapon states to limit nuclear proliferation and nuclear disarmament?*
- *How can the disarmament requirements as laid down in the Non-Proliferation Treaty be fulfilled?*
- *What can be done to make sure that the Non-Proliferation Treaty is complied with?*
- *What can this committee do to prevent other countries who do not hold a nuclear and chemical arsenal from acquiring one?*

# Further reading

**Persepolis**

A comic book by the Iranian author Merjane Satrapi that explores how Iran was affected by the cultural revolution and how it ended up where it is today.

**The Atomic Bomb**

A crash course video explaining the history of nuclear warfare
https://youtu.be/w4q1fG1vh5I?si=M8WpqCuE6UOvbcLy

**Can Nuclear Weapons Prevent War?**

A video explaining the role of atomic weapons in international relations.

https://youtu.be/0jfv-uvwF14?si=G37T_Y8zLzLy4zmu

# References


“From ‘Atoms for Peace’ to ‘JCPOA’: History of Iranian Nuclear Development. | K=1 Project,” n.d., https://k1project.columbia.edu/content/atoms-peace-jcpoa-history-iranian-nuclear-development.

ICAN. “Which Countries Have Nuclear Weapons?,” n.d.

https://www.icanw.org/nuclear_arsenals.

Kali Robinson, “What Is the Iran Nuclear Deal?,” *Council on Foreign Relations*,

October 27, 2023, https://www.cfr.org/backgrounder/what-iran-nuclear-deal.

Praveen Swami, “Pakistan Sold Iran Nuke Technology in 1980s, Former President

Rafsanjani Reveals,” *The Indian Express*, December 25, 2015,

https://indianexpress.com/article/world/world-news/pakistan-sold-iran-nuke-tech-in-1980s-former-president-rafsanjani-reveals/.

“The Persian-Russian Connection,” Default, n.d.,

https://www.lawfaremedia.org/article/the-persian-russian-connection.

“Timeline - Nuclear Museum,” Nuclear Museum, n.d.,

https://ahf.nuclearmuseum.org/ahf/nuc-history/timeline/.

Twenty, “Nuclear Non-Proliferation Treaty - UNODA,” UNODA - Regional Centre for

Peace and Disarmament in Asia and the Pacific, January 5, 2024,

https://www.unrcpd.org/wmd/the-nuclear-non-proliferation-treaty/.

# Agenda Item Two: The Prevention of Terrorists Gaining Radioactive Sources

## Definitions and Key Terms:

### Radioactive Sources

There are a variety of radioactive sources that have differing applications. The International Atomic Agency (IAEA, 2024) defines radioactive sources as any source that contains radioactive material of a radionuclide, which is an element in its unstable form that releases radiation. These sources emit ionising radiation, in either beta or alpha particles or gamma rays.

***Sealed sources*** are often used for cancer treatment or laboratory equipment. This is where the radioactive sources are either closely bonded in a solid form or permanently sealed in a capsule to prevent leaks and have a high concentration of radioactive material (IAEA, 2024).

***Unsealed sources*** have radioactive material that is not permanently sealed or in a solid form, instead being liquid or gas. They have multiple uses in medicine and can be used as a tracer in industry (IAEA, 2024).

***Disused sources*** are radioactive sources that are no longer used or intended for use (IAEA, 2024).

***Orphaned sources*** are radioactive sources that are not under regulatory control. They could have never been under regulatory control, have been abandoned, or transferred without proper authorisation (IAEA, 2024). This is what poses the greatest threat to terrorists gaining radioactive sources.

### Nuclear Terrorism

This refers to the general malicious use of nuclear or radioactive material by a terrorist group (IAEA, 2005). The theft or smuggling of a nuclear weapon to terrorists is a relatively small risk, but one that has potentially disastrous consequences (IAEA, 2005). In contrast, the malicious use of radioactive sources in “dirty bombs” by terrorists is a much more likely event to occur, but would have significantly smaller consequences (IAEA, 2005).

### Usage of Radioactive Materials

***Nuclear Energy***

Nuclear energy uses nuclear fission - the splitting of an unstable element's nucleus - which releases heat and radiation. This heat then warms water to produce steam which then turns a turbine, generating energy (IAEA, 2022). Uranium is the most common element used in nuclear energy, specifically uranium-235. A key issue of nuclear energy is its production of nuclear waste, which requires safe and effective disposal in order to prevent accidents and potential adverse effects of radiation (IAEA, 2022). The energy produced by nuclear plants can be used for electricity, heating, and desalination (IAEA, 2021).

***Health***

Radioactive sources are used in radiotherapy which treats cancer by exposing cancerous cells to high levels of ionising radiation (IAEA, 2023). External radiation therapy uses high-energy beams that are emitted from a cobalt unit or linear accelerator (IAEA, 2023). Internal radiotherapy uses small encapsulated sources inside the body to be delivered directly to the cancerous cells.Temporary treatment uses caesium, iridium, or cobalt, while permanent treatment uses iodine-125 which loses its radioactivity over time (IAEA, 2023).

Radiation can also be used as pest-control to prevent insect-related diseases or improve food security (IAEA, 2023). The Sterile Insect Technique uses ionising radiation to sterilise insects which reduce the population.

# Background

The International Convention on the Suppressing of Acts of Nuclear Terrorism (ICSANT) of 2005 covers a wide scope of potential acts of nuclear terrorism and targets. The previous 1980 Convention on the Physical Protection of Nuclear Material (CPPNM) was incredibly limited in prevention of nuclear terrorism and dealing with potential aftermaths. The ICSANT was unanimously approved by the General Assembly and was the first anti-terrorist treaty adopted since 9/11 (Nuclear Threat Initiative (NTI), 2023). The treaty does not place any new restrictions on the use of nuclear weapons by states, and first entered into force in 2007 (NTI, 2023). 125 countries are party to the treaty, with 115 having ratified it (NTI, 2023).

The treaty achieved a number of things. Primarily, it criminalised the action of planning, threatening, or undertaking acts of nuclear terrorism and requires national legislation to criminalise such acts (NTI, 2023). It sought to require states to take preventative measures against nuclear terrorism and provided key definitions of nuclear terrorism.

The UN have passed a multitude of GA Resolutions on preventing the acquisition by terrorists of gaining radioactive sources - most recently A/RES/77/77 in 2022. This predominantly encourages states to undertake national legislation, to become members of the IAEA, and to ratify the ICSANT.

### Threat of Nuclear Terrorism

As previously established, a key source of worry in regards to nuclear terrorism is the development of a dirty bomb. Preventing terrorists acquiring radioactive sources is therefore vital to minimise the risk of dirty bombs, or even terrorist groups from developing their own nuclear weapons. While there is a continual international fear of terrorists gaining access to WMD or targeting nuclear power plants, this is not relevant to the discussion of preventing the acquisition of radioactive sources.

Radioactive sources have a tendency to become lost or abandoned - it is impossible to truly put a number on the amount of orphan sources globally. From 2003-2013, it was estimated that there were over 30 instances of missing radioactive materials in the UK alone - including ytterbium-169 from Rolls-Royce and caesium-137 from The Royal Free Hospital (Macalister and Halpin, 2013). This is just a small example of how easy it is for sources to become orphaned and have the potential to fall into or be smuggled into the hands of terrorist organisations.

## Goiania Incident

Instances of orphaned sources have been recorded since the 60s, with some being incredibly fatal. Arguably the worst case is the 1987 Goiania accident in Brazil. Scavengers were combing through an abandoned clinic - searching for valuable materials that could then be sold - when a radiation therapy source was discovered (IAEA, 1988). The canister contained caesium chloride, which was then taken home by the two men before they broke open the canister which then emitted a blue light (IAEA, 1988). After 5 days, the source was sold to a scrapyard, where the relative of the owner took some of the caesium home - his six year old daughter played with the powder (IAEA, 1988). The wife of the scrapyard owner took the capsule to the hospital, where it was identified as dangerous - an action that saved lives (IAEA, 1988). The two men who found the canister survived, but both suffered from radiation sickness and burns, leading to an amputation of one arm (Backhouse et al., 2023). The six year old died a month later and was buried in a lead coffin that was encased in concrete due to being radioactive (IAEA, 1988). The wife of the scrapyard owner also died despite her heroic actions, and a further two men who worked at the scrapyard died (IAEA, 1988). About 250 people in total were irradiated, but 112,000 people admitted themselves for monitoring at the hospital (IAEA, 1988).

While the Goiania incident is the worst orphan source case, it led to effective measures put in place to better ensure the security and safety of radioactive sources throughout their entire lifespan (Hansen, 2008). However, the need for continued safety measures and discussions is clear, when orphan source incidents have continued and still led to deaths.

### Stolen Sources

In 2014 it was reported that the IS had stolen 40 kg of Uranium from a university in Iraq (NTI, 2015). While this has been noted as having very weak capabilities, it is incredibly important to recognise that there is at least one instance of a terrorist group gaining access to radioactive sources.

## Timeline:

Pre-1900s:

In 1896, radioactivity was discovered by Henri Becquerel (Atomic Heritage Foundation, n.d.). Just two years later, Marie Curie and her husband, Pierre Curie, discover polonium and radium (Atomic Heritage Foundation, n.d.).

1930s:

The neutron was discovered in 1932 by James Chadwick, and Leo Szilard in 1933 developed the idea of using a chain reaction of neutron collisions with atomic nuclei to release energy - with potential military capabilities - leading him to file a patent for this in 1934 (Atomic Heritage Foundation, n.d.). In 1934, Ida Noddack argued that radioactivity is caused by the atom splitting into smaller pieces, leading to work in 1938 which proves this theory (Atomic Heritage Foundation, n.d.).

In 1939, Fission was developed further as a theory and its capabilities, which leads to Oppenheimer and Einstein's ideas about an atomic bomb being capable (Atomic Heritage Foundation, n.d.).

1940s:

Nuclear discoveries and developments throughout the early 1940s focused on developing an atomic bomb. The "Little boy" type used a Uranium-235 core, while the "Fat Man" type used a polonium core (Atomic Heritage Foundation, n.d.). In August 1945, the detonation of bombs over Hiroshima and Nagasaki occurred (Atomic Heritage Foundation, n.d.).

Post WWII saw the beginning of an arms race between the USSR and USA, with Russia exploding their first bomb in 1949 (Atomic Heritage Foundation, n.d.).

1950s:

The first ever nuclear reactor to produce electricity is the EBR-1 reactor in the US, which first went into use in 1951 (Atomic Heritage Foundation, n.d.). The development of nuclear weapons continued throughout the 50s (Atomic Heritage Foundation, n.d.). In 1953, President Eisenhower outlined a program that would see the development and distribution of nuclear-technology materials for peaceful purposes (Atomic Heritage Foundation, n.d.).

France's first commercial reactors began to operate from 1959 onwards (World Nuclear Association, n.d.). In 1957, a core caught fire at the UK's Windscale power plant; it would see over 200 deaths from cancer attributed to the radiation released (Union of Concerned Scientists (UCS), 2013). The IAEA was formed in 1957 as a result of increasing concern over nuclear capabilities, and as a result of the 1953 "Atoms for Peace" address by Eisenhower (IAEA, 2016).

### 1960s:

1960 saw commercial energy reactors be developed in the US, leading to increased nuclear energy sites (World Nuclear Association, n.d.). In 1961, the Idaho Falls accident happened in a Nuclear power plant that killed all workers on duty (UCS, 2013). In 1963 the IAEA established the Vienna Convention on the Civil Liability for Nuclear Damage which sought to ensure that states were applying regulations and safety measures for those who work with nuclear material for peaceful purposes (IAEA, 1963).

The first reported orphan source incidents began in 1962 in Mexico, while reports differ as to how the source was acquired, it led to the deaths of four individuals (Comas, 1964). Other orphan source incidents occurred in China (1963), Argentina (1968), and Germany (1968).

### 1970s:

The 1970s saw increased orphan source incidents globally, occuring in countries like Japan (1971), South Africa (1977), Algeria (1978), Australia (1978), and California (1979). 1979 also saw the partial meltdown at Three Mile Island in the US which is considered the most serious nuclear accident in US history (UCS, 2013).

### 1980s:

While the most memorable nuclear incident during the 80s is the meltdown of the Chernobyl power plant in 1986, other nuclear incidents and accidents happened globally. The largest orphan source disaster in 1987 happened in Brazil (IAE, 1988) which saw multiple deaths, but other incidents occurred in Azerbaijan (1982), India (1982), Mexico (1983), Morocco (1984), and in Ukraine (then part of the USSR) in 1989. As a result of the Goiania incident in Brazil in 1987, the IAEA took increasing measures and approaches to see safer destruction and removal of radioactive sources across the globe (IAEA, 1988).

In 1987 the Convention on the Physical Protection of Nuclear Material was brought into force. This sought to ensure that states established and upheld legal obligations for protecting nuclear material for peaceful purposes (IAEA, 1982).

### 1990s:

The beginning of the 1990s saw the end of the USSR, which would then pose a major issue for nuclear security. While the issue of nuclear weapons in these new states became a focus, there was also the realisation that these ex-soviet states were littered with orphaned sources that had not been accounted for (Lluma, 2000). This led to multiple instances in

Georgia, where orphaned radioactive sources from an ex-soviet military base resulted in eleven individuals receiving radiation ulcers and a total of twelve orphaned sources were found throughout 1996 and 1997 (IAEA, 2000).

Orphan source incidents continued to take place globally, happening in South Africa (1990), China (1992, 1996, 1999), Estonia (1994), France (1995), Iran (1996), Russia (1997 & 1999), Turkey (1998), and Peru (1999).

## 2000s:

In 2001, another orphaned source incident occurred in Georgia - this time in Lia (IAEA, 2014). Three lumberjacks discovered two strontium-90 cores in the forest where they were scavenging for firewood (IAEA, 2014). As they were looking to keep warm, the sources that had melted the snow in the surrounding area seemed like a perfect substitute and the three took them to be used as personal heaters (IAEA, 2014). All patients would suffer radiation burns, and one died after 893 days of treatment for the ulcers (IAEA, 2014). Other orphan sourced events continued throughout this decade, occurring in Thailand (2000), Egypt (2000), Russia (2000 & 2003), and Tunisia (2008).

The ICSANT was signed in 2005 which was the first to criminalise the act of planning, threatening, or undertaking nuclear terrorism - as well as also providing key definitions (ICSANT, 2005).

## 2010s:

Throughout the 2010s orphan source incidents continued to occur, however much less frequently than previous decades. Incidents occurred in India (2010), Venezuela (2010), Italy (2010), and Mexico (2010). The incident in Mexico saw the hijacking of a truck that was transporting a Cobalt-60 source for a medical unit (IAEA, 2013). The source was eventually discovered, but it demonstrated the need for states to prepare national emergency responses in incidents where a potential nuclear threat may occur (IAEA, 2013).

## 2020s:

Fewer incidents of orphan sources have occurred through the early 2020s. In 2023 however, there were multiple instances in Australia, the USA, Mexico, and Brazil. A few of these were stolen, and demonstrate that the threat of potential nuclear terrorism is definitely still an issue.

# Discussion

### The International Atomic Energy Agency (IAEA)

The IAEA has provided a Code of Conduct (2004) on the safety and security of Radioactive Sources. This is guidance provided to member states on how to ensure high levels of safety and security of radioactive sources, prevent unauthorised access or theft/loss of radioactive sources, and mitigate the radiological consequences of any malicious act involving a radioactive source.

The Nuclear Security Programme 2022-2025 is a further framework and legislation provided by the IAEA on the security of radioactive sources (IAEA, 2021). It details support for member states on education, security, and management of nuclear sites and equipment. It also discusses and encourages the sharing of information between states on effective and safe management of sources (IAEA, 2021).

The IAEA Incident and Trafficking Database (IDTB) is a means for the IAEA to provide better reporting systems for incidents of theft, loss, or mishandling of radioactive sources (IAEA, 2023). It covers all types of nuclear material, and sees states reporting incidents in their own countries - even hoaxes - so that better security and prevention mechanisms can be put into place (IAEA, 2023). With 143 member states, the IDTB saw 146 reported incidents in 2022 by 31 states (IAEA, 2023). Since 1993, the IAEA has determined that about 3.5% of reported thefts have been related to trafficking, 8.5% have been confirmed as not having a malicious intent, but a whopping 88% of thefts have an undetermined intent (IAEA, 2023). Regardless, the IDTB is a vital part of the IAEA and their security programme and has provided clearer transparency and effective support for states with incidents (IAEA, 2023).

### INTERPOL

INTERPOL has also established guidelines and frameworks to prevent and limit the smuggling of radioactive sources across borders (INTERPOL, n.d.). Whether attempts are made on land, sea, or air, INTERPOL have provided frameworks and workshops for member states to undertake which seek to prevent and identify the smuggling of radioactive material and train border-staff on effectively dealing with identified radioactive sources (INTERPOL, n.d.).

INTERPOL have also established the Geiger Database (INTERPOL, n.d.) which is an international database that collates radiological and nuclear data. This is then analysed to recognise trends, risks, and potential security issues which can be used to inform member states of potential terrorist or criminal acts involving radiological material. In the event of a radiological or nuclear disaster, INTERPOL have specially trained individuals and guidelines in order to effectively manage a radioactive crime-scene, supporting the public, and undertaking appropriate safety measures (INTERPOL, n.d.).

# Current Challenges:

### *International Cooperation*

The USSR had vast nuclear capabilities, yet after its collapse there have been increased issues regarding responsibility for orphaned sources as well as problems with tracking radioactive sources in ex-soviet states. Many states that were previously in the USSR have faced orphaned source incidents, and are at great risk of potential future cases. From the 1990s-2006, over 300 orphan sources were found in Georgia alone and there was at least one death as a result (IAEA, 2006). This is just one example of a previous USSR state having mass orphan sources that pose a great risk of being acquired by terrorists.

Furthermore, with current geopolitical developments and increased conflicts globally, there has been further difficulty with ensuring the securitisation of radioactive sources. With insurgency movements or terrorist organisations posing a threat to nations across the globe, the demand for effective security of radioactive sources is vital to prevent terrorist groups from acquiring them.

### *National legislation*

Equally, not every state has ratified the ISCANT or is part of the IAEA. This means that any approaches are not global, and not every state is following the same guidelines or security measures for radioactive materials. As there is no fully legislative international agreement, states take differing approaches that vary in efficacy, causing the issues of orphan sources to remain.

### *Technological advancements*

Nuclear technology is an area that is developing at a rapid pace, especially with recent developments in fusion technology (IAEA, 2023). It is vital that all uses of radioactive sources receive adequate protection and security measures, even if those uses have not yet been established. States do not develop on the same path, and it is important to recognise that there is no fully implemented standardisation of security and safety procedures within states but also across borders.

Furthermore, as technology develops, the risk of cyberterrorist attacks only increases. Nuclear power plants have been a key target for cyber attacks in the past (SOURCE), and as more data and information are shared between states online, it is vital that states have effective cyber security measures in place to prevent the information on secured radioactive sources from being released.

# Blocs

### The Western Allies:

These states have ratified the ISCANT and are members of the IAEA (NTI, 2023). With donations to the Nuclear Security Fund, they have sought to better establish the security of radioactive sources globally. Through collaboration across borders in order to prevent the smuggling of radioactive sources, these states will seek to further security efforts internationally while upholding strong national standards of security.

### BRICS:

These states have fully ratified the ISCANT and work with the IAEA. In 2021, the China International Development Cooperation Agency (CIDCA) established a project with the IAEA to provide information sharing and education to developing countries (IAEA, 2021). With the India Safeguards Agreement (2008) and extensive collaboration between Brazil and the IAEA, these states have also indicated their support for preventing terrorists from gaining radioactive sources. Russia has previously given funding to the Nuclear Security Fund (NTI, 2023), but since their invasion of Ukraine this international cooperation has wavered.

### The Arab League:

The UAE and Morocco have both ratified the ISCANT and work closely with the IAEA (NTI, 2023). Morocco has seen oversight and support from the IAEA for nuclear and radiation safety standards (IAEA, 2023a), while the UAE has also sought to establish safeguards with the IAEA (2023b).

While Iraq's history of potential terrorist acquisition of radioactive sources is tumultuous, their recent development and work with the IAEA should be noted (NTI, 2015). They have ratified the ISCANT and worked with the IAEA to better establish safeguards (NTI, 2015). It is important to note that the Islamic State did steal radioactive sources from a university in Iraq, which demonstrates the importance of legislation on this issue, but these sources have been considered as incredibly weak by the IAEA (NTI, 2015).

## States that Prioritise Sovereignty:

Pakistan has not ratified the ISCANT but is a member of the IAEA (NTI, 2019). They have signed very few treaties regarding any nuclear or radioactive material guidance, including the NPT. Pakistan has been victim to numerous attempts at theft of radioactive sources, therefore it is vital that it implements effective security measures.

The DPRK is the only state to have withdrawn from the NPT and has also not ratified the ISCANT (NPT, 2018). They have had a somewhat rocky relationship with the IAEA in the

past but they are a committed member. There are no recorded instances of orphan sources in the DPRK.

Iran has an incredibly unstable relationship with the IAEA and the international sphere regarding all things nuclear. Iran has not ratified the ISCANT and has broken numerous treaties and agreements with the IAEA (NTI, 2020). Nuclear terrorism is a very real threat to Iran, with a nuclear site being attacked in 2021 (BBC, 2021), however there are no known reported orphan source incidents.

## Questions to consider

How can the UN ensure states undertake effective security measures for the tracking and removal of disused radioactive material?

How can states implement effective counterterrorism measures when the sharing of information on radioactive sources is incredibly difficult?

How does cyberterrorism pose a risk to the security of databases and information regarding the whereabouts of radioactive sources?

What measures, if any, can be taken to ensure that states facing conflicts can secure radioactive sources from terrorist groups?

How can states work across borders to prevent the smuggling of radioactive materials?

What can be done to provide effective international frameworks for the handling of orphaned sources?
Are there any international measures that can be implemented to prevent the use or development of a dirty bomb? And in the case of a dirty bomb being used, how can the international community respond in the best way?

## Further reading

Explaining Nuclear & Radioactive Sources:

The International Atomic Energy Agency's Podcasts - https://www.iaea.org/podcasts

IAEA General 2023 Conference at a glance - https://www.iaea.org/newscenter/multimedia/videos/iaea-general-conference-at-a-glance

IAEA Safeguards explained - https://www.iaea.org/newscenter/multimedia/videos/iaea-safeguards-past-and-future

Orphan Sources:

Brief explanation of the Goiania Incident - A Brief History of: The Goiania Incident (Short Documentary)

Brief explanation of the Lia incident in Georgia -

A Brief History of: The Lia Radiological Accident (Short Documentary)

# References


Atomic Heritage Foundation. *Timeline - Nuclear Museum*. [Online]. Available at: https://ahf.nuclearmuseum.org/ahf/nuc-history/timeline/ [Accessed 23 February 2024].

BBC News. (2021). Iran says key Natanz nuclear facility hit by 'sabotage'. [Online]. 11 April. Available at: https://www.bbc.co.uk/news/world-middle-east-56708778 [Accessed 25 January 2024].

Factsheet, 2023. *IAEA Incident and Trafficking Database (ITDB)*. [Online]. Available at: https://www.iaea.org/sites/default/files/22/01/itdb-factsheet.pdf [Accessed 25 January 2024].

IAEA. (1988). *The Radiological Accident in Goiania*. [Online]. Available at: https://www-pub.iaea.org/mtcd/publications/pdf/pub815_web.pdf.

IAEA. (2014). *THE RADIOLOGICAL ACCIDENT IN LIA, GEORGIA*. [Online]. Available at: https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1660web-81061875.pdf.

IAEA. (2021). *NUCLEAR SECURITY PLAN 2022-2025*. [Online]. Available at: https://www.iaea.org/sites/default/files/gc/gc65-24.pdf.

INTERNATIONAL ATOMIC ENERGY AGENCY. (2019a). Civil Liability for Nuclear Damage. In: *Civil Liability for Nuclear Damage*. pp.1–521. [Accessed 25 February 2024].

INTERNATIONAL ATOMIC ENERGY AGENCY. (2019b). Code of conduct on the safety and security of radioactive sources: Guidance on the import and export of radioactive sources. *IAEA Bulletin*, p.1. [Accessed 18 January 2024].

INTERNATIONAL ATOMIC ENERGY AGENCY. (2019c). Convention on the Physical Protection of Nuclear Material. In: *Convention on the Physical Protection of Nuclear Material*. pp.1–403. [Accessed 25 February 2024].

INTERNATIONAL ATOMIC ENERGY AGENCY. (2019d). Guidance on the management of disused radioactive sources. *IAEA Bulletin*, pp.1–180. [Accessed 18 January 2024].

INTERNATIONAL ATOMIC ENERGY AGENCY. (2019e). The Radiological Accident in Lilo. In: *The Radiological Accident in Lilo*. pp.1–103. [Accessed 25 February 2024].

Llumá, D. (2000). Former Soviet Union: What the Russians Left Behind. *The Bulletin of the atomic scientists*, 56 (3), pp.14–17.

Macalister, T. (2013). Radioactive materials lost in more than 30 incidents over past decade. *The Guardian*. [Online]. 5 May. Available at: https://www.theguardian.com/environment/2013/may/05/radioactive-materials-lost-30-incidents [Accessed 25 January 2024].

NATO Advanced Research Workshop on Legal Framework for Strengthening Nuclear Security and Combating Nuclear Terrorism and Advanced Research Workshop on Legal Framework for Strengthening Nuclear Security and Combating Nuclear Terrorism, NATO. (2012). *Legal framework for strengthening nuclear security and combating nuclear terrorism [electronic resource]*, NATO science for peace and security series. E, Human and societal dynamics v. 92. Washington, D.C.: IOS Press.

NTI. (2015). *Iraq Nuclear Overview*. [Online]. Available at: https://www.nti.org/analysis/articles/iraq-nuclear/ [Accessed 25 January 2024].

NTI. (2018). *North Korea Nuclear Overview*. [Online]. Available at: https://www.nti.org/analysis/articles/north-korea-nuclear/ [Accessed 25 January 2024].

NTI. (2019). *Pakistan Nuclear Overview*. [Online]. Available at: https://www.nti.org/analysis/articles/pakistan-nuclear/ [Accessed 25 January 2024].

NTI. (2020). *Iran Nuclear Overview*. [Online]. Available at: https://www.nti.org/analysis/articles/iran-nuclear/ [Accessed 25 January 2024].

NTI. (2023). *International Convention on the Suppression of Acts of Nuclear Terrorism*. [Online]. Available at: https://www.nti.org/education-center/treaties-and-regimes/international-convention-suppression-acts-nuclear-terrorism/ [Accessed 25 January 2024].

Others, F. B. A. (2023). Goiânia accident. *Encyclopedia Britannica*. [Online]. Available at: https://www.britannica.com/topic/Goiania-accident.

Session, S.-F. (2020). *A/RES/75/70*. [Online]. Available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/N20/357/50/PDF/N2035750.pdf?OpenElement [Accessed 11 December 2023].

United Nations General Assembly. (2016). *A/RES/71/66*. [Online]. Available at: https://documents-dds-

ny.un.org/doc/UNDOC/GEN/N16/422/18/PDF/N1642218.pdf?OpenElement [Accessed 11 December 2023].

United Nations General Assembly. (2018). *A/RES/73/66*. [Online]. Available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/N18/421/02/PDF/N1842102.pdf?OpenElement [Accessed 11 December 2023].

United Nations General Assembly. (2022). *A/RES/77/77*. [Online]. Available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/N22/739/35/PDF/N2273935.pdf?OpenElement [Accessed 11 December 2023].

World Nuclear Association. *History of Nuclear Energy - World Nuclear Association*. [Online]. Available at: https://www.world-nuclear.org/information-library/current-and-future-generation/outline-history-of-nuclear-energy.aspx [Accessed 23 February 2024].

(2005). *Nuclear Terrorism: Identifying and Combating the Risks*. [Online]. Available at: https://www.iaea.org/newscenter/statements/nuclear-terrorism-identifying-and-combating-risks [Accessed 18 January 2024].

(2006). *Radioactive Sources Recovered in Georgia*. [Online]. Available at: https://www.iaea.org/newscenter/news/radioactive-sources-recovered-georgia [Accessed 25 January 2024].

(2008). *Goiânia´s Legacy Two Decades On*. [Online]. Available at: https://www.iaea.org/newscenter/news/goianias-legacy-two-decades-on [Accessed 25 January 2024].

(2016). *History*. [Online]. Available at: https://www.iaea.org/about/overview/history [Accessed 25 February 2024].

(2019). *Incident and Trafficking Database (ITDB)*. [Online]. Available at: https://www.iaea.org/resources/databases/itdb [Accessed 25 January 2024].

(2021). *IAEA and China's Development Agency Sign Groundbreaking Agreement to Support Developing Countries*. [Online]. Available at: https://www.iaea.org/newscenter/news/iaea-and-chinas-development-agency-sign-groundbreaking-agreement-to-support-developing-countries [Accessed 25 January 2024].

(2022). *IAEA Report on 2013 Radiological Incident in Mexico Highlights Role of National Radiological Emergency Plan*. [Online]. Available at: https://www.iaea.org/newscenter/news/iaea-report-on-2013-radiological-incident-in-mexico-highlights-role-of-national-radiological-emergency-plan [Accessed 25 February 2024].

(2023a). *IAEA Mission Says Morocco Progresses with New Nuclear and Radiation Safety Framework, Recommends Further Steps to Complete Transition*. [Online]. Available at:

https://www.iaea.org/newscenter/pressreleases/iaea-mission-says-morocco-progresses-with-new-nuclear-and-radiation-safety-framework-recommends-further-steps-to-complete-transition [Accessed 25 January 2024].

(2023b). *New United Arab Emirates Member State Support Programme to Aid Nuclear Verification*. [Online]. Available at: https://www.iaea.org/newscenter/news/new-united-arab-emirates-member-state-support-programme-to-aid-nuclear-verification [Accessed 25 January 2024].

(2024). *What are Radioactive Sources?* [Online]. Available at: https://www.iaea.org/newscenter/news/what-are-radioactive-sources [Accessed 18 January 2024].

*A Brief History of Nuclear Accidents Worldwide*. [Online]. Available at: https://www.ucsusa.org/resources/brief-history-nuclear-accidents-worldwide [Accessed 23 February 2024a].

*Code-2004_web.pdf*. [Online]. Available at: https://www-pub.iaea.org/MTCD/publications/PDF/Code-2004_web.pdf.

*Investigating radiological incidents*. [Online]. Available at: https://www.interpol.int/Crimes/Terrorism/Radiological-and-Nuclear-terrorism/Investigating-radiological-incidents [Accessed 24 January 2024c].

*Our response to nuclear terrorism*. [Online]. Available at: https://www.interpol.int/Crimes/Terrorism/Radiological-and-Nuclear-terrorism/Our-response-to-radiological-and-nuclear-terrorism [Accessed 24 January 2024d].

*Radiological and nuclear detection*. [Online]. Available at: https://www.interpol.int/Crimes/Terrorism/Radiological-and-Nuclear-terrorism/Radiological-and-nuclear-detection [Accessed 24 January 2024e].

*Radiological and nuclear prevention*. [Online]. Available at: https://www.interpol.int/Crimes/Terrorism/Radiological-and-Nuclear-terrorism/Radiological-and-nuclear-prevention [Accessed 23 January 2024f].

*Responding to a nuclear event*. [Online]. Available at: https://www.interpol.int/Crimes/Terrorism/Radiological-and-Nuclear-terrorism/Responding-to-a-nuclear-event [Accessed 24 January 2024g].