

McKennaMUN VIII Background Guide



International Atomic Energy Agency (IAEA)

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Claremont McKenna
College**



DIRECTOR'S LETTER

Dear Delegates,

Welcome to the International Atomic Energy Agency Committee. I am incredibly excited to have you all here as delegates for our eighth annual McKenna Model United Nations Conference. My name is Sofía Victoria de la Peña (SV), and I will be your Chair for this committee session. I am a Sophomore at CMC majoring in Government and Economics. In my free time, I enjoy exploring the many amenities of L.A., boxing, and being a part of the CMC MUN Team!

In addition to my interests in the humanities, I also really love STEM and have taken several science classes here at CMC. Furthermore, I genuinely love the work and research the IAEA does, I have read several articles their scientists have published and simply find the Agency fascinating. Additionally, I value the institution and its principles as a whole, as it has played a crucial role in ensuring the safe and peaceful use of nuclear science.

I look forward to meeting you all and hearing your ideas and solutions during committee. If you have any questions or concerns, please don't hesitate to reach out!

Sincerely,

Sofia Victoria de la Peña
Chair International Atomic Energy Agency

INTRODUCTION

The International Atomic Energy Agency (IAEA) is a specialized international organization with the goal of promoting the peaceful and safe use of nuclear technologies. This includes its usage for nuclear energy and explicitly excludes its usage for military purposes such as nuclear weaponry. Although it is an autonomous organization with its own director General and governing bodies, it reports back to the United Nations General Assembly and the Security Council. Originally established in 1957, the IAEA is now based in Vienna, Austria and consists of 171 member states. The framework of the IAEA revolves around establishing internationally binding rules using treaties.¹

The three main missions of the IAEA are Safety and Security, Science and Technology, and Safeguards and Verification. Responsible for upholding these missions are the three main bodies: The Board of Governors, The General Conference, and the Secretariat. The Board of Governors is a policy-making body consisting of 35 Board Members that meets five times a year. It is responsible for establishing a budget, reading membership applications, and publishing the IAEA's safety standards. Some of the elected and nominated Board Members for 2019-2019

¹ "IAEA Treaties," *International Atomic Energy Agency*.

include Brazil, China, Egypt, France, Germany, Italy, Japan, Pakistan, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.²

The General Conference, consisting of all 171 Member States, meets annually to review and approve the policies of the Board of Governors. It also serves as a debate forum for the representatives to voice their nation's concerns on current events. It is also responsible for organizing a Scientific Forum to discuss advancements in nuclear science and technologies.³ The Secretariat is the administrative body consisting of more than 2000 general and professional staff members from all over the world. This body, directly overseen by the Director General, is responsible for running the IAEA, working in six different departments based on their specializations: Management, Nuclear Sciences and Applications, Nuclear Energy, Nuclear Safety and Security, Technical Cooperation, and Safeguards.⁴

These bodies collectively form the IAEA and work together to uphold the three missions: they ensure the peaceful use of nuclear technologies by inspecting existing facilities, they promote safety within these facilities by providing and implementing safety information, guidelines standards, and they act as a scientific hub by providing information on scientific advancements and by allowing for research and discussion of the various fields. In order to better implement change and promote security, the IAEA also consists of different regional cooperative areas that allow for the sharing of information between these nations and the organization of

² “IAEA Board of Governors,” *International Atomic Energy Agency*.

³ “IAEA General Conference,” *International Atomic Energy Agency*.

⁴ “IAEA Employees & Staff: Strength Through Diversity,” *International Atomic Energy Agency*.

regional conferences.⁵ These include the African Regional Cooperative Agreement for Research, Development, and Training Related to Nuclear Science and Technology (AFRA), the Cooperative Agreement for Arab States in Asia for Research, Development, and Training related to Nuclear Science and Technology (ARASIA), the Regional Cooperative Agreement for Research, Development, and Training related to Nuclear Science and Technology for Asia and the Pacific (RCA), and the Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL).

The goal of this Committee Session is to uphold and promote the three missions of the IAEA.

Topic I: Nuclear Power and its Radioactive Waste

INTRODUCTION

Nuclear power is the use of nuclear reactions, such as nuclear fission of plutonium and uranium, to generate electricity. It is considered by many, including the World Nuclear Association, a sustainable and clean source of energy due to the fact that it can produce

⁵ “IAEA Partnerships: Regional/Cooperative Agreements,” *International Atomic Energy Agency*.

electricity without releasing Carbon dioxide into the environment.⁶ It is being widely used by many countries as an environmentally friendly alternative to other energy sources such as the burning of fossil fuels. Nuclear fission has been proven to be an effective and efficient source of energy; however, it can have several adverse effects that must be addressed. Three of the most prevalent and widely discussed issues with nuclear power are in its production, release of radiation, and the proper disposal of the waste.

Nuclear power is not a perfectly clean source of energy. Although other energy sources emit more carbon dioxide, it is still released during the mining of the Uranium, the transportation of waste, and especially when new Power plants are constructed.⁷ Another issue with nuclear power plants is their constant emission of low-level radiation.⁸ This release of radioactive chemicals, in the form of both liquids and gases, can have long term effects on the environment and living creatures habiting the surrounding areas. Additionally, if any accident were to occur at the sites – as they have in the past - it could be detrimental to the surrounding areas and perhaps beyond. Perhaps one of the most pressing issues with nuclear power, and the focus of this committee session, is the issue of disposal/storage of nuclear waste.⁹ Nuclear waste is nuclear fuel that can no longer be used to sustain nuclear reactions. The storage of this waste is a

⁶ Richard Rhodes, “Why Nuclear Power Must be Part of the Solution,” *Yale School of Forestry and Environmental Studies: Yale Environment360*, Jul 2018.

⁷ Rose Kivi, “How Does Nuclear Energy Affect the Environment?” *Sciencing*, April 2018.

⁸ “Radiation Monitoring at Nuclear Power Plants,” *United States Nuclear Regulatory Commission*, Jan 2018.

⁹ “Nuclear Explained, Nuclear Power and the Environment,” *United States Energy Information Administration: Independent Statistics and Analysis*, Jan 2019.

particular issue for many nations as the waste cannot be destroyed or properly disposed of.

Therefore, there is no current solution for the long-term storage of this waste.

The safety and management of individual Nuclear Power Plants are ultimately the responsibility of the nations that are using nuclear technologies. However, the International Atomic Energy Agency (IAEA), specifically its Department of Nuclear Safety and Security, provides guidelines and standards for their safe use.¹⁰ In addition to these safety standards, the IAEA also provides general information on how to better construct and operate the nuclear sites.

HISTORY

The science of nuclear radiation first developed as countries applied theories of atomic radiation to warfare. Since the 1950s, atomic theory has been used to harness reliable energy sources.¹¹ Nuclear energy first became commercialized in the 1960s, with the United States' production of the Yankee Rowe Nuclear Power Station. Canada, France, and The Soviet Union followed soon after with their production of commercial nuclear power plants. Despite the many advancements in nuclear science and technology, there was a decline in demand and usage of nuclear power in the 1970s, mostly due to several incidents and widespread activism against it.¹² Since then, the industry has grown, with 31 countries currently using nuclear power. Most nuclear power plants are currently located in North America, Europe, and East and South Asia.

¹⁰ "IAEA Factsheets and NAQs- Nuclear Safety," *International Atomic Energy Agency*, Jun 2011.

¹¹ "Outline History of Nuclear Energy," *World Nuclear Association*, Apr 2019.

¹² *Ibid.*

With 58 operating commercial nuclear power reactors, the United States is the leader in nuclear energy, though France is not far behind.¹³

Because of these developments, the accumulation of nuclear waste has increased dramatically. Regulatory programs within individual nations have tried to address this challenge. One example is with the U.S. Nuclear Regulatory Commission's creation of pre-licensing activities to properly dispose of waste in specific regions within the continental United States.¹⁴ The 1972 London Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (commonly known as the London Convention) was one of the first occasions where the world community, driven by the United Nations, addressed the issue of nuclear waste disposal. This convention emphasized the threats that improper disposal of nuclear waste poses to the oceans and marine creatures.¹⁵

Nuclear Accidents

To better assess nuclear accidents, the IAEA introduced the International Nuclear and Radiological Event Scale (INES), ranging from 1 (minor anomaly) to 7 (major accident).¹⁶ Three accidents at commercial nuclear power sites that have been rated level 5 or above in the past

¹³ "EIA Frequently Asked Questions," *United States Energy Information Administration: Independent Statistics and Analysis*, Dec 2019.

¹⁴ "U.S. NRC Historical Information," *United States Nuclear Regulatory Commission*, Feb 2018.

¹⁵ "London Convention (LDC, LC) and London Protocol," *International Maritime Organization: Index of IMO Resolutions*, Oct 2018.

¹⁶ "The International Nuclear and Radiological Event Scale User's Manual," *The International Atomic Energy Agency and the OECD/Nuclear Energy Agency*, 2013.

forty years are the Chernobyl Disaster, the Fukushima Daiichi Disaster, and the Three Mile Island Accident.

Chernobyl Disaster: This nuclear accident occurred at the Chernobyl Nuclear Power Plant in the Ukrainian Republic of the Soviet Union in April of 1986. It resulted from the reactor core exploding and causing a fire that persisted for several days, spreading radioactive materials into the environment. It is considered to be the largest and most detrimental nuclear accident in history resulting in an estimated 4000 deaths from either direct or indirect causes.¹⁷ It is one of the two nuclear disasters classified as Level 7 by the INES. Apart from the health consequences due to radiation exposure, this accident also had several economic and environmental repercussions.¹⁸ In order to better evaluate these varied impacts, the IAEA established the Chernobyl Forum in 2003. This Forum found that to this day, regions in Ukraine, Belarus, and the Russian Federation are still dealing with the effects of this accident.

Fukushima Daiichi Disaster: This nuclear accident occurred in March 2011 at the Nuclear Power Plant in Ōkuma, Fukushima Prefecture, Japan. The cause of this accident was the Tōhoku Earthquake of 2011 and its subsequent tsunami. As the equipment at the site was not designed to withstand natural disasters of this capacity, the earthquake and tsunami caused the malfunction of several different units of the reactor, resulting in hydrogen tank explosions, three nuclear meltdowns, and the spread of radioactive materials to several of the units.¹⁹ Radioactive

¹⁷ “Chernobyl: The True Scale of the Accident,” *International Atomic Energy Agency*, Sep 2005.

¹⁸ “Chernobyl’s Legacy: Health, Environmental and Socioeconomic Impacts,” *The Chernobyl Forum 2003-2005*.

¹⁹ “Fukushima Nuclear Accident Update Log,” *The International Atomic Energy Agency*, Jan 2013.

isotopes also spread throughout the town and eventually into the Pacific Ocean. This nuclear accident was so grave that it is only the second to be classified at Level 7 by the INES²⁰ In the years before the accident, the IAEA had issued several warnings regarding Japan's ability to properly run Nuclear Power Plants due to the island's susceptibility to serious earthquakes.

Three Mile Island Accident: This nuclear accident occurred at the Three Mile Island Nuclear Generating Station in Pennsylvania, United States in March 1979. Although only classified at a Level 5 accident, defined as an "accident with wider consequences," it is still the most serious nuclear accident in all of United States history. It was largely due to errors in the design and oversight of the plant²¹ and resulted in the release of radioactive gases into the environment. However, this did not have a substantial effect on the environment or human health.²² The accident also prompted the Nuclear Regulatory Commission to modify its regulations on power plants.

For each of these accidents and many more, the IAEA entered the sites and conducted thorough investigations into the causes of the accidents as well as how to best remedy them and prevent them from occurring in the future. Environmental Laboratories, a division within the IAEA, is the research hub for evaluating these accidents.²³ Staffers there, often working with

²⁰ "Fukushima Daiichi Accident," *World Nuclear Association*, Oct 2018.

²¹ "Background on the Three Mile Island Accident," *United States Nuclear Regulatory Commission*, Jun 2018.

²² Ibid.

²³ IAEA's division Environment Laboratories actually consists of four different laboratories that individually conduct research on the different adverse and even positives effects nuclear power can have on the environment. "Division of IAEA Environment Laboratories," *The International Atomic Energy Agency: Department of Nuclear Sciences and Applications*.

individual nations' environmental departments, study the effects of emitted radiation on the aquatic and terrestrial systems in the surrounding areas of most nuclear power plants.²⁴ The IAEA has also worked with several other environmental organizations over the years to ensure the safety of nuclear technologies, including the Union of Concerned Scientists, the Nuclear Energy Institute, and the United States Nuclear Regulatory Commission.

THE ISSUE

After years of implementing safety standards and guidelines for nuclear power plants, the IAEA considers most nuclear sites to be relatively safe for the environment. This, however, follows the implication that the power plants are being run properly as to avoid an uncontrolled nuclear reactor, which is not always the case.²⁵ Thus, the largest issue the IAEA and several nations currently face is with the proper storage and disposal of nuclear waste. In the status quo, each of the three steps of storing and disposing of nuclear waste poses challenges: first, the spent fuel must be handled properly and cooled in pools that are currently dangerously overcrowded; second, the waste must be transported, a process that is tedious and expensive; and, third, there is no long-term solution for the storage of this waste. As the IAEA recently summed up these problems before the UN's General Assembly:

²⁴ "Division of IAEA Environment Laboratories," *The International Atomic Energy Agency: Department of Nuclear Sciences and Applications*.

²⁵ "Nuclear Explained, Nuclear Power and the Environment," *United States Energy Information Administration: Independent Statistics and Analysis*, Jan 2019.

“We should ... consider multinational approaches to the management and disposal of spent fuel and radioactive waste. Over 50 countries currently have spent fuel stored in temporary locations, awaiting reprocessing or disposal. Not all countries have the appropriate geological conditions for such disposal - and, for many countries with small nuclear programs, the financial and human resources required for the construction and operation of a geological disposal facility are daunting”²⁶

Nuclear waste is nuclear fuel that has already been used to sustain nuclear reactions and can no longer be used. There are several different categories of waste that can either have low levels of radioactivity such as Uranium Mill Tailings or higher levels of radioactivity such as Spent reactor fuel.²⁷ The storage of spent nuclear fuel, one of the most common forms of waste, presents an even larger issue due to its extremely radioactive nature. This type of waste has to be carefully handled and stored in pools of water before it can even begin to be transported. Although radioactivity does reduce over time due to radioactive decay, nuclear waste can remain active for tens of thousands of years despite its inability to sustain nuclear reactions. As of now, there is no scientific way to destroy or dispose of this waste, causing it to accumulate with the increasing usage of nuclear energy.

Before long term or even short-term storage is possible, the nuclear waste must be treated and conditioned in order to make it safer for transportation and handling.²⁸ The main disposal

²⁶ International Nuclear Waste Disposal Concepts,” *World Nuclear Association*, Nov 2016.

²⁷ “Nuclear Explained, Nuclear Power and the Environment,” *United States Energy Information Administration: Independent Statistics and Analysis*, Jan 2019.

²⁸ “Radioactive Waste Management,” *World Nuclear Association*, Apr 2018.

options currently acknowledged by the IAEA are near surface disposal and deep geological disposal. Near surface, disposal is typically used for low-level radioactive waste and at times intermediate-level radioactive waste as it is susceptible to many problems such as natural disasters and climate changes.²⁹ This waste is either stored at ground level or in caverns/crates immediately below the ground. Countries that commonly use this method of storage include France, Japan, Spain, Sweden, the United Kingdom, and the United States. Deep geological disposal is the commonly used method of disposal for high-level radioactive waste, long-lived intermediate level radioactive waste, and spent fuel.³⁰ This waste is stored in between 250 meters to 5000 meters below the ground as this type of waste needs to be isolated with several barriers to ensure proper safety. This deep geological disposal includes several methods such as mined repositories and deep boreholes. Countries that commonly use these methods are Argentina, Canada, France, Japan, Russia, Spain, Switzerland, The United Kingdom, and the United States. Other proposed storage and disposal strategies include but are not limited to sub-seabed disposal, deep well injection, disposal in outer space, and repository locations such as Yucca Mountain (proposed by the US).³¹

Further issues with the storage of nuclear waste arises with the temporary storage of the waste at the nuclear power plants as well as its transport. One of the most commonly used methods is storage ponds, known as spent fuel pools. These pools are used to cool the fuel rods,

²⁹ "Storage and Disposal of Nuclear Waste," *World Nuclear Association*, Oct 2018.

³⁰ *Ibid.*

³¹ *Ibid.*

providing protection from initial radiation doses. Dry storage in vaults and casks is another method of temporary storage and cooling where, instead of water, air circulation is used to cool the fuel. These pools and casks are designed to hold a specific amount of fuel. However, many countries are just meeting or even exceeding the capacity of the pools due to inefficient transport methods and a lack of permanent disposal options.³² Additionally, an unshielded and ill-prepared spent fuel pool can expose the surrounding environment and public to dangerous levels of radiation. Therefore, these pools must be constantly cooled, the chemicals continually adjusted, and they must be regularly monitored.³³

Regardless of disposal method, they all present common concerns: risk of contamination to groundwater, risk of earthquake and other natural disasters, the threat of radiation leaks, the risk of attack from external parties, and the general risks and challenges of transportation. In addition to all these risks, perhaps the largest issue is the lack of international uniformity with disposal and transportation practices.³⁴ Despite the solutions many countries have offered, there is still an ongoing debate in several nations on how to properly dispose of nuclear waste while minimizing all possible consequences.

³² “Nuclear Waste,” *Union of Concerned Scientists*, Apr 2016.

³³ “The World Nuclear Waste Report. Focus Europe,” *Berlin & Brussels*, 2019.

³⁴ “Transport of Radioactive Materials,” *World Nuclear Association*, Jul 2017.

The International Atomic Energy Agency has set in place several regulations for the storage and disposal of waste to ensure safety and efficiency. However, it still poses an issue in several countries, especially since there is no one standard way of disposing of it.

Key Actors

United States

The United States is the world leader in nuclear energy and technology. With 58 nuclear power plants and 98 nuclear reactors located throughout the country, it accounts for nearly 30% of the world's nuclear energy.³⁵ Nonetheless, nuclear power contributes just 20% of the electricity generated in the United States.³⁶ The primary source of energy in the United States is the burning of fossil fuels, first petroleum followed by natural gas.³⁷ The storage and disposal of nuclear waste in the United States has been the topic of an ongoing debate over the past forty years. The United States contains over 90,000 metric tons of nuclear waste, a number that continues to rise with the use of nuclear energy.³⁸ As of now, waste is located in over 35 different states, and the only permanent solution being seriously explored and utilized is the Yucca Mountain Nuclear Waste Site in Nevada.³⁹ Nuclear waste continues to be a widely contested issue in the United

³⁵ "Map of United States Nuclear Plants," *Nuclear Energy Institute*.

³⁶ "Department of Energy: Nuclear," *United States Department of Energy*.

³⁷ "U.S. Energy Facts Explained," *United States Energy Information Administration: Independent Statistics and Analysis*, 2018.

³⁸ "Disposal of High-Level Nuclear Waste," *United States Government Accountability Office*.

³⁹ *Ibid.*

States. There are several agencies within the United States that monitor and regulate the nuclear industries including the Department of Energy, the United States Energy Information Administration, the Nuclear Energy Institute and several others. These organizations work closely with the IAEA.

France

With 58 nuclear power plants in France, nuclear power contributes to 71.7% of electricity generated in the country.⁴⁰ Due to France's commitment to sustainability, laid out under the Energy Transition for Green Growth Act, they are a leading world power in the nuclear industry. Most waste in France is currently stored in temporary repository sites, at around 1000 locations throughout the country. However, there is a plan for a deep geological repository site as a long-term solution.⁴¹ Although nuclear waste has been a political issue for France for many decades. Currently, there is widespread concern that its nuclear power and waste sites are susceptible to terrorist attacks.⁴² France has also been commended by the IAEA for its measures to address the issue of nuclear waste. In addition to the several environmental organizations and agencies in France, such as the Ministry for the Ecological and Inclusive Transition, there are also several that focus on nuclear energy and technology: Nuclear Policy Council (Conseil

⁴⁰ "IAEA Country Nuclear Power Profiles: France," *The International Atomic Energy Agency*, 2019.

⁴¹ Melissa Mahony, "What France Plans to do With Its Nuclear Waste," *ZDNet*, Aug 2010.

⁴² "Managing Nuclear Waste in France: the Long and Short Game," *Power Magazine: Technology*, May 2018.

Politique Nucléaire – CPN), The French Alternative Energies and Atomic Energy Commission, and the Nuclear Energy Agency being based in France.

Russian Federation

Nuclear technologies are widely used in Russia as a means of increasing economic success. Specifically, the export of nuclear technologies and services is a driving economic factor in Russia.⁴³ The nation also relies on nuclear energy for a steady portion of its electricity, with 36 nuclear power plants present throughout the country. Due to the Chernobyl disaster, there are several laws to ensure the safety of nuclear power plants, including the Law on Utilization of Atomic Energy and the Law on State Policy in the Field of Radioactive Waste Management. Spent nuclear fuel reprocessing has become a large issue in the Russian Federation. In order to improve its radioactive waste management, the Russian Federation has collaborated with several other countries such as the United States and countries within the European Union. Additionally, Russia has begun clean-up efforts to help reverse the effects of radioactive leaks that occurred at storage facility in Andreyeva Bay under the Soviet Union in the 1980s.⁴⁴ Environmental agencies in the Russian Federation, many of which collaborate with other nation's organizations and the

⁴³ "IAEA Country Nuclear Power Profiles: Russian Federation," *The International Atomic Energy Agency*, 2019.

⁴⁴ Shaun Walker, "Russia Begins Cleaning Up the Soviet's Top-Secret Nuclear Waste Dump," *The Guardian*, Jul 2017.

IAEA, including the International Centre of Ecological Safety in the Russian Federation (Rosatom) and the Federal Agency on Atomic Energy.

LOOKING AHEAD

Nuclear fission as an energy source was originally sought after as a solution to growing environmental issues and climate change as a whole. The most commonly used sources of energy in most of the world are fossil fuels, which present environmental issues such as land degradation, water pollution, and emission of air pollutants. To address this issue, several other energy sources have been created and implanted over the past several decades; apart from nuclear energy, this also includes solar energy using solar panels, wind energy using wind turbines, geothermal energy using the earth's natural store energy, and hydroelectric energy. Although many countries have adopted these methods, fossil fuels and nuclear energy still remain popular. Looking forward, it is important to acknowledge the downfalls and benefits of each of these energy sources, including nuclear energy and the issue with managing its waste.

Member states of the IAEA have adopted different measures to address the issue of nuclear waste. The most popular of these being near-surface disposal, specific landfill disposal, belowground facilities, geological disposal, borehole disposal, and several different storage cask types within each of these facilities.⁴⁵ Conversations of privatizing the industry are also underway. However, the issues with each of these methods have only begun to be explored

⁴⁵ "The World Nuclear Waste Report. Focus Europe," *Berlin & Brussels*, 2019.

within the last decade. The proper management of waste is of the utmost importance for the IAEA and its member states. The question for delegates is not only which method is best, but how to implement standardized and widespread measures to ensure management is undergone properly and safely. Delegates must be pragmatic about their solutions, respecting the sovereignty of each nation's nuclear program while following the IAEA's doctrine.

Topic II: Nuclear Disarmament in North Korea

INTRODUCTION

Nuclear proliferation refers to the spread of nuclear technology, specifically nuclear weapons, that can be used for warfare. Following the Treaty on the Non-Proliferation of Nuclear Weapons, this spread of nuclear weapons only refers to nations that are not originally recognized as Nuclear Weapon States. Nuclear weapons are weapons of mass destruction that use nuclear reactions, with either fission bombs or thermonuclear bombs, to release large amounts of energy in a detrimental way.⁴⁶ They have the capacity to destroy entire cities and spread radiation with their detonation. Since the end of World War II in 1945, nuclear weapons have been at the forefront of international politics due to their dangerous nature. Currently, there are roughly

⁴⁶ Rosie McCall, "The Real (and Terrifying) Scale of Nuclear Weapons," *IFL Science Magazine*, Oct 2017.

14,000 nuclear weapon warheads worldwide and 2,000 nuclear tests have been conducted.⁴⁷ Nine nations possess nuclear weapons (presented in order of stockpile from largest to least): the Russian Federation, the United States, France, the Republic of China, the United Kingdom, Israel, Pakistan, India, and the Democratic People’s Republic of Korea (also known as North Korea).⁴⁸

Since the first official establishment of nuclear weapons as a world threat, several multilateral treaties have been signed, including the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the Partial Test Ban Treaty, the Comprehensive Nuclear-Test-Ban Treaty, and the Treaty on the Prohibition of Nuclear Weapons. Although each has mattered, the most significant agreement is the NPT.⁴⁹ The NPT is an international arms control agreement among 190 states that seeks to prevent nuclear proliferation. The only five universally accepted possessors of nuclear weapons, classified as the Nuclear Weapon States, are the United States, Russia, China, France, and the United Kingdom. Five prominent United Nations member states that are not signers of this treaty are India, Israel, Pakistan, South Sudan, and North Korea – them having withdrawn from the treaty in 2003.⁵⁰

The goals of the International Atomic Energy Agency (IAEA) align closely with those of the NPT as well as several other anti-proliferation treaties. The IAEA was established in order to

⁴⁷ Hans Kristensen and Matt Korda, “Status of World Nuclear Forces,” *Federation of American Scientists*, May 2019.

⁴⁸ *Ibid.*

⁴⁹ “Nuclear Weapons,” *United Nations Office for Disarmament Affairs*.

⁵⁰ “Treaty on the Non-Proliferation of Nuclear Weapons: Status of the Treaty,” *United Nations Office for Disarmament Affairs*.

promote the creation and use of nuclear technology peacefully and safely and to prevent the spread of nuclear proliferation for warfare through several international safeguards.⁵¹ One of its largest goals is to establish and execute these safeguards as well as promote widespread disarmament. IAEA nuclear safeguards are a key component of the NPT as well as international safety precautions as a whole. These safeguards include measures to monitor nuclear activities to ensure they are not being used for military purposes.⁵² Nations accept these measures through legally binding agreements with the IAEA. Additionally, several articles of the NPT, especially Article 3, require NPT states to cooperate with the Agency as a whole as well as comply with all safeguard agreements.⁵³ To date, the IAEA has safeguards agreements with 175 States, including India, Pakistan, and Israel which are not a party to the NPT.⁵⁴ In addition to agreements with these the NPT states, the IAEA also has to safeguard agreements with nations in Latin America and the Caribbean, the South Pacific, Southeast Asia, Africa, and Central Asia.⁵⁵ Over the years, the IAEA has expressed concerns regarding the Democratic People's Republic of Korea, especially since its withdrawal from the IAEA. North Korea has been consistently not complying with the IAEA safeguards, resulting in the IAEA expressing "deep concern" over the state and its nuclear capacities.⁵⁶

⁵¹ "Treaty on the Non-Proliferation of Nuclear Weapons: Background," *International Atomic Energy Agency*.

⁵² "Basics of IAEA Safeguards," *International Atomic Energy Agency*.

⁵³ "Basics of IAEA Safeguards," *International Atomic Energy Agency*.

⁵⁴ "Safeguards Agreements," *International Atomic Energy Agency*.

⁵⁵ "Nuclear-Weapon-Free-Zones," *International Atomic Energy Agency: Safeguards Legal Framework*.

⁵⁶ "Fact Sheet on DPRK Nuclear Safeguards," *International Atomic Energy Agency*.

HISTORY

The United States' dropping of the atomic bomb "Little Boy" on Hiroshima in August of 1946 sparked a continuation of the Soviet- US Nuclear Arms Race and thus the establishment of nuclear weapons throughout the world. Nuclear weapons have only been utilized twice in history, with the United States detonation over Hiroshima and Nagasaki. Collectively, these occurrences resulted in approximately 200,000 deaths, showcasing the dangerous capacities of nuclear weapons.⁵⁷ These weapons were a result of the United States' then-secret nuclear research and development program called the Manhattan Project. During this time, the Soviet Union had a similar nuclear research program in order to catch up with the United States and develop an atomic bomb of their own. As hostilities increased between the United States and the Soviet Union, the Nuclear Arms Race continued with both nations aggressively expanding their nuclear facilities and research.⁵⁸

In the following years, several other countries launched their own nuclear programs in order to develop nuclear weapons: The United Kingdom has successfully tested nuclear weapons in 1952, France in 1960, China in 1964, India in 1974, Pakistan in 1998, North Korea in 2006 and Israel's program being uncovered in 1986.⁵⁹ Over this time, several renowned scientists such as Albert Einstein were vocal about their concerns regarding weapons of this destructive capacity. In 1985, the International Physicians for the Prevention of Nuclear War even went on

⁵⁷ "A Brief History of Nuclear Weapons States," *Asia Society Non-Profit Organization*.

⁵⁸ "Einstein Exhibition: Nuclear Arms Race," *American Museum of Natural History*.

⁵⁹ Nick Robins-Early, "This is When the World's Nations Got Their Nuclear Weapons," *Huffpost*, January 2016.

to win the Nobel Peace Prize.⁶⁰ Additionally, nuclear weapons were incredibly unpopular amongst social movements, with worldwide protests and marches against nuclear proliferation and for disarmament. For example, The Nuclear Freeze Campaign was a mass political and social movement in the United States to urge both the USA and the USSR to stop their development of nuclear weapons and begin disarmament.⁶¹

Since one of its first resolutions in 1946, the United Nations General Assembly has also been continuously urging the disarmament and elimination of nuclear weapons.⁶² In 1954, following US President Dwight D. Eisenhower's speech to the General Assembly, the United Nations decided to establish an "Atoms for Peace" organization to address all issues regarding nuclear weapons.⁶³ This organization, known as the International Atomic Energy Agency, was then established in 1957 with unanimous support.

Although there have been several multilateral treaties as well as international agreements on nuclear disarmament and preventing further nuclear proliferation, the Treaty on the Non-Proliferation of Nuclear Weapons is the most significant international law on the matter. This treaty, largely headed by the United States and the Soviet Union, established that non-nuclear weapon states would never begin developing nuclear weapons and that

⁶⁰ "Nuclear Weapons History: The Road to a World Free of Nuclear Weapons," *International Campaign to Abolish Nuclear Weapons (ICAN)*.

⁶¹ Andrew Lanham, "Lessons from the Nuclear Freeze," *Boston Review, a Political and Literary Forum*, March 2017.

⁶² "Nuclear Weapons History: The Road to a World Free of Nuclear Weapons," *International Campaign to Abolish Nuclear Weapons (ICAN)*.

⁶³ "International Atomic Energy Agency: History," *International Atomic Energy Agency*.

nuclear-weapon states would begin disarmament.⁶⁴ This treaty was first signed in 1968 and came into effect in 1970.

KEY ACTORS

Democratic People's Republic of Korea

The Democratic People's Republic of Korea, commonly known as the DPRK or North Korea, was first established as a nation in 1948, after Korea was split on the 38th parallel with the Soviet Union occupying the North and the United States occupying the South. For many years tensions between the two nations arose as they each claimed the jurisdiction of Korean peninsula as a whole, resulting in the Korean War from 1950 to 1953. Although the war ended with an armistice, hostilities still remained high between the nations and a Korean Demilitarized Zone was established on the border of the countries to act as a buffer zone.

From 1948 till his death in 1994, Kim Il-Sung was the leader of North Korea. Known as "The Great Leader," he ruled the nation with a philosophy known as "Juche" which translates to self-reliance, a principle that explains North Korea's isolationism and secrecy.⁶⁵ Under his leadership, and with the support of the Soviet Union, North Korea experienced much industrial growth as well as established a powerful military. Kim Il-Sung's successor was his son, Kim Jong Il whom also put a large emphasis on establishing a strong military presence. Due to his "military first" philosophy, Kim Jong Il expanded the Korean People's Army and established it

⁶⁴ "A Brief History of Nuclear Weapons States," *Asia Society Non-Profit Organization*.

⁶⁵ "History: North Korea," *History*.

as the economic and political center of the nation.⁶⁶ The third and final leader of North Korea to date is Kim Jong Un. Kim Jong Un took power in 2011, at nearly 30 years old, after the death of his father. Since then, he has encompassed the role of Supreme Leader, will full control over North Korea's military, economy, and an inherited nuclear arsenal.

From the 1980s to the early 2000s, North Korea labored to become a nuclear power. In 1985, they had initially signed on to the Non-Proliferation Treaty but continually refused to complete the IAEA's safeguards agreement.⁶⁷ Nuclear research began in North Korea as early as 1986, with the United States Central Intelligence Committee suspecting that the nation possessed two nuclear warheads by 1994. Over the years, as more nations vowed to pursue disarmament, North and South Korea even signed the South-North Joint Declaration on the Denuclearization of the Korean Peninsula in 1992. However, North Korea did not comply with many of the Declaration's edicts.⁶⁸ For example, in 1993 the IAEA uncovered several discrepancies with the DPRK's nuclear reports and declared that the nation was violating the safeguards as well as the NPT as a whole.⁶⁹ North Korea, under Kim Il-Sung and Kim Jong Il underwent several talks and agreements with the United States and the IAEA, none of which were successful. North Korea withdrew from the IAEA in 1994 and then from the NPT in 2003.⁷⁰

⁶⁶ Ibid.

⁶⁷ "History: North Korea," *History*.

⁶⁸ Kelsey Davenport, "Chronology of U.S.-North Korean Nuclear and Missile Diplomacy," *Arms Control Association*, Nov 2019.

⁶⁹ "Fact Sheet on DPRK Nuclear Safeguards," *International Atomic Energy Agency*.

⁷⁰ Kelsey Davenport, "Chronology of U.S.-North Korean Nuclear and Missile Diplomacy," *Arms Control Association*, Nov 2019.

Currently, North Korea is not a member of the Non-Proliferation Treaty, the Comprehensive Nuclear-Test Ban Treaty, nor the Chemical Weapon's convention. Since 2006, it is known to have conducted six nuclear tests each at higher levels of sophistication and destructive capacity.⁷¹ The international community has continuously looked askance on North Korea's actions and several nations – including Australia, China, Japan, Russia, South Korea, the United States, the European Union, and even the United Nations Security Council– have imposed a series of sanctions against North Korea.⁷²

North Korea has a continued history of non-compliance with the United Nations, the International Atomic Energy Agency, and the international community as a whole. Over the past two decades, North Korea has developed an advanced nuclear weapons program, ballistic missiles program, and a suspected chemical and biological weapons program. They are known to have conducted nuclear tests, each with increasing sophistication, in 2006, 2009, 2013, 2016, and 2017. As of now, North Korea's nuclear stockpile contains more than 30 nuclear weapons and they contain the capacity and nuclear materials to construct at least 30 more.⁷³ Experts estimate that within the next decade, the DPRK could develop as many as 100 nuclear warheads.⁷⁴ The

⁷¹ “North Korea Overview,” *Nuclear Threat Initiative*, Aug 2019.

⁷² Ibid.

⁷³ Ibid.

⁷⁴ Joel Wit and Sun Young Ahn, “North Korea's Nuclear Futures: Technology and Strategy,” *Johns Hopkins School of Advanced International Studies: U.S.-Korea Institute*, 2015.

state also has an advanced and highly secretive chemical and biological warfare program and is suspected to possess dangerous chemical and biological capabilities.⁷⁵

The Nuclear Missiles test of 2017 was North Korea's last showcase of their refined nuclear program with the successful testing of its first intercontinental ballistic missile (ICBM).⁷⁶ An ICBM is a missile with the capacity to carry nuclear warheads as far as 5500 kilometers (3400 miles) with high precision and accuracy. It is considered highly dangerous and is only possessed by the most advanced states such as the United States, Russia, China, Iran and now North Korea.

Despite their pause in missile tests, the 2017 test having been the last one yet, evidence still suggests that North Korea has continued its nuclear weapons program, despite international dissent and IAEA's objections and warnings.⁷⁷ By 2018, estimates were that North Korea has continued to develop missiles as well as nuclear warheads in order to expand its arsenal.⁷⁸ Perhaps the largest distinction between North Korea and the other eight states known to possess nuclear weapons is their avid refusal to engage in denuclearization talks and aggressive expansion of their nuclear weapons programs.⁷⁹ Although the DPRK has, in several instances, vowed to halt its programs – with its initial signing of the NPT and its several agreements and

⁷⁵ Bertil Lintner, "North Korea's Chemical Weapons: the Real Threat the World Should Fear?" *The National Interest*, Aug 2019.

⁷⁶ David Sanger and Choe Sang-Hun, "North Korea Links 2nd 'Crucial' Test to Nuclear Weapons Program," *New York Times*, Dec. 2019.

⁷⁷ Timothy Martin and Andrew Jeong, "North Korea Keeps Stockpiling Materials to Make Nuclear Weapons, Report Finds," *Wall Street Journal*, Feb 2019.

⁷⁸ Eric Brewer, "North Korea Nuclear Threat is Here," *The Hill*, Jan 2020.

⁷⁹ Greg Thielmann, "Understanding the North Korean Threat," *Arms Control Association*, May 2015.

pledges with/to the United Nations, the IAEA, and even the United States – it has never fully complied with other nations or organizations.

In 2016, North Korea’s Supreme Leader Kim Jong Un and United States President Donald Trump have engaged in several talks to address the DPRK’s nuclear program and hostilities between the two nations. Although these talks continued through 2019, little progress has been made thus far. In fact, North Korea continues to threaten the expansions of its nuclear programs.⁸⁰

Since the DPRK’s withdrawal from the IAEA, and even during its time as a member state, the Agency has had increasing amounts of trouble getting North Korea to comply with their safeguards or regulations as a whole. Although the IAEA does indeed monitor North Korea’s Yongbyon Nuclear Scientific Research Center using satellite imagery, it does not have ground access to the site.⁸¹ Therefore, the IAEA, as well as the international community, is generally unaware of the whereabouts within this facility as well as the intended purpose of these said nuclear capacities. There have been several statements issued by IAEA member states as well as the Director General voicing their concerns regarding north Korea to the Board of Governors, but no progress or set timeline has been established for managing North Korea and their expansive nuclear program.⁸²

⁸⁰ “What’s Behind North Korea’s ‘Christmas Gift’ Threat,” *National Public Radio: LRN Miami, FL*, Dec 2019.

⁸¹ “IAEA Ready to Undertake Verification and Monitoring in North Korea,” *International Atomic Energy Agency*, Mar 2019

⁸² “IAEA and DPRK: Chronology of Key Events,” *International Atomic Energy Agency*.

B.4 Key Actors

United States

With around 6,000 weapons, the United States has the second largest nuclear arsenal in the world. It is the only nation to have ever utilized nuclear weapons, during World War II in Japan. Due to the United States' allied relations with South Korea since the onset of the Korean War, hostilities have been high between the USA and the Democratic People's Republic of Korea. The United States is a staunch ally of South Korea, having vouched support for the nation on several different occasions, and even vowed to protect the nation under the NATO Collective Agreement.⁸³ The United States also has several air bases stationed across South Korea storing nuclear weapons.

The United States has since then been an avid advocator for the reunification of the Korean Peninsula in a peaceful and democratic way. As the DPRK's nuclear weapons program grew, tensions increased between the countries and the United States continually imposed economic sanctions on the state. In 2002, President George W. Bush even went as far as to call North Korea one of the "Axis of Evil" alongside Iran and Iraq.⁸⁴ Since 1995, the United States and North Korea have entered in several agreements regarding denuclearization, and although North Korea was initially supportive, they never fully complied continually violated the United States' agreements.⁸⁵ The most recent talks between the two countries began in 2017, after North

⁸³ Alexandra Ma and Shayanne Gal, "These are the 9 Nuclear-Armed Countries and the 31 Allies They've Vowed to Defend," *Business Insider*, Sep 2019.

⁸⁴ Bush, George W. "State of the Union Address 2002," January 29, 2002.

⁸⁵ "U.S. Relations with North Korea: Bilateral Relations Fact Sheet," *U.S. Department of State*.

Korea performed their sixth nuclear test. The United States' intentions with these talks was to begin denuclearization negotiations using diplomatic and economic pressure on Kim Jong Un.⁸⁶ United States President Donald Trump personally met with Kim Jong Un in June of 2018 at a summit in Singapore. The purpose of this summit, along with one other following in February 2019 and a brief meeting in North Korea in June 2019, was to get North Korea to halt its nuclear weapons program, begin disarmament, and institute general peace in the region.⁸⁷ Despite these talks, there is still evidence of North Korea continuing its program.

The People's Republic of China

The People's Republic of China (also known as China or the PRC) first developed nuclear weapons in 1964, with their nuclear tests beginning that year and continuing until 1996. Starting then, the nation began to decrease its nuclear weapons program following the protocols of the Comprehensive Nuclear Test Ban Treaty, which the nation signed in 1996.⁸⁸ The PRC joined the IAEA in 1984 and later signed the Treaty on the Non-Proliferation of Nuclear Weapons as a nuclear weapon state in 1992. In the status quo, China's nuclear weapons program lacks transparency, with their nuclear stockpile never having been confirmed. However, it is estimated that the PRC currently possess around 290 nuclear warheads.⁸⁹ China holds a unique

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ "China Overview," *Nuclear Threat Initiative*, May 2019.

⁸⁹ Alexandra Ma and Shayanne Gal, "These are the 9 Nuclear-Armed Countries and the 31 Allies They've Vowed to Defend," *Business Insider*, Sep 2019.

philosophy regarding its nuclear arsenal, being the first nuclear weapon state to adopt a “no first use” policy where they vow never to use their nuclear weapons unless in response to another nuclear attack.⁹⁰ Despite China’s willingness to work with foreign nations and entities with the NPT and several other treaties, the nation was exporting missile and nuclear related goods from the 1980s till around 2004, causing much controversy and enmity.⁹¹ They provided nuclear information and technology to several nations including Iran, Iraq, Syria, and North Korea.

China is often considered among North Korea’s closest allies. They have maintained close economic and diplomatic ties since the 1960s. China is their top trading partner and even maintains an embassy in North Korea.⁹² On several occasions, China has renounced North Korea’s nuclear program and attempted to instill change in the regime. It has also mediated talks between North Korea and several international organizations, urged the DPRK not to withdraw from the NPT, aggressively opposed all the nuclear missile tests, and participated in the Four Party Talks in order to establish a peace treaty between North Korea and the United States.⁹³ Although Sino-DPRK ties underwent some stress due to North Korea’s nuclear weapons program, the nations have reconciled and continued close diplomatic relations since 2018 after a meeting between Kim Jong Un and Xi Jinping in Beijing.

Russian Federation

⁹⁰ “China Overview,” *Nuclear Threat Initiative*, May 2019.

⁹¹ Ibid.

⁹² Eleanor Albert, “The China- North Korea Relationship,” *Council on Foreign Relations*, Jun 2019.

⁹³ Daniel Wertz, “China-North Korea Relations,” *The National Committee on North Korea*, Nov 2019.

The Russian Federation, with an estimated 6,490 nuclear weapons, contains the largest nuclear arsenal in the world, the hegemon in nuclear weapons. Containing the “nuclear triad,” Russia has the capacities to deploy nuclear weapons through the air-based missiles (strategic bombing), sea-based missiles (sea-launched ballistic missiles), air-based missiles (intercontinental ballistic missiles).⁹⁴ As a member of the IAEA and the NPT, Russia has vowed to and followed through with reducing its nuclear arsenal.⁹⁵

Russia has maintained close relations with North Korea since the Soviet Union’s initial military backing of the nation during the Korean War in the 1950s. North Korea and the Soviet Union had close economic ties due to their shared communist agendas.⁹⁶ Much of Russia’s economic support and subsidies for North Korea, however, declined after the fall of the Soviet Union in 1990. Since then, Russia and North Korea have continued their diplomatic relationship especially under the leadership of Vladimir Putin. Regarding the DPRK’s nuclear weapons program, Russia has been one of the few countries to oppose the aggressive sanctions placed by the UN on North Korea. However, the nation is widely concerned with North Korea’s programs as well as their intentions for these weapons; Vladimir Putin even openly condemned North Korea’s nuclear missile tests, calling them a “provocation” that could lead to “global catastrophe.”⁹⁷

⁹⁴ Alexandra Ma and Shayanne Gal, “These are the 9 Nuclear-Armed Countries and the 31 Allies They’ve Vowed to Defend,” *Business Insider*, Sep 2019.

⁹⁵ “Russia Overview,” *Nuclear Threat Initiative*, Oct 2018.

⁹⁶ Scott Snyder, “Where Does the Russia-North Korea Relationship Stand?” *Council on Foreign Relations*, Apr 2019.

⁹⁷ Anthea Batsakis, “North Korea Allies: Who Has Kim Jong-un’s Back?” *Herald Sun*, Sep 2017.

LOOKING AHEAD

Nuclear weapons are weapons of mass destruction with the power and capability to easily destroy several cities. The industry has grown tremendously in the past seventy years, with major advancements in the science and technologies that have spread throughout nations worldwide. The International Atomic Energy Agency has a duty to ensure that these technologies are not being misused for military purposes.

Most member states of the IAEA unanimously support gradual widespread denuclearization. Advancements on this matter have been made in several cases, with nations such as South Africa and Libya entirely halting their nuclear programs and eliminating their nuclear weapons and nations such as the Soviet Union largely reducing their stockpiles. It is of the utmost importance that the IAEA continue with this mission and ensure that each member state as well as non-member states are cooperating with the international community on its collective safety from nuclear weapons.

As delegates approach this situation, it is key to remember the IAEA's history with North Korea. They have been consistently unreliable and non-compliant with IAEA safeguards as well as international agreements and treaties. However, the IAEA looks positively on the lack of nuclear tests being run by North Korea within the past three years as well as negotiations that have been occurring between the DPRK and member states such as the United States and the

Russian Federation. As the rest of the nuclear community continues to decrease its nuclear programs and arsenals, the IAEA is looking to take measures to spread and promote its philosophies of nuclear science for peace throughout the Korean Peninsula.

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VIII