



Florida High Schools Model United Nations

FHSMUN 43

INTERNATIONAL ATOMIC ENERGY AGENCY

NUCLEAR SAFETY AND SECURITY

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Abstract

Some of the hesitation surrounding expanding nuclear energy programs to the developing world may stem from a variety of security concerns. Growing technology advancements have made it easier for countries to develop nuclear material more easily. Countries like Iran and the Democratic People's Republic of Korea have lobbied for the construction of nuclear reactors within their borders in order to supply more power to their citizens. However, given their antagonistic attitudes with much of the Western world, as well as underlying suspicions of aims to develop nuclear weapons programs, their requests often fall on deaf ears and are admonished if carried out without the acquiescence of the developed world. Shifts in political dynamics have increased tensions between Iran and the United States as a result of the The Joint Comprehensive Plan of Action (JCPOA) agreement, and disregard for restrictions imposed. Similarly, there is a fear that if nuclear reactors were given to developing countries lacking a sufficiently transparent (i.e., not corrupted by bribery) security mechanism, rogue agents may be able to obtain nuclear materials for use in nefarious activities, such as the creation of a dirty bomb or a small-scale nuclear weapon. Unless nuclear waste and nuclear byproducts from the developing world's reactors can be stored, monitored, and tracked in a secure fashion, the developed world will remain reluctant to provide nuclear power to everyone else for fear that the material will fall into the so-called "wrong" hands. Furthermore, limiting the International Atomic Energy Agency (IAEA) ability to accurately monitor growing nuclear powers will further fuel the possibility of nuclear power entering the "wrong" hands, and endanger the lives of many. In a world with increasing interconnectivity and growing technological advancements, what steps can be taken to protect such information and material?

Introduction

Emerging at the same time as the formation of the United Nations, nuclear capabilities and security became an immediate concern amongst nations due to its destructive and devastating consequences. Following the use of nuclear arms on the Japanese cities Hiroshima and Nagasaki in August 1945, the potential use of nuclear technology for weaponry posed a central concern for the international community. The topic of nuclear safety and security became more pressing as nuclear power use was expanded throughout the 1960s and 1970s, and as new nuclear powers such as India, Pakistan and South Africa emerged. A minor accident at a nuclear power station located on Three Mile Island in the United States helped catalyze these concerns, but the issue did not gain much widespread attention until 1986 when the catastrophic event, Chernobyl, took place in the USSR.¹ Renewed attention to nuclear safety and security became framed in a global

¹ "Backgrounder on the Three Mile Island Accident | Nrc.gov." Accessed December 5, 2021.

security context after the attacks of 11 September 2001. The March 2011 tsunami that heavily damaged the Fukushima Daiichi reactor in Japan brought further concerns about nuclear safety and security back to the forefront of the international agenda, along with another incident involving an explosion within a furnace at the Marcoule Nuclear Site in France later that year.²

With the creation of the International Atomic Energy Agency (IAEA) to advise over the dissemination of peaceful nuclear technology and guard against the development of nuclear weapons capabilities in the global community (a move that was received with wide-ranging support), the UN capitalized on the international momentum gained by IAEA to establish the Nuclear Non-Proliferation Treaty (NPT) in 1968.³ On 5 March 1970, after two years, the Nuclear Non-Proliferation Treaty (NPT) was ratified after the United Kingdom of Great Britain and Northern Ireland (UK), United States of America (USA), Union of Soviet Socialist Republics (USSR), and 40 other signatory states approved the treaty.

Initially ratified by only 43 member nations, the NPT, as of today, has been ratified by 189 states. In terms of UN member states, only Israel, India, and Pakistan have yet to ratify the treaty. Technically, the Democratic People's Republic of Korea (DPRK) is one of the 189 countries that have adopted the treaty, though they withdrew in 2003 and have yet to re-adopt.⁴ Two UN observers, the Holy See and the State of Palestine, have also become parties to the NPT.

The Chernobyl accident

The 26th of April, 1986, was just like any other day. For many in the western world, it was any other day — until it was released three days later that a nuclear power catastrophe the likes of which had never been seen before had occurred on that date outside of the sleepy Soviet town of Pripyat.⁵ The accident took place at the Chernobyl power station during a routine training exercise. Reactor 4 experienced a catastrophic meltdown as a result of faulty testing protocol, resulting in the release of “400 times more radioactivity than was released at Hiroshima.”⁶

The four power generating nuclear reactors at Chernobyl were RBMK-1000 reactors of an “unusual” Soviet design, first manufactured and developed in the 1950s.⁷ The reactors generated power using a basic pressurized model that was common for the time. However, due to the various economic and industrial limitations of the Soviet Union following the end of the Second World War, as well as their comparatively limited nuclear knowledge, the reactors' blueprints differed distinctly from other nuclear reactors than those existing in the western world. This is worth noting as it highlights the differences in Soviet Union technology versus the Western world, drawing back to the Cold War race for technology.

While they were designed originally to produce plutonium for use in weapons, the Soviet

<https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html>.

² “Nuclear Accident - Explosion at the Marcoule Site in France.” europarl.europa.eu. Accessed December 5, 2021.

https://www.europarl.europa.eu/doceo/document/E-7-2011-008422_EN.html.

³ “Treaty on the Non-Proliferation of Nuclear Weapons (NPT) – UNODA.” United Nations. United Nations. Accessed December 5, 2021. <https://www.un.org/disarmament/wmd/nuclear/npt/>.

⁴ <https://www.armscontrol.org/act/2005-05/features/npt-withdrawal-time-security-council-step>

⁵ Serge Schemann, “Soviet Announces Nuclear Accident at Electric Plant,” *The New York Times*, 29 April 1986, Page A1, <http://proquest.umi.com/>.

⁶ Richard Stone, “The Long Shadow of Chernobyl,” *National Geographic*, April 2006, <http://www.nationalgeographic.com/>.

⁷ “RBMK Reactors | reactor bolshoy moshchnosty kanalny | Positive void coefficient,” World Nuclear Association, <http://www.world-nuclear.org/info/inf31.html>.

reactors were later modified to be used to generate electricity due to a growing demand for electricity supplies (though some reactors still were used to manufacture weapons).⁸ The peculiarities did not end there: the reactor was designed with a highly positive void coefficient, meaning that reactivity would increase dramatically as temperature and power level also increased.⁹ Additionally, the substance used to control the nuclear reaction (graphite) differed from the coolant used for the reactor's internal mechanics (water); as a result,

“[because] the neutron absorbing properties of the cooling water are a significant factor in the operating characteristics, [...] the reduction in neutron absorption as a result of steam production, and the consequent presence of extra free neutrons, enhances the chain reaction. This leads to an increase in the reactivity of the system.”¹⁰

If, for whatever reason, the nuclear reaction was not controlled properly, the likelihood of it spiraling out of control was far greater in the RBMK-1000 model used at Chernobyl than in other reactors with smaller void coefficients.

As the situation dragged into the following day, workers at the Chernobyl power station on April 26th prepared to carry out a test on Reactor 4 to examine “how long turbines would spin and supply power to the main circulating pumps following a loss of main electrical power supply.”¹¹ In order to carry out the test (of which a similar one was conducted the year prior but terminated early due to instability), various automatic shutdown mechanisms had to be disabled, leading to a domino effect that would cause the reactor's meltdown. As the graphite control rods were lowered into the reactor core to slow its power-generating capability, a power surge took place, rapidly heating the reactor core and its fuel. The water serves as a coolant vaporized on contact with the superheated core, leading to increases in both pressure and the presence of water vapor, or steam. An emergency circuit meant to increase cooling in the event of such an emergency ruptured, causing more water to dump onto the core, thus creating more steam. With no outlet for the pressure buildup, part of the core was damaged in a resulting explosion, “releasing fission products to the atmosphere.”¹² Seconds later, an additional explosion took place, the cause of which is indeterminate even today. This explosion blasted “[fuel], moderator, and structural materials [...]”, starting a number of fires, [as] the destroyed core was exposed to the atmosphere.”¹³

The ejection of such highly nuclear material from the reactor core contaminated wide swaths of land stretching from in and around the immediate vicinity to places as far away as Sweden and Norway.¹⁴ The Soviet government did not announce the disaster immediately. Suspicions of an accident having taken place were raised after Swedish government officials and nuclear technicians noted upticks in the amount of radiation present in their air around the Forsmark Nuclear Power Station,¹⁵ some 800 miles away from Pripyat, where Chernobyl was

⁸ Ibid.

⁹ "NRC: Glossary -- Void coefficient of reactivity," Nuclear Regulatory Commission (United States), <http://www.nrc.gov/reading-rm/basic-ref/glossary/void-coefficient-of-reactivity.html>.

¹⁰ Ibid.

¹¹ "Chernobyl | Chernobyl Accident | Chernobyl Disaster," World Nuclear Association, <http://www.world-nuclear.org/info/chernobyl/inf07.html>.

¹² Ibid.

¹³ "Chernobyl Appendix 1: Sequence of Events," World Nuclear Association, <http://www.world-nuclear.org/info/chernobyl/inf07app.htm>.

¹⁴ "Chernobyl | Chernobyl Accident | Chernobyl Disaster," World Nuclear Association.

¹⁵ Serge Schemann, "Soviet Announces Nuclear Accident at Electric Plant."

located.¹⁶ Weather patterns were further examined in order to discover how winds carrying radioactive material came from. This was done after determining that Forsmark was not the source of radiation. When meteorological data unveiled the Soviets as the culprits, the Politburo was forced to release a statement giving a cursory acknowledgement of what had happened.

Firefighters who were first dispatched to Reactor 4 to extinguish its fires were unaware of the highly radioactive material with which they were dealing. Elements from the core gave lethal doses of radiation, with some first responders being exposed to 20 sieverts of radiation,¹⁷ enough to cause acute radiation poisoning leading to an almost certain death.¹⁸ This figure is all the more startling when contrasted with the maximum level of exposure to radiation allowed on a *yearly* basis for workers at nuclear power stations in the United States: 0.05 sieverts¹⁹—a level 400 times less than what first responders received at Chernobyl.

Containment measures began to take shape after the fires were extinguished. Helicopters dumped loads of clay, dolomite, and lead over the gaping hole in Reactor 4 to attempt to bury the nuclear waste, but this led to, in some instances, a further release of nuclear material²⁰. Eventually, liquid nitrogen was pumped into the reactor core to serve the dual functions of cooling the still-hot nuclear material as well as to choke any oxygen present out of the area to mitigate the possibility of further fires starting. A large concrete structure (darkly nicknamed the “sarcophagus”) was constructed over Reactor 4 as soon as conditions on the ground were safe enough to do so in an attempt to limit any other nuclear material from escaping;²¹ however, due to slipshod construction efforts, the sarcophagus began to deteriorate rapidly, forcing the need to build what is being dubbed the New Safe Confinement structure, a massive arched building that will go above the remnants of the reactor’s structure and enclose it completely, to be completed by 2012 at a cost of roughly \$1.4 billion.²²

Initially, those residents living within a 30 kilometer radius of the power station were evacuated and forced to relocate, leaving virtually all of their personal belongings behind in Pripyat; later on, the so-called “zone of exclusion” was expanded to include all territory within 4,300 square kilometers of Chernobyl.²³ Thirty people died as a direct result of the meltdown as a result of acute radiation poisoning, the explosion itself, or in the efforts to extinguish the fires in the reactor.²⁴ Over 25 years later, Pripyat remains almost completely deserted, as fears about elevated radiation levels deter all but a hundred determined souls, and curious tourists, from spending any significant time in the immediate surroundings of Chernobyl.²⁵

Après le deluge: The Fukushima Daiichi Reactor

¹⁶ Distance is approximate and was calculated using Google Earth (can be downloaded at <http://earth.google.com>).

¹⁷ “Chernobyl | Chernobyl Accident | Chernobyl Disaster,” World Nuclear Association.

¹⁸ “Health Effects | Radiation Protection | US EPA,” Environmental Protection Agency (United States), http://www.epa.gov/rpdweb00/understand/health_effects.html.

¹⁹ “10 CFR 20.1201 Occupational dose limits for adults,” Nuclear Regulatory Commission (United States), <http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/part020-1201.html>.

²⁰ <https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/chernobyl-bg.html>

²¹ “Chernobyl Appendix 1: Sequence of Events,” World Nuclear Association.

²² “Chernobyl to be covered in steel,” BBC News, <http://news.bbc.co.uk/2/hi/europe/6999140.stm>

²³ “Chernobyl | Chernobyl Accident | Chernobyl Disaster,” World Nuclear Association.

²⁴ Richard Stone, “The Long Shadow of Chernobyl,” *National Geographic*, April 2006.

²⁵ Andrew W. Lehren, “Walking the streets of a nuclear ghost town” *New York Times* May 25, 2012.

Japan's relationship with nuclear technologies has long been fraught with contradictions and danger for over six decades. Ranging from the detonation of the first nuclear weapons in conflict over the cities of Hiroshima and Nagasaki in August 1945 to Japan's fervent embrace of nuclear power, in the absence of major coal and oil resources, to the devastating March 2011 tsunami and damage at the Fukushima Daiichi reactor. When the cooling systems for the Fukushima Daiichi reactors were disabled and/or destroyed by the tsunami and the subsequent flooding, it "became clear . . . that Japan lacked some of the basic hardware to respond to a nuclear crisis and, after initial resistance, had to look abroad for help."²⁶ Estimates of deaths and future cases of cancer caused by or directly attributable to the Fukushima nuclear disaster have become highly contentious in Japan, Europe, and the United States. Researchers from Stanford University concluded in June 2012 that the disaster might cause between 15-1,300 deaths and between 24-2,500 cases of cancer, in addition to the approximately 600 people, many of whom were elderly and/or chronically ill, who died during the evacuation of a 20 square kilometer radius around Fukushima.²⁷

In the aftermath of the Fukushima Daiichi nuclear crisis, Japan ordered all domestic nuclear reactors shut down for over one year so that more thorough inspections could be conducted by the IAEA. Japanese legislators also created the Nuclear Regulation Agency and have passed guidelines that may lead to a gradual phasing out of nuclear power in Japan over the next forty years.²⁸ The Nuclear Regulation Agency has demonstrated that the legislation creating it has given it considerable autonomy by issuing "seismic warnings" to nuclear power plants that may lead to their permanent shutdown. As recent elections have shown, however, the fate of the nuclear power industry in Japan may ultimately be more dependent on the political fortunes of the recently victorious Liberal Democratic Party (LDP) and other political actors that generally tend to be friendlier with the nuclear power industry.²⁹

The man who knew too much?

While the UN System and the larger international community overwhelmingly emphasize the responsibilities of state actors, it is increasingly clear that comprehensively addressing phenomena such as nuclear non-proliferation requires much greater acknowledgement of the effect of non-state actors. The poster child for nuclear proliferators is indubitably Pakistani nuclear scientist, Abdul Qadeer "AQ" Khan. Khan's vital role in developing Pakistan's nuclear arsenal has made him a widely revered figure in Pakistan, the veritable father of the "Islamic bomb." In 2004, however, Khan admitted to spearheading an international nuclear material smuggling ring that sold vital technologies to governments such as Iran and Libya; Khan's technologies and knowledge have also been repeatedly linked to the nuclear weapons programs of the Democratic People's Republic of Korea (DPRK).³⁰

For his involvement in this smuggling ring, Khan was placed under house arrest in 2004 with some restrictions being eased in 2009. Many international observers argued, however, that Khan's house arrest only negligibly impacted his ability to continue nuclear proliferation.³¹ By

²⁶ Norimitsu Onishi, "'Safety Myth' Left Japan Ripe for Nuclear Crisis" *New York Times* June 24, 2011.

²⁷ *Science Daily*, "Global Health Impacts of the Fukushima Nuclear Disaster" July 17, 2012.

²⁸ *BBC News*, "Nuclear power: Japan cools on phase-out deadline" September 19, 2012.

²⁹ *Economist*, "Are nukes back?" December 19, 2012.

³⁰ Laufer, Michael. "A. Q. Khan Nuclear Chronology." Carnegie Endowment for International Peace. Accessed December 5, 2021. <https://carnegieendowment.org/2005/09/07/a.-q.-khan-nuclear-chronology-pub-17420>.

³¹ Joby Warrick, "Nuclear Scientist AQ Khan is Freed from House Arrest," *Washington Post*, 7 February 2009.

early 2010, Khan was facing additional questions from the Pakistani government for allegedly smuggling nuclear technologies and knowledge to Iran and Iraq.³² Khan's ultimate significance for the international community consists only partly of the actual technologies and knowledge that he and others smuggled to countries interested in obtaining nuclear weapons. His greater significance may in fact be the unfortunate example that he may well provide to other scientists and state sponsors seeking to engage in nuclear proliferation for profit and/or altering regional and global balances of power or terror. Actors such as Khan play a leading role in non-nuclear weapon states gaining nuclear knowledge and potentially building their arsenal. Delegates of the General Assembly Fourth Committee must consider the potential ramifications and consider solutions that deal with rogue actors such as Khan.

The role of the Nuclear Non-Proliferation Treaty (NPT)

The quest for universal adoption of and adherence to the NPT has stalled as a result of the mistrust exhibited by the three, now four, states that have withdrawn or not acceded to the treaty. India and Pakistan have persistently refused to join the NPT, until one or the other joins first, due to their tense rivalry that has contributed to festering a situation of mutual distrust and hostility over this issue.³³ Israel refuses to adopt the NPT because its government does not view the NPT as an effective mechanism to prevent countries, even state parties to the NPT, from violating its provisions, particularly referring to its concerns over Iran's nuclear enrichment activities and Libya's attempts to obtain critical nuclear technologies and knowledge³⁴. Israel maintains a policy of neither conceding nor denying that it has nuclear weapons, although most states and non-state actors in the Middle East and around the world are convinced that Israel has an extensive and growing stockpile of nuclear weapons. Many of Israel's members have called for at least twenty years for Israel to accede to the NPT, with these resolutions being defeated by relatively small margins at the IAEA.³⁵ The most recent, and fourth state to have withdrawn or not accede to the treaty, is North Korea. In 2003, North Korea reactivated their notice of withdrawal filed in 1993 after citing concerns of the United States displaying hostile behavior towards the nation.³⁶

While the 2010 Non-Proliferation Treaty Review Conference conducted a thorough review of and offered many suggestions toward the NPT, several concerns arise when considering the effectiveness and validity of the NPT in the 21st century³⁷. While substantial nuclear weapon free zones have been successfully created throughout the world, complete disarmament might not be the most prudent option. To again quote Christopher Ford from a 2007 speech discussing disarmament,

"This is a formidable challenge, for logic suggests that as the number of nuclear weapons decreases, the 'marginal utility' of a nuclear weapon as an instrument of military power increases. At the extreme, which it is precisely disarmament's hope to create, the strategic utility of even one or two nuclear weapons would be huge ... One needs little reminder that a country that possesses the only

³² "Pakistan seeks court backing to probe scientist AQ Khan," BBC News, 22 March 2010.

³³ "India and Pakistan." Home page -, May 4, 2021. <https://cnduk.org/resources/india-and-pakistan/>.

³⁴ "Arms Control Today." Israel, India, and Pakistan: Engaging the Non-NPT States in the Nonproliferation Regime | Arms Control Association. Accessed December 5, 2021. <https://www.armscontrol.org/act/2003-12/features/israel-india-pakistan-engaging-non-npt-states-nonproliferation-regime>.

³⁵ Alfred Nurja and Peter Crail, "IAEA Vote to Press Israel Falls Short," *Arms Control Today*, October 2010.

³⁶ <https://www.asil.org/insights/volume/8/issue/2/north-koreas-withdrawal-nuclear-nonproliferation-treaty>

³⁷ Choubey, Deepti. "Understanding the 2010 NPT Review Conference." Carnegie Endowment for International Peace, June 3, 2010. <https://carnegieendowment.org/2010/06/03/understanding-2010-npt-review-conference-pub-40910>.

nuclear weapons in the world sits in a position of extraordinary power.

This is a sobering fact with which advocates of disarmament must wrestle, because it means that the very achievement of total nuclear disarmament could greatly increase the incentives for nuclear proliferation. It is therefore vital for any zero-option regime to be able to provide rock-solid assurances that it will be able to deter — and, if necessary, respond to — attempts to achieve 'breakout' from a disarmament regime by suddenly beginning to produce nuclear weapons and thereby seize strategic advantage."³⁸

Finally, it is uncertain how nuclear weapon states (NWS) should provide appropriate security assurances to non-nuclear weapon states, as referenced in the Final Document of the 2010 Review Conference.³⁹ But perhaps the primary crisis facing the NPT today is the engagement of several Treaty signatories in clandestine nuclear weapon projects as well as the International Community's failure to effectively halt this activity. Coupled with the fact that, contrary to the intent of the second pillar of the treaty, nuclear powers have failed to display their commitment to true and permanent disarmament policies, the treaty seems to suffer from a "crisis of confidence."⁴⁰

As a result of these crises, the 2010 Review Conference made public several vital concerns that must be addressed in order to ensure the further existence of this treaty.⁴¹ While it could be argued that the reason why so many states have ratified this treaty is because it provides them with a security assurance (that is to say that their neighboring states cannot just develop weaponized nuclear technology, destabilize the region, and threaten their interests), it is also abundantly clear that the global community cannot prevent non-NPT member states from doing just that. And therein lies a potential flaw within the framework/execution of the NPT's regulations: without the powerful deterrent of 'security assurance,' the treaty could become obsolete and face certain demise. At the same time, this provision means little in certain regions of the world where the NPT has either not been signed or is subject to constant rebuke.

The Nuclear Deal

The Joint Comprehensive Plan of Action (JCPOA), otherwise known as the Iran Nuclear Deal, is a landmark accord that was reached between Iran and a number of global superpowers in 2015.⁴² Members of the nuclear deal include Germany and the five permanent members of the UN Security Council: China, France, Russia, the United Kingdom, and the United States. The European Union also later joined the deal. Despite Iran signing onto the Nuclear Non-Proliferation Treaty of 1970, the Iranian government secretly pursued developing nuclear technology after the overthrow of the Pahlavi dynasty in 1979⁴³ — which caused the P5+1 to push for an accord restricting Iran from further development of nuclear capabilities.

Under the accord, Iran agreed to dismantle their nuclear program and open nuclear facilities to international oversight in exchange for billions of dollars' worth in sanction relief. The objective

³⁸ Christopher Ford, Remarks to Conference on Disarmament and Nonproliferation Issues, Nagasaki, Japan, 31 Aug 2007, <http://merln.ndu.edu/archivepdf/wmd/State/92733.pdf>.

³⁹ Choubey, Deepti. "Understanding the 2010 NPT Review Conference." Carnegie Endowment for International Peace, June 3, 2010. <https://carnegieendowment.org/2010/06/03/understanding-2010-npt-review-conference-pub-40910>.

⁴⁰ Special Comment: Preserving Non-Proliferation Treaty <http://www.unidir.org/pdf/articles/pdf-art2185.pdf>.

⁴¹ "2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons."

Nonproliferation, 2010. https://www.nonproliferation.org/wp-content/uploads/2015/04/2010_fd_part_i.pdf.

⁴² <https://www.armscontrol.org/factsheets/JCPOA-at-a-glance>

of this accord was to slow the growth of Iran's nuclear weapons program. Furthermore, the group developed the deal so that if Iran under Tehran's rule decided to pursue a nuclear weapon, it would take at least one year for Iran to develop the nuclear weapon – allocating enough time for global powers to respond. The point of the accord was to restrict Iran's nuclear capabilities, not necessarily stop them entirely through limiting the numbers and types of centrifuges that Iran can operate, and the size of the enriched uranium stockpile. Additionally, Iran would be subjected to the implementation of a protocol that would allow inspectors from the IAEA, “unfettered access” to its nuclear facilities.

However, the deal between Iran, the United States, and the other global superpowers did not last very long. Under the Trump Administration, the United States withdrew from the deal in 2018 and reinstated devastating banking and oil sanctions as a result.⁴⁴ The United States withdrew from the agreement citing that “the agreement failed to address Iran's ballistic missile program and its proxy warfare in the region.... sunset provisions would enable Iran to pursue nuclear weapons in the future.”⁴⁵ Essentially meaning, Iran did not meet the requirements as outlined in the agreement. The sunset provisions furthermore were not reached, as it is a specific clause in legislation that provides an automatic repeal of all or part of a law once met. In an effort to keep the agreement alive, France, Germany, and the United Kingdom developed a barter system – INSTEX, in order to facilitate transactions with Iran outside of the United States banking system. However, the goods and services facilitated under INSTEX were already exempt from United States sanctions.

Despite the United States withdrawal, several countries, including the United States' allies continued to import Iranian oil. This was halted a year later after the Trump administration withdrew waivers to other states in order to halt Iran's oil exports. The withdrawal of waivers meant that the United States would no longer grant sanction waivers to states to purchase Iranian oil. This targeted move was meant to cut off a significant source of revenue to the Iranian government. However, this did not entirely stop US allies from importing Iranian oil, in fact, led to a resistance that contributed to an increase of oil prices.⁴⁶

As a result of the United States withdrawing from the agreement, Iran started to breach the agreement and go beyond the agreed upon limits to its stockpile of low-enriched uranium. Iran began to develop new centrifuges to accelerate uranium enrichment, resume heavy water production in the Arak facility, and enrich uranium at Fordow.⁴⁷ Furthermore, Iran announced in 2020 that they would no longer follow the limits placed on its uranium enrichment, following the United States targeting and killing a top Iranian general, Qasem Soleimani.⁴⁸ Iran further removed IAEA's ability to inspect Iranian nuclear facilities.

Prior to the enactment of the JCPOA, Iran's economy suffered for years due to numerous sanctions imposed on the nation that contributed to a growing recession, currency depreciation, and inflation. Under the JCPOA, Iran quickly bounced back and as sanctions lifted – inflation slowed, exchange rates became stabilized and exports of oil quickly rose. As a result of the

⁴⁴ <https://sgp.fas.org/crs/nuke/R44942.pdf>

⁴⁵ “What Is the Iran Nuclear Deal?” Council on Foreign Relations. Council on Foreign Relations. Accessed November 7, 2021. <https://www.cfr.org/background/what-iran-nuclear-deal>.

⁴⁶ <https://www.atlanticcouncil.org/blogs/new-atlanticist/trump-ends-sanctions-waivers-for-countries-importing-iranian-oil/>

⁴⁷ Hafezi, Parisa, and Arshad Mohammed. “Iran to Develop Centrifuges for Faster Uranium Enrichment.” Reuters. Thomson Reuters, September 4, 2019. <https://www.reuters.com/article/us-iran-nuclear-centrifuges/iran-to-develop-centrifuges-for-faster-uranium-enrichment-idUSKCN1VP2OP>.

⁴⁸ Wamsley, Laurel, and Emily Kwong. “Iran Abandons Nuclear Deal Limitations in Wake of Soleimani Killing.” NPR. NPR, January 5, 2020. <https://www.npr.org/2020/01/05/793814276/iran-abandons-nuclear-deal-limitations-in-wake-of-soleimani-killing>.

JCPOA, Iran began to export more than 2.1 million barrels of oil each day.⁴⁹

With the withdrawal of the United States, the weight of American sanctions bore down heavily on Iran. This quickly resulted in oil exports plummeting to “below three hundred thousand barrels per day.”⁵⁰ With sanctions enacted again, the black market and smuggling rings have flourished, with the Islamic Revolutionary Guard Corps (IRGC) leading the way. This could prove burdensome as actual revenue made from the sale of Iranian crude oil, may never return back into the Iranian economy.⁵¹

⁴⁹ “U.S. Energy Information Administration - EIA - Independent Statistics and Analysis.” Iran's crude oil production fell to an almost 40-year low in 2020 - Today in Energy - U.S. Energy Information Administration (EIA). Accessed December 5, 2021. <https://www.eia.gov/todayinenergy/detail.php?id=49116>.

⁵⁰ “What Is the Iran Nuclear Deal?” Council on Foreign Relations. Council on Foreign Relations. Accessed November 7, 2021. <https://www.cfr.org/backgrounder/what-iran-nuclear-deal>.

⁵¹ Batmanghelidj, Esfandyar. “Tougher U.S. Sanctions Will Enrich Iran's Revolutionary Guards.” Foreign Policy, October 4, 2018. <https://foreignpolicy.com/2018/10/04/irans-revolutionary-guard-corps-wont-suffer-from-stronger-u-s-sanctions-theyll-benefit-irgc-trump-sanctions/>.

Challenges in Nuclear Verification

As technology advances and becomes continuously more accessible, nuclear proliferation is easier than ever before. Countries have made significant progress in technological and communication development since the IAEA's founding in 1957 – making nuclear capability-centered technology not an 'out of reach' thought, as it once was for some nations, such as North Korea. The key challenges faced by the IAEA today include the growing number of nuclear material and facilities under IAEA safeguards, and the mounting pressure placed on a restrictive budget, which has recently been cut.⁵²

Pressure on the regular budget is a serious problem for the organization. Inspections must be financed under the regular budget, to ensure safeguards implementation is neutral and unbiased. Any form of voluntary contribution to inspections from Member States cannot be utilized due to the high probability of bias. Therefore, growing cuts in the future will result in a reduction in the number of IAEA inspectors, thereby potentially damaging nuclear verification activities. Last year, the safeguard was estimated to be around 142 million euros and has only increased by only 6.3 percent since 2010.⁵³ During this period, the number of nuclear facilities rose by over 12 percent – to just over 1,300, while the number of nuclear materials under safeguards rose by over 24 percent.⁵⁴ The number of nuclear material accounting reports also has gone up by more than a third since 2010 to over 880,000.⁵⁵

IAEA Nuclear Safety Conferences

For years, the IAEA has hosted a series of conferences designed to enhance nuclear safety and security - including the first International Regulators Conference on Nuclear Safety in Washington from December 4-6, 2012 and the Fukushima Ministerial Conference from December 15-17, 2012. The Washington conference on Nuclear Safety was convened as a direct result of the 2012 Nuclear Security Summit in Seoul, Republic of Korea in late March 2012.⁵⁶ Most recently, the IAEA hosted the International Conference on A Decade of Progress After Fukushima -Daiichi: Building on Lessons Learned to Further Strengthen Nuclear Safety from November 9-12, 2021. During this conference, experts from nuclear organizations around the world discussed lessons learned from the nuclear accident, and addressed issues of regulatory oversight, accident management, human and organizational factors, and more.⁵⁷ The conference also included a youth side event, aimed at including young professionals to discuss their views about safety of nuclear power.

⁵² "Challenges in Nuclear Verification." IAEA. IAEA, April 5, 2019.

<https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>.

⁵³ "Challenges in Nuclear Verification." IAEA. IAEA, April 5, 2019.

<https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>.

⁵⁴ "Challenges in Nuclear Verification." IAEA. IAEA, April 5, 2019.

<https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>.

⁵⁵ "Challenges in Nuclear Verification." IAEA. IAEA, April 5, 2019.

<https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>.

⁵⁶ Delegates may access the official *communiqué* as well as other critical documents from the Seoul Nuclear Security Summit at:

http://www.thenuclearsecuritysummit.org/eng_media/speeches/speeches_list.jsp

⁵⁷ Delegates may access the official *communiqué* as well as other critical documents from the Seoul Nuclear Security Summit at: http://www.thenuclearsecuritysummit.org/eng_media/speeches/speeches_list.jsp

As these international conferences attract more participating states, the commitments announced at these conferences and summits acquire greater international notoriety.⁵⁸ Designating newer, tougher standards for nuclear safety and security and then ensuring international compliance with these standards are essential elements of these conferences and summits.

IAEA Assistance to and Services for its Member States

States join international organizations, particularly organizations with regulatory agencies, because governments perceive these organizations to provide significant benefits in exchange for voluntarily ceding elements of their policy autonomy. The IAEA assists member states through its extensive emergency preparedness, engineering, safety, seismic, and site reviews as well as through development and dissemination of safety and design guidelines for improved nuclear safety infrastructure.⁵⁹ The IAEA continues to monitor safety developments and radiation levels at the Fukushima Daiichi reactor and releases regular updates through its website.⁶⁰ Delegates may wish to consider how these IAEA nuclear safety assistance programs and services may be strengthened, particularly in the aftermath of the Fukushima Daiichi nuclear disaster and the recent news from several European countries that nuclear safety procedures and regulations need to be strengthened.⁶¹

⁵⁸ The respective participating states' commitments may be found at: [http://www.thenuclearsecuritysummit.org/userfiles/Highlights%20of%20the%20Seoul%20Nuclear%20Security%20Summit\(120403\).pdf](http://www.thenuclearsecuritysummit.org/userfiles/Highlights%20of%20the%20Seoul%20Nuclear%20Security%20Summit(120403).pdf)

⁵⁹ IAEA, "Establishing the Safety Infrastructure" 2012. Found at: <http://www-ns.iaea.org/tech-areas/safety-infrastructure/default.asp?s=117&l=118>

⁶⁰ Delegates may access the December 28, 2012 Fukushima Daiichi Status Report at: <http://www.iaea.org/newscenter/focus/fukushima/statusreport281212.pdf>

⁶¹ Harvey Morris, "Question Marks on Europe's Nuclear Safety" *International Herald Tribune* October 2, 2012

Guiding Questions

Has your country adopted nuclear power on a wide- or small-scale? Have any accidents occurred? Has your country been discouraged or prohibited from using nuclear power for peaceful purposes? Has your country conducted recent nuclear safety reviews?

What steps does your country take to secure nuclear materials, such as waste or fuel, used for civilian purposes? What commitments have your country pledged and/or undertaken in recent years, including at the Seoul Nuclear Security Summit in March 2012?

What are some concrete steps that can be taken to prevent the export of nuclear materials and technology to non-nuclear states?

How can the IAEA and its inspectors be empowered and better equipped to conduct conclusive inspections into the nuclear programs of suspected states? How do issues of state sovereignty factor in to considerations of the nuclear weapons inspectors? How should the international NPT community respond to sovereignty violation claims?

What would be the appropriate ways to respond to criminal smuggling to nuclear materials by non-state actors such as AQ Khan?

What are additional steps that your country can take to assist the IAEA?

Additional Resources:

IAEA “Nuclear Safety Review for the Year 2012” July 2012. The full report is available at: http://www.iaea.org/About/Policy/GC/GC56/GC56InfDocuments/English/gc56inf-2_en.pdf

IAEA “Challenges in Nuclear Verification.” April 2019. Statement is available at: <https://www.iaea.org/newscenter/statements/challenges-in-nuclear-verification>

UNODA “Treaty on the Non-Proliferation of Nuclear Weapons (NPT) – UNODA.” Statement is available at: <https://www.un.org/disarmament/wmd/nuclear/npt/>

UN Resolution 66/33 (2011). Resolution is available at: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N11/460/80/PDF/N1146080.pdf?OpenElement>

UN Resolution 61/70 (2006). Resolution is available at: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N06/498/63/PDF/N0649863.pdf?OpenElement>

UN Resolution 56/24 (2001). Resolution is available at: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N01/477/49/PDF/N0147749.pdf?OpenElement>